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(54) **Title:** THERAPEUTIC COMPOUNDS AND THEIR USE IN CANCER

(57) **Abstract:** The invention relates to compounds of Formulae I-III and their therapeutic uses.

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THERAPEUTIC COMPOUNDS AND THEIR USE IN CANCER

THERAPEUTIC COMPOUNDS AND THEIR USE IN CANCER

CROSS-REFERENCE TO RELATED APPLICATIONS

This application claims the benefit of U.S. Provisional application no. 60/799,874 filed May 12, 2006; U.S. Provisional application no. 60/822,159 filed August 11, 2006; U.S. Provisional application no. 60/865,140 filed November 9, 2006; and U.S. Provisional application no. 60/883,707 filed January 5, 2007, each of which is incorporated by reference in its entirety.

STATEMENT REGARDING FEDERALLY SPONSORED RESEARCH OR DEVELOPMENT

N/A

FIELD OF THE INVENTION

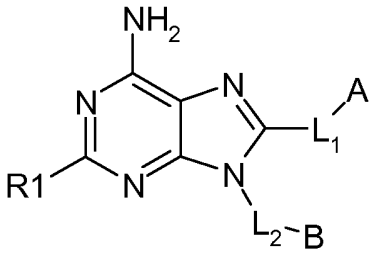
[0001] The invention relates to novel compounds and their use to treat diseases.

BACKGROUND OF THE INVENTION

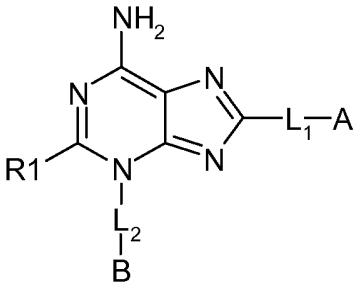
[0002] Cancer is prevalent: In the United States, the probability of developing invasive cancer is 38% for females and 46% for males that live to be 70 years older and older. There will be about 1.4 million new cases of cancer in 2006. Although the five year survival rate for cancer is now 65%, up from about 50% in the mid-nineteen seventies, cancer is deadly. It is estimated that 565,000 people in the United States will die from cancer in 2006. (American Cancer Society, Surveillance Research, 2006). Although numerous treatments are available for various cancers, the fact remains that many cancers remain uncurable, untreatable, and/or become resistant to standard therapies. Thus, there is a need for new cancer treatments.

BRIEF SUMMARY OF THE INVENTION

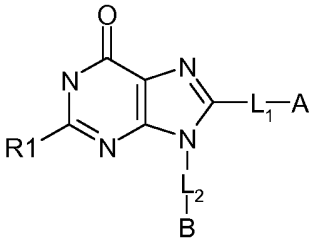
[0003] The invention relates to compounds of Formulae I-III below. The invention also relates to pharmaceutical compositions having one or more compounds of Formulae I-III and a pharmaceutically acceptable excipient. The compounds of Formulae I-III were discovered by the inventors to have pharmacological activity. One particular activity the compounds of Formulae I-III were found to have is anticancer activity.



FORMULA I



FORMULA II



FORMULA III

[0004] The invention provides compounds of Formula I wherein:

[0005] A is chosen from a substituted or unsubstituted aryl, heteroaryl, heterocyclic, or carbocyclic group;

[0006] B is chosen from a substituted or unsubstituted aryl, heteroaryl, heterocyclic, or carbocyclic group;

[0007] R1 is chosen from hydro, alkyl, aryl, heteroaryl, amino, halo, sulfur, and thioalkyl.

[0008] L_1 can be saturated, partially saturated, or unsaturated, and is chosen from $-(CH_2)_n-(CH_2)_n-$, $-(CH_2)_nC(=O)(CH_2)_n-$, $-(CH_2)_nC(=O)N(CH_2)_n-$, $-(CH_2)_nNC(=O)O(CH_2)_n-$, $-(CH_2)_nNC(=O)N(CH_2)_n-$, $-(CH_2)_nNC(=S)S(CH_2)_n-$, -

$(CH_2)_nOC(=O)S(CH_2)_n$-, -$(CH_2)_nNH(CH_2)_n$-, -$(CH_2)_nO(CH_2)_n$-, -$(CH_2)_nS(CH_2)_n$-, and -$(CH_2)_nNC(=S)N(CH_2)_n$-, where each n is independently chosen from 0, 1, 2, 3, 4, 5, 6, 7, and 8, and wherein each carbon and/or nitrogen can be optionally substituted with one or more substituents independently chosen from hydroxyl, halo, alkoxy, alkyl, amino, cycloalkyl, -NR_2R_3, -NSO_2R_4, -$NC(=O)NR_2R_3$, heteroaryl, aryl, cycloalkyl, and heterocyclic; wherein -R_2 and -R_3 are independently chosen from –H, alkyl, and -$C(=O)OR_4$; and wherein R_4 is an alkyl group (*e.g.*, methyl, ethyl, propyl, isopropyl, butyl, isobutyl, or *tert*-butyl).

[0009] L_2 can be saturated, partially saturated, or unsaturated, and is chosen from -$(CH_2)_n$-$(CH_2)_n$-, -$(CH_2)_nC(=O)(CH_2)_n$-, -$(CH_2)_nC(=O)N(CH_2)_n$-, -$(CH_2)_nNC(=O)O(CH_2)_n$-, -$(CH_2)_nNC(=O)N(CH_2)_n$-, -$(CH_2)_nNC(=S)S(CH_2)_n$-, -$(CH_2)_nOC(=O)S(CH_2)_n$-, -$(CH_2)_nNH(CH_2)_n$-, -$(CH_2)_nO(CH_2)_n$-, -$(CH_2)_nS(CH_2)_n$-, and -$(CH_2)_nNC(=S)N(CH_2)_n$-, where each n is independently chosen from 0, 1, 2, 3, 4, 5, 6, 7, and 8, and wherein each carbon and/or nitrogen can be optionally substituted with one or more substituents independently chosen from hydroxyl, halo, alkoxy, alkyl, amino, cycloalkyl, -NR_2R_3, -NSO_2R_4, -$NC(=O)NR_2R_3$, heteroaryl, aryl, cycloalkyl, and heterocyclic; wherein -R_2 and -R_3 are independently chosen from –H, alkyl, and -$C(=O)OR_4$; and wherein R_4 is an alkyl group (*e.g.*, methyl, ethyl, propyl, isopropyl, butyl, isobutyl, or *tert*-butyl).

[0010] L_1 and L_2 can be in either orientation, e.g., -$(CH_2)_nNC(=S)S(CH_2)_n$-, refers to purine-$(CH_2)_nNC(=S)S(CH_2)_n$-phenyl and purine–$(CH_2)_nSC(=S)N(CH_2)_n$-phenyl orientations unless otherwise specified.

[0011] According to one aspect, A is an aryl group having one or more substituents chosen from halo, alkyl, alkoxy, haloalkyl, haloalkoxy, nitro, -C(=O)alkyl, hydroxyl, -C≡N, -SO_3, and –COOH. In a more specific aspect of the invention, A is a phenyl group having one or more substituents chosen from halo, alkyl, alkoxy, haloalkyl, haloalkoxy, nitro, -C(=O)alkyl, hydroxyl, and –COOH. In an even more specific aspect, A is a phenyl group having one or more substituents chosen from –F, -Cl, -Br, -I, -OCH_3, -CF_3, -CH_3, -OCF_3, -$C(=O)CH_3$, -COOH, -C≡N, and -NO_2.

[0012] In one aspect of the compounds of the invention, A is an aryl group with one or more substituents chosen from hydroxyl, halo, alkyl, alkoxy, haloalkyl, haloalkoxy, -$N(C_{1-3}$ alkyl$)_2$, -$NH(C_{1-3}$ alkyl), -$C(=O)NH_2$, -$C(=O)NH(C_{1-3}$ alkyl), -$C(=O)N(C_{1-3}$ alkyl$)_2$, -

$S(=O)_2(C_{1-3}alkyl)$, $-S(=O)_2NH_2$, $-S(=O)_2N(C_{1-3}\ alkyl)_2$, $-S(=O)_2NH(C_{1-3}\ alkyl)$, $-CHF_2$, $-OCF_3$, $-OCHF_2$, $-SCF_3$, $-CF_3$, -CN, $-NH_2$, and $-NO_2$. In one specific aspect, A is a phenyl group.

[0013] In one aspect of the compounds of the invention, A is a phenyl group having from 1-5 substituents independently chosen from acylamino, acyloxy, alkenyl, alkoxy, alkyl, alkylthio, alkynyl, amino, aryl, arylalkyl, arylalkenyl, arylalkynyl, arylalkoxy, aryloxy, arylthio, carbocycle, cyano, cyanato, halo, haloalkyl, halophenyl, hydroxyl, heteroaryl, heteroaryloxy, heterocycle, heteroarylalkoxy, isocyanato, isothiocyanato, nitro, sulfinyl, sulfonyl, sulfonamide, thiocarbonyl, thiocyanato, trihalomethanesulfonamido, O-carbamyl, N-carbamyl, O-thiocarbamyl, N-thiocarbamyl, and C-amido.

[0014] According to one aspect of the compounds of the invention, B is an aryl group having one or more substituents chosen from halo, alkyl, alkoxy, haloalkyl, haloalkoxy, nitro, -C(=O)alkyl, hydroxyl, $-SO_3$, and –COOH. In one specific aspect, B is a phenyl group. In a more specific aspect, B is a phenyl group having one or more substituents chosen from halo, alkyl, alkoxy, haloalkyl, haloalkoxy, nitro, -C(=O)alkyl, hydroxyl, and –COOH. In an even more specific aspect, B is a phenyl group having one or more substituents chosen from –F, -Cl, -Br, -I, $-CH_3$, $-OCH_3$, $-CF_3$, $-OCF_3$, $-C(=O)CH_3$, -COOH, -C≡N, and $-NO_2$.

[0015] In one aspect of the compounds of the invention, B is an aryl group with one or more substituents chosen from hydroxyl, halo, alkyl, alkoxy, haloalkyl, haloalkoxy, $-N(C_{1-3}\ alkyl)_2$, $-NH(C_{1-3}\ alkyl)$, $-C(=O)NH_2$, $-C(=O)NH(C_{1-3}\ alkyl)$, $-C(=O)N(C_{1-3}\ alkyl)_2$, $-S(=O)_2(C_{1-3}alkyl)$, $-S(=O)_2NH_2$, $-S(=O)_2N(C_{1-3}\ alkyl)_2$, $-S(=O)_2NH(C_{1-3}\ alkyl)$, $-CHF_2$, $-OCF_3$, $-OCHF_2$, $-SCF_3$, $-CF_3$, -CN, $-NH_2$, $-SO_3$, and $-NO_2$.

[0016] In one aspect of the compounds of the invention, B is a phenyl group having from 1-5 substituents independently chosen from acylamino, acyloxy, alkenyl, alkoxy, alkyl, alkylthio, alkynyl, amino, aryl, arylalkyl, arylalkenyl, arylalkynyl, arylalkoxy, aryloxy, arylthio, carbocycle, cyano, cyanato, halo, haloalkyl, halophenyl, hydroxyl, heteroaryl, heteroaryloxy, heterocycle, heteroarylalkoxy, isocyanato, isothiocyanato, nitro, sulfinyl, sulfonyl, sulfonamide, thiocarbonyl, thiocyanato, trihalomethanesulfonamido, O-carbamyl, N-carbamyl, O-thiocarbamyl, N-thiocarbamyl, and C-amido.

[0017] According to one embodiment, A is a substituted or unsubstituted benzo[1,3]dioxole group. In one aspect of this embodiment, A is a 6-bromo-benzo[1,3]dioxol-5-yl group. In one aspect of this embodiment, A is an unsubstituted benzo[1,3]dioxole group. In one aspect of this embodiment, A is a 6-iodo-

benzo[1,3]dioxol-5-yl group. In one aspect of this embodiment, A is a 6-chloro-benzo[1,3]dioxol-5-yl group. In one aspect of this embodiment, A is a 6-fluoro-benzo[1,3]dioxol-5-yl group. In one aspect of this embodiment, A has from 1-5 substituents independently chosen from acylamino, acyloxy, alkenyl, alkoxy, alkyl, alkylthio, alkynyl, amino, aryl, arylalkyl, arylalkenyl, arylalkynyl, arylalkoxy, aryloxy, arylthio, carbocycle, cyano, cyanato, halo, haloalkyl, halophenyl, hydroxyl, heteroaryl, heteroaryloxy, heterocycle, heteroarylalkoxy, isocyanato, isothiocyanato, nitro, sulfinyl, sulfonyl, sulfonamide, thiocarbonyl, thiocyanato, trihalomethanesulfonamido, O-carbamyl, N-carbamyl, O-thiocarbamyl, N-thiocarbamyl, and C-amido.

[0018] According to one embodiment, A is a substituted or unsubstituted indanone group. In one aspect of this embodiment, A has from 1-5 substituents independently chosen from acylamino, acyloxy, alkenyl, alkoxy, alkyl, alkylthio, alkynyl, amino, aryl, arylalkyl, arylalkenyl, arylalkynyl, arylalkoxy, aryloxy, arylthio, carbocycle, cyano, cyanato, halo, haloalkyl, halophenyl, hydroxyl, heteroaryl, heteroaryloxy, heterocycle, heteroarylalkoxy, isocyanato, isothiocyanato, nitro, sulfinyl, sulfonyl, sulfonamide, thiocarbonyl, thiocyanato, trihalomethanesulfonamido, O-carbamyl, N-carbamyl, O-thiocarbamyl, N-thiocarbamyl, and C-amido.

[0019] According to one embodiment, A is a substituted or unsubstituted indane group. In one aspect of this embodiment, A has from 1-5 substituents independently chosen from acylamino, acyloxy, alkenyl, alkoxy, alkyl, alkylthio, alkynyl, amino, aryl, arylalkyl, arylalkenyl, arylalkynyl, arylalkoxy, aryloxy, arylthio, carbocycle, cyano, cyanato, halo, haloalkyl, halophenyl, hydroxyl, heteroaryl, heteroaryloxy, heterocycle, heteroarylalkoxy, isocyanato, isothiocyanato, nitro, sulfinyl, sulfonyl, sulfonamide, thiocarbonyl, thiocyanato, trihalomethanesulfonamido, O-carbamyl, N-carbamyl, O-thiocarbamyl, N-thiocarbamyl, and C-amido.

[0020] According to one embodiment, A is a substituted or unsubstituted benzo[1,4] dioxane group. In one aspect of this embodiment, A has from 1-5 substituents independently chosen from acylamino, acyloxy, alkenyl, alkoxy, alkyl, alkylthio, alkynyl, amino, aryl, arylalkyl, arylalkenyl, arylalkynyl, arylalkoxy, aryloxy, arylthio, carbocycle, cyano, cyanato, halo, haloalkyl, halophenyl, hydroxyl, heteroaryl, heteroaryloxy, heterocycle, heteroarylalkoxy, isocyanato, isothiocyanato, nitro, sulfinyl, sulfonyl, sulfonamide, thiocarbonyl, thiocyanato, trihalomethanesulfonamido, O-carbamyl, N-carbamyl, O-thiocarbamyl, N-thiocarbamyl, and C-amido.

[0021] According to one embodiment, A is a substituted or unsubstituted benzoxazinone group. In one aspect of this embodiment, A has from 1-5 substituents independently chosen from acylamino, acyloxy, alkenyl, alkoxy, alkyl, alkylthio, alkynyl, amino, aryl, arylalkyl, arylalkenyl, arylalkynyl, arylalkoxy, aryloxy, arylthio, carbocycle, cyano, cyanato, halo, haloalkyl, halophenyl, hydroxyl, heteroaryl, heteroaryloxy, heterocycle, heteroarylalkoxy, isocyanato, isothiocyanato, nitro, sulfinyl, sulfonyl, sulfonamide, thiocarbonyl, thiocyanato, trihalomethanesulfonamido, O-carbamyl, N-carbamyl, O-thiocarbamyl, N-thiocarbamyl, and C-amido.

[0022] According to one embodiment, A is a substituted or unsubstituted benzoxazine group. In one aspect of this embodiment, A has from 1-5 substituents independently chosen from acylamino, acyloxy, alkenyl, alkoxy, alkyl, alkylthio, alkynyl, amino, aryl, arylalkyl, arylalkenyl, arylalkynyl, arylalkoxy, aryloxy, arylthio, carbocycle, cyano, cyanato, halo, haloalkyl, halophenyl, hydroxyl, heteroaryl, heteroaryloxy, heterocycle, heteroarylalkoxy, isocyanato, isothiocyanato, nitro, sulfinyl, sulfonyl, sulfonamide, thiocarbonyl, thiocyanato, trihalomethanesulfonamido, O-carbamyl, N-carbamyl, O-thiocarbamyl, N-thiocarbamyl, and C-amido.

[0023] According to one embodiment, A is a substituted or unsubstituted benzodioxine group. In one aspect of this embodiment, A has from 1-5 substituents independently chosen from acylamino, acyloxy, alkenyl, alkoxy, alkyl, alkylthio, alkynyl, amino, aryl, arylalkyl, arylalkenyl, arylalkynyl, arylalkoxy, aryloxy, arylthio, carbocycle, cyano, cyanato, halo, haloalkyl, halophenyl, hydroxyl, heteroaryl, heteroaryloxy, heterocycle, heteroarylalkoxy, isocyanato, isothiocyanato, nitro, sulfinyl, sulfonyl, sulfonamide, thiocarbonyl, thiocyanato, trihalomethanesulfonamido, O-carbamyl, N-carbamyl, O-thiocarbamyl, N-thiocarbamyl, and C-amido.

[0024] According to one embodiment, A is a substituted or unsubstituted naphthyl group. In one aspect of this embodiment, A has from 1-6 substituents independently chosen from acylamino, acyloxy, alkenyl, alkoxy, alkyl, alkylthio, alkynyl, amino, aryl, arylalkyl, arylalkenyl, arylalkynyl, arylalkoxy, aryloxy, arylthio, carbocycle, cyano, cyanato, halo, haloalkyl, halophenyl, hydroxyl, heteroaryl, heteroaryloxy, heterocycle, heteroarylalkoxy, isocyanato, isothiocyanato, nitro, sulfinyl, sulfonyl, sulfonamide, thiocarbonyl, thiocyanato, trihalomethanesulfonamido, O-carbamyl, N-carbamyl, O-thiocarbamyl, N-thiocarbamyl, and C-amido.

[0025] According to one embodiment, A is a substituted or unsubstituted pyrrole group. In one aspect of this embodiment, A has from 1-3 substituents independently

chosen from acylamino, acyloxy, alkenyl, alkoxy, alkyl, alkylthio, alkynyl, amino, aryl, arylalkyl, arylalkenyl, arylalkynyl, arylalkoxy, aryloxy, arylthio, carbocycle, cyano, cyanato, halo, haloalkyl, halophenyl, hydroxyl, heteroaryl, heteroaryloxy, heterocycle, heteroarylalkoxy, isocyanato, isothiocyanato, nitro, sulfinyl, sulfonyl, sulfonamide, thiocarbonyl, thiocyanato, trihalomethanesulfonamido, O-carbamyl, N-carbamyl, O-thiocarbamyl, N-thiocarbamyl, and C-amido. According to one aspect A is unsubstituted.

[0026] According to one embodiment, A is a substituted or unsubstituted pyridine group. In one aspect of this embodiment, A has from 1-4 substituents independently chosen from acylamino, acyloxy, alkenyl, alkoxy, alkyl, alkylthio, alkynyl, amino, aryl, arylalkyl, arylalkenyl, arylalkynyl, arylalkoxy, aryloxy, arylthio, carbocycle, cyano, cyanato, halo, haloalkyl, halophenyl, hydroxyl, heteroaryl, heteroaryloxy, heterocycle, heteroarylalkoxy, isocyanato, isothiocyanato, nitro, sulfinyl, sulfonyl, sulfonamide, thiocarbonyl, thiocyanato, trihalomethanesulfonamido, O-carbamyl, N-carbamyl, O-thiocarbamyl, N-thiocarbamyl, and C-amido. According to one aspect of this embodiment, A is unsubstituted.

[0027] According to one embodiment, A is a substituted or unsubstituted cyclohexyl group. In one aspect of this embodiment, A has from 1-5 substituents independently chosen from acylamino, acyloxy, alkenyl, alkoxy, alkyl, alkylthio, alkynyl, amino, aryl, arylalkyl, arylalkenyl, arylalkynyl, arylalkoxy, aryloxy, arylthio, carbocycle, cyano, cyanato, halo, haloalkyl, halophenyl, hydroxyl, heteroaryl, heteroaryloxy, heterocycle, heteroarylalkoxy, isocyanato, isothiocyanato, nitro, sulfinyl, sulfonyl, sulfonamide, thiocarbonyl, thiocyanato, trihalomethanesulfonamido, O-carbamyl, N-carbamyl, O-thiocarbamyl, N-thiocarbamyl, and C-amido. According to one aspect of this embodiment, A is unsubstituted.

[0028] According to one embodiment, B is a substituted or unsubstituted benzo[1,3]dioxole group. In one aspect of this embodiment, B is a 6-bromo-benzo[1,3]dioxol-5-yl group. In one aspect of this embodiment, B is an unsubstituted benzo[1,3]dioxole group. In one aspect of this embodiment, B is a 6-iodo-benzo[1,3]dioxol-5-yl group. In one aspect of this embodiment, B is a 6-chloro-benzo[1,3]dioxol-5-yl group. In one aspect of this embodiment, B is a 6-fluoro-benzo[1,3]dioxol-5-yl group. In one aspect of this embodiment, B has from 1-4 substituents independently chosen from acylamino, acyloxy, alkenyl, alkoxy, alkyl, alkylthio, alkynyl, amino, aryl, arylalkyl, arylalkenyl, arylalkynyl, arylalkoxy, aryloxy, arylthio, carbocycle, cyano, cyanato, halo, haloalkyl, halophenyl, hydroxyl, heteroaryl,

heteroaryloxy, heterocycle, heteroarylalkoxy, isocyanato, isothiocyanato, nitro, sulfinyl, sulfonyl, sulfonamide, thiocarbonyl, thiocyanato, trihalomethanesulfonamido, O-carbamyl, N-carbamyl, O-thiocarbamyl, N-thiocarbamyl, and C-amido.

[0029] According to one embodiment, B is a substituted or unsubstituted naphthyl group. In one aspect of this embodiment, B has from 1-6 substituents independently chosen from acylamino, acyloxy, alkenyl, alkoxy, alkyl, alkylthio, alkynyl, amino, aryl, arylalkyl, arylalkenyl, arylalkynyl, arylalkoxy, aryloxy, arylthio, carbocycle, cyano, cyanato, halo, haloalkyl, halophenyl, hydroxyl, heteroaryl, heteroaryloxy, heterocycle, heteroarylalkoxy, isocyanato, isothiocyanato, nitro, sulfinyl, sulfonyl, sulfonamide, thiocarbonyl, thiocyanato, trihalomethanesulfonamido, O-carbamyl, N-carbamyl, O-thiocarbamyl, N-thiocarbamyl, and C-amido. According to one aspect of this embodiment, B is unsubstituted.

[0030] According to one embodiment, B is a substituted or unsubstituted pyrrole group. In one aspect of this embodiment, B has from 1-3 substituents independently chosen from acylamino, acyloxy, alkenyl, alkoxy, alkyl, alkylthio, alkynyl, amino, aryl, arylalkyl, arylalkenyl, arylalkynyl, arylalkoxy, aryloxy, arylthio, carbocycle, cyano, cyanato, halo, haloalkyl, halophenyl, hydroxyl, heteroaryl, heteroaryloxy, heterocycle, heteroarylalkoxy, isocyanato, isothiocyanato, nitro, sulfinyl, sulfonyl, sulfonamide, thiocarbonyl, thiocyanato, trihalomethanesulfonamido, O-carbamyl, N-carbamyl, O-thiocarbamyl, N-thiocarbamyl, and C-amido. According to one aspect of this embodiment, B is unsubstituted.

[0031] According to one embodiment, B is a substituted or unsubstituted pyridine group. In one aspect of this embodiment, B has from 1-4 substituents independently chosen from acylamino, acyloxy, alkenyl, alkoxy, alkyl, alkylthio, alkynyl, amino, aryl, arylalkyl, arylalkenyl, arylalkynyl, arylalkoxy, aryloxy, arylthio, carbocycle, cyano, cyanato, halo, haloalkyl, halophenyl, hydroxyl, heteroaryl, heteroaryloxy, heterocycle, heteroarylalkoxy, isocyanato, isothiocyanato, nitro, sulfinyl, sulfonyl, sulfonamide, thiocarbonyl, thiocyanato, trihalomethanesulfonamido, O-carbamyl, N-carbamyl, O-thiocarbamyl, N-thiocarbamyl, and C-amido. According to one aspect of this embodiment, B is unsubstituted.

[0032] According to one embodiment, B is a substituted or unsubstituted cyclohexyl group. In one aspect of this embodiment, B has from 1-5 substituents independently chosen from acylamino, acyloxy, alkenyl, alkoxy, alkyl, alkylthio, alkynyl, amino, aryl, arylalkyl, arylalkenyl, arylalkynyl, arylalkoxy, aryloxy, arylthio, carbocycle, cyano,

cyanato, halo, haloalkyl, halophenyl, hydroxyl, heteroaryl, heteroaryloxy, heterocycle, heteroarylalkoxy, isocyanato, isothiocyanato, nitro, sulfinyl, sulfonyl, sulfonamide, thiocarbonyl, thiocyanato, trihalomethanesulfonamido, O-carbamyl, N-carbamyl, O-thiocarbamyl, N-thiocarbamyl, and C-amido. According to one aspect of this embodiment, B is unsubstituted.

[0033] According to one aspect of the invention, compounds of Formula I are provided wherein:

[0034] A is a substituted or unsubstituted aryl group;

[0035] B is a substituted or unsubstituted aryl group;

[0036] R1 is chosen from hydro, alkyl, aryl, heteroaryl, amino, halo, sulfur, and thioalkyl.

[0037] L_1 can be saturated, partially saturated, or unsaturated, and is chosen from -$(CH_2)_n$-$(CH_2)_n$-, -$(CH_2)_n$C(=O)$(CH_2)_n$-, -$(CH_2)_n$C(=O)N$(CH_2)_n$-, -$(CH_2)_n$NC(=O)O$(CH_2)_n$-, -$(CH_2)_n$NC(=O)N$(CH_2)_n$-, -$(CH_2)_n$NC(=S)S$(CH_2)_n$-, -(CH_2)nOC(=O)S$(CH_2)_n$-, -$(CH_2)_n$NH$(CH_2)_n$-, -$(CH_2)_n$O$(CH_2)_n$-, -$(CH_2)_n$S$(CH_2)_n$-, -$(CH_2)_n$NC(=S)N$(CH_2)_n$-, where each n is independently chosen from 0, 1, 2, 3, 4, 5, 6, 7, and 8, and wherein each carbon and/or nitrogen can be optionally substituted with one or more substituents independently chosen from hydroxyl, halo, alkoxy, C_{1-3} alkyl, and C_{3-6} cycloalkyl groups;

[0038] L_2 can be saturated, partially saturated, or unsaturated, and is chosen from -$(CH_2)_n$-$(CH_2)_n$-, -$(CH_2)_n$C(=O)$(CH_2)_n$-, -$(CH_2)_n$C(=O)N$(CH_2)_n$-, -$(CH_2)_n$NC(=O)O$(CH_2)_n$-, -$(CH_2)_n$NC(=O)N$(CH_2)_n$-, -$(CH_2)_n$NC(=S)S$(CH_2)_n$-, -(CH_2)nOC(=O)S$(CH_2)_n$-, -$(CH_2)_n$NH$(CH_2)_n$-, -$(CH_2)_n$O$(CH_2)_n$-, -$(CH_2)_n$S$(CH_2)_n$-, -$(CH_2)_n$NC(=S)N$(CH_2)_n$-, where each n is independently chosen from 0, 1, 2, 3, 4, 5, 6, 7, and 8, and wherein each carbon and/or nitrogen can be optionally substituted with one or more substituents independently chosen from hydroxyl, halo, alkoxy, C_{1-3} alkyl, and C_{3-6} cycloalkyl groups; and pharmaceutically acceptable salts thereof.

[0039] According to one aspect of the invention, compounds of Formula I are provided wherein:

[0040] A is a substituted or unsubstituted heteroaryl group;

[0041] B is a substituted or unsubstituted aryl group;

[0042] R1 is chosen from hydro, alkyl, aryl, heteroaryl, amino, halo, sulfur, and thioalkyl;

[0043] L_1 can be saturated, partially saturated, or unsaturated, and is chosen from -$(CH_2)_n$-$(CH_2)_n$-, -$(CH_2)_n$C(=O)$(CH_2)_n$-, -$(CH_2)_n$C(=O)N$(CH_2)_n$-, -$(CH_2)_n$NC(=O)O$(CH_2)_n$-, -$(CH_2)_n$NC(=O)N$(CH_2)_n$-, -$(CH_2)_n$NC(=S)S$(CH_2)_n$-, -(CH_2)nOC(=O)S$(CH_2)_n$-, -$(CH_2)_n$NH$(CH_2)_n$-, -$(CH_2)_n$O$(CH_2)_n$-, -$(CH_2)_n$S$(CH_2)_n$-, -$(CH_2)_n$NC(=S)N$(CH_2)_n$-, where each n is independently chosen from 0, 1, 2, 3, 4, 5, 6, 7, and 8, and wherein each carbon and/or nitrogen can be optionally substituted with one or more substituents independently chosen from hydroxyl, halo, alkoxy, C_{1-3} alkyl, and C_{3-6} cycloalkyl groups;

[0044] L_2 can be saturated, partially saturated, or unsaturated, and is chosen from -$(CH_2)_n$-$(CH_2)_n$-, -$(CH_2)_n$C(=O)$(CH_2)_n$-, -$(CH_2)_n$C(=O)N$(CH_2)_n$-, -$(CH_2)_n$NC(=O)O$(CH_2)_n$-, -$(CH_2)_n$NC(=O)N$(CH_2)_n$-, -$(CH_2)_n$NC(=S)S$(CH_2)_n$-, -(CH_2)nOC(=O)S$(CH_2)_n$-, -$(CH_2)_n$NH$(CH_2)_n$-, -$(CH_2)_n$O$(CH_2)_n$-, -$(CH_2)_n$S$(CH_2)_n$-, -$(CH_2)_n$NC(=S)N$(CH_2)_n$-, where each n is independently chosen from 0, 1, 2, 3, 4, 5, 6, 7, and 8, and wherein each carbon and/or nitrogen can be optionally substituted with one or more substituents independently chosen from hydroxyl, halo, alkoxy, C_{1-3} alkyl, and C_{3-6} cycloalkyl groups; and pharmaceutically acceptable salts thereof.

[0045] According to one aspect of the invention, compounds of Formula I are provided wherein A is a substituted or unsubstituted aryl group; B is a substituted or unsubstituted heteroaryl group; R1 is chosen from hydro, alkyl, aryl, heteroaryl, amino, halo, sulfur, and thioalkyl; and pharmaceutically acceptable salts thereof.

[0046] According to one aspect of the invention, compounds of Formula I are provided wherein A is a substituted or unsubstituted heterocyclic group; B is a substituted or unsubstituted aryl group; and R1 is chosen from hydro, alkyl, aryl, heteroaryl, alkyl amino, halo, sulfur, and thioalkyl.

[0047] According to one aspect of the invention, compounds of Formula I are provided wherein A is a substituted or unsubstituted aryl group; B is a substituted or unsubstituted heterocyclic group; R1 is chosen from hydro, alkyl, aryl, heteroaryl, amino, halo, sulfur, and thioalkyl.

[0048] According to some aspects of the invention, in the compound of Formula I, A is substituted or unsubstituted and chosen from indazolyl, 1H-indolyl, benzothiazolyl, 1H-benzotriazolyl, benzooxazolyl, 1H-benzoimadazolyl, 3H-benzooxazol-2-one, 4H-benzo[1,4]oxazin-3-one, 1,3 dihydro-benzoimadazol-2-one, 3H-benzothialo-2-one, 1H-pyrazolo[3,4-b]pyridine, 1H-quinaxolin-2-one, 1H-quinaxolin-2-one, 4H-benzo[1,4]oxazin-3-one, isoquinoline, indoline, 1,3 dihydro-indol-2-one, 2,3-dihydro-benzo[1,4]dioxine, thienyl (thiophenyl), benzo[b]thienyl, naphtho[2,3-b]thienyl, thianthrenyl, furyl (furanyl),

isobenzofuranyl, chromenyl, xanthenyl, phenoxanthiinyl, pyrrolyl, 2H-pyrrolyl, imidazolyl, pyrazolyl, pyridyl (pyridinyl), 2-pyridyl, 3-pyridyl, 4-pyridyl, pyrazinyl, pyrimidinyl, pyridazinyl, indolizinyl, isoindolyl, 3H-indolyl, indolyl, purinyl, 4H-quinolizinyl, isoquinolyl, quinolyl, phthalzinyl, naphthyridinyl, quinozalinyl, cinnolinyl, pteridinyl, carbazolyl, β-carbolinyl, phenanthridinyl, acrindinyl, perimidinyl, phenanthrolinyl, phenazinyl, isothiazolyl, phenothiazinyl, isoxazolyl, furazanyl, phenoxazinyl, 1,4-dihydroquinoxaline-2,3-dione, 7 aminoisocoumarin, pyrido[1,2-a]pyrimidin-4-one, pyrazolo[1,5-a]pyrimidinyl, pyrazolo[1,5-a]pyrimidin-3-yl, 1,2-benzoisoxazol-3-yl, benzimidazolyl, 2-oxindolyl, 2 oxobenzimidazolyl, tetrahydrofuranyl, pyranyl, piperidinyl, piperazinyl, pyrrolidinyl, imidazolidinyl, imidazolinyl, indolinyl, isoindolinyl, quinuclidinyl, morpholinyl, isochromanyl, chromanyl, pyrazolidinyl, pyrazolinyl, tetronoyl, and tetramoyl.

[0049] According to some aspects of the invention, in the compound of Formula I, B is substituted or unsubstituted and chosen from indazolyl, 1H-indolyl, benzothiazolyl, 1H-benzotriazolyl, benzooxazolyl, 1H-benzoimadazolyl, 3H-benzooxazol-2-one, 4H-benzo[1,4]oxazin-3-one, 1,3 dihydro-benzoimadazol-2-one, 3H-benzothialo-2-one, 1H-pyrazolo[3,4-b]pyridine, 1H-quinaxolin-2-one, 1H-quinaxolin-2-one, 4H-benzo[1,4]oxazin-3-one, isoquinoline, indoline, 1,3 dihydro-indol-2-one, 2,3-dihydro-benzo[1,4]dioxine, thienyl (thiophenyl), benzo[b]thienyl, naphtho[2,3-b]thienyl, thianthrenyl, furyl (furanyl), isobenzofuranyl, chromenyl, xanthenyl, phenoxanthiinyl, pyrrolyl, 2H-pyrrolyl, imidazolyl, pyrazolyl, pyridyl (pyridinyl), 2-pyridyl, 3-pyridyl, 4-pyridyl, pyrazinyl, pyrimidinyl, pyridazinyl, indolizinyl, isoindolyl, 3H-indolyl, indolyl, purinyl, 4H-quinolizinyl, isoquinolyl, quinolyl, phthalzinyl, naphthyridinyl, quinozalinyl, cinnolinyl, pteridinyl, carbazolyl, β-carbolinyl, phenanthridinyl, acrindinyl, perimidinyl, phenanthrolinyl, phenazinyl, isothiazolyl, phenothiazinyl, isoxazolyl, furazanyl, phenoxazinyl, 1,4-dihydroquinoxaline-2,3-dione, 7 aminoisocoumarin, pyrido[1,2-a]pyrimidin-4-one, pyrazolo[1,5-a]pyrimidinyl, pyrazolo[1,5-a]pyrimidin-3-yl, 1,2-benzoisoxazol-3-yl, benzimidazolyl, 2-oxindolyl, 2 oxobenzimidazolyl, tetrahydrofuranyl, pyranyl, piperidinyl, piperazinyl, pyrrolidinyl, imidazolidinyl, imidazolinyl, indolinyl, isoindolinyl, quinuclidinyl, morpholinyl, isochromanyl, chromanyl, pyrazolidinyl, pyrazolinyl, tetronoyl, and tetramoyl.

[0050] In some aspects of the compounds of the invention, the A ring is substituted with one or more substituents chosen from $-L_1$-C(=O)OH, - L_1-CH=CHC(=O)OH, – L_1-C(=O)NH_2, – L_1-C(=O)NH(C_{1-3} alkyl), – L_1-C(=O)N(C_{1-3} alkyl)$_2$, – L_1-S(=O)$_2$(C_{1-3}alkyl), –

L_1-$S(=O)_2NH_2$, – L_1-$S(=O)_2N(C_{1-3}$ alkyl$)_2$, – L_1-$S(=O)_2NH(C_{1-3}$ alkyl), - L_1-$C(=O)NHOH$, - L_1-$C(=O)CH_2NH_2$, - L_1-$C(=O)CH_2OH$, - L_1-$C(=O)CH_2SH$, - L_1-$C(=O)NHCN$, - L_1-$NHC(=O)OR_o$, - L_1-$C(=O)NHR_o$, - L_1-$NH(C=O)NHR_o$, - L_1-$C(=O)N(R_o)_2$, - L_1-$NH(C=O)N(R_o)_2$, - L_1-sulfo; where R_o is chosen from alkyl and haloalkyl, and L_1 is independent of any other L_1 in the compound and is defined as above.

[0051] In some aspects of the compounds of the invention, the B ring is substituted with one or more substituents chosen from –L_1-$C(=O)OH$, - L_1-$CH=CHC(=O)OH$, – L_1-$C(=O)NH_2$, – L_1-$C(=O)NH(C_{1-3}$ alkyl), – L_1-$C(=O)N(C_{1-3}$ alkyl$)_2$, – L_1-$S(=O)_2(C_{1-3}$alkyl), – L_1-$S(=O)_2NH_2$, – L_1-$S(=O)_2N(C_{1-3}$ alkyl$)_2$, – L_1-$S(=O)_2NH(C_{1-3}$ alkyl), - L_1-$C(=O)NHOH$, - L_1-$C(=O)CH_2NH_2$, - L_1-$C(=O)CH_2OH$, - L_1-$C(=O)CH_2SH$, - L_1-$C(=O)NHCN$, - L_1-$NHC(=O)OR_o$, - L_1-$C(=O)NHR_o$, - L_1-$NH(C=O)NHR_o$, - L_1-$C(=O)N(R_o)_2$, - L_1-$NH(C=O)N(R_o)_2$, - L_1-sulfo; where R_o is chosen from alkyl and haloalkyl, and L_1 is independent of any other L_1 in the compound and is defined as above.

[0052] According to one aspect of the compounds of the invention, L_1 is chosen from –CH_2-, –CH_2CH_2-, -$CH_2CH_2CH_2$, –$CH(CH_3)CH_2$-, –$CH(CH_2CH_3)CH_2$-, –$CH(CH(CH_3)_2)CH_2$-, -$C(CH_2CH_2)CH_2$-, -$C(CH_2CH_2CH_2)CH_2$-, -$CH(CH(CH_3)CH_2CH_3)CH_2$-, -$CH(CH(CH_2)_4)CH_2$-, -$CH(CH(CH_2)_5)CH_2$-, -$CH(OH)CH_2$-, and -$CH(CH_2OH)CH_2$-. In a more specific aspect L_1 is chosen from –CH_2CH_2- and -$CH_2CH_2CH_2$. In an even more specific aspect, L_1 is–CH_2CH_2-. L_1 can be in either orientation, e.g., -$CH(CH_2CH_2)CH_2$- refers to purine-$CH(CH_2CH_2)CH_2$-phenyl and purine–$CH_2CH(CH_2CH_2)$-phenyl orientations unless otherwise specified.

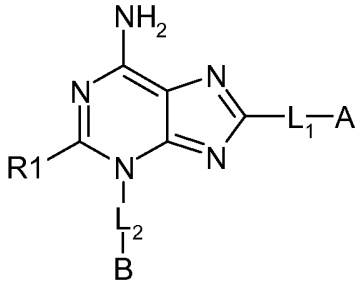
[0053] According to one aspect of the invention, compounds of Formula I are provided where L_2 is chosen from –CH_2-, –CH_2CH_2-, -$CH_2CH_2CH_2$, –$CH(CH_3)CH_2$-, –$CH(CH_2CH_3)CH_2$-, –$CH(CH(CH_3)_2)CH_2$-, -$C(CH_2CH_2)CH_2$-, -$C(CH_2CH_2CH_2)CH_2$-, -$CH(CH(CH_3)CH_2CH_3)CH_2$-, -$CH(CH(CH_2)_4)CH_2$-, -$CH(CH(CH_2)_5)CH_2$-, -$CH(OH)CH_2$-, and -$CH(CH_2OH)CH_2$-. In a more specific aspect L_2 is chosen from –CH_2CH_2- and -$CH_2CH_2CH_2$-. In an even more specific aspect L_2 is–CH_2CH_2-. L_2 can be in either orientation, *e.g.*, -$CH(CH_2CH_2)CH_2$- refers to *e.g*, purine-$CH(CH_2CH_2)CH_2$-phenyl and purine–$CH_2CH(CH_2CH_2)$-phenyl orientations unless otherwise specified.

[0054] According to one aspect of the compounds of the invention, A is a group chosen from 2,5-dimethoxyphenyl, 2,5-diethoxyphenyl, 2,4-dimethoxyphenyl, 3,4,5-trimethoxyphenyl, 4-chlorophenyl, and 4-benzonitrile. In this aspect, the positions

(numbering) of the substituents are relative to the linkage of the phenyl group to the purine core. In a specific embodiment of this aspect L_1 is –S-.

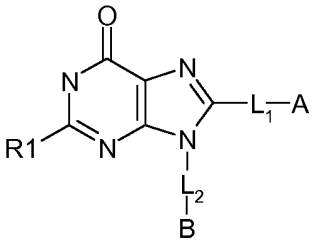
[0055] According to one aspect of the compounds of the invention, B is a group chosen from 2-bromophenyl, 2-fluorophenyl, 2-chlorophenyl, 3-fluorophenyl, 3-iodophenyl, 3-bromophenyl, 4-fluorophenyl, 4-chlorophenyl, 4-bromophenyl, 2,3-dichlorophenyl, 2,4-dichlorophenyl, 2,6-dichlorophenyl, 2,3-difluorophenyl, 3,5-difluorophenyl, 4-chloro-2-fluorophenyl, 2-chloro-6-fluorophenyl, pentafluorophenyl, 2-nitrophenyl, 3-nitrophenyl, 4-nitrophenyl, 4-benzoic acid, 2-trifluoromethylphenyl, 3-trifluoromethylphenyl, 3-methoxyphenyl, 3-methoxyphenyl, 3,4-dimethoxyphenyl, 3,5-dimethoxyphenyl, 3,4,5-trimethoxyphenyl, 3-ethoxy-4-methoxyphenyl, p-tolyl, o-tolyl, 2,5-dimethylphenyl, 3,5-dimethylphenyl, 2,4,6-trimethylphenyl, 4-phenylethanone, 4-phenol, 4-benzenesulfonic acid, 4-dimethylaminophenyl, 4-carbamic acid tert-butyl ester phenyl, 4-aminophenyl, 3-trifluoromethoxyphenyl, and 3,5 bistrifluoromethylphenyl. In this aspect, the positions (numbering) of the substituents are relative to the linkage of the phenyl group to the purine core. In a specific embodiment of this aspect, L_2 is chosen from $–CH_2-CH_2-$ and $–CH_2-CH_2-CH_2-$.

[0056] The invention also provides compounds of Formula II where the variables are as in any of the above embodiments and aspects of the invention for the compounds of Formula I.



FORMULA II

[0057] The invention also provides compounds of Formula III where the variables are as in any of the above embodiments and aspects of the invention for the compounds of Formula I.



FORMULA III

[0058] According to one aspect of the invention, compounds of Formula I are provided wherein:

[0059] A is a substituted or unsubstituted heterocyclic group;

[0060] B is a substituted or unsubstituted aryl group;

[0061] R1 is chosen from hydro, alkyl, aryl, heteroaryl, amino, halo, sulfur, and thioalkyl;

[0062] L_1 can be saturated, partially saturated, or unsaturated, and is chosen from $-(CH_2)_n-(CH_2)_n-$, $-(CH_2)_nC(=O)(CH_2)_n-$, $-(CH_2)_nC(=O)N(CH_2)_n-$, $-(CH_2)_nNC(=O)O(CH_2)_n-$, $-(CH_2)_nNC(=O)N(CH_2)_n-$, $-(CH_2)_nNC(=S)S(CH_2)_n-$, $-(CH_2)nOC(=O)S(CH_2)_n-$, $-(CH_2)_nNH(CH_2)_n-$, $-(CH_2)_nO(CH_2)_n-$, $-(CH_2)_nS(CH_2)_n-$, $-(CH_2)_nNC(=S)N(CH_2)_n-$, where each n is independently chosen from 0, 1, 2, 3, 4, 5, 6, 7, and 8, and wherein each carbon and/or nitrogen can be optionally substituted with one or more substituents independently chosen from hydroxyl, halo, alkoxy, C_{1-3} alkyl, and C_{3-6} cycloalkyl groups;

[0063] L_2 can be saturated, partially saturated, or unsaturated, and is chosen from $-(CH_2)_n-(CH_2)_n-$, $-(CH_2)_nC(=O)(CH_2)_n-$, $-(CH_2)_nC(=O)N(CH_2)_n-$, $-(CH_2)_nNC(=O)O(CH_2)_n-$, $-(CH_2)_nNC(=O)N(CH_2)_n-$, $-(CH_2)_nNC(=S)S(CH_2)_n-$, $-(CH_2)nOC(=O)S(CH_2)_n-$, $-(CH_2)_nNH(CH_2)_n-$, $-(CH_2)_nO(CH_2)_n-$, $-(CH_2)_nS(CH_2)_n-$, $-(CH_2)_nNC(=S)N(CH_2)_n-$, where each n is independently chosen from 0, 1, 2, 3, 4, 5, 6, 7, and 8, and wherein each carbon and/or nitrogen can be optionally substituted with one or more substituents independently chosen from hydroxyl, halo, alkoxy, C_{1-3} alkyl, and C_{3-6} cycloalkyl groups; and pharmaceutically acceptable salts thereof.

[0064] In one aspect of the invention, A can be substituted or unsubstituted and is chosen from an aryl or heterocyclic group;

[0065] B can be substituted or unsubstituted and is chosen from a heteroaryl or heterocyclic group having one or more hetero atoms chosen from –N-, -O-, -S-, and –P-;

[0066] R1 is chosen from a hydro, alkyl, alkoxy, aryl, heteroaryl, heterocyclic, carbocyclic, amino, halo, sulfur, and thioalkyl group;

[0067] L_1 and L_2 are as defined above in their broadest aspects; and pharmaceutically acceptable salts thereof.

[0068] In another aspect of the invention, A can be substituted or unsubstituted and is chosen from a benzo[1,3]dioxole or phenyl group;

[0069] B can be a substituted or unsubstituted heteroaryl or heterocyclic group having one or more hetero atoms chosen from –N-, -O-, -S-, and –P-;

[0070] R1 is chosen from a hydro, alkyl, alkoxy, aryl, heteroaryl, heterocyclic, carbocyclic, amino, halo, sulfur, and thioalkyl group;

[0071] L_1 and L_2 are as defined above in their broadest aspects; and pharmaceutically acceptable salts thereof.

[0072] In one aspect of the invention, A can be substituted or unsubstituted and is a group chosen from 5-halo-benzo[1,3]dioxole (*e.g*, 5-bromo-benzo[1,3]dioxole), dimethoxybenzene (*e.g.*, 1,4-dimethoxybenzene, 2,3-dimethoxybenzene, and 2,4-dimethoxybenzene), and diethoxybenzene (*e.g.*, 1,4-diethoxybenzene, 2,3-diethoxybenzene, and 2,4-diethoxybenzene);

[0073] B can be substituted or unsubstituted and is chosen from a heteroaryl or heterocyclic group having one or more hetero atoms chosen from –N-, -O-, -S-, and –P-;

[0074] R1 is chosen from a hydro, alkyl, alkoxy, aryl, heteroaryl, heterocyclic, carbocyclic, amino, halo, sulfur, and thioalkyl group;

[0075] L_1 and L_2 are as defined above in their broadest aspects; and pharmaceutically acceptable salts thereof.

[0076] In one aspect of the invention, A can be substituted or unsubstituted and is chosen from a aryl, heteroaryl, heterocyclic, and carbocyclic group;

[0077] B can be substituted or unsubstituted and is a heterocyclic group chosen from piperidine, pyrrolidine, azetidine, piperazine, morpholine, and tetrahydro-pyran;

[0078] R1 is chosen from a hydro, alkyl, alkoxy, aryl, heteroaryl, heterocyclic, carbocyclic, amino, halo, sulfur, and thioalkyl group;

[0079] L_1 and L_2 are defined as above; and pharmaceutically acceptable salts thereof.

[0080] In one aspect of the invention, A can be substituted or unsubstituted and is chosen from an aryl, heteroaryl, heterocyclic, and carbocyclic group;

[0081] B is a group chosen from piperidine, piperidine-1-carboxylic acid ethyl ester, piperidine-1-carboxylic acid tert-butyl ester, 2,2,6,6-tetramethyl-piperidine, piperidine-2,6-dione, piperidine-1-carbaldehyde, 1-methyl-pyrrolidine, 1-isopropyl-piperazine, tetrahydro-pyran, adamantane, piperidine-1-carbaldehyde, 1-piperidin-1-yl-ethanone, 1-methanesulfonyl-piperidine, 1-propyl-piperidine, 1-trifluoromethanesulfonyl-piperidine, piperidine-1-carboxylic acid tert-butyl ester, pyrrolidine-1-carboxylic acid tert-butyl ester, morpholine-4-carboxylic acid tert-butyl ester, 1-pyrrolidin-1-yl-ethanone, 1-methanesulfonyl-pyrrolidine, pyrrolidine-1-carbaldehyde, azetidine-1-carboxylic acid *tert*-butyl ester, 1-methyl-azetidine, azetidine, azetidine-1-carbaldehyde, 1-azetidin-1-yl-ethanone, 1-methanesulfonyl-azetidine, and 1-trifluoromethanesulfonyl-azetidine, cycloheptane, imidazole, undecafluorocyclohexane, cyclohexyl-carbamic acid *tert*-butyl ester, 1-piperazin-1-yl-ethanone, 6,6-dimethyl-bicyclo[3.1.1]hept-2-ene, 5-methyl 2,4-dihydro-pyrazol-3-one, piperidine-1-carboxylic acid benzyl ester, morpholine, pyrrolidine-1-carboxylic acid benzyl ester, piperidine-1,2-dicarboxylic acid 1-tert butyl ester 2-ethyl ester, benzyl-1,2,3,6-tetrahydro-pyridine, hexahydro-4b-aza-cyclopropa[cd]pentalene, 2-isopropyl-piperidine-1carboxylic acid *tert*-butyl ester, piperidine-1-carboxylic acid ethyl amide, piperidine-1-carboxylic acid isopropyl amide, piperidine-1-carboxylic acid *tert*-butyl amide, [{piperidine-1-carbonyl}amino]-acetic acid ethyl ester, isopropyl piperidine, isobutyl piperidine, 2,2-dimethyl-1-piperidin-1-yl-propan-1-one, 2,2-dimethyl-1-piperidin-1-yl-butan-1-one, 2-isopropyl-piperidine, 1-isopropyl piperazine, and 1-cyclopentyl-piperazine.

[0082] R1 is chosen from a hydro, alkyl, alkoxy, aryl, heteroaryl, heterocyclic, carbocyclic, amino, halo, sulfur, and thioalkyl group;

[0083] L_1 and L_2 are as defined above in their broadest aspects; and pharmaceutically acceptable salts thereof.

[0084] In one aspect of the invention, A can be substituted or unsubstituted and is chosen from a benzo[1,3]dioxole and phenyl group;

[0085] B can be substituted or unsubstituted and is a heteroaryl or heterocyclic group chosen from piperidine, pyrrolidine, azetidine, piperazine, morpholine, and tetrahydro-pyran.

[0086] R1 is chosen from a hydro, alkyl, alkoxy, aryl, heteroaryl, heterocyclic, carbocyclic, amino, halo, sulfur, and thioalkyl group;

[0087] L_1 and L_2 are as defined above in their broadest aspects; and pharmaceutically acceptable salts thereof.

[0088] In one aspect of the invention, A can be substituted or unsubstituted and is chosen from a benzo[1,3]dioxole and phenyl group;

[0089] B is a group chosen from piperidine, piperidine-1-carboxylic acid ethyl ester, piperidine-1-carboxylic acid tert-butyl ester, 2,2,6,6-tetramethyl-piperidine, piperidine-2,6-dione, piperidine-1-carbaldehyde, 1-methyl-pyrrolidine, 1-isopropyl-piperazine, tetrahydro-pyran, adamantane, piperidine-1-carbaldehyde, 1-piperidin-1-yl-ethanone, 1-methanesulfonyl-piperidine, 1-propyl-piperidine, 1-trifluoromethanesulfonyl-piperidine, piperidine-1-carboxylic acid tert-butyl ester, pyrrolidine-1-carboxylic acid tert-butyl ester, morpholine-4-carboxylic acid tert-butyl ester, 1-pyrrolidin-1-yl-ethanone, 1-methanesulfonyl-pyrrolidine, pyrrolidine-1-carbaldehyde, azetidine-1-carboxylic acid *tert*-butyl ester, 1-methyl-azetidine, azetidine, azetidine-1-carbaldehyde, 1-azetidin-1-yl-ethanone, 1-methanesulfonyl-azetidine, and 1-trifluoromethanesulfonyl-azetidine, cycloheptane, imidazole, undecafluorocyclohexane, cyclohexyl-carbamic acid *tert*-butyl ester, 1-piperazin-1-yl-ethanone, 6,6-dimethyl-bicyclo[3.1.1]hept-2-ene, 5-methyl 2,4-dihydro-pyrazol-3-one, piperidine-1-carboxylic acid benzyl ester, morpholine, pyrrolidine-1-carboxylic acid benzyl ester, piperidine-1,2-dicarboxylic acid 1-tert butyl ester 2-ethyl ester, benzyl-1,2,3,6-tetrahydro-pyridine, hexahydro-4b-aza-

cyclopropa[cd]pentalene, 2-isopropyl-piperidine-1carboxylic acid *tert*-butyl ester, piperidine-1-carboxylic acid ethyl amide, piperidine-1-carboxylic acid isopropyl amide, piperidine-1-carboxylic acid *tert*-butyl amide, [{piperidine-1-carbonyl}amino]-acetic acid ethyl ester, isopropyl piperidine, isobutyl piperidine, 2,2-dimethyl-1-piperidin-1-yl-propan-1-one, 2,2-dimethyl-1-piperidin-1-yl-butan-1-one, 2-isopropyl-piperidine, 1-isopropyl piperazine, and 1-cyclopentyl-piperazine;

[0090] R1 is chosen from a hydro, alkyl, alkoxy, aryl, heteroaryl, heterocyclic, carbocyclic, amino, halo, sulfur, and thioalkyl group;

[0091] L_1 and L_2 are as defined above in their broadest aspects; and pharmaceutically acceptable salts thereof.

[0092] In one aspect of the invention, A is a group chosen from 5-halo-benzo[1,3]dioxole, dimethoxybenzene, and diethoxybenzene;

[0093] B is a group chosen from piperidine, piperidine-1-carboxylic acid ethyl ester, piperidine-1-carboxylic acid tert-butyl ester, 2,2,6,6-tetramethyl-piperidine, piperidine-2,6-dione, piperidine-1-carbaldehyde, 1-methyl-pyrrolidine, 1-isopropyl-piperazine, tetrahydro-pyran, adamantane, piperidine-1-carbaldehyde, 1-piperidin-1-yl-ethanone, 1-methanesulfonyl-piperidine, 1-propyl-piperidine, 1-trifluoromethanesulfonyl-piperidine, piperidine-1-carboxylic acid tert-butyl ester, pyrrolidine-1-carboxylic acid tert-butyl ester, morpholine-4-carboxylic acid tert-butyl ester, 1-pyrrolidin-1-yl-ethanone, 1-methanesulfonyl-pyrrolidine, pyrrolidine-1-carbaldehyde, azetidine-1-carboxylic acid *tert*-butyl ester, 1-methyl-azetidine, azetidine, azetidine-1-carbaldehyde, 1-azetidin-1-yl-ethanone, 1-methanesulfonyl-azetidine, and 1-trifluoromethanesulfonyl-azetidine, cycloheptane, imidazole, undecafluorocyclohexane, cyclohexyl-carbamic acid *tert*-butyl ester, 1-piperazin-1-yl-ethanone, 6,6-dimethyl-bicyclo[3.1.1]hept-2-ene, 5-methyl 2,4-dihydro-pyrazol-3-one, piperidine-1-carboxylic acid benzyl ester, morpholine, pyrrolidine-1-carboxylic acid benzyl ester, piperidine-1,2-dicarboxylic acid 1-tert butyl ester 2-ethyl ester, benzyl-1,2,3,6-tetrahydro-pyridine, hexahydro-4b-aza-cyclopropa[cd]pentalene, 2-isopropyl-piperidine-1carboxylic acid *tert*-butyl ester, piperidine-1-carboxylic acid ethyl amide, piperidine-1-carboxylic acid isopropyl amide, piperidine-1-carboxylic acid *tert*-butyl amide, [{piperidine-1-

carbonyl}amino]-acetic acid ethyl ester, isopropyl piperidine, isobutyl piperidine, 2,2-dimethyl-1-piperidin-1-yl-propan-1-one, 2,2-dimethyl-1-piperidin-1-yl-butan-1-one, 2-isopropyl-piperidine, 1-isopropyl piperazine, and 1-cyclopentyl-piperazine;

[0094] R1 is chosen from a hydro, alkyl, alkoxy, aryl, heteroaryl, heterocyclic, carbocyclic, amino, halo, sulfur, and thioalkyl group;

[0095] L_1 and L_2 are as defined above in their broadest aspects; and pharmaceutically acceptable salts thereof.

[0096] According to one aspect of the invention, in the compounds of Formula I, A is an aryl or heterocyclic group having one or more substituents chosen from halo, alkyl, alkoxy, haloalkyl, haloalkoxy, nitro, -C(=O)alkyl, hydroxyl, -C≡N, -SO_3, and –COOH. In a more specific aspect A is a phenyl group having one or more substituents chosen from halo, alkyl, alkoxy, haloalkyl, haloalkoxy, nitro, -C(=O)alkyl, hydroxyl, and –COOH. In another specific aspect, A is a phenyl group having one or more substituents chosen from –F, -Cl, -Br, -I, -OCH_3, and -OCH_2CH_3. In another aspect A is a benzo[1,3]dioxole group having one or more substituents chosen from halo, alkyl, alkoxy, haloalkyl, haloalkoxy, nitro, -C(=O)alkyl, hydroxyl, and –COOH. In another specific aspect, A is a benzo[1,3]dioxole group having one or more substituents chosen from –F, -Cl, -Br, -I, -OCH_3, and -OCH_2CH_3.

[0097] In one aspect, in the compounds of Formula I, A is an aryl or heterocyclic group with one or more substituents chosen from hydroxyl, halo, alkyl, alkoxy, haloalkyl, haloalkoxy, -$N(C_{1-3}$ alkyl$)_2$, -$NH(C_{1-3}$ alkyl), -$C(=O)NH_2$, -$C(=O)NH(C_{1-3}$ alkyl), -$C(=O)N(C_{1-3}$ alkyl$)_2$, -$S(=O)_2(C_{1-3}$alkyl), -$S(=O)_2NH_2$, -$S(=O)_2N(C_{1-3}$ alkyl$)_2$, -$S(=O)_2NH(C_{1-3}$ alkyl), -CHF_2, -OCF_3, -$OCHF_2$, -SCF_3, -CF_3, -CN, -NH_2, and -NO_2. In one specific aspect, A is a phenyl group having one or more substituents chosen from hydroxyl, halo, alkyl, alkoxy, haloalkyl, haloalkoxy, -$N(C_{1-3}$ alkyl$)_2$, -$NH(C_{1-3}$ alkyl), -$C(=O)NH_2$, -$C(=O)NH(C_{1-3}$ alkyl), -$C(=O)N(C_{1-3}$ alkyl$)_2$, -$S(=O)_2(C_{1-3}$alkyl), -$S(=O)_2NH_2$, -$S(=O)_2N(C_{1-3}$ alkyl$)_2$, -$S(=O)_2NH(C_{1-3}$ alkyl), -CHF_2, -OCF_3, -$OCHF_2$, -SCF_3, -CF_3, -CN, -NH_2, and -NO_2. In another specific aspect, A is a benzo[1,3]dioxole group having one or more substituents chosen from hydroxyl, halo, alkyl, alkoxy, haloalkyl, haloalkoxy, -$N(C_{1-3}$ alkyl$)_2$, -

$NH(C_{1-3}$ alkyl), -C(=O)NH_2, -C(=O)$NH(C_{1-3}$ alkyl), -C(=O)$N(C_{1-3}$ alkyl)$_2$, -$S(=O)_2(C_{1-3}$alkyl), -$S(=O)_2NH_2$, -$S(=O)_2N(C_{1-3}$ alkyl)$_2$, -$S(=O)_2NH(C_{1-3}$ alkyl), -CHF_2, -OCF_3, -$OCHF_2$, -SCF_3, -CF_3, -CN, -NH_2, and -NO_2.

[0098] In one aspect, in the compounds of Formula I, A is a phenyl or benzo[1,3]dioxole group having from 1-5 substituents independently chosen from acylamino, acyloxy, alkenyl, alkoxy, alkyl, alkylthio, alkynyl, amino, aryl, arylalkyl, arylalkenyl, arylalkynyl, arylalkoxy, aryloxy, arylthio, carbocycle, cyano, cyanato, halo, haloalkyl, halophenyl, hydroxyl, heteroaryl, heteroaryloxy, heterocycle, heteroarylalkoxy, isocyanato, isothiocyanato, nitro, sulfinyl, sulfonyl, sulfonamide, thiocarbonyl, thiocyanato, trihalomethanesulfonamido, O-carbamyl, N-carbamyl, O-thiocarbamyl, N-thiocarbamyl, and C-amido.

[0099] According to one aspect, in the compounds of Formula I, B is a heterocyclic group having one or more heteroatoms chosen from –N- and –O- wherein the heterocyclic group can have one or more substituents chosen from hydro, halo, alkyl, alkoxy, haloalkyl, haloalkoxy, nitro, -CH_2-aryl, -C(=O)alkyl, -C(=O)cycloalkyl, -C(=O)-NH-Alkyl, cycloalkyl, hydroxyl, -SO_3, –COOH (and esters thereof), amino acid (chosen from natural and non-natural amino acids), peptide having 1-5 amino acid residues (chosen from natural and non-natural amino acids), -C(=O)alkyl where the alkyl is substituted with one or more substituents (chosen from alkyl, amino, alkoxy, haloalkyl, haloalkoxy, nitro, cyano, hydroxyl, –COOH (and esters thereof), sulfonyl, sulfonamide) and sulfonyl. In one specific aspect, B is a piperidine (piperidinyl) group. In one specific aspect, B is a piperidine group substituted with one or more substituents chosen from hydro, halo, alkyl, alkoxy, haloalkyl, haloalkoxy, nitro, -CH_2-aryl, -C(=O)alkyl, -C(=O)cycloalkyl, -C(=O)-NH-Alkyl, cycloalkyl, hydroxyl, -SO_3, –COOH (and esters thereof), amino acid (chosen from natural and non-natural amino acids), peptide having 1-5 amino acid residues (chosen from natural and non-natural amino acids), -C(=O)alkyl where the alkyl is substituted with one or more substituents (chosen from alkyl, amino, alkoxy, haloalkyl, haloalkoxy, nitro, cyano, hydroxyl, –COOH (and esters thereof), sulfonyl, sulfonamide) and sulfonyl. In a more specific aspect, B is a piperidine group having one or more substituents chosen from hydro,

halo, alkyl, alkoxy, haloalkyl, haloalkoxy, nitro, -CH_2-aryl, -C(=O)alkyl, -C(=O)-NH-Alkyl, cycloalkyl, hydroxyl, -SO_3, –COOH (and esters thereof), and sulfonyl. In an even more specific aspect, B is a piperidine group having one or more substituents chosen from –C(=O), –C(=O)CH_3, -CH_3, -CH_2CH_3, -$CH_2CH_2CH_3$, -C(=O)OCH_2CH_3, -$S(=O)_2CH_3$, -$S(=O)_2CF_3$, -C(=O)$OC(CH_3)_3$, –C(=O)OCH_2-phenyl, -CH_2-phenyl, -$CH(CH_3)_2$, -C(=O)$NHCH_2CH_3$, -C(=O)$NHCH(CH_3)_2$, -C(=O)$NHC(CH_3)_3$, -C(=O)$NHCH_2C(=O)OCH_2CH_3$, -C(=O)$C(CH_3)_3$, -$CH(CH_3)_2$, -$CH_2CH(CH_3)_2$, -C(=O)$CH_2C(CH_3)_3$, and cyclopentyl.

[00100] In one specific aspect, B is a homopiperidine (homopiperidinyl) group. In a more specific aspect, B is a homopiperidine group having one or more substituents chosen from hydro, halo, alkyl, alkoxy, haloalkyl, haloalkoxy, nitro, -CH_2-aryl, -C(=O)alkyl, -C(=O)cycloalkyl, -C(=O)-NH-Alkyl, cycloalkyl, hydroxyl, -SO_3, –COOH (and esters thereof), amino acid (chosen from natural and non-natural amino acids), peptide having 1-5 amino acid residues (chosen from natural and non-natural amino acids), -C(=O)alkyl where the alkyl is substituted with one or more substituents (chosen from alkyl, amino, alkoxy, haloalkyl, haloalkoxy, nitro, cyano, hydroxyl, –COOH (and esters thereof), sulfonyl, sulfonamide) and sulfonyl. In an even more specific aspect, B is a homopiperidine group having one or more substituents chosen from –C(=O), –C(=O)CH_3, -CH_3, -CH_2CH_3, -$CH_2CH_2CH_3$, -C(=O)OCH_2CH_3, -$S(=O)_2CH_3$, -$S(=O)_2CF_3$, -C(=O)$OC(CH_3)_3$, –C(=O)OCH_2-phenyl, -CH_2-phenyl, -$CH(CH_3)_2$, -C(=O)$NHCH_2CH_3$, -C(=O)$NHCH(CH_3)_2$, -C(=O)$NHC(CH_3)_3$, -C(=O)$NHCH_2C(=O)OCH_2CH_3$, -C(=O)$C(CH_3)_3$, -$CH(CH_3)_2$, -$CH_2CH(CH_3)_2$, -C(=O)$CH_2C(CH_3)_3$, and cyclopentyl.

[00101] In one specific aspect, B is a piperazine (piperazinyl) group. In a more specific aspect, B is a piperazine group having one or more substituents chosen from hydro, halo, alkyl, alkoxy, haloalkyl, haloalkoxy, nitro, -CH_2-aryl, -C(=O)alkyl, -C(=O)cycloalkyl, -C(=O)-NH-Alkyl, cycloalkyl, hydroxyl, -SO_3, –COOH (and esters thereof), amino acid (chosen from natural and non-natural amino acids), peptide having 1-5 amino acid residues (chosen from natural and non-natural amino acids), -C(=O)alkyl where the alkyl is substituted with one or more substituents (chosen from alkyl, amino, alkoxy, haloalkyl, haloalkoxy, nitro, cyano,

hydroxyl, –COOH (and esters thereof), sulfonyl, sulfonamide) and sulfonyl. In an even more specific aspect, B is a piperazine group having one or more substituents chosen from –C(=O), –C(=O)CH_3, -CH_3, -CH_2CH_3, -$CH_2CH_2CH_3$, -C(=O)OCH_2CH_3, -S(=O)$_2CH_3$, -S(=O)$_2CF_3$, -C(=O)$OC(CH_3)_3$, –C(=O)OCH_2-phenyl, -CH_2-phenyl, -$CH(CH_3)_2$, -C(=O)$NHCH_2CH_3$, -C(=O)$NHCH(CH_3)_2$, -C(=O)$NHC(CH_3)_3$, -C(=O)$NHCH_2C$(=O)OCH_2CH_3, -C(=O)$C(CH_3)_3$, -$CH(CH_3)_2$, -$CH_2CH(CH_3)_2$, -C(=O)$CH_2C(CH_3)_3$, and cyclopentyl.

[00102] In one specific aspect, B is a pyrrolidine (pyrrolidinyl) group. In a more specific aspect, B is a pyrrolidine group having one or more substituents chosen from hydro, halo, alkyl, alkoxy, haloalkyl, haloalkoxy, nitro, -CH_2-aryl, -C(=O)alkyl, -C(=O)cycloalkyl, -C(=O)-NH-Alkyl, cycloalkyl, hydroxyl, -SO_3, –COOH (and esters thereof), amino acid (chosen from natural and non-natural amino acids), peptide having 1-5 amino acid residues (chosen from natural and non-natural amino acids), -C(=O)alkyl where the alkyl is substituted with one or more substituents (chosen from alkyl, amino, alkoxy, haloalkyl, haloalkoxy, nitro, cyano, hydroxyl, –COOH (and esters thereof), sulfonyl, sulfonamide) and sulfonyl. In an even more specific aspect, B is a pyrrolidine group having one or more substituents chosen from –C(=O), –C(=O)CH_3, -CH_3, -CH_2CH_3, -$CH_2CH_2CH_3$, -C(=O)OCH_2CH_3, -S(=O)$_2CH_3$, -S(=O)$_2CF_3$, -C(=O)$OC(CH_3)_3$, –C(=O)OCH_2-phenyl, -CH_2-phenyl, -$CH(CH_3)_2$, -C(=O)$NHCH_2CH_3$, -C(=O)$NHCH(CH_3)_2$, -C(=O)$NHC(CH_3)_3$, -C(=O)$NHCH_2C$(=O)OCH_2CH_3, -C(=O)$C(CH_3)_3$, -$CH(CH_3)_2$, -$CH_2CH(CH_3)_2$, -C(=O)$CH_2C(CH_3)_3$, and cyclopentyl.

[00103] In one specific aspect, B is an azetidine (azetidinyl) group. In a more specific aspect, B is an azetidine group having one or more substituents chosen from hydro, halo, alkyl, alkoxy, haloalkyl, haloalkoxy, nitro, -CH_2-aryl, -C(=O)alkyl, -C(=O)cycloalkyl, -C(=O)-NH-Alkyl, cycloalkyl, hydroxyl, -SO_3, –COOH (and esters thereof), amino acid (chosen from natural and non-natural amino acids), peptide having 1-5 amino acid residues (chosen from natural and non-natural amino acids), -C(=O)alkyl where the alkyl is substituted with one or more substituents (chosen from alkyl, amino, alkoxy, haloalkyl, haloalkoxy, nitro, cyano, hydroxyl, –COOH (and esters thereof), sulfonyl, sulfonamide) and sulfonyl. In an

even more specific aspect, B is an azetidine group having one or more substituents chosen from –C(=O), –C(=O)CH_3, -CH_3, -CH_2CH_3, -$CH_2CH_2CH_3$, -C(=O)OCH_2CH_3, -S(=O)$_2CH_3$, -S(=O)$_2CF_3$, -C(=O)$OC(CH_3)_3$, –C(=O)OCH_2-phenyl, -CH_2-phenyl, -$CH(CH_3)_2$, -C(=O)$NHCH_2CH_3$, -C(=O)$NHCH(CH_3)_2$, -C(=O)$NHC(CH_3)_3$, -C(=O)$NHCH_2C$(=O)OCH_2CH_3, -C(=O)$C(CH_3)_3$, -$CH(CH_3)_2$, -$CH_2CH(CH_3)_2$, -C(=O)$CH_2C(CH_3)_3$, and cyclopentyl.

[00104] In one aspect of the compounds of Formula I, B is a heterocyclic group with one or more substituents chosen from hydroxyl, halo, alkyl, alkoxy, haloalkyl, haloalkoxy, -N(C_{1-3} alkyl)$_2$, -NH(C_{1-3} alkyl), -C(=O)NH_2, -C(=O)NH(C_{1-3} alkyl), -C(=O)N(C_{1-3} alkyl)$_2$, -S(=O)$_2$(C_{1-3}alkyl), -S(=O)$_2NH_2$, -S(=O)$_2$N(C_{1-3} alkyl)$_2$, -S(=O)$_2$NH(C_{1-3} alkyl), -CHF_2, -OCF_3, -$OCHF_2$, -SCF_3, -CF_3, -CN, -NH_2, -SO_3, and -NO_2. In a specific aspect, B a group is chosen piperidine, piperazine, pyrrolidine, azetidine, tetrahydro-pyran, and morpholine group, each having one or more substituents. In a more specific aspect, B is a piperidine group having one or more substituents.

[00105] In one aspect, B is a group chosen from piperidine, piperazine, pyrrolidine, azetidine, tetrahydro-pyran, and morpholine, wherein said B group can have from 1-5 substituents independently chosen from acylamino, acyloxy, alkenyl, alkoxy, alkyl, alkylthio, alkynyl, amino, aryl, arylalkyl, arylalkenyl, arylalkynyl, arylalkoxy, aryloxy, arylthio, carbocycle, cyano, cyanato, halo, haloalkyl, halophenyl, hydroxyl, heteroaryl, heteroaryloxy, heterocycle, heteroarylalkoxy, isocyanato, isothiocyanato, nitro, sulfinyl, sulfonyl, sulfonamide, thiocarbonyl, thiocyanato, trihalomethanesulfonamido, O-carbamyl, N-carbamyl, O-thiocarbamyl, N-thiocarbamyl, and C-amido. In a more specific aspect, B is a piperidine group having one or more substituents.

[00106] According to one embodiment, A is a substituted or unsubstituted benzo[1,3]dioxole group. In one aspect of this embodiment, A is a 5-bromo-benzo[1,3]dioxole group. In one aspect of this embodiment, A is an unsubstituted benzo[1,3]dioxole group. In one aspect of this embodiment, A is a 5-iodo-benzo[1,3]dioxole group. In one aspect of this embodiment, A is a 5-chloro-benzo[1,3]dioxole group. In one aspect of this embodiment, A is a 5-fluoro-

benzo[1,3]dioxole group. In one aspect of this embodiment, A has from 1-5 substituents independently chosen from acylamino, acyloxy, alkenyl, alkoxy, alkyl, alkylthio, alkynyl, amino, aryl, arylalkyl, arylalkenyl, arylalkynyl, arylalkoxy, aryloxy, arylthio, carbocycle, cyano, cyanato, halo, haloalkyl, halophenyl, hydroxyl, heteroaryl, heteroaryloxy, heterocycle, heteroarylalkoxy, isocyanato, isothiocyanato, nitro, sulfinyl, sulfonyl, sulfonamide, thiocarbonyl, thiocyanato, trihalomethanesulfonamido, O-carbamyl, N-carbamyl, O-thiocarbamyl, N-thiocarbamyl, and C-amido.

[00107] In one aspect of the invention, A is substituted with one or more substituents and is a group chosen from a phenyl, benzo[1,3]dioxole, indanone, group; B is substituted with one or more substituents and is a group chosen from piperidine, piperazine, pyrrolidine, azetidine, tetrahyro-pyran, and morpholine; R_1 is a hydro; L_1 is –S-; L_2 is $–CH_2CH_2$-, and pharmaceutically acceptable salt thereof. According to this aspect of the invention, the A group substituents are chosen from halo, -CN, alkoxy, and the B group substituents are chosen from –C(=O), –$C(=O)CH_3$, $-CH_3$, $-CH_2CH_3$, $-CH_2CH_2CH_3$, $-C(=O)OCH_2CH_3$, $-S(=O)_2CH_3$, $-S(=O)_2CF_3$, $-C(=O)OC(CH_3)_3$, $–C(=O)OCH_2$-phenyl, $-CH_2$-phenyl, $-CH(CH_3)_2$, $-C(=O)NHCH_2CH_3$, $-C(=O)NHCH(CH_3)_2$, $-C(=O)NHC(CH_3)_3$, $-C(=O)NHCH_2C(=O)OCH_2CH_3$, $-C(=O)C(CH_3)_3$, $-CH(CH_3)_2$, $-CH_2CH(CH_3)_2$, $-C(=O)CH_2C(CH_3)_3$, and cyclopentyl.

[00108] In one aspect of the invention, A can be substituted or unsubstituted and is chosen from an aryl and heterocyclic group;

[00109] B can be substituted or unsubstituted and is chosen from a cycloalkyl and heterocyclic group;

[00110] R1 is chosen from a hydro, alkyl, alkoxy, aryl, heteroaryl, heterocyclic, carbocyclic, amino, halo, sulfur, and thioalkyl group;

[00111] L_1 and L_2 are as defined above in their broadest aspects; and pharmaceutically acceptable salts thereof.

[00112] In another aspect of the invention, A can be substituted or unsubstituted and is chosen from a benzo[1,3]dioxole and phenyl group;

[00113] B can be substituted or unsubstituted and is chosen from a heteroaryl, heterocyclic, and cycloalkyl group;

[00114] R1 is chosen from a hydro, alkyl, alkoxy, aryl, heteroaryl, heterocyclic, carbocyclic, amino, halo, sulfur, and thioalkyl group;

L_1 and L_2 are as defined above in their broadest aspects; and pharmaceutically acceptable salts thereof.

[00115] In one aspect of the invention, A can be substituted or unsubstituted and is a group chosen from 5-halo-benzo[1,3]dioxole (*e.g.*, 5-bromo-benzo[1,3]dioxole), dimethoxybenzene (*e.g.*, 1,4-dimethoxybenzene, 2,3-dimethoxybenzene, and 2,4-dimethoxybenzene), and diethoxybenzene (*e.g.*, 1,4-diethoxybenzene, 2,3-diethoxybenzene, and 2,4-diethoxybenzene);

[00116] B can be substituted or unsubstituted and is chosen from a cycloalkyl, heteroaryl, and heterocyclic group;

[00117] R1 is chosen from a hydro, alkyl, alkoxy, aryl, heteroaryl, heterocyclic, carbocyclic, amino, halo, sulfur, and thioalkyl group;

[00118] L_1 and L_2 are as defined above in their broadest aspects; and pharmaceutically acceptable salts thereof.

[00119] In one aspect of the invention, A can be substituted or unsubstituted and is chosen from an aryl, heteroaryl, heterocyclic, and carbocyclic group;

[00120] B can be substituted or unsubstituted and is a group chosen from cyclopropyl, cyclobutyl, cyclopentyl, cyclohexyl, tetrahydrofuranyl, oxepanyl (oxepane), tetrahydro-thiophenyl (tetrahydro-thiophene), thiopyranyl, thiepanyl (thiepane), and tetrahydro-pyranyl;

[00121] R1 is chosen from a hydro, alkyl, alkoxy, aryl, heteroaryl, heterocyclic, carbocyclic, amino, halo, sulfur, and thioalkyl group;

[00122] L_1 and L_2 are defined as above; and pharmaceutically acceptable salts thereof.

[00123] In one aspect of the invention, A can be substituted or unsubstituted and is chosen from an aryl, heteroaryl, heterocyclic, and carbocyclic group;

[00124] -L_2-B is a group chosen from (1-Cyclopropyl-propyl)-carbamic acid tert-butyl ester, [1-(Tetrahydro-thiopyran-4-yl)-propyl]-carbamic acid tert-butyl ester, (1-Cyclohexyl-propyl)-carbamic acid tert-butyl ester, (1-Cyclobutyl-propyl)-carbamic acid tert-butyl ester, N-(1-Cyclopropyl-propyl)-methanesulfonamide, 1-(1-Cyclopropyl-propyl)-3-isopropyl-urea, (1-Cyclopentyl-propyl)-carbamic acid tert-butyl ester, [1-(Tetrahydro-pyran-4-yl)-propyl]-carbamic acid tert-butyl ester, 1-Cyclopropyl-propylamine, 1-Cyclohexyl-propylamine, 1-Cyclobutyl-propylamine, 1-Cyclopentyl-propylamine, 1-(Tetrahydro-pyran-4-yl)-propylamine, 1-(Tetrahydro-thiopyran-4-yl)-propyl amine, and 1-(1-Cyclohexyl-propyl)-1H-pyrrole;

[00125] R1 is chosen from a hydro, alkyl, alkoxy, aryl, heteroaryl, heterocyclic, carbocyclic, amino, halo, sulfur, and thioalkyl group;

[00126] L_1 is as defined above; and pharmaceutically acceptable salts thereof.

[00127] In some specific aspects of the invention, L_2 is as defined above and has one or more substituents chosen from hydroxyl, halo, alkoxy, amino, C_{1-3} alkyl, C_{3-7} cycloalkyl, -N-C(=O)$OC(CH_3)_3$, -NSO_2CH_3, -$NC(=O)NC(CH_3)_2$, and pyrrolyl.

[00128] In one aspect of the invention, A can be substituted or unsubstituted and is chosen from a benzo[1,3]dioxole and phenyl group;

[00129] B can be substituted or unsubstituted and is a heteroaryl or heterocyclic group chosen from cyclopropyl, cyclobutyl, cyclopentyl, cyclohexyl, tetrahydrofuranyl, oxepanyl (oxepane), tetrahydro-thiophenyl (tetrahydro-thiophene), thiopyranyl, thiepanyl (thiepane), and tetrahydro-pyranyl;

[00130] R1 is chosen from a hydro, alkyl, alkoxy, aryl, heteroaryl, heterocyclic, carbocyclic, amino, halo, sulfur, and thioalkyl group;

[00131] L_1 and L_2 are as defined above in their broadest aspects; and pharmaceutically acceptable salts thereof.

[00132] In one aspect of the invention, A can be substituted or unsubstituted and is chosen from a benzo[1,3]dioxole and phenyl group;

[00133] B is a group chosen from cyclopropyl, cyclobutyl, cyclopentyl, cyclohexyl, tetrahydrofuranyl, oxepanyl (oxepane), tetrahydro-thiophenyl (tetrahydro-thiophene), thiopyranyl, thiepanyl (thiepane), and tetrahydro-pyranyl;

[00134] R1 is chosen from a hydro, alkyl, alkoxy, aryl, heteroaryl, heterocyclic, carbocyclic, amino, halo, sulfur, and thioalkyl group;

[00135] L_1 and L_2 are as defined above in their broadest aspects; and pharmaceutically acceptable salts thereof.

[00136] In one aspect of the invention, A is a group chosen from 5-halo-benzo[1,3]dioxole, dimethoxybenzene, and diethoxybenzene;

[00137] B is a group chosen cyclopropyl, cyclobutyl, cyclopentyl, cyclohexyl, tetrahydrofuranyl, oxepanyl (oxepane), tetrahydro-thiophenyl (tetrahydro-thiophene), thiopyranyl, thiepanyl (thiepane), and tetrahydro-pyranyl;

[00138] R1 is chosen from a hydro, alkyl, alkoxy, aryl, heteroaryl, heterocyclic, carbocyclic, amino, halo, sulfur, and thioalkyl group;

[00139] L_1 and L_2 are as defined above in their broadest aspects; and pharmaceutically acceptable salts thereof.

[00140] According to one aspect of the invention, in the compounds of Formula I, A is an aryl or heterocyclic group having one or more substituents chosen from halo, alkyl, alkoxy, haloalkyl, haloalkoxy, nitro, -C(=O)alkyl, hydroxyl, -C≡N, $-SO_3$, and –COOH. In another specific aspect, A is a phenyl group having one or more substituents chosen from halo, alkyl, alkoxy, haloalkyl, haloalkoxy, nitro, -C(=O)alkyl, hydroxyl, and –COOH. In another specific aspect, A is a phenyl group having one or more substituents chosen from –F, -Cl, -Br, -I, $-OCH_3$, and $-OCH_2CH_3$. In another aspect, A is a benzo[1,3]dioxole group having one or more substituents chosen from halo, alkyl, alkoxy, haloalkyl, haloalkoxy, nitro, -C(=O)alkyl, hydroxyl, and –COOH. In another specific aspect, A is a benzo[1,3]dioxole group having one or more substituents chosen from –F, -Cl, -Br, -I, $-OCH_3$, and $-OCH_2CH_3$.

[00141] In one aspect, in the compounds of Formula I, A is an aryl or heterocyclic group with one or more substituents chosen from hydroxyl, halo, alkyl, alkoxy, haloalkyl, haloalkoxy, $-N(C_{1-3}\ alkyl)_2$, $-NH(C_{1-3}\ alkyl)$, $-C(=O)NH_2$, -

C(=O)NH(C_{1-3} alkyl), -C(=O)N(C_{1-3} alkyl)$_2$, -S(=O)$_2$(C_{1-3}alkyl), -S(=O)$_2$NH$_2$, -S(=O)$_2$N(C_{1-3} alkyl)$_2$, -S(=O)$_2$NH(C_{1-3} alkyl), -CHF_2, -OCF_3, -$OCHF_2$, -SCF_3, -CF_3, -CN, -NH_2, and -NO_2. In one specific aspect, A is a phenyl group having one or more substituents chosen from hydroxyl, halo, alkyl, alkoxy, haloalkyl, haloalkoxy, -N(C_{1-3} alkyl)$_2$, -NH(C_{1-3} alkyl), -C(=O)NH_2, -C(=O)NH(C_{1-3} alkyl), -C(=O)N(C_{1-3} alkyl)$_2$, -S(=O)$_2$(C_{1-3}alkyl), -S(=O)$_2$$NH_2$, -S(=O)$_2$N($C_{1-3}$ alkyl)$_2$, -S(=O)$_2$NH(C_{1-3} alkyl), -CHF_2, -OCF_3, -$OCHF_2$, -SCF_3, -CF_3, -CN, -NH_2, and -NO_2. In another specific aspect, A is a benzo[1,3]dioxole group having one or more substituents chosen from hydroxyl, halo, alkyl, alkoxy, haloalkyl, haloalkoxy, -N(C_{1-3} alkyl)$_2$, -NH(C_{1-3} alkyl), -C(=O)NH_2, -C(=O)NH(C_{1-3} alkyl), -C(=O)N(C_{1-3} alkyl)$_2$, -S(=O)$_2$(C_{1-3}alkyl), -S(=O)$_2$$NH_2$, -S(=O)$_2$N($C_{1-3}$ alkyl)$_2$, -S(=O)$_2$NH(C_{1-3} alkyl), -CHF_2, -OCF_3, -$OCHF_2$, -SCF_3, -CF_3, -CN, -NH_2, and -NO_2.

[00142] In one specific aspect of the compounds of the invention, B is a cycloalkyl (*e.g.*, cyclopropyl, cyclobutyl, cyclohexyl, or cycloheptyl) group. In another specific aspect, B is a cycloalkyl group having one or more substituents chosen from hydro, halo, alkyl, alkoxy, haloalkyl, haloalkoxy, nitro, -CH_2-aryl, -C(=O)alkyl, -C(=O)-NH-Alkyl, cycloalkyl, hydroxyl, -SO_3, –COOH (and esters thereof), and sulfonyl. In another specific aspect, B is a cycloalkyl group having one or more substituents chosen from –C(=O), –C(=O)CH_3, -CH_3, -CH_2CH_3, -$CH_2CH_2CH_3$, -C(=O)OCH_2CH_3, -S(=O)$_2$$CH_3$, -S(=O)$_2$$CF_3$, -C(=O)OC($CH_3$)$_3$, –C(=O)$OCH_2$-phenyl, -$CH_2$-phenyl, -CH($CH_3$)$_2$, -C(=O)$NHCH_2CH_3$, -C(=O)NHCH($CH_3$)$_2$, -C(=O)NHC($CH_3$)$_3$, -C(=O)$NHCH_2$C(=O)$OCH_2CH_3$, -C(=O)C($CH_3$)$_3$, -CH($CH_3$)$_2$, -$CH_2$CH($CH_3$)$_2$, -C(=O)$CH_2$C($CH_3$)$_3$, cyclopropyl, cyclobutyl, cyclopentyl, and cyclohexyl.

[00143] In one specific aspect of the compounds of the invention, B is a thiopyranyl group. In another specific aspect, B is a thiopyranyl group having one or more substituents chosen from hydro, halo, alkyl, alkoxy, haloalkyl, haloalkoxy, nitro, -CH_2-aryl, -C(=O)alkyl, -C(=O)-NH-Alkyl, cycloalkyl, hydroxyl, -SO_3, –COOH (and esters thereof), and sulfonyl. In another specific aspect, B is a thiopyranyl group having one or more substituents chosen from –C(=O), –C(=O)CH_3, -CH_3, -CH_2CH_3, -$CH_2CH_2CH_3$, -C(=O)OCH_2CH_3, -S(=O)$_2$$CH_3$, -

$S(=O)_2CF_3$, -C(=O)$OC(CH_3)_3$, –C(=O)OCH_2-phenyl, -CH_2-phenyl, -$CH(CH_3)_2$, -C(=O)$NHCH_2CH_3$, -C(=O)$NHCH(CH_3)_2$, -C(=O)$NHC(CH_3)_3$, -C(=O)$NHCH_2C(=O)OCH_2CH_3$, -C(=O)$C(CH_3)_3$, -$CH(CH_3)_2$, -$CH_2CH(CH_3)_2$, -C(=O)$CH_2C(CH_3)_3$, cyclopropyl, cyclobutyl, cyclopentyl, and cyclohexyl.

[00144] In one specific aspect of the compounds of the invention, B is a tetrahydro-pyranyl group. In another specific aspect, B is a tetrahydro-pyranyl group having one or more substituents chosen from hydro, halo, alkyl, alkoxy, haloalkyl, haloalkoxy, nitro, -CH_2-aryl, -C(=O)alkyl, -C(=O)-NH-Alkyl, cycloalkyl, hydroxyl, -SO_3, –COOH (and esters thereof), and sulfonyl. In another specific aspect, B is a tetrahydro-pyranyl group having one or more substituents chosen from –C(=O), –C(=O)CH_3, -CH_3, -CH_2CH_3, -$CH_2CH_2CH_3$, -C(=O)OCH_2CH_3, -$S(=O)_2CH_3$, -$S(=O)_2CF_3$, -C(=O)$OC(CH_3)_3$, –C(=O)OCH_2-phenyl, -CH_2-phenyl, -$CH(CH_3)_2$, -C(=O)$NHCH_2CH_3$, -C(=O)$NHCH(CH_3)_2$, -C(=O)$NHC(CH_3)_3$, -C(=O)$NHCH_2C(=O)OCH_2CH_3$, -C(=O)$C(CH_3)_3$, -$CH(CH_3)_2$, -$CH_2CH(CH_3)_2$, -C(=O)$CH_2C(CH_3)_3$, cyclopropyl, cyclobutyl, cyclopentyl, and cyclohexyl.

[00145] In one aspect, B is a group chosen cyclopropyl, cyclobutyl, cyclopentyl, cyclohexyl, tetrahydrofuranyl, oxepanyl (oxepane), tetrahydro-thiophenyl (tetrahydro-thiophene), thiopyranyl, thiepanyl (thiepane), and tetrahydro-pyranyl, wherein said B group can have from 1-5 substituents independently chosen from acylamino, acyloxy, alkenyl, alkoxy, alkyl, alkylthio, alkynyl, amino, aryl, arylalkyl, arylalkenyl, arylalkynyl, arylalkoxy, aryloxy, arylthio, carbocycle, cyano, cyanato, halo, haloalkyl, halophenyl, hydroxyl, heteroaryl, heteroaryloxy, heterocycle, heteroarylalkoxy, isocyanato, isothiocyanato, nitro, sulfinyl, sulfonyl, sulfonamide, thiocarbonyl, thiocyanato, trihalomethanesulfonamido, O-carbamyl, N-carbamyl, O-thiocarbamyl, N-thiocarbamyl, and C-amido.

[00146] In one aspect of the invention, A is substituted with one or more substituents and is a group chosen from a phenyl or benzo[1,3]dioxole group; B is substituted with one or more substituents and is a group chosen from cyclopropyl, cyclobutyl, cyclopentyl, cyclohexyl, pyrrolyl, thiopyranyl, and tetrahydro-pyranyl; R_1 is a hydro; L_1 is –S-; L_2 is –CH_2CH_2-, and pharmaceutically acceptable salt thereof. According to this aspect of the invention, the A group substituents are

chosen from halo and alkoxy, and the B group substituents are chosen from –C(=O), –C(=O)CH_3, -CH_3, -CH_2CH_3, -$CH_2CH_2CH_3$, -C(=O)OCH_2CH_3, -S(=O)$_2CH_3$, -S(=O)$_2CF_3$, -C(=O)$OC(CH_3)_3$, –C(=O)OCH_2-phenyl, -CH_2-phenyl, -$CH(CH_3)_2$, -C(=O)$NHCH_2CH_3$, -C(=O)$NHCH(CH_3)_2$, -C(=O)$NHC(CH_3)_3$, -C(=O)$NHCH_2C$(=O)OCH_2CH_3, -C(=O)$C(CH_3)_3$, -$CH(CH_3)_2$, -$CH_2CH(CH_3)_2$, -C(=O)$CH_2C(CH_3)_3$, cyclopropyl, cyclobutyl, cyclopentyl, and cyclohexyl.

[00147] In one aspect, the invention provides compounds of Formula I wherein R1 is hydro.

[00148] In one aspect, the invention provides compounds of Formula I wherein L_1 is –S-.

[00149] In one aspect, the invention provides compounds of Formula I wherein L_2 –CH_2CH_2-.

[00150] In one aspect, the invention provides compounds of Formula I, wherein the B ring is an optionally substituted admantane ring.

[00151] In one aspect, the invention provides compounds of Formula I wherein wherein L_2 is -$(CH_2)_n$-$(CH_2)_n$-, and each n is independently chosen from 0, 1, 2, and 3 and wherein each carbon can be optionally substituted with one or more substituents independently chosen from hydroxyl, halo, alkoxy, alkyl, amino, cycloalkyl, -NR_2R_3, -NSO_2R_4, -NC(=O)NR_2R_3, heteroaryl, aryl, cycloalkyl, and heterocyclic; wherein -R_2 and -R_3 are independently chosen from –H, alkyl, and -C(=O)OR_4; and wherein R_4 is an alkyl group (*e.g.*, methyl, ethyl, propyl, isopropyl, butyl, isobutyl, or *tert*-butyl).

[00152] Unless otherwise defined, all technical and scientific terms used herein have the same meaning as commonly understood by one of ordinary skill in the art to which this invention pertains. Although methods and materials similar or equivalent to those described herein can be used in the practice or testing of the present invention, suitable methods and materials are described below. In case of conflict, the present specification, including definitions, will control. In addition, the materials, methods, and examples are illustrative only and not intended to be limiting.

[00153] Other features and advantages of the invention will be apparent from the following detailed description, and from the claims.

DETAILED DESCRIPTION OF THE INVENTION

1. Definitions

[00154] As used herein, "acylamino" (or "acylamido") groups are any C1-6 acyl (alkanoyl) as defined herein, attached to an amino nitrogen, e.g., acetamido, chloroacetamido, propionamido, butanoylamido, pentanoylamido and hexanoylamido, as well as aryl-substituted C1-6 acylamino groups, e.g., benzoylamido, and pentafluorobenzoylamido.

[00155] As used herein, "acyloxy" groups are any C1-6 acyl (alkanoyl) as definided herein, attached to an oxy (–O–) group, e.g., formyloxy, acetoxy, propionoyloxy, butanoyloxy, pentanoyloxy and hexanoyloxy.

[00156] As used herein, the term "alkenyl" refers to, by itself or as part of another group, a straight or branched chain radical of 2-10 carbon atoms, unless the chain length is limited thereto, including at least one double bond between two of the carbon atoms in the chain. Typical non-limiting examples of alkenyl groups include ethenyl, 1-propenyl, 2-propenyl, 2-methyl-1-propenyl, 1-butenyl and 2-butenyl.

[00157] As used herein, the term "alkoxy" refers to both an -O-alkyl and an -O-cycloalkyl group, as defined herein. Lower alkoxy refers to -O-lower alkyl groups. Non-limiting alkoxy groups include oxygen substituted by one of the C1-10 alkyl groups mentioned above, which may be optionally substituted. Alkoxy substituents include, without limitation, halo, morpholino, amino including alkylamino and dialkylamino, and carboxy including esters thereof.

[00158] As used herein, the term "alkyl" refers to a saturated aliphatic hydrocarbon including straight chain and branched chain groups. In one aspect, the alkyl group has 1 to 20 carbon atoms (whenever it appears herein, a numerical range such as "1 to 20" refers to each integer in the given range; e.g., "1 to 20 carbon atoms" means that the alkyl group may consist of 1 carbon atom, 2 carbon atoms, 3 carbon atoms, etc. up to and including 20 carbon atoms). In another aspect, it is a medium size alkyl having 1 to 10 carbon atoms. In yet another aspect, it is a lower alkyl having 1 to 6 carbon atoms, and even more preferably 1 to 4 carbon atoms. The alkyl group may be substituted or unsubstituted. When substituted, the substituent group(s) can be one or more independently chosen from cycloalkyl, aryl, heteroaryl, heterocyclic, hydroxy, alkoxy, aryloxy, mercapto, alkylthio, arylthio, cyano, halo, carbonyl, thiocarbonyl, O-carbamyl, N-carbamyl, O-thiocarbamyl, N-thiocarbamyl, C-amido, N-amido, C-carboxy, O-carboxy, cyanato, isocyanato, thiocyanato, isothiocyanato, nitro, silyl, and amino. Typical non-

limiting examples of C1-10 alkyl groups include methyl, ethyl, propyl, isopropyl, butyl, sec butyl, tert butyl, pentyl, hexyl and octyl groups, which may be optionally substituted.

[00159] As used herein, the term "alkylthio" group refers to both an S-alkyl and an -S-cycloalkyl group, as defined herein. Non-limiting alkylthio groups include sulfur substituted by one of the C1-10 alkyl groups mentioned above, which may be optionally substituted. Also included are the sulfoxides and sulfones of such alkylthio groups.

[00160] As used herein, the term "alkynyl" refers to a straight or branched chain radical of 2-10 carbon atoms, unless the chain length is limited thereto, wherein there is at least one triple bond between two of the carbon atoms in the chain. Typical alkynyl groups include ethynyl, 1-propynyl, 1-methyl-2-propynyl, 2-propynyl, 1-butynyl and 2-butynyl.

[00161] As used herein, the term "amino" refers to an $-NR_{17}R_{18}$ group, with R_{17} and R_{18} being hydro to give an $-NH_2$ group. Independently, R_{17} and R_{18} may also be hydro, C1-10 alkyl or cycloalkyl groups, or R_{17} and R_{17} are combined with the N to form a ring structure, such as a piperidine, or R_{17} and R_{18} are combined with the N to form a ring, such as a piperazine. One of R_{17} and R_{18} can be hydro and the other alkyl or cycloalkyl. The alkyl or cycloalkyl group may be optionally substituted.

[00162] As used herein, the term "amino acid" refers to natural and non-natural amino acids. Examples of natural amino acids include, but are not limited, Alanine, arginine, asparagine, aspartic acid, cysteine, glutamic acid, glutamine, glycine, histidine, isoleucine, leucine, lysine, methionine, phenylalanine, proline, serine, threonine, tryptophan, tyrosine, valine, and protected versions thereof (e.g., boc). Examples of non-natural amino acids include, but are not limited to, O-methyl-L-tyrosine, an L-3-(2-naphthyl)alanine, a 3-methyl-phenylalanine, an O-4-allyl-L-tyrosine, a 4-propyl-L-tyrosine, a tri-O-acetyl-GlcNAcβ-serine, an L-Dopa, a fluorinated phenylalanine, an isopropyl-L-phenylalanine, a p-azido-L-phenylalanine, a p-acyl-L-phenylalanine, a p-benzoyl-L-phenylalanine, an L-phosphoserine, a phosphonoserine, a phosphonotyrosine, a p-iodo-phenylalanine, a p-bromophenylalanine, a p-amino-L-phenylalanine, and an isopropyl-L-phenylalanine.

[00163] As used herein, the term "aryl" refers to, by itself or as part, of another group a monocyclic, bicyclic or tricyclic aromatic groups containing from 6 to 14 carbons in the ring portion. Non-limiting aryl groups include C6-14 aryl, preferably C6-10 aryl. Typical C6-14 aryl groups include phenyl, naphthyl, phenanthrenyl, anthracenyl, indenyl, azulenyl, biphenyl, biphenylenyl and fluorenyl groups.

[00164] As used herein, the term “arylalkyl” refers to any of the C1-10 alkyl groups substituted by any of the above-mentioned C6-14 aryl groups as defined herein. Non-limiting examples of arylalkyl group include benzyl, phenethyl, and naphthylmethyl.

[00165] As used herein, the term “arylalkenyl” is used herein to mean any of the above-mentioned C2-10 alkenyl groups substituted by any of the above-mentioned C6-14 aryl groups.

[00166] As used herein, the term “arylalkynyl” refers to any of C2-10 alkynyl groups substituted by any of the above-mentioned C6-14 aryl groups as defined herein.

[00167] As used herein, the term “arylalkoxy” refers to any of the C1-10 alkoxy groups substituted by any of the aryl groups as defined herein, which may be optionally substituted. Examples of arylalkoxy groups include benzyloxy and phenethyloxy.

[00168] As used herein, the term “aryloxy” refers to oxygen substituted by any of the C6-14 aryl groups defined herein, which may be optionally substituted. Examples of aryloxy groups include phenoxy and 4-methylphenoxy.

[00169] As used herein, the term "arylthio" group refers to both an -S-aryl and an -S-heteroaryl group, as defined herein.

[00170] As used herein, the term “carbocycle” or “carbocyclic” refers to cycloalkyl and partially saturated carbocyclic groups. Non-limiting carbocyclic groups are C3-8 cycloalkyl and cycloalkenyl. Typical cycloalkyl groups include cyclopropyl, cyclobutyl, cyclopentyl, cyclohexyl, cyclohexenyl, and cycloheptyl.

[00171] As used herein, the term "cyano" refers to a -C≡ N group.

[00172] As used herein, the term "cyanato" refers to a -CNO group.

[00173] As used herein, the term “halo” or “halogen group” refers to a fluoro, chloro, bromo and iodo group.

[00174] As used herein, the term “haloalkyl” refers to C1-10 alkyl groups substituted by one or more fluoro, chloro, bromo or iodo groups, e.g., fluoromethyl, difluoromethyl, trifluoromethyl, pentafluoroethyl, 1,1-difluoroethyl, chloromethyl, chlorofluoromethyl and trichloromethyl groups. The halo groups can be independently chosen.

[00175] As used herein, the term “halophenyl” refers to a phenyl group substituted with one or more fluoro, chloro, bromo or iodo groups. The halo groups can be independently chosen, e.g., a di-halo substituted phenyl can have a fluoro and a chloro substituent.

[00176] As used herein, the term "hydro" refers to an –H group.

[00177] As used herein, the term "hydroxyl" refers to an –OH group.

[00178] As used herein, the term "heteroaryl" refers to groups having 5 to 14 ring atoms; 6, 10 or 14 π electrons shared in a cyclic array; and containing carbon atoms and 1, 2 or 3 oxygen, nitrogen or sulfur heteroatoms. Non-limiting heteroaryl groups include thienyl (thiophenyl), benzo[b]thienyl, naphtho[2,3-b]thienyl, thianthrenyl, furyl (furanyl), isobenzofuranyl, chromenyl, xanthenyl, phenoxanthiinyl, pyrrolyl, including without limitation 2H-pyrrolyl, imidazolyl, pyrazolyl, pyridyl (pyridinyl), including without limitation 2-pyridyl, 3-pyridyl, and 4-pyridyl, pyrazinyl, pyrimidinyl, pyridazinyl, indolizinyl, isoindolyl, 3H-indolyl, indolyl, indazolyl, purinyl, 4H-quinolizinyl, isoquinolyl, quinolyl, phthalzinyl, naphthyridinyl, quinozalinyl, cinnolinyl, pteridinyl, carbazolyl, β-carbolinyl, phenanthridinyl, acrindinyl, perimidinyl, phenanthrolinyl, phenazinyl, isothiazolyl, phenothiazinyl, isoxazolyl, furazanyl, phenoxazinyl, 1,4-dihydroquinoxaline-2,3-dione, 7 aminoisocoumarin, pyrido[1,2-a]pyrimidin-4-one, pyrazolo[1,5-a]pyrimidinyl, including without limitation pyrazolo[1,5-a]pyrimidin-3-yl, 1,2-benzoisoxazol-3-yl, benzimidazolyl, 2-oxindolyl and 2 oxobenzimidazolyl. Where the heteroaryl group contains a nitrogen atom in a ring, such nitrogen atom may be in the form of an N-oxide, e.g., a pyridyl N oxide, pyrazinyl N-oxide and pyrimidinyl N-oxide. Heteroaryl groups can be monocyclic, bicyclic, tricyclic, and/or polycyclic.

[00179] As used herein, the term "heteroaryloxy" refers to oxygen substituted by a heteroaryl group as defined herein, which may be optionally substituted. Non-limiting heteroaryloxy groups include pyridyloxy, pyrazinyloxy, pyrrolyloxy, pyrazolyloxy, imidazolyloxy and thiophenyloxy.

[00180] As used herein, the term "heterocycle" or heterocyclic" refers to a saturated or partially saturated 3-7 membered monocyclic, 7-10 membered bicyclic ring system, or 7-14 membered polycyclic ring system, which carbon atoms and from one to five heteroatoms independently selected from the group consisting of O, N, and S, wherein the nitrogen and sulfur heteroatoms can be optionally oxidized, the nitrogen can be optionally quaternized, and including any bicyclic group in which any of the above-defined heterocyclic rings is fused to a benzene ring, and wherein the heterocyclic ring can be substituted on carbon or on a nitrogen atom if the resulting compound is stable (as is readily recognized by the skilled artisan). Non-limiting saturated or partially saturated heterocyclic groups include tetrahydrofuranyl, pyranyl, piperidinyl, piperazinyl, pyrrolidinyl, imidazolidinyl, imidazolinyl, indolinyl, isoindolinyl, quinuclidinyl,

morpholinyl, isochromanyl, chromanyl, pyrazolidinyl, pyrazolinyl, tetronoyl, and tetramoyl groups.

[00181] As used herein, the term "heteroarylalkoxy" refers to a C1-10 alkoxy groups substituted by a heteroaryl group as defined herein, which may be optionally substituted.

[00182] As used herein, the term "isocyanato" refers to a -NCO group.

[00183] As used herein, the term "isothiocyanato" refers to a -NCS group.

[00184] As used herein, the term "nitro" refers to a $-NO_2$ group.

[00185] As used herein, the term "sulfinyl" refers to a -S(=O)R" group. R" can be a cycloalkyl or alkyl group. The alkyl or cycloalkyl group may be optionally substituted.

[00186] As used herein, the term "sulfonyl" refers to a $-S(=O)_2R$" group. R" can be a cycloalkyl or alkyl group. The alkyl or cycloalkyl group may be optionally substituted.

[00187] As used herein, the term "sulfonamido" refers to a $-S(=O)_2NR_{17}R_{18}$. Independently, R_{17} and R_{18} may be hydro, C1-10 alkyl or cycloalkyl groups, or R_{17} and R_{18} are combined with the N to form a ring structure, such as a piperidine, or R_{17} and R_{18} are combined with the N and to form a ring, such as a piperazine. One of R_{17} and R_{18} can be hydro and the other alkyl or cycloalkyl. The alkyl or cycloalkyl group may be optionally substituted.

[00188] As used herein, the term "thiocarbonyl" group refers to a -C(=S)R" group. R" can be a cycloalkyl or alkyl group. The alkyl or cycloalkyl group may be optionally substituted.

[00189] As used herein, the term "thiocyanato" refers to a -CNS group.

[00190] As used herein, the term "trihalomethanesulfonamido" refers to a $X_3CS(=O)_2\ NR_{17}$ -group with X being independently chosen from -Br, –Cl, -F, and -I groups and R_{17} is as defined herein.

[00191] As used herein, the term "O-carbamyl" refers to a $-OC(=O)NR_{17}R_{18}$ group. R_{17} and R_{18} may be hydro, C1-10 alkyl or cycloalkyl groups, or R_{17} and R_{18} are combined with the N to form a ring structure, such as a piperidine, or R_{17} and R_{18} are combined with the N and to form a ring, such as a piperazine. One of R_{17} and R_{18} can be hydro and the other alkyl or cycloalkyl. The alkyl or cycloalkyl group may be optionally substituted.

[00192] As used herein, the term "N-carbamyl" refers to a $R_{18}OC(=O)NR_{17}$- group. R_{18} may be hydro; R_{17} and R_{18} may be C1-10 alkyl or cycloalkyl groups, or R_{17} and R_{18} are combined with the N to form a ring structure, such as a piperidine, or R_{17} and R_{18} are combined with the N and to form a ring, such as a piperazine. One of R_{17} and R_{18} can be hydro and the other alkyl or cycloalkyl. The alkyl or cycloalkyl group may be optionally substituted.

[00193] As used herein, the term "O-thiocarbamyl" refers to a $-OC(=S)NR_{17}R_{18}$ group. R_{17} and R_{18} may be hydro, C1-10 alkyl or cycloalkyl groups, or R_{17} and R_{18} are combined with the N to form a ring structure, such as a piperidine, or R_{17} and R_{18} are combined with the N and to form a ring, such as a piperazine. One of R_{17} and R_{18} can be hydro and the other alkyl or cycloalkyl. The alkyl or cycloalkyl group may be optionally substituted.

[00194] As used herein, the term "N-thiocarbamyl" refers to a $R_{17}OC(=S)NR_{18}$- group. R_{17} may be hydro; R_{17} and R_{18} may be C1-10 alkyl or cycloalkyl groups. The alkyl or cycloalkyl group may be optionally substituted.

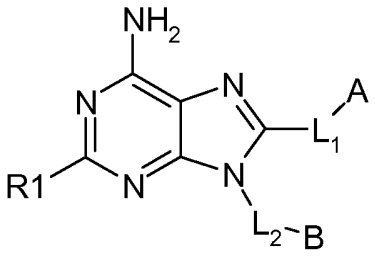
[00195] As used herein, the term "C-amido" refers to a $-C(=O)NR_{17}R_{18}$ group. An "N-amido" refers to a $R_{17}C(=O)NR_{18}$- group (R_{18} is not hydro). R_{17} and R_{18} may be hydro, C1-10 alkyl or cycloalkyl groups, or R_{17} and R_{18} are combined with the N to form a ring structure, such as a piperidine, or R_{17} and R_{18} are combined with the N and to form a ring, such as a piperazine. One of R_{17} and R_{18} can be hydro and the other alkyl or cycloalkyl. The alkyl or cycloalkyl group may be optionally substituted.

[00196] In some aspects, the alkyl, alkenyl, alkynyl, aryl, heteroaryl, cycloalkyl, carbocyclic and heterocyclic groups include one or more halo, hydroxy, carboxyl, amino, nitro, cyano, C1-C6 acylamino, C1-C6 acyloxy, C1 C6 alkoxy, aryloxy, alkylthio, C6-C10 aryl, C4-C7 cycloalkyl, C2-C6 alkenyl, C2 C6 alkynyl, C6-C10 aryl(C2-C6)alkenyl, C6-C10 aryl(C2-C6)alkynyl, heterocyclic or heteroaryl groups, unless otherwise specified.

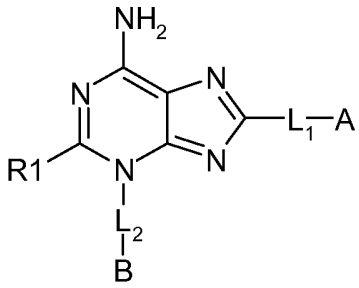
[00197] In some aspects, the aryl, arylalkyl, arylalkenyl, arylalkynyl and heteroaryl and heteroarylalkyl groups can be optionally substituted with one or more halo, C1-C6 haloalkyl, C6-C10 aryl, C4-C7 cycloalkyl, C1-C6 alkyl, C2-C6 alkenyl, C2-C6 alkynyl, C6 C10 aryl(C1 C6)alkyl, C6-C10 aryl(C2-C6)alkenyl, C6-C10 aryl(C2-C6)alkynyl, C1-C6 hydroxyalkyl, nitro, amino, ureido, cyano, C1-C6 acylamino, hydroxy, thiol, C1-C6 acyloxy, azido, C1-C6 alkoxy, carboxy or C1-2 alkylenedioxy (e.g., methylenedioxy) groups, unless otherwise specified.

[00198] 2. Compounds and Compositions of the Invention

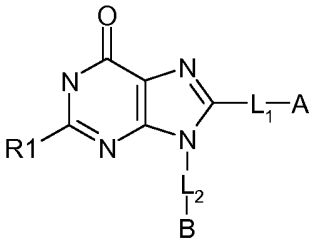
[00199] The invention relates to compounds of Formulae I-III. The invention also relates to pharmaceutical compositions having one or more compounds of Formulae I-III and a pharmaceutically acceptable carrier (excipient). The compounds of Formulae I-III were discovered by the inventors to have pharmacological activity. One particular activity the compounds of Formulae I-III were found to have is anticancer activity. The invention relates to compounds of Formulae I-III below. The invention also relates to pharmaceutical compositions having one or more compounds of Formulae I-III and a pharmaceutically acceptable excipient. The compounds of Formulae I-III were discovered by the inventors to have pharmacological activity. One particular activity the compounds of Formulae I-III were found to have is anticancer activity. The invention relates to compounds of Formulae I-III below. The invention also relates to pharmaceutical compositions having one or more compounds of Formulae I-III and a pharmaceutically acceptable excipient. The compounds of Formulae I-III were discovered by the inventors to have pharmacological activity. One particular activity the compounds of Formulae I-III were found to have is anticancer activity.



FORMULA I



FORMULA II



FORMULA III

[00200] The invention provides compounds of Formula I wherein:

[00201] A is chosen from a substituted or unsubstituted aryl, heteroaryl, heterocyclic, or carbocyclic group;

[00202] B is chosen from a substituted or unsubstituted aryl, heteroaryl, heterocyclic, or carbocyclic group;

[00203] R1 is chosen from hydro, alkyl, aryl, heteroaryl, amino, halo, sulfur, and thioalkyl.

[00204] L_1 can be saturated, partially saturated, or unsaturated, and is chosen from $-(CH_2)_n-(CH_2)_n-$, $-(CH_2)_nC(=O)(CH_2)_n-$, $-(CH_2)_nC(=O)N(CH_2)_n-$, $-(CH_2)_nNC(=O)O(CH_2)_n-$, $-(CH_2)_nNC(=O)N(CH_2)_n-$, $-(CH_2)_nNC(=S)S(CH_2)_n-$, $-(CH_2)_nOC(=O)S(CH_2)_n-$, $-(CH_2)_nNH(CH_2)_n-$, $-(CH_2)_nO(CH_2)_n-$, $-(CH_2)_nS(CH_2)_n-$, and $-(CH_2)_nNC(=S)N(CH_2)_n-$, where each n is independently chosen from 0, 1, 2, 3, 4, 5, 6, 7, and 8, and wherein each carbon and/or nitrogen can be optionally substituted with one or more substituents independently chosen from hydroxyl, halo, alkoxy, alkyl, amino, cycloalkyl, $-NR_2R_3$, $-NSO_2R_4$, $-NC(=O)NR_2R_3$, heteroaryl, aryl, cycloalkyl, and heterocyclic; wherein $-R_2$ and $-R_3$ are independently chosen from –H, alkyl, and $-C(=O)OR_4$; and wherein R_4 is an alkyl group (*e.g.*, methyl, ethyl, propyl, isopropyl, butyl, isobutyl, or *tert*-butyl).

[00205] L_2 can be saturated, partially saturated, or unsaturated, and is chosen from $-(CH_2)_n-(CH_2)_n-$, $-(CH_2)_nC(=O)(CH_2)_n-$, $-(CH_2)_nC(=O)N(CH_2)_n-$, $-(CH_2)_nNC(=O)O(CH_2)_n-$, $-(CH_2)_nNC(=O)N(CH_2)_n-$, $-(CH_2)_nNC(=S)S(CH_2)_n-$, $-(CH_2)_nOC(=O)S(CH_2)_n-$, $-(CH_2)_nNH(CH_2)_n-$, $-(CH_2)_nO(CH_2)_n-$, $-(CH_2)_nS(CH_2)_n-$, and $-(CH_2)_nNC(=S)N(CH_2)_n-$, where each n is independently chosen from 0, 1, 2, 3, 4, 5, 6, 7, and 8, and wherein each carbon and/or nitrogen can be optionally substituted with one or more substituents independently chosen from hydroxyl, halo, alkoxy,

alkyl, amino, cycloalkyl, -NR_2R_3, -NSO_2R_4, -$NC(=O)NR_2R_3$, heteroaryl, aryl, cycloalkyl, and heterocyclic; wherein -R_2 and -R_3 are independently chosen from –H, alkyl, and -$C(=O)OR_4$; and wherein R_4 is an alkyl group (*e.g.*, methyl, ethyl, propyl, isopropyl, butyl, isobutyl, or *tert*-butyl).

[00206] L_1 and L_2 can be in either orientation, e.g., -$(CH_2)_nNC(=S)S(CH_2)_n$-, refers to purine-$(CH_2)_nNC(=S)S(CH_2)_n$-phenyl and purine–$(CH_2)_nSC(=S)N(CH_2)_n$-phenyl orientations unless otherwise specified.

[00207] According to one aspect, A is an aryl group having one or more substituents chosen from halo, alkyl, alkoxy, haloalkyl, haloalkoxy, nitro, -C(=O)alkyl, hydroxyl, -C≡N, -SO_3, and –COOH. In a more specific aspect of the invention, A is a phenyl group having one or more substituents chosen from halo, alkyl, alkoxy, haloalkyl, haloalkoxy, nitro, -C(=O)alkyl, hydroxyl, and –COOH. In an even more specific aspect, A is a phenyl group having one or more substituents chosen from –F, -Cl, -Br, -I, -OCH_3, -CF_3, -CH_3, -OCF_3, -$C(=O)CH_3$, -COOH, -C≡N, and -NO_2.

[00208] In one aspect of the compounds of the invention, A is an aryl group with one or more substituents chosen from hydroxyl, halo, alkyl, alkoxy, haloalkyl, haloalkoxy, -$N(C_{1\text{-}3}\ alkyl)_2$, -$NH(C_{1\text{-}3}\ alkyl)$, -$C(=O)NH_2$, -$C(=O)NH(C_{1\text{-}3}\ alkyl)$, -$C(=O)N(C_{1\text{-}3}\ alkyl)_2$, -$S(=O)_2(C_{1\text{-}3}alkyl)$, -$S(=O)_2NH_2$, -$S(=O)_2N(C_{1\text{-}3}\ alkyl)_2$, -$S(=O)_2NH(C_{1\text{-}3}\ alkyl)$, -$CHF_2$, -$OCF_3$, -$OCHF_2$, -$SCF_3$, -$CF_3$, -CN, -$NH_2$, and -$NO_2$. In one specific aspect, A is a phenyl group.

[00209] In one aspect of the compounds of the invention, A is a phenyl group having from 1-5 substituents independently chosen from acylamino, acyloxy, alkenyl, alkoxy, alkyl, alkylthio, alkynyl, amino, aryl, arylalkyl, arylalkenyl, arylalkynyl, arylalkoxy, aryloxy, arylthio, carbocycle, cyano, cyanato, halo, haloalkyl, halophenyl, hydroxyl, heteroaryl, heteroaryloxy, heterocycle, heteroarylalkoxy, isocyanato, isothiocyanato, nitro, sulfinyl, sulfonyl, sulfonamide, thiocarbonyl, thiocyanato, trihalomethanesulfonamido, O-carbamyl, N-carbamyl, O-thiocarbamyl, N-thiocarbamyl, and C-amido.

[00210] According to one aspect of the compounds of the invention, B is an aryl group having one or more substituents chosen from halo, alkyl, alkoxy, haloalkyl, haloalkoxy, nitro, -C(=O)alkyl, hydroxyl, -SO_3, and –COOH. In one specific aspect, B is a phenyl group. In a more specific aspect, B is a phenyl group having one or more substituents chosen from halo, alkyl, alkoxy, haloalkyl, haloalkoxy, nitro, -C(=O)alkyl,

hydroxyl, and –COOH. In an even more specific aspect, B is a phenyl group having one or more substituents chosen from –F, -Cl, -Br, -I, $-CH_3$, $-OCH_3$, $-CF_3$, $-OCF_3$, $-C(=O)CH_3$, -COOH, $-C\equiv N$, and $-NO_2$.

[00211] In one aspect of the compounds of the invention, B is an aryl group with one or more substituents chosen from hydroxyl, halo, alkyl, alkoxy, haloalkyl, haloalkoxy, $-N(C_{1-3}\text{ alkyl})_2$, $-NH(C_{1-3}\text{ alkyl})$, $-C(=O)NH_2$, $-C(=O)NH(C_{1-3}\text{ alkyl})$, $-C(=O)N(C_{1-3}\text{ alkyl})_2$, $-S(=O)_2(C_{1-3}\text{alkyl})$, $-S(=O)_2NH_2$, $-S(=O)_2N(C_{1-3}\text{ alkyl})_2$, $-S(=O)_2NH(C_{1-3}\text{ alkyl})$, $-CHF_2$, $-OCF_3$, $-OCHF_2$, $-SCF_3$, $-CF_3$, -CN, $-NH_2$, $-SO_3$, and $-NO_2$.

[00212] In one aspect of the compounds of the invention, B is a phenyl group having from 1-5 substituents independently chosen from acylamino, acyloxy, alkenyl, alkoxy, alkyl, alkylthio, alkynyl, amino, aryl, arylalkyl, arylalkenyl, arylalkynyl, arylalkoxy, aryloxy, arylthio, carbocycle, cyano, cyanato, halo, haloalkyl, halophenyl, hydroxyl, heteroaryl, heteroaryloxy, heterocycle, heteroarylalkoxy, isocyanato, isothiocyanato, nitro, sulfinyl, sulfonyl, sulfonamide, thiocarbonyl, thiocyanato, trihalomethanesulfonamido, O-carbamyl, N-carbamyl, O-thiocarbamyl, N-thiocarbamyl, and C-amido.

[00213] According to one embodiment, A is a substituted or unsubstituted benzo[1,3]dioxole group. In one aspect of this embodiment, A is a 6-bromo-benzo[1,3]dioxol-5-yl group. In one aspect of this embodiment, A is an unsubstituted benzo[1,3]dioxole group. In one aspect of this embodiment, A is a 6-iodo-benzo[1,3]dioxol-5-yl group. In one aspect of this embodiment, A is a 6-chloro-benzo[1,3]dioxol-5-yl group. In one aspect of this embodiment, A is a 6-fluoro-benzo[1,3]dioxol-5-yl group. In one aspect of this embodiment, A has from 1-5 substituents independently chosen from acylamino, acyloxy, alkenyl, alkoxy, alkyl, alkylthio, alkynyl, amino, aryl, arylalkyl, arylalkenyl, arylalkynyl, arylalkoxy, aryloxy, arylthio, carbocycle, cyano, cyanato, halo, haloalkyl, halophenyl, hydroxyl, heteroaryl, heteroaryloxy, heterocycle, heteroarylalkoxy, isocyanato, isothiocyanato, nitro, sulfinyl, sulfonyl, sulfonamide, thiocarbonyl, thiocyanato, trihalomethanesulfonamido, O-carbamyl, N-carbamyl, O-thiocarbamyl, N-thiocarbamyl, and C-amido.

[00214] According to one embodiment, A is a substituted or unsubstituted indanone group. In one aspect of this embodiment, A has from 1-5 substituents independently chosen from acylamino, acyloxy, alkenyl, alkoxy, alkyl, alkylthio, alkynyl, amino, aryl, arylalkyl, arylalkenyl, arylalkynyl, arylalkoxy, aryloxy, arylthio, carbocycle, cyano, cyanato, halo, haloalkyl, halophenyl, hydroxyl, heteroaryl, heteroaryloxy,

heterocycle, heteroarylalkoxy, isocyanato, isothiocyanato, nitro, sulfinyl, sulfonyl, sulfonamide, thiocarbonyl, thiocyanato, trihalomethanesulfonamido, O-carbamyl, N-carbamyl, O-thiocarbamyl, N-thiocarbamyl, and C-amido.

[00215] According to one embodiment, A is a substituted or unsubstituted indane group. In one aspect of this embodiment, A has from 1-5 substituents independently chosen from acylamino, acyloxy, alkenyl, alkoxy, alkyl, alkylthio, alkynyl, amino, aryl, arylalkyl, arylalkenyl, arylalkynyl, arylalkoxy, aryloxy, arylthio, carbocycle, cyano, cyanato, halo, haloalkyl, halophenyl, hydroxyl, heteroaryl, heteroaryloxy, heterocycle, heteroarylalkoxy, isocyanato, isothiocyanato, nitro, sulfinyl, sulfonyl, sulfonamide, thiocarbonyl, thiocyanato, trihalomethanesulfonamido, O-carbamyl, N-carbamyl, O-thiocarbamyl, N-thiocarbamyl, and C-amido.

[00216] According to one embodiment, A is a substituted or unsubstituted benzo[1,4] dioxane group. In one aspect of this embodiment, A has from 1-5 substituents independently chosen from acylamino, acyloxy, alkenyl, alkoxy, alkyl, alkylthio, alkynyl, amino, aryl, arylalkyl, arylalkenyl, arylalkynyl, arylalkoxy, aryloxy, arylthio, carbocycle, cyano, cyanato, halo, haloalkyl, halophenyl, hydroxyl, heteroaryl, heteroaryloxy, heterocycle, heteroarylalkoxy, isocyanato, isothiocyanato, nitro, sulfinyl, sulfonyl, sulfonamide, thiocarbonyl, thiocyanato, trihalomethanesulfonamido, O-carbamyl, N-carbamyl, O-thiocarbamyl, N-thiocarbamyl, and C-amido.

[00217] According to one embodiment, A is a substituted or unsubstituted benzoxazinone group. In one aspect of this embodiment, A has from 1-5 substituents independently chosen from acylamino, acyloxy, alkenyl, alkoxy, alkyl, alkylthio, alkynyl, amino, aryl, arylalkyl, arylalkenyl, arylalkynyl, arylalkoxy, aryloxy, arylthio, carbocycle, cyano, cyanato, halo, haloalkyl, halophenyl, hydroxyl, heteroaryl, heteroaryloxy, heterocycle, heteroarylalkoxy, isocyanato, isothiocyanato, nitro, sulfinyl, sulfonyl, sulfonamide, thiocarbonyl, thiocyanato, trihalomethanesulfonamido, O-carbamyl, N-carbamyl, O-thiocarbamyl, N-thiocarbamyl, and C-amido.

[00218] According to one embodiment, A is a substituted or unsubstituted benzoxazine group. In one aspect of this embodiment, A has from 1-5 substituents independently chosen from acylamino, acyloxy, alkenyl, alkoxy, alkyl, alkylthio, alkynyl, amino, aryl, arylalkyl, arylalkenyl, arylalkynyl, arylalkoxy, aryloxy, arylthio, carbocycle, cyano, cyanato, halo, haloalkyl, halophenyl, hydroxyl, heteroaryl, heteroaryloxy, heterocycle, heteroarylalkoxy, isocyanato, isothiocyanato, nitro, sulfinyl, sulfonyl,

sulfonamide, thiocarbonyl, thiocyanato, trihalomethanesulfonamido, O-carbamyl, N-carbamyl, O-thiocarbamyl, N-thiocarbamyl, and C-amido.

[00219] According to one embodiment, A is a substituted or unsubstituted benzodioxine group. In one aspect of this embodiment, A has from 1-5 substituents independently chosen from acylamino, acyloxy, alkenyl, alkoxy, alkyl, alkylthio, alkynyl, amino, aryl, arylalkyl, arylalkenyl, arylalkynyl, arylalkoxy, aryloxy, arylthio, carbocycle, cyano, cyanato, halo, haloalkyl, halophenyl, hydroxyl, heteroaryl, heteroaryloxy, heterocycle, heteroarylalkoxy, isocyanato, isothiocyanato, nitro, sulfinyl, sulfonyl, sulfonamide, thiocarbonyl, thiocyanato, trihalomethanesulfonamido, O-carbamyl, N-carbamyl, O-thiocarbamyl, N-thiocarbamyl, and C-amido.

[00220] According to one embodiment, A is a substituted or unsubstituted naphthyl group. In one aspect of this embodiment, A has from 1-6 substituents independently chosen from acylamino, acyloxy, alkenyl, alkoxy, alkyl, alkylthio, alkynyl, amino, aryl, arylalkyl, arylalkenyl, arylalkynyl, arylalkoxy, aryloxy, arylthio, carbocycle, cyano, cyanato, halo, haloalkyl, halophenyl, hydroxyl, heteroaryl, heteroaryloxy, heterocycle, heteroarylalkoxy, isocyanato, isothiocyanato, nitro, sulfinyl, sulfonyl, sulfonamide, thiocarbonyl, thiocyanato, trihalomethanesulfonamido, O-carbamyl, N-carbamyl, O-thiocarbamyl, N-thiocarbamyl, and C-amido.

[00221] According to one embodiment, A is a substituted or unsubstituted pyrrole group. In one aspect of this embodiment, A has from 1-3 substituents independently chosen from acylamino, acyloxy, alkenyl, alkoxy, alkyl, alkylthio, alkynyl, amino, aryl, arylalkyl, arylalkenyl, arylalkynyl, arylalkoxy, aryloxy, arylthio, carbocycle, cyano, cyanato, halo, haloalkyl, halophenyl, hydroxyl, heteroaryl, heteroaryloxy, heterocycle, heteroarylalkoxy, isocyanato, isothiocyanato, nitro, sulfinyl, sulfonyl, sulfonamide, thiocarbonyl, thiocyanato, trihalomethanesulfonamido, O-carbamyl, N-carbamyl, O-thiocarbamyl, N-thiocarbamyl, and C-amido. According to one aspect A is unsubstituted.

[00222] According to one embodiment, A is a substituted or unsubstituted pyridine group. In one aspect of this embodiment, A has from 1-4 substituents independently chosen from acylamino, acyloxy, alkenyl, alkoxy, alkyl, alkylthio, alkynyl, amino, aryl, arylalkyl, arylalkenyl, arylalkynyl, arylalkoxy, aryloxy, arylthio, carbocycle, cyano, cyanato, halo, haloalkyl, halophenyl, hydroxyl, heteroaryl, heteroaryloxy, heterocycle, heteroarylalkoxy, isocyanato, isothiocyanato, nitro, sulfinyl, sulfonyl, sulfonamide, thiocarbonyl, thiocyanato, trihalomethanesulfonamido, O-carbamyl, N-

carbamyl, O-thiocarbamyl, N-thiocarbamyl, and C-amido. According to one aspect of this embodiment, A is unsubstituted.

[00223] According to one embodiment, A is a substituted or unsubstituted cyclohexyl group. In one aspect of this embodiment, A has from 1-5 substituents independently chosen from acylamino, acyloxy, alkenyl, alkoxy, alkyl, alkylthio, alkynyl, amino, aryl, arylalkyl, arylalkenyl, arylalkynyl, arylalkoxy, aryloxy, arylthio, carbocycle, cyano, cyanato, halo, haloalkyl, halophenyl, hydroxyl, heteroaryl, heteroaryloxy, heterocycle, heteroarylalkoxy, isocyanato, isothiocyanato, nitro, sulfinyl, sulfonyl, sulfonamide, thiocarbonyl, thiocyanato, trihalomethanesulfonamido, O-carbamyl, N-carbamyl, O-thiocarbamyl, N-thiocarbamyl, and C-amido. According to one aspect of this embodiment, A is unsubstituted.

[00224] According to one embodiment, B is a substituted or unsubstituted benzo[1,3]dioxole group. In one aspect of this embodiment, B is a 6-bromo-benzo[1,3]dioxol-5-yl group. In one aspect of this embodiment, B is an unsubstituted benzo[1,3]dioxole group. In one aspect of this embodiment, B is a 6-iodo-benzo[1,3]dioxol-5-yl group. In one aspect of this embodiment, B is a 6-chloro-benzo[1,3]dioxol-5-yl group. In one aspect of this embodiment, B is a 6-fluoro-benzo[1,3]dioxol-5-yl group. In one aspect of this embodiment, B has from 1-4 substituents independently chosen from acylamino, acyloxy, alkenyl, alkoxy, alkyl, alkylthio, alkynyl, amino, aryl, arylalkyl, arylalkenyl, arylalkynyl, arylalkoxy, aryloxy, arylthio, carbocycle, cyano, cyanato, halo, haloalkyl, halophenyl, hydroxyl, heteroaryl, heteroaryloxy, heterocycle, heteroarylalkoxy, isocyanato, isothiocyanato, nitro, sulfinyl, sulfonyl, sulfonamide, thiocarbonyl, thiocyanato, trihalomethanesulfonamido, O-carbamyl, N-carbamyl, O-thiocarbamyl, N-thiocarbamyl, and C-amido.

[00225] According to one embodiment, B is a substituted or unsubstituted naphthyl group. In one aspect of this embodiment, B has from 1-6 substituents independently chosen from acylamino, acyloxy, alkenyl, alkoxy, alkyl, alkylthio, alkynyl, amino, aryl, arylalkyl, arylalkenyl, arylalkynyl, arylalkoxy, aryloxy, arylthio, carbocycle, cyano, cyanato, halo, haloalkyl, halophenyl, hydroxyl, heteroaryl, heteroaryloxy, heterocycle, heteroarylalkoxy, isocyanato, isothiocyanato, nitro, sulfinyl, sulfonyl, sulfonamide, thiocarbonyl, thiocyanato, trihalomethanesulfonamido, O-carbamyl, N-carbamyl, O-thiocarbamyl, N-thiocarbamyl, and C-amido. According to one aspect of this embodiment, B is unsubstituted.

[00226] According to one embodiment, B is a substituted or unsubstituted pyrrole group. In one aspect of this embodiment, B has from 1-3 substituents independently chosen from acylamino, acyloxy, alkenyl, alkoxy, alkyl, alkylthio, alkynyl, amino, aryl, arylalkyl, arylalkenyl, arylalkynyl, arylalkoxy, aryloxy, arylthio, carbocycle, cyano, cyanato, halo, haloalkyl, halophenyl, hydroxyl, heteroaryl, heteroaryloxy, heterocycle, heteroarylalkoxy, isocyanato, isothiocyanato, nitro, sulfinyl, sulfonyl, sulfonamide, thiocarbonyl, thiocyanato, trihalomethanesulfonamido, O-carbamyl, N-carbamyl, O-thiocarbamyl, N-thiocarbamyl, and C-amido. According to one aspect of this embodiment, B is unsubstituted.

[00227] According to one embodiment, B is a substituted or unsubstituted pyridine group. In one aspect of this embodiment, B has from 1-4 substituents independently chosen from acylamino, acyloxy, alkenyl, alkoxy, alkyl, alkylthio, alkynyl, amino, aryl, arylalkyl, arylalkenyl, arylalkynyl, arylalkoxy, aryloxy, arylthio, carbocycle, cyano, cyanato, halo, haloalkyl, halophenyl, hydroxyl, heteroaryl, heteroaryloxy, heterocycle, heteroarylalkoxy, isocyanato, isothiocyanato, nitro, sulfinyl, sulfonyl, sulfonamide, thiocarbonyl, thiocyanato, trihalomethanesulfonamido, O-carbamyl, N-carbamyl, O-thiocarbamyl, N-thiocarbamyl, and C-amido. According to one aspect of this embodiment, B is unsubstituted.

[00228] According to one embodiment, B is a substituted or unsubstituted cyclohexyl group. In one aspect of this embodiment, B has from 1-5 substituents independently chosen from acylamino, acyloxy, alkenyl, alkoxy, alkyl, alkylthio, alkynyl, amino, aryl, arylalkyl, arylalkenyl, arylalkynyl, arylalkoxy, aryloxy, arylthio, carbocycle, cyano, cyanato, halo, haloalkyl, halophenyl, hydroxyl, heteroaryl, heteroaryloxy, heterocycle, heteroarylalkoxy, isocyanato, isothiocyanato, nitro, sulfinyl, sulfonyl, sulfonamide, thiocarbonyl, thiocyanato, trihalomethanesulfonamido, O-carbamyl, N-carbamyl, O-thiocarbamyl, N-thiocarbamyl, and C-amido. According to one aspect of this embodiment, B is unsubstituted.

[00229] According to one aspect of the invention, compounds of Formula I are provided wherein:

[00230] A is a substituted or unsubstituted aryl group;

[00231] B is a substituted or unsubstituted aryl group;

[00232] R1 is chosen from hydro, alkyl, aryl, heteroaryl, amino, halo, sulfur, and thioalkyl.

[00233] L_1 can be saturated, partially saturated, or unsaturated, and is chosen from $-(CH_2)_n-(CH_2)_n-$, $-(CH_2)_nC(=O)(CH_2)_n-$, $-(CH_2)_nC(=O)N(CH_2)_n-$, $-(CH_2)_nNC(=O)O(CH_2)_n-$, $-(CH_2)_nNC(=O)N(CH_2)_n-$, $-(CH_2)_nNC(=S)S(CH_2)_n-$, $-(CH_2)nOC(=O)S(CH_2)_n-$, $-(CH_2)_nNH(CH_2)_n-$, $-(CH_2)_nO(CH_2)_n-$, $-(CH_2)_nS(CH_2)_n-$, $-(CH_2)_nNC(=S)N(CH_2)_n-$, where each n is independently chosen from 0, 1, 2, 3, 4, 5, 6, 7, and 8, and wherein each carbon and/or nitrogen can be optionally substituted with one or more substituents independently chosen from hydroxyl, halo, alkoxy, C_{1-3} alkyl, and C_{3-6} cycloalkyl groups;

[00234] L_2 can be saturated, partially saturated, or unsaturated, and is chosen from $-(CH_2)_n-(CH_2)_n-$, $-(CH_2)_nC(=O)(CH_2)_n-$, $-(CH_2)_nC(=O)N(CH_2)_n-$, $-(CH_2)_nNC(=O)O(CH_2)_n-$, $-(CH_2)_nNC(=O)N(CH_2)_n-$, $-(CH_2)_nNC(=S)S(CH_2)_n-$, $-(CH_2)nOC(=O)S(CH_2)_n-$, $-(CH_2)_nNH(CH_2)_n-$, $-(CH_2)_nO(CH_2)_n-$, $-(CH_2)_nS(CH_2)_n-$, $-(CH_2)_nNC(=S)N(CH_2)_n-$, where each n is independently chosen from 0, 1, 2, 3, 4, 5, 6, 7, and 8, and wherein each carbon and/or nitrogen can be optionally substituted with one or more substituents independently chosen from hydroxyl, halo, alkoxy, C_{1-3} alkyl, and C_{3-6} cycloalkyl groups; and pharmaceutically acceptable salts thereof.

[00235] According to one aspect of the invention, compounds of Formula I are provided wherein:

[00236] A is a substituted or unsubstituted heteroaryl group;

[00237] B is a substituted or unsubstituted aryl group;

[00238] R1 is chosen from hydro, alkyl, aryl, heteroaryl, amino, halo, sulfur, and thioalkyl;

[00239] L_1 can be saturated, partially saturated, or unsaturated, and is chosen from $-(CH_2)_n-(CH_2)_n-$, $-(CH_2)_nC(=O)(CH_2)_n-$, $-(CH_2)_nC(=O)N(CH_2)_n-$, $-(CH_2)_nNC(=O)O(CH_2)_n-$, $-(CH_2)_nNC(=O)N(CH_2)_n-$, $-(CH_2)_nNC(=S)S(CH_2)_n-$, $-(CH_2)nOC(=O)S(CH_2)_n-$, $-(CH_2)_nNH(CH_2)_n-$, $-(CH_2)_nO(CH_2)_n-$, $-(CH_2)_nS(CH_2)_n-$, $-(CH_2)_nNC(=S)N(CH_2)_n-$, where each n is independently chosen from 0, 1, 2, 3, 4, 5, 6, 7, and 8, and wherein each carbon and/or nitrogen can be optionally substituted with one or more substituents independently chosen from hydroxyl, halo, alkoxy, C_{1-3} alkyl, and C_{3-6} cycloalkyl groups;

[00240] L_2 can be saturated, partially saturated, or unsaturated, and is chosen from $-(CH_2)_n-(CH_2)_n-$, $-(CH_2)_nC(=O)(CH_2)_n-$, $-(CH_2)_nC(=O)N(CH_2)_n-$, $-(CH_2)_nNC(=O)O(CH_2)_n-$, $-(CH_2)_nNC(=O)N(CH_2)_n-$, $-(CH_2)_nNC(=S)S(CH_2)_n-$, $-(CH_2)nOC(=O)S(CH_2)_n-$, $-(CH_2)_nNH(CH_2)_n-$, $-(CH_2)_nO(CH_2)_n-$, $-(CH_2)_nS(CH_2)_n-$, $-$

$(CH_2)_nNC(=S)N(CH_2)_n$-, where each n is independently chosen from 0, 1, 2, 3, 4, 5, 6, 7, and 8, and wherein each carbon and/or nitrogen can be optionally substituted with one or more substituents independently chosen from hydroxyl, halo, alkoxy, C_{1-3} alkyl, and C_{3-6} cycloalkyl groups; and pharmaceutically acceptable salts thereof.

[00241] According to one aspect of the invention, compounds of Formula I are provided wherein A is a substituted or unsubstituted aryl group; B is a substituted or unsubstituted heteroaryl group; R1 is chosen from hydro, alkyl, aryl, heteroaryl, amino, halo, sulfur, and thioalkyl; and pharmaceutically acceptable salts thereof.

[00242] According to one aspect of the invention, compounds of Formula I are provided wherein A is a substituted or unsubstituted heterocyclic group; B is a substituted or unsubstituted aryl group; and R1 is chosen from hydro, alkyl, aryl, heteroaryl, alkyl amino, halo, sulfur, and thioalkyl.

[00243] According to one aspect of the invention, compounds of Formula I are provided wherein A is a substituted or unsubstituted aryl group; B is a substituted or unsubstituted heterocyclic group; R1 is chosen from hydro, alkyl, aryl, heteroaryl, amino, halo, sulfur, and thioalkyl.

[00244] According to some aspects of the invention, in the compound of Formula I, A is substituted or unsubstituted and chosen from indazolyl, 1H-indolyl, benzothiazolyl, 1H-benzotriazolyl, benzooxazolyl, 1H-benzoimadazolyl, 3H-benzooxazol-2-one, 4H-benzo[1,4]oxazin-3-one, 1,3 dihydro-benzoimadazol-2-one, 3H-benzothialo-2-one, 1H-pyrazolo[3,4-b]pyridine, 1H-quinaxolin-2-one, 1H-quinaxolin-2-one, 4H-benzo[1,4]oxazin-3-one, isoquinoline, indoline, 1,3 dihydro-indol-2-one, 2,3-dihydro-benzo[1,4]dioxine, thienyl (thiophenyl), benzo[b]thienyl, naphtho[2,3-b]thienyl, thianthrenyl, furyl (furanyl), isobenzofuranyl, chromenyl, xanthenyl, phenoxanthiinyl, pyrrolyl, 2H-pyrrolyl, imidazolyl, pyrazolyl, pyridyl (pyridinyl), 2-pyridyl, 3-pyridyl, 4-pyridyl, pyrazinyl, pyrimidinyl, pyridazinyl, indolizinyl, isoindolyl, 3H-indolyl, indolyl, purinyl, 4H-quinolizinyl, isoquinolyl, quinolyl, phthalzinyl, naphthyridinyl, quinozalinyl, cinnolinyl, pteridinyl, carbazolyl, β-carbolinyl, phenanthridinyl, acrindinyl, perimidinyl, phenanthrolinyl, phenazinyl, isothiazolyl, phenothiazinyl, isoxazolyl, furazanyl, phenoxazinyl, 1,4-dihydroquinoxaline-2,3-dione, 7 aminoisocoumarin, pyrido[1,2-a]pyrimidin-4-one, pyrazolo[1,5-a]pyrimidinyl, pyrazolo[1,5-a]pyrimidin-3-yl, 1,2-benzoisoxazol-3-yl, benzimidazolyl, 2-oxindolyl, 2 oxobenzimidazolyl, tetrahydrofuranyl, pyranyl, piperidinyl, piperazinyl, pyrrolidinyl, imidazolidinyl, imidazolinyl, indolinyl, isoindolinyl,

quinuclidinyl, morpholinyl, isochromanyl, chromanyl, pyrazolidinyl, pyrazolinyl, tetronoyl, and tetramoyl.

[00245] According to some aspects of the invention, in the compound of Formula I, B is substituted or unsubstituted and chosen from indazolyl, 1H-indolyl, benzothiazolyl, 1H-benzotriazolyl, benzooxazolyl, 1H-benzoimadazolyl, 3H-benzooxazol-2-one, 4H-benzo[1,4]oxazin-3-one, 1,3 dihydro-benzoimadazol-2-one, 3H-benzothialo-2-one, 1H-pyrazolo[3,4-b]pyridine, 1H-quinaxolin-2-one, 1H-quinaxolin-2-one, 4H-benzo[1,4]oxazin-3-one, isoquinoline, indoline, 1,3 dihydro-indol-2-one, 2,3-dihydro-benzo[1,4]dioxine, thienyl (thiophenyl), benzo[b]thienyl, naphtho[2,3-b]thienyl, thianthrenyl, furyl (furanyl), isobenzofuranyl, chromenyl, xanthenyl, phenoxanthiinyl, pyrrolyl, 2H-pyrrolyl, imidazolyl, pyrazolyl, pyridyl (pyridinyl), 2-pyridyl, 3-pyridyl, 4-pyridyl, pyrazinyl, pyrimidinyl, pyridazinyl, indolizinyl, isoindolyl, 3H-indolyl, indolyl, purinyl, 4H-quinolizinyl, isoquinolyl, quinolyl, phthalzinyl, naphthyridinyl, quinozalinyl, cinnolinyl, pteridinyl, carbazolyl, β-carbolinyl, phenanthridinyl, acrindinyl, perimidinyl, phenanthrolinyl, phenazinyl, isothiazolyl, phenothiazinyl, isoxazolyl, furazanyl, phenoxazinyl, 1,4-dihydroquinoxaline-2,3-dione, 7 aminoisocoumarin, pyrido[1,2-a]pyrimidin-4-one, pyrazolo[1,5-a]pyrimidinyl, pyrazolo[1,5-a]pyrimidin-3-yl, 1,2-benzoisoxazol-3-yl, benzimidazolyl, 2-oxindolyl, 2 oxobenzimidazolyl, tetrahydrofuranyl, pyranyl, piperidinyl, piperazinyl, pyrrolidinyl, imidazolidinyl, imidazolinyl, indolinyl, isoindolinyl, quinuclidinyl, morpholinyl, isochromanyl, chromanyl, pyrazolidinyl, pyrazolinyl, tetronoyl, and tetramoyl.

[00246] In some aspects of the compounds of the invention, the A ring is substituted with one or more substituents chosen from $-L_1$-C(=O)OH, - L_1-CH=CHC(=O)OH, – L_1-C(=O)NH_2, – L_1-C(=O)NH(C_{1-3} alkyl), – L_1-C(=O)N(C_{1-3} alkyl)$_2$, – L_1-S(=O)$_2$(C_{1-3}alkyl), – L_1-S(=O)$_2NH_2$, – L_1-S(=O)$_2$N(C_{1-3} alkyl)$_2$, – L_1-S(=O)$_2$NH(C_{1-3} alkyl), - L_1-C(=O)NHOH, - L_1-C(=O)CH_2NH_2, - L_1-C(=O)CH_2OH, - L_1-C(=O)CH_2SH, - L_1-C(=O)NHCN, - L_1-NHC(=O)OR_o, - L_1-C(=O)NHR_o, - L_1-NH(C=O)NHR_o, - L_1-C(=O)N(R_o)$_2$, - L_1-NH(C=O)N(R_o)$_2$, - L_1-sulfo; where R_o is chosen from alkyl and haloalkyl, and L_1 is independent of any other L_1 in the compound and is defined as above.

[00247] In some aspects of the compounds of the invention, the B ring is substituted with one or more substituents chosen from $-L_1$-C(=O)OH, - L_1-CH=CHC(=O)OH, – L_1-C(=O)NH_2, – L_1-C(=O)NH(C_{1-3} alkyl), – L_1-C(=O)N(C_{1-3} alkyl)$_2$, – L_1-S(=O)$_2$(C_{1-3}alkyl), – L_1-S(=O)$_2NH_2$, – L_1-S(=O)$_2$N(C_{1-3} alkyl)$_2$, – L_1-S(=O)$_2$NH(C_{1-3} alkyl), - L_1-C(=O)NHOH, - L_1-C(=O)CH_2NH_2, - L_1-C(=O)CH_2OH, - L_1-C(=O)CH_2SH, - L_1-

C(=O)NHCN, - L_1-NHC(=O)OR_o, - L_1-C(=O)NHR_o, - L_1-NH(C=O)NHR_o, - L_1-C(=O)$N(R_o)_2$, - L_1-NH(C=O)$N(R_o)_2$, - L_1-sulfo; where R_o is chosen from alkyl and haloalkyl, and L_1 is independent of any other L_1 in the compound and is defined as above.

[00248] According to one aspect of the compounds of the invention, L_1 is chosen from $–CH_2-$, $–CH_2CH_2-$, $-CH_2CH_2CH_2$, $–CH(CH_3)CH_2-$, $–CH(CH_2CH_3)CH_2-$, $–CH(CH(CH_3)_2)CH_2-$, $-C(CH_2CH_2)CH_2-$, $-C(CH_2CH_2CH_2)CH_2-$, $-CH(CH(CH_3)CH_2CH_3)CH_2-$, $-CH(CH(CH_2)_4)CH_2-$, $-CH(CH(CH_2)_5)CH_2-$, $-CH(OH)CH_2-$, and $-CH(CH_2OH)CH_2-$. In a more specific aspect L_1 is chosen from $–CH_2CH_2-$ and $-CH_2CH_2CH_2$. In an even more specific aspect, L_1 is$–CH_2CH_2-$. L_1 can be in either orientation, e.g., $-CH(CH_2CH_2)CH_2-$ refers to purine-$CH(CH_2CH_2)CH_2$-phenyl and purine–$CH_2CH(CH_2CH_2)$-phenyl orientations unless otherwise specified.

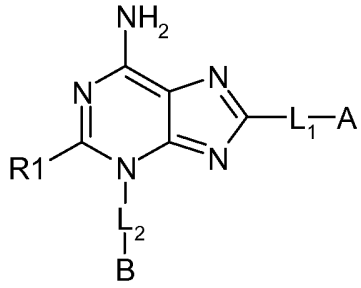
[00249] According to one aspect of the invention, compounds of Formula I are provided where L_2 is chosen from $–CH_2-$, $–CH_2CH_2-$, $-CH_2CH_2CH_2$, $–CH(CH_3)CH_2-$, $–CH(CH_2CH_3)CH_2-$, $–CH(CH(CH_3)_2)CH_2-$, $-C(CH_2CH_2)CH_2-$, $-C(CH_2CH_2CH_2)CH_2-$, $-CH(CH(CH_3)CH_2CH_3)CH_2-$, $-CH(CH(CH_2)_4)CH_2-$, $-CH(CH(CH_2)_5)CH_2-$, $-CH(OH)CH_2-$, and $-CH(CH_2OH)CH_2-$. In a more specific aspect L_2 is chosen from $–CH_2CH_2-$ and $-CH_2CH_2CH_2-$. In an even more specific aspect L_2 is$–CH_2CH_2-$. L_2 can be in either orientation, *e.g.*, $-CH(CH_2CH_2)CH_2-$ refers to *e.g*, purine-$CH(CH_2CH_2)CH_2$-phenyl and purine–$CH_2CH(CH_2CH_2)$-phenyl orientations unless otherwise specified.

[00250] According to one aspect of the compounds of the invention, A is a group chosen from 2,5-dimethoxyphenyl, 2,5-diethoxyphenyl, 2,4-dimethoxyphenyl, 3,4,5-trimethoxyphenyl, 4-chlorophenyl, and 4-benzonitrile. In this aspect, the positions (numbering) of the substituents are relative to the linkage of the phenyl group to the purine core. In a specific embodiment of this aspect L_1 is –S-.

[00251] According to one aspect of the compounds of the invention, B is a group chosen from 2-bromophenyl, 2-fluorophenyl, 2-chlorophenyl, 3-fluorophenyl, 3-iodophenyl, 3-bromophenyl, 4-fluorophenyl, 4-chlorophenyl, 4-bromophenyl, 2,3-dichlorophenyl, 2,4-dichlorophenyl, 2,6-dichlorophenyl, 2,3-difluorophenyl, 3,5-difluorophenyl, 4-chloro-2-fluorophenyl, 2-chloro-6-fluorophenyl, pentafluorophenyl, 2-nitrophenyl, 3-nitrophenyl, 4-nitrophenyl, 4-benzoic acid, 2-trifluoromethylphenyl, 3-trifluoromethylphenyl, 3-methoxyphenyl, 3-methoxyphenyl, 3,4-dimethoxyphenyl, 3,5-dimethoxyphenyl, 3,4,5-trimethoxyphenyl, 3-ethoxy-4-methoxyphenyl, p-tolyl, o-tolyl, 2,5-

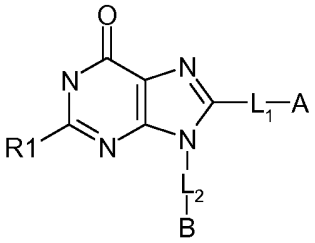
dimethylphenyl, 3,5-dimethylphenyl, 2,4,6-trimethylphenyl, 4-phenylethanone, 4-phenol, 4-benzenesulfonic acid, 4-dimethylaminophenyl, 4-carbamic acid tert-butyl ester phenyl, 4-aminophenyl, 3-trifluoromethoxyphenyl, and 3,5 bistrifluoromethylphenyl. In this aspect, the positions (numbering) of the substituents are relative to the linkage of the phenyl group to the purine core. In a specific embodiment of this aspect, L_2 is chosen from $-CH_2-CH_2-$ and $-CH_2-CH_2-CH_2-$.

[00252] The invention also provides compounds of Formula II where the variables are as in any of the above embodiments and aspects of the invention for the compounds of Formula I.



FORMULA II

[00253] The invention also provides compounds of Formula III where the variables are as in any of the above embodiments and aspects of the invention for the compounds of Formula I.



FORMULA III

[00254] According to one aspect of the invention, compounds of Formula I are provided wherein:

[00255] A is a substituted or unsubstituted heterocyclic group;

[00256] B is a substituted or unsubstituted aryl group;

[00257] R1 is chosen from hydro, alkyl, aryl, heteroaryl, amino, halo, sulfur, and thioalkyl;

[00258] L_1 can be saturated, partially saturated, or unsaturated, and is chosen from $-(CH_2)_n-(CH_2)_n-$, $-(CH_2)_nC(=O)(CH_2)_n-$, $-(CH_2)_nC(=O)N(CH_2)_n-$, $-(CH_2)_nNC(=O)O(CH_2)_n-$, $-(CH_2)_nNC(=O)N(CH_2)_n-$, $-(CH_2)_nNC(=S)S(CH_2)_n-$, $-(CH_2)nOC(=O)S(CH_2)_n-$, $-(CH_2)_nNH(CH_2)_n-$, $-(CH_2)_nO(CH_2)_n-$, $-(CH_2)_nS(CH_2)_n-$, $-(CH_2)_nNC(=S)N(CH_2)_n-$, where each n is independently chosen from 0, 1, 2, 3, 4, 5, 6, 7, and 8, and wherein each carbon and/or nitrogen can be optionally substituted with one or more substituents independently chosen from hydroxyl, halo, alkoxy, C_{1-3} alkyl, and C_{3-6} cycloalkyl groups;

[00259] L_2 can be saturated, partially saturated, or unsaturated, and is chosen from $-(CH_2)_n-(CH_2)_n-$, $-(CH_2)_nC(=O)(CH_2)_n-$, $-(CH_2)_nC(=O)N(CH_2)_n-$, $-(CH_2)_nNC(=O)O(CH_2)_n-$, $-(CH_2)_nNC(=O)N(CH_2)_n-$, $-(CH_2)_nNC(=S)S(CH_2)_n-$, $-(CH_2)nOC(=O)S(CH_2)_n-$, $-(CH_2)_nNH(CH_2)_n-$, $-(CH_2)_nO(CH_2)_n-$, $-(CH_2)_nS(CH_2)_n-$, $-(CH_2)_nNC(=S)N(CH_2)_n-$, where each n is independently chosen from 0, 1, 2, 3, 4, 5, 6, 7, and 8, and wherein each carbon and/or nitrogen can be optionally substituted with one or more substituents independently chosen from hydroxyl, halo, alkoxy, C_{1-3} alkyl, and C_{3-6} cycloalkyl groups; and pharmaceutically acceptable salts thereof.

[00260] In one aspect of the invention, A can be substituted or unsubstituted and is chosen from an aryl or heterocyclic group;

[00261] B can be substituted or unsubstituted and is chosen from a heteroaryl or heterocyclic group having one or more hetero atoms chosen from –N-, -O-, -S-, and –P-;

[00262] R1 is chosen from a hydro, alkyl, alkoxy, aryl, heteroaryl, heterocyclic, carbocyclic, amino, halo, sulfur, and thioalkyl group;

[00263] L_1 and L_2 are as defined above in their broadest aspects; and pharmaceutically acceptable salts thereof.

[00264] In another aspect of the invention, A can be substituted or unsubstituted and is chosen from a benzo[1,3]dioxole or phenyl group;

[00265] B can be a substituted or unsubstituted heteroaryl or heterocyclic group having one or more hetero atoms chosen from –N-, -O-, -S-, and –P-;

[00266] R1 is chosen from a hydro, alkyl, alkoxy, aryl, heteroaryl, heterocyclic, carbocyclic, amino, halo, sulfur, and thioalkyl group;

[00267] L_1 and L_2 are as defined above in their broadest aspects; and pharmaceutically acceptable salts thereof.

[00268] In one aspect of the invention, A can be substituted or unsubstituted and is a group chosen from 5-halo-benzo[1,3]dioxole (*e.g*, 5-bromo-benzo[1,3]dioxole), dimethoxybenzene (*e.g.*, 1,4-dimethoxybenzene, 2,3-dimethoxybenzene, and 2,4-dimethoxybenzene), and diethoxybenzene (*e.g.*, 1,4-diethoxybenzene, 2,3-diethoxybenzene, and 2,4-diethoxybenzene);

[00269] B can be substituted or unsubstituted and is chosen from a heteroaryl or heterocyclic group having one or more hetero atoms chosen from –N-, -O-, -S-, and –P-;

[00270] R1 is chosen from a hydro, alkyl, alkoxy, aryl, heteroaryl, heterocyclic, carbocyclic, amino, halo, sulfur, and thioalkyl group;

[00271] L_1 and L_2 are as defined above in their broadest aspects; and pharmaceutically acceptable salts thereof.

[00272] In one aspect of the invention, A can be substituted or unsubstituted and is chosen from a aryl, heteroaryl, heterocyclic, and carbocyclic group;

[00273] B can be substituted or unsubstituted and is a heterocyclic group chosen from piperidine, pyrrolidine, azetidine, piperazine, morpholine, and tetrahydro-pyran;

[00274] R1 is chosen from a hydro, alkyl, alkoxy, aryl, heteroaryl, heterocyclic, carbocyclic, amino, halo, sulfur, and thioalkyl group;

[00275] L_1 and L_2 are defined as above; and pharmaceutically acceptable salts thereof.

[00276] In one aspect of the invention, A can be substituted or unsubstituted and is chosen from an aryl, heteroaryl, heterocyclic, and carbocyclic group;

[00277] B is a group chosen from piperidine, piperidine-1-carboxylic acid ethyl ester, piperidine-1-carboxylic acid tert-butyl ester, 2,2,6,6-tetramethyl-piperidine, piperidine-2,6-dione, piperidine-1-carbaldehyde, 1-methyl-pyrrolidine, 1-isopropyl-piperazine, tetrahydro-pyran, adamantane, piperidine-1-carbaldehyde, 1-

piperidin-1-yl-ethanone, 1-methanesulfonyl-piperidine, 1-propyl-piperidine, 1-trifluoromethanesulfonyl-piperidine, piperidine-1-carboxylic acid tert-butyl ester, pyrrolidine-1-carboxylic acid tert-butyl ester, morpholine-4-carboxylic acid tert-butyl ester, 1-pyrrolidin-1-yl-ethanone, 1-methanesulfonyl-pyrrolidine, pyrrolidine-1-carbaldehyde, azetidine-1-carboxylic acid *tert*-butyl ester, 1-methyl-azetidine, azetidine, azetidine-1-carbaldehyde, 1-azetidin-1-yl-ethanone, 1-methanesulfonyl-azetidine, and 1-trifluoromethanesulfonyl-azetidine, cycloheptane, imidazole, undecafluorocyclohexane, cyclohexyl-carbamic acid *tert*-butyl ester, 1-piperazin-1-yl-ethanone, 6,6-dimethyl-bicyclo[3.1.1]hept-2-ene, 5-methyl 2,4-dihydro-pyrazol-3-one, piperidine-1-carboxylic acid benzyl ester, morpholine, pyrrolidine-1-carboxylic acid benzyl ester, piperidine-1,2-dicarboxylic acid 1-tert butyl ester 2-ethyl ester, benzyl-1,2,3,6-tetrahydro-pyridine, hexahydro-4b-aza-cyclopropa[cd]pentalene, 2-isopropyl-piperidine-1carboxylic acid *tert*-butyl ester, piperidine-1-carboxylic acid ethyl amide, piperidine-1-carboxylic acid isopropyl amide, piperidine-1-carboxylic acid *tert*-butyl amide, [{piperidine-1-carbonyl}amino]-acetic acid ethyl ester, isopropyl piperidine, isobutyl piperidine, 2,2-dimethyl-1-piperidin-1-yl-propan-1-one, 2,2-dimethyl-1-piperidin-1-yl-butan-1-one, 2-isopropyl-piperidine, 1-isopropyl piperazine, and 1-cyclopentyl-piperazine.

[00278] R1 is chosen from a hydro, alkyl, alkoxy, aryl, heteroaryl, heterocyclic, carbocyclic, amino, halo, sulfur, and thioalkyl group;

[00279] L_1 and L_2 are as defined above in their broadest aspects; and pharmaceutically acceptable salts thereof.

[00280] In one aspect of the invention, A can be substituted or unsubstituted and is chosen from a benzo[1,3]dioxole and phenyl group;

[00281] B can be substituted or unsubstituted and is a heteroaryl or heterocyclic group chosen from piperidine, pyrrolidine, azetidine, piperazine, morpholine, and tetrahydro-pyran.

[00282] R1 is chosen from a hydro, alkyl, alkoxy, aryl, heteroaryl, heterocyclic, carbocyclic, amino, halo, sulfur, and thioalkyl group;

[00283] L_1 and L_2 are as defined above in their broadest aspects; and pharmaceutically acceptable salts thereof.

[00284] In one aspect of the invention, A can be substituted or unsubstituted and is chosen from a benzo[1,3]dioxole and phenyl group;

[00285] B is a group chosen from piperidine, piperidine-1-carboxylic acid ethyl ester, piperidine-1-carboxylic acid tert-butyl ester, 2,2,6,6-tetramethyl-piperidine, piperidine-2,6-dione, piperidine-1-carbaldehyde, 1-methyl-pyrrolidine, 1-isopropyl-piperazine, tetrahydro-pyran, adamantane, piperidine-1-carbaldehyde, 1-piperidin-1-yl-ethanone, 1-methanesulfonyl-piperidine, 1-propyl-piperidine, 1-trifluoromethanesulfonyl-piperidine, piperidine-1-carboxylic acid tert-butyl ester, pyrrolidine-1-carboxylic acid tert-butyl ester, morpholine-4-carboxylic acid tert-butyl ester, 1-pyrrolidin-1-yl-ethanone, 1-methanesulfonyl-pyrrolidine, pyrrolidine-1-carbaldehyde, azetidine-1-carboxylic acid *tert*-butyl ester, 1-methyl-azetidine, azetidine, azetidine-1-carbaldehyde, 1-azetidin-1-yl-ethanone, 1-methanesulfonyl-azetidine, and 1-trifluoromethanesulfonyl-azetidine, cycloheptane, imidazole, undecafluorocyclohexane, cyclohexyl-carbamic acid *tert*-butyl ester, 1-piperazin-1-yl-ethanone, 6,6-dimethyl-bicyclo[3.1.1]hept-2-ene, 5-methyl 2,4-dihydro-pyrazol-3-one, piperidine-1-carboxylic acid benzyl ester, morpholine, pyrrolidine-1-carboxylic acid benzyl ester, piperidine-1,2-dicarboxylic acid 1-tert butyl ester 2-ethyl ester, benzyl-1,2,3,6-tetrahydro-pyridine, hexahydro-4b-aza-cyclopropa[cd]pentalene, 2-isopropyl-piperidine-1carboxylic acid *tert*-butyl ester, piperidine-1-carboxylic acid ethyl amide, piperidine-1-carboxylic acid isopropyl amide, piperidine-1-carboxylic acid *tert*-butyl amide, [{piperidine-1-carbonyl}amino]-acetic acid ethyl ester, isopropyl piperidine, isobutyl piperidine, 2,2-dimethyl-1-piperidin-1-yl-propan-1-one, 2,2-dimethyl-1-piperidin-1-yl-butan-1-one, 2-isopropyl-piperidine, 1-isopropyl piperazine, and 1-cyclopentyl-piperazine;

[00286] R1 is chosen from a hydro, alkyl, alkoxy, aryl, heteroaryl, heterocyclic, carbocyclic, amino, halo, sulfur, and thioalkyl group;

[00287] L_1 and L_2 are as defined above in their broadest aspects; and pharmaceutically acceptable salts thereof.

[00288] In one aspect of the invention, A is a group chosen from 5-halo-benzo[1,3]dioxole, dimethoxybenzene, and diethoxybenzene;

[00289] B is a group chosen from piperidine, piperidine-1-carboxylic acid ethyl ester, piperidine-1-carboxylic acid tert-butyl ester, 2,2,6,6-tetramethyl-piperidine, piperidine-2,6-dione, piperidine-1-carbaldehyde, 1-methyl-pyrrolidine, 1-isopropyl-piperazine, tetrahydro-pyran, adamantane, piperidine-1-carbaldehyde, 1-piperidin-1-yl-ethanone, 1-methanesulfonyl-piperidine, 1-propyl-piperidine, 1-trifluoromethanesulfonyl-piperidine, piperidine-1-carboxylic acid tert-butyl ester, pyrrolidine-1-carboxylic acid tert-butyl ester, morpholine-4-carboxylic acid tert-butyl ester, 1-pyrrolidin-1-yl-ethanone, 1-methanesulfonyl-pyrrolidine, pyrrolidine-1-carbaldehyde, azetidine-1-carboxylic acid *tert*-butyl ester, 1-methyl-azetidine, azetidine, azetidine-1-carbaldehyde, 1-azetidin-1-yl-ethanone, 1-methanesulfonyl-azetidine, and 1-trifluoromethanesulfonyl-azetidine, cycloheptane, imidazole, undecafluorocyclohexane, cyclohexyl-carbamic acid *tert*-butyl ester, 1-piperazin-1-yl-ethanone, 6,6-dimethyl-bicyclo[3.1.1]hept-2-ene, 5-methyl 2,4-dihydro-pyrazol-3-one, piperidine-1-carboxylic acid benzyl ester, morpholine, pyrrolidine-1-carboxylic acid benzyl ester, piperidine-1,2-dicarboxylic acid 1-tert butyl ester 2-ethyl ester, benzyl-1,2,3,6-tetrahydro-pyridine, hexahydro-4b-aza-cyclopropa[cd]pentalene, 2-isopropyl-piperidine-1carboxylic acid *tert*-butyl ester, piperidine-1-carboxylic acid ethyl amide, piperidine-1-carboxylic acid isopropyl amide, piperidine-1-carboxylic acid *tert*-butyl amide, [{piperidine-1-carbonyl}amino]-acetic acid ethyl ester, isopropyl piperidine, isobutyl piperidine, 2,2-dimethyl-1-piperidin-1-yl-propan-1-one, 2,2-dimethyl-1-piperidin-1-yl-butan-1-one, 2-isopropyl-piperidine, 1-isopropyl piperazine, and 1-cyclopentyl-piperazine;

[00290] R1 is chosen from a hydro, alkyl, alkoxy, aryl, heteroaryl, heterocyclic, carbocyclic, amino, halo, sulfur, and thioalkyl group;

[00291] L_1 and L_2 are as defined above in their broadest aspects; and pharmaceutically acceptable salts thereof.

[00292] According to one aspect of the invention, in the compounds of Formula I, A is an aryl or heterocyclic group having one or more substituents chosen from halo, alkyl, alkoxy, haloalkyl, haloalkoxy, nitro, -C(=O)alkyl, hydroxyl, -C≡N, $-SO_3$, and –COOH. In a more specific aspect A is a phenyl group having one or more substituents chosen from halo, alkyl, alkoxy, haloalkyl, haloalkoxy, nitro, -

C(=O)alkyl, hydroxyl, and –COOH. In another specific aspect, A is a phenyl group having one or more substituents chosen from –F, -Cl, -Br, -I, $-OCH_3$, and $-OCH_2CH_3$. In another aspect A is a benzo[1,3]dioxole group having one or more substituents chosen from halo, alkyl, alkoxy, haloalkyl, haloalkoxy, nitro, -C(=O)alkyl, hydroxyl, and –COOH. In another specific aspect, A is a benzo[1,3]dioxole group having one or more substituents chosen from –F, -Cl, -Br, -I, $-OCH_3$, and $-OCH_2CH_3$.

[00293] In one aspect, in the compounds of Formula I, A is an aryl or heterocyclic group with one or more substituents chosen from hydroxyl, halo, alkyl, alkoxy, haloalkyl, haloalkoxy, $-N(C_{1-3}\ alkyl)_2$, $-NH(C_{1-3}\ alkyl)$, $-C(=O)NH_2$, $-C(=O)NH(C_{1-3}\ alkyl)$, $-C(=O)N(C_{1-3}\ alkyl)_2$, $-S(=O)_2(C_{1-3}alkyl)$, $-S(=O)_2NH_2$, $-S(=O)_2N(C_{1-3}\ alkyl)_2$, $-S(=O)_2NH(C_{1-3}\ alkyl)$, $-CHF_2$, $-OCF_3$, $-OCHF_2$, $-SCF_3$, $-CF_3$, -CN, $-NH_2$, and $-NO_2$. In one specific aspect, A is a phenyl group having one or more substituents chosen from hydroxyl, halo, alkyl, alkoxy, haloalkyl, haloalkoxy, $-N(C_{1-3}\ alkyl)_2$, $-NH(C_{1-3}\ alkyl)$, $-C(=O)NH_2$, $-C(=O)NH(C_{1-3}\ alkyl)$, $-C(=O)N(C_{1-3}\ alkyl)_2$, $-S(=O)_2(C_{1-3}alkyl)$, $-S(=O)_2NH_2$, $-S(=O)_2N(C_{1-3}\ alkyl)_2$, $-S(=O)_2NH(C_{1-3}\ alkyl)$, $-CHF_2$, $-OCF_3$, $-OCHF_2$, $-SCF_3$, $-CF_3$, -CN, $-NH_2$, and $-NO_2$. In another specific aspect, A is a benzo[1,3]dioxole group having one or more substituents chosen from hydroxyl, halo, alkyl, alkoxy, haloalkyl, haloalkoxy, $-N(C_{1-3}\ alkyl)_2$, $-NH(C_{1-3}\ alkyl)$, $-C(=O)NH_2$, $-C(=O)NH(C_{1-3}\ alkyl)$, $-C(=O)N(C_{1-3}\ alkyl)_2$, $-S(=O)_2(C_{1-3}alkyl)$, $-S(=O)_2NH_2$, $-S(=O)_2N(C_{1-3}\ alkyl)_2$, $-S(=O)_2NH(C_{1-3}\ alkyl)$, $-CHF_2$, $-OCF_3$, $-OCHF_2$, $-SCF_3$, $-CF_3$, -CN, $-NH_2$, and $-NO_2$.

[00294] In one aspect, in the compounds of Formula I, A is a phenyl or benzo[1,3]dioxole group having from 1-5 substituents independently chosen from acylamino, acyloxy, alkenyl, alkoxy, alkyl, alkylthio, alkynyl, amino, aryl, arylalkyl, arylalkenyl, arylalkynyl, arylalkoxy, aryloxy, arylthio, carbocycle, cyano, cyanato, halo, haloalkyl, halophenyl, hydroxyl, heteroaryl, heteroaryloxy, heterocycle, heteroarylalkoxy, isocyanato, isothiocyanato, nitro, sulfinyl, sulfonyl, sulfonamide, thiocarbonyl, thiocyanato, trihalomethanesulfonamido, O-carbamyl, N-carbamyl, O-thiocarbamyl, N-thiocarbamyl, and C-amido.

[00295] According to one aspect, in the compounds of Formula I, B is a heterocyclic group having one or more heteroatoms chosen from –N- and –O- wherein the heterocyclic group can have one or more substituents chosen from hydro, halo, alkyl, alkoxy, haloalkyl, haloalkoxy, nitro, -CH_2-aryl, -C(=O)alkyl, -C(=O)cycloalkyl, -C(=O)-NH-Alkyl, cycloalkyl, hydroxyl, -SO_3, –COOH (and esters thereof), amino acid (chosen from natural and non-natural amino acids), peptide having 1-5 amino acid residues (chosen from natural and non-natural amino acids), -C(=O)alkyl where the alkyl is substituted with one or more substituents (chosen from alkyl, amino, alkoxy, haloalkyl, haloalkoxy, nitro, cyano, hydroxyl, –COOH (and esters thereof), sulfonyl, sulfonamide) and sulfonyl. In one specific aspect, B is a piperidine (piperidinyl) group. In one specific aspect, B is a piperidine group substituted with one or more substituents chosen from hydro, halo, alkyl, alkoxy, haloalkyl, haloalkoxy, nitro, -CH_2-aryl, -C(=O)alkyl, -C(=O)cycloalkyl, -C(=O)-NH-Alkyl, cycloalkyl, hydroxyl, -SO_3, –COOH (and esters thereof), amino acid (chosen from natural and non-natural amino acids), peptide having 1-5 amino acid residues (chosen from natural and non-natural amino acids), -C(=O)alkyl where the alkyl is substituted with one or more substituents (chosen from alkyl, amino, alkoxy, haloalkyl, haloalkoxy, nitro, cyano, hydroxyl, –COOH (and esters thereof), sulfonyl, sulfonamide) and sulfonyl. In a more specific aspect, B is a piperidine group having one or more substituents chosen from hydro, halo, alkyl, alkoxy, haloalkyl, haloalkoxy, nitro, -CH_2-aryl, -C(=O)alkyl, -C(=O)-NH-Alkyl, cycloalkyl, hydroxyl, -SO_3, –COOH (and esters thereof), and sulfonyl. In an even more specific aspect, B is a piperidine group having one or more substituents chosen from –C(=O), –C(=O)CH_3, -CH_3, -CH_2CH_3, -$CH_2CH_2CH_3$, -C(=O)OCH_2CH_3, -S(=O)$_2CH_3$, -S(=O)$_2CF_3$, -C(=O)$OC(CH_3)_3$, –C(=O)OCH_2-phenyl, -CH_2-phenyl, -$CH(CH_3)_2$, -C(=O)$NHCH_2CH_3$, -C(=O)$NHCH(CH_3)_2$, -C(=O)$NHC(CH_3)_3$, -C(=O)$NHCH_2C$(=O)OCH_2CH_3, -C(=O)$C(CH_3)_3$, -$CH(CH_3)_2$, -$CH_2CH(CH_3)_2$, -C(=O)$CH_2C(CH_3)_3$, and cyclopentyl.

[00296] In one specific aspect, B is a homopiperidine (homopiperidinyl) group. In a more specific aspect, B is a homopiperidine group having one or more substituents chosen from hydro, halo, alkyl, alkoxy, haloalkyl, haloalkoxy, nitro, -

CH_2-aryl, -C(=O)alkyl, -C(=O)cycloalkyl, -C(=O)-NH-Alkyl, cycloalkyl, hydroxyl, $-SO_3$, –COOH (and esters thereof), amino acid (chosen from natural and non-natural amino acids), peptide having 1-5 amino acid residues (chosen from natural and non-natural amino acids), -C(=O)alkyl where the alkyl is substituted with one or more substituents (chosen from alkyl, amino, alkoxy, haloalkyl, haloalkoxy, nitro, cyano, hydroxyl, –COOH (and esters thereof), sulfonyl, sulfonamide) and sulfonyl. In an even more specific aspect, B is a homopiperidine group having one or more substituents chosen from –C(=O), $-C(=O)CH_3$, $-CH_3$, $-CH_2CH_3$, $-CH_2CH_2CH_3$, $-C(=O)OCH_2CH_3$, $-S(=O)_2CH_3$, $-S(=O)_2CF_3$, $-C(=O)OC(CH_3)_3$, $-C(=O)OCH_2$-phenyl, $-CH_2$-phenyl, $-CH(CH_3)_2$, $-C(=O)NHCH_2CH_3$, $-C(=O)NHCH(CH_3)_2$, $-C(=O)NHC(CH_3)_3$, $-C(=O)NHCH_2C(=O)OCH_2CH_3$, $-C(=O)C(CH_3)_3$, $-CH(CH_3)_2$, $-CH_2CH(CH_3)_2$, $-C(=O)CH_2C(CH_3)_3$, and cyclopentyl.

[00297] In one specific aspect, B is a piperazine (piperazinyl) group. In a more specific aspect, B is a piperazine group having one or more substituents chosen from hydro, halo, alkyl, alkoxy, haloalkyl, haloalkoxy, nitro, $-CH_2$-aryl, -C(=O)alkyl, -C(=O)cycloalkyl, -C(=O)-NH-Alkyl, cycloalkyl, hydroxyl, $-SO_3$, –COOH (and esters thereof), amino acid (chosen from natural and non-natural amino acids), peptide having 1-5 amino acid residues (chosen from natural and non-natural amino acids), -C(=O)alkyl where the alkyl is substituted with one or more substituents (chosen from alkyl, amino, alkoxy, haloalkyl, haloalkoxy, nitro, cyano, hydroxyl, –COOH (and esters thereof), sulfonyl, sulfonamide) and sulfonyl. In an even more specific aspect, B is a piperazine group having one or more substituents chosen from –C(=O), $-C(=O)CH_3$, $-CH_3$, $-CH_2CH_3$, $-CH_2CH_2CH_3$, $-C(=O)OCH_2CH_3$, $-S(=O)_2CH_3$, $-S(=O)_2CF_3$, $-C(=O)OC(CH_3)_3$, $-C(=O)OCH_2$-phenyl, $-CH_2$-phenyl, $-CH(CH_3)_2$, $-C(=O)NHCH_2CH_3$, $-C(=O)NHCH(CH_3)_2$, $-C(=O)NHC(CH_3)_3$, $-C(=O)NHCH_2C(=O)OCH_2CH_3$, $-C(=O)C(CH_3)_3$, $-CH(CH_3)_2$, $-CH_2CH(CH_3)_2$, $-C(=O)CH_2C(CH_3)_3$, and cyclopentyl.

[00298] In one specific aspect, B is a pyrrolidine (pyrrolidinyl) group. In a more specific aspect, B is a pyrrolidine group having one or more substituents chosen from hydro, halo, alkyl, alkoxy, haloalkyl, haloalkoxy, nitro, $-CH_2$-aryl, -C(=O)alkyl, -C(=O)cycloalkyl, -C(=O)-NH-Alkyl, cycloalkyl, hydroxyl, $-SO_3$, –

COOH (and esters thereof), amino acid (chosen from natural and non-natural amino acids), peptide having 1-5 amino acid residues (chosen from natural and non-natural amino acids), -C(=O)alkyl where the alkyl is substituted with one or more substituents (chosen from alkyl, amino, alkoxy, haloalkyl, haloalkoxy, nitro, cyano, hydroxyl, –COOH (and esters thereof), sulfonyl, sulfonamide) and sulfonyl. In an even more specific aspect, B is a pyrrolidine group having one or more substituents chosen from –C(=O), –C(=O)CH_3, -CH_3, -CH_2CH_3, -$CH_2CH_2CH_3$, -C(=O)OCH_2CH_3, -$S(=O)_2CH_3$, -$S(=O)_2CF_3$, -C(=O)$OC(CH_3)_3$, –C(=O)OCH_2-phenyl, -CH_2-phenyl, -$CH(CH_3)_2$, -C(=O)$NHCH_2CH_3$, -C(=O)$NHCH(CH_3)_2$, -C(=O)$NHC(CH_3)_3$, -C(=O)$NHCH_2C(=O)OCH_2CH_3$, -C(=O)$C(CH_3)_3$, -$CH(CH_3)_2$, -$CH_2CH(CH_3)_2$, -C(=O)$CH_2C(CH_3)_3$, and cyclopentyl.

[00299] In one specific aspect, B is an azetidine (azetidinyl) group. In a more specific aspect, B is an azetidine group having one or more substituents chosen from hydro, halo, alkyl, alkoxy, haloalkyl, haloalkoxy, nitro, -CH_2-aryl, -C(=O)alkyl, -C(=O)cycloalkyl, -C(=O)-NH-Alkyl, cycloalkyl, hydroxyl, -SO_3, –COOH (and esters thereof), amino acid (chosen from natural and non-natural amino acids), peptide having 1-5 amino acid residues (chosen from natural and non-natural amino acids), -C(=O)alkyl where the alkyl is substituted with one or more substituents (chosen from alkyl, amino, alkoxy, haloalkyl, haloalkoxy, nitro, cyano, hydroxyl, –COOH (and esters thereof), sulfonyl, sulfonamide) and sulfonyl. In an even more specific aspect, B is an azetidine group having one or more substituents chosen from –C(=O), –C(=O)CH_3, -CH_3, -CH_2CH_3, -$CH_2CH_2CH_3$, -C(=O)OCH_2CH_3, -$S(=O)_2CH_3$, -$S(=O)_2CF_3$, -C(=O)$OC(CH_3)_3$, –C(=O)OCH_2-phenyl, -CH_2-phenyl, -$CH(CH_3)_2$, -C(=O)$NHCH_2CH_3$, -C(=O)$NHCH(CH_3)_2$, -C(=O)$NHC(CH_3)_3$, -C(=O)$NHCH_2C(=O)OCH_2CH_3$, -C(=O)$C(CH_3)_3$, -$CH(CH_3)_2$, -$CH_2CH(CH_3)_2$, -C(=O)$CH_2C(CH_3)_3$, and cyclopentyl.

[00300] In one aspect of the compounds of Formula I, B is a heterocyclic group with one or more substituents chosen from hydroxyl, halo, alkyl, alkoxy, haloalkyl, haloalkoxy, -$N(C_{1-3}$ alkyl$)_2$, -$NH(C_{1-3}$ alkyl), -C(=O)NH_2, -C(=O)$NH(C_{1-3}$ alkyl), -C(=O)$N(C_{1-3}$ alkyl$)_2$, -$S(=O)_2(C_{1-3}$alkyl), -$S(=O)_2NH_2$, -$S(=O)_2N(C_{1-3}$ alkyl$)_2$, -$S(=O)_2NH(C_{1-3}$ alkyl), -CHF_2, -OCF_3, -$OCHF_2$, -SCF_3, -CF_3, -CN, -NH_2, -SO_3, and -

NO_2. In a specific aspect, B a group is chosen piperidine, piperazine, pyrrolidine, azetidine, tetrahydro-pyran, and morpholine group, each having one or more substituents. In a more specific aspect, B is a piperidine group having one or more substituents.

[00301] In one aspect, B is a group chosen from piperidine, piperazine, pyrrolidine, azetidine, tetrahydro-pyran, and morpholine, wherein said B group can have from 1-5 substituents independently chosen from acylamino, acyloxy, alkenyl, alkoxy, alkyl, alkylthio, alkynyl, amino, aryl, arylalkyl, arylalkenyl, arylalkynyl, arylalkoxy, aryloxy, arylthio, carbocycle, cyano, cyanato, halo, haloalkyl, halophenyl, hydroxyl, heteroaryl, heteroaryloxy, heterocycle, heteroarylalkoxy, isocyanato, isothiocyanato, nitro, sulfinyl, sulfonyl, sulfonamide, thiocarbonyl, thiocyanato, trihalomethanesulfonamido, O-carbamyl, N-carbamyl, O-thiocarbamyl, N-thiocarbamyl, and C-amido. In a more specific aspect, B is a piperidine group having one or more substituents.

[00302] According to one embodiment, A is a substituted or unsubstituted benzo[1,3]dioxole group. In one aspect of this embodiment, A is a 5-bromo-benzo[1,3]dioxole group. In one aspect of this embodiment, A is an unsubstituted benzo[1,3]dioxole group. In one aspect of this embodiment, A is a 5-iodo-benzo[1,3]dioxole group. In one aspect of this embodiment, A is a 5-chloro-benzo[1,3]dioxole group. In one aspect of this embodiment, A is a 5-fluoro-benzo[1,3]dioxole group. In one aspect of this embodiment, A has from 1-5 substituents independently chosen from acylamino, acyloxy, alkenyl, alkoxy, alkyl, alkylthio, alkynyl, amino, aryl, arylalkyl, arylalkenyl, arylalkynyl, arylalkoxy, aryloxy, arylthio, carbocycle, cyano, cyanato, halo, haloalkyl, halophenyl, hydroxyl, heteroaryl, heteroaryloxy, heterocycle, heteroarylalkoxy, isocyanato, isothiocyanato, nitro, sulfinyl, sulfonyl, sulfonamide, thiocarbonyl, thiocyanato, trihalomethanesulfonamido, O-carbamyl, N-carbamyl, O-thiocarbamyl, N-thiocarbamyl, and C-amido.

[00303] In one aspect of the invention, A is substituted with one or more substituents and is a group chosen from a phenyl or benzo[1,3]dioxole group; B is substituted with one or more substituents and is a group chosen from piperidine,

piperazine, pyrrolidine, azetidine, tetrahyro-pyran, and morpholine; R_1 is a hydro; L_1 is –S-; L_2 is $–CH_2CH_2$-, and pharmaceutically acceptable salt thereof. According to this aspect of the invention, the A group substituents are chosen from halo and alkoxy, and the B group substituents are chosen from –C(=O), $–C(=O)CH_3$, $-CH_3$, $-CH_2CH_3$, $-CH_2CH_2CH_3$, $-C(=O)OCH_2CH_3$, $-S(=O)_2CH_3$, $-S(=O)_2CF_3$, $-C(=O)OC(CH_3)_3$, $–C(=O)OCH_2$-phenyl, $-CH_2$-phenyl, $-CH(CH_3)_2$, $-C(=O)NHCH_2CH_3$, $-C(=O)NHCH(CH_3)_2$, $-C(=O)NHC(CH_3)_3$, $-C(=O)NHCH_2C(=O)OCH_2CH_3$, $-C(=O)C(CH_3)_3$, $-CH(CH_3)_2$, $-CH_2CH(CH_3)_2$, $-C(=O)CH_2C(CH_3)_3$, and cyclopentyl.

[00304] In one aspect of the invention, A can be substituted or unsubstituted and is chosen from an aryl and heterocyclic group;

[00305] B can be substituted or unsubstituted and is chosen from a cycloalkyl and heterocyclic group;

[00306] R1 is chosen from a hydro, alkyl, alkoxy, aryl, heteroaryl, heterocyclic, carbocyclic, amino, halo, sulfur, and thioalkyl group;

[00307] L_1 and L_2 are as defined above in their broadest aspects; and pharmaceutically acceptable salts thereof.

[00308] In another aspect of the invention, A can be substituted or unsubstituted and is chosen from a benzo[1,3]dioxole and phenyl group;

[00309] B can be substituted or unsubstituted and is chosen from a heteroaryl, heterocyclic, and cycloalkyl group;

[00310] R1 is chosen from a hydro, alkyl, alkoxy, aryl, heteroaryl, heterocyclic, carbocyclic, amino, halo, sulfur, and thioalkyl group; L_1 and L_2 are as defined above in their broadest aspects; and pharmaceutically acceptable salts thereof.

[00311] In one aspect of the invention, A can be substituted or unsubstituted and is a group chosen from 5-halo-benzo[1,3]dioxole (*e.g.*, 5-bromo-benzo[1,3]dioxole), dimethoxybenzene (*e.g.*, 1,4-dimethoxybenzene, 2,3-dimethoxybenzene, and 2,4-dimethoxybenzene), and diethoxybenzene (*e.g.*, 1,4-diethoxybenzene, 2,3-diethoxybenzene, and 2,4-diethoxybenzene);

[00312] B can be substituted or unsubstituted and is chosen from a cycloalkyl, heteroaryl, and heterocyclic group;

[00313] R1 is chosen from a hydro, alkyl, alkoxy, aryl, heteroaryl, heterocyclic, carbocyclic, amino, halo, sulfur, and thioalkyl group;

[00314] L_1 and L_2 are as defined above in their broadest aspects; and pharmaceutically acceptable salts thereof.

[00315] In one aspect of the invention, A can be substituted or unsubstituted and is chosen from an aryl, heteroaryl, heterocyclic, and carbocyclic group;

[00316] B can be substituted or unsubstituted and is a group chosen from cyclopropyl, cyclobutyl, cyclopentyl, cyclohexyl, tetrahydrofuranyl, oxepanyl (oxepane), tetrahydro-thiophenyl (tetrahydro-thiophene), thiopyranyl, thiepanyl (thiepane), and tetrahydro-pyranyl;

[00317] R1 is chosen from a hydro, alkyl, alkoxy, aryl, heteroaryl, heterocyclic, carbocyclic, amino, halo, sulfur, and thioalkyl group;

[00318] L_1 and L_2 are defined as above; and pharmaceutically acceptable salts thereof.

[00319] In one aspect of the invention, A can be substituted or unsubstituted and is chosen from an aryl, heteroaryl, heterocyclic, and carbocyclic group;

[00320] $-L_2$-B is a group chosen from (1-Cyclopropyl-propyl)-carbamic acid tert-butyl ester, [1-(Tetrahydro-thiopyran-4-yl)-propyl]-carbamic acid tert-butyl ester, (1-Cyclohexyl-propyl)-carbamic acid tert-butyl ester, (1-Cyclobutyl-propyl)-carbamic acid tert-butyl ester, N-(1-Cyclopropyl-propyl)-methanesulfonamide, 1-(1-Cyclopropyl-propyl)-3-isopropyl-urea, (1-Cyclopentyl-propyl)-carbamic acid tert-butyl ester, [1-(Tetrahydro-pyran-4-yl)-propyl]-carbamic acid tert-butyl ester, 1-Cyclopropyl-propylamine, 1-Cyclohexyl-propylamine, 1-Cyclobutyl-propylamine, 1-Cyclopentyl-propylamine, 1-(Tetrahydro-pyran-4-yl)-propylamine, 1-(Tetrahydro-thiopyran-4-yl)-propyl amine, and 1-(1-Cyclohexyl-propyl)-1H-pyrrole;

[00321] R1 is chosen from a hydro, alkyl, alkoxy, aryl, heteroaryl, heterocyclic, carbocyclic, amino, halo, sulfur, and thioalkyl group;

[00322] L_1 is as defined above; and pharmaceutically acceptable salts thereof.

[00323] In some specific aspects of the invention, L_2 is as defined above and has one or more substituents chosen from hydroxyl, halo, alkoxy, amino, C_{1-3} alkyl, C_{3-7} cycloalkyl, -N-C(=O)$OC(CH_3)_3$, -NSO_2CH_3, -$NC(=O)NC(CH_3)_2$, and pyrrolyl.

[00324] In one aspect of the invention, A can be substituted or unsubstituted and is chosen from a benzo[1,3]dioxole and phenyl group;

[00325] B can be substituted or unsubstituted and is a heteroaryl or heterocyclic group chosen from cyclopropyl, cyclobutyl, cyclopentyl, cyclohexyl, tetrahydrofuranyl, oxepanyl (oxepane), tetrahydro-thiophenyl (tetrahydro-thiophene), thiopyranyl, thiepanyl (thiepane), and tetrahydro-pyranyl;

[00326] R1 is chosen from a hydro, alkyl, alkoxy, aryl, heteroaryl, heterocyclic, carbocyclic, amino, halo, sulfur, and thioalkyl group;

[00327] L_1 and L_2 are as defined above in their broadest aspects; and pharmaceutically acceptable salts thereof.

[00328] In one aspect of the invention, A can be substituted or unsubstituted and is chosen from a benzo[1,3]dioxole and phenyl group;

[00329] B is a group chosen from cyclopropyl, cyclobutyl, cyclopentyl, cyclohexyl, tetrahydrofuranyl, oxepanyl (oxepane), tetrahydro-thiophenyl (tetrahydro-thiophene), thiopyranyl, thiepanyl (thiepane), and tetrahydro-pyranyl;

[00330] R1 is chosen from a hydro, alkyl, alkoxy, aryl, heteroaryl, heterocyclic, carbocyclic, amino, halo, sulfur, and thioalkyl group;

[00331] L_1 and L_2 are as defined above in their broadest aspects; and pharmaceutically acceptable salts thereof.

[00332] In one aspect of the invention, A is a group chosen from 5-halo-benzo[1,3]dioxole, dimethoxybenzene, and diethoxybenzene;

[00333] B is a group chosen cyclopropyl, cyclobutyl, cyclopentyl, cyclohexyl, tetrahydrofuranyl, oxepanyl (oxepane), tetrahydro-thiophenyl (tetrahydro-thiophene), thiopyranyl, thiepanyl (thiepane), and tetrahydro-pyranyl;

[00334] R1 is chosen from a hydro, alkyl, alkoxy, aryl, heteroaryl, heterocyclic, carbocyclic, amino, halo, sulfur, and thioalkyl group;

[00335] L_1 and L_2 are as defined above in their broadest aspects; and pharmaceutically acceptable salts thereof.

[00336] According to one aspect of the invention, in the compounds of Formula I, A is an aryl or heterocyclic group having one or more substituents chosen from halo, alkyl, alkoxy, haloalkyl, haloalkoxy, nitro, -C(=O)alkyl, hydroxyl, -C≡N, $-SO_3$, and –COOH. In another specific aspect, A is a phenyl group having one or more substituents chosen from halo, alkyl, alkoxy, haloalkyl, haloalkoxy, nitro, -C(=O)alkyl, hydroxyl, and –COOH. In another specific aspect, A is a phenyl group having one or more substituents chosen from –F, -Cl, -Br, -I, $-OCH_3$, and $-OCH_2CH_3$. In another aspect, A is a benzo[1,3]dioxole group having one or more substituents chosen from halo, alkyl, alkoxy, haloalkyl, haloalkoxy, nitro, -C(=O)alkyl, hydroxyl, and –COOH. In another specific aspect, A is a benzo[1,3]dioxole group having one or more substituents chosen from –F, -Cl, -Br, -I, $-OCH_3$, and $-OCH_2CH_3$.

[00337] In one aspect, in the compounds of Formula I, A is an aryl or heterocyclic group with one or more substituents chosen from hydroxyl, halo, alkyl, alkoxy, haloalkyl, haloalkoxy, $-N(C_{1-3}\ alkyl)_2$, $-NH(C_{1-3}\ alkyl)$, $-C(=O)NH_2$, $-C(=O)NH(C_{1-3}\ alkyl)$, $-C(=O)N(C_{1-3}\ alkyl)_2$, $-S(=O)_2(C_{1-3}alkyl)$, $-S(=O)_2NH_2$, $-S(=O)_2N(C_{1-3}\ alkyl)_2$, $-S(=O)_2NH(C_{1-3}\ alkyl)$, $-CHF_2$, $-OCF_3$, $-OCHF_2$, $-SCF_3$, $-CF_3$, -CN, $-NH_2$, and $-NO_2$. In one specific aspect, A is a phenyl group having one or more substituents chosen from hydroxyl, halo, alkyl, alkoxy, haloalkyl, haloalkoxy, $-N(C_{1-3}\ alkyl)_2$, $-NH(C_{1-3}\ alkyl)$, $-C(=O)NH_2$, $-C(=O)NH(C_{1-3}\ alkyl)$, $-C(=O)N(C_{1-3}\ alkyl)_2$, $-S(=O)_2(C_{1-3}alkyl)$, $-S(=O)_2NH_2$, $-S(=O)_2N(C_{1-3}\ alkyl)_2$, $-S(=O)_2NH(C_{1-3}\ alkyl)$, $-CHF_2$, $-OCF_3$, $-OCHF_2$, $-SCF_3$, $-CF_3$, -CN, $-NH_2$, and $-NO_2$. In another specific aspect, A is a benzo[1,3]dioxole group having one or more substituents chosen from hydroxyl, halo, alkyl, alkoxy, haloalkyl, haloalkoxy, $-N(C_{1-3}\ alkyl)_2$, $-NH(C_{1-3}\ alkyl)$, $-C(=O)NH_2$, $-C(=O)NH(C_{1-3}\ alkyl)$, $-C(=O)N(C_{1-3}\ alkyl)_2$, $-S(=O)_2(C_{1-3}alkyl)$, $-S(=O)_2NH_2$, $-S(=O)_2N(C_{1-3}\ alkyl)_2$, $-S(=O)_2NH(C_{1-3}\ alkyl)$, $-CHF_2$, $-OCF_3$, $-OCHF_2$, $-SCF_3$, $-CF_3$, -CN, $-NH_2$, and $-NO_2$.

[00338] In one specific aspect of the compounds of the invention, B is a cycloalkyl (*e.g.*, cyclopropyl, cyclobutyl, cyclohexyl, or cycloheptyl) group. In another specific aspect, B is a cycloalkyl group having one or more substituents chosen from hydro, halo, alkyl, alkoxy, haloalkyl, haloalkoxy, nitro, -CH_2-aryl, -C(=O)alkyl, -C(=O)-NH-Alkyl, cycloalkyl, hydroxyl, -SO_3, –COOH (and esters thereof), and sulfonyl. In another specific aspect, B is a cycloalkyl group having one or more substituents chosen from –C(=O), –$C(=O)CH_3$, -CH_3, -CH_2CH_3, -$CH_2CH_2CH_3$, -$C(=O)OCH_2CH_3$, -$S(=O)_2CH_3$, -$S(=O)_2CF_3$, -$C(=O)OC(CH_3)_3$, –$C(=O)OCH_2$-phenyl, -CH_2-phenyl, -$CH(CH_3)_2$, -$C(=O)NHCH_2CH_3$, -$C(=O)NHCH(CH_3)_2$, -$C(=O)NHC(CH_3)_3$, -$C(=O)NHCH_2C(=O)OCH_2CH_3$, -$C(=O)C(CH_3)_3$, -$CH(CH_3)_2$, -$CH_2CH(CH_3)_2$, -$C(=O)CH_2C(CH_3)_3$, cyclopropyl, cyclobutyl, cyclopentyl, and cyclohexyl.

[00339] In one specific aspect of the compounds of the invention, B is a thiopyranyl group. In another specific aspect, B is a thiopyranyl group having one or more substituents chosen from hydro, halo, alkyl, alkoxy, haloalkyl, haloalkoxy, nitro, -CH_2-aryl, -C(=O)alkyl, -C(=O)-NH-Alkyl, cycloalkyl, hydroxyl, -SO_3, –COOH (and esters thereof), and sulfonyl. In another specific aspect, B is a thiopyranyl group having one or more substituents chosen from –C(=O), –$C(=O)CH_3$, -CH_3, -CH_2CH_3, -$CH_2CH_2CH_3$, -$C(=O)OCH_2CH_3$, -$S(=O)_2CH_3$, -$S(=O)_2CF_3$, -$C(=O)OC(CH_3)_3$, –$C(=O)OCH_2$-phenyl, -CH_2-phenyl, -$CH(CH_3)_2$, -$C(=O)NHCH_2CH_3$, -$C(=O)NHCH(CH_3)_2$, -$C(=O)NHC(CH_3)_3$, -$C(=O)NHCH_2C(=O)OCH_2CH_3$, -$C(=O)C(CH_3)_3$, -$CH(CH_3)_2$, -$CH_2CH(CH_3)_2$, -$C(=O)CH_2C(CH_3)_3$, cyclopropyl, cyclobutyl, cyclopentyl, and cyclohexyl.

[00340] In one specific aspect of the compounds of the invention, B is a tetrahydro-pyranyl group. In another specific aspect, B is a tetrahydro-pyranyl group having one or more substituents chosen from hydro, halo, alkyl, alkoxy, haloalkyl, haloalkoxy, nitro, -CH_2-aryl, -C(=O)alkyl, -C(=O)-NH-Alkyl, cycloalkyl, hydroxyl, -SO_3, –COOH (and esters thereof), and sulfonyl. In another specific aspect, B is a tetrahydro-pyranyl group having one or more substituents chosen from –C(=O), –$C(=O)CH_3$, -CH_3, -CH_2CH_3, -$CH_2CH_2CH_3$, -$C(=O)OCH_2CH_3$, -$S(=O)_2CH_3$, -$S(=O)_2CF_3$, -$C(=O)OC(CH_3)_3$, –$C(=O)OCH_2$-phenyl, -CH_2-phenyl, -

$CH(CH_3)_2$, -C(=O)$NHCH_2CH_3$, -C(=O)$NHCH(CH_3)_2$, -C(=O)$NHC(CH_3)_3$, -C(=O)$NHCH_2C(=O)OCH_2CH_3$, -C(=O)$C(CH_3)_3$, -$CH(CH_3)_2$, -$CH_2CH(CH_3)_2$, -C(=O)$CH_2C(CH_3)_3$, cyclopropyl, cyclobutyl, cyclopentyl, and cyclohexyl.

[00341] In one aspect, B is a group chosen cyclopropyl, cyclobutyl, cyclopentyl, cyclohexyl, tetrahydrofuranyl, oxepanyl (oxepane), tetrahydro-thiophenyl (tetrahydro-thiophene), thiopyranyl, thiepanyl (thiepane), and tetrahydro-pyranyl, wherein said B group can have from 1-5 substituents independently chosen from acylamino, acyloxy, alkenyl, alkoxy, alkyl, alkylthio, alkynyl, amino, aryl, arylalkyl, arylalkenyl, arylalkynyl, arylalkoxy, aryloxy, arylthio, carbocycle, cyano, cyanato, halo, haloalkyl, halophenyl, hydroxyl, heteroaryl, heteroaryloxy, heterocycle, heteroarylalkoxy, isocyanato, isothiocyanato, nitro, sulfinyl, sulfonyl, sulfonamide, thiocarbonyl, thiocyanato, trihalomethanesulfonamido, O-carbamyl, N-carbamyl, O-thiocarbamyl, N-thiocarbamyl, and C-amido.

[00342] In one aspect of the invention, A is substituted with one or more substituents and is a group chosen from a phenyl or benzo[1,3]dioxole group; B is substituted with one or more substituents and is a group chosen from cyclopropyl, cyclobutyl, cyclopentyl, cyclohexyl, pyrrolyl, thiopyranyl, and tetrahydro-pyranyl; R_1 is a hydro; L_1 is –S-; L_2 is $–CH_2CH_2$-, and pharmaceutically acceptable salt thereof. According to this aspect of the invention, the A group substituents are chosen from halo and alkoxy, and the B group substituents are chosen from –C(=O), $–C(=O)CH_3$, $-CH_3$, $-CH_2CH_3$, $-CH_2CH_2CH_3$, -C(=O)OCH_2CH_3, -S(=O)$_2CH_3$, -S(=O)$_2CF_3$, -C(=O)$OC(CH_3)_3$, –C(=O)OCH_2-phenyl, $-CH_2$-phenyl, -$CH(CH_3)_2$, -C(=O)$NHCH_2CH_3$, -C(=O)$NHCH(CH_3)_2$, -C(=O)$NHC(CH_3)_3$, -C(=O)$NHCH_2C(=O)OCH_2CH_3$, -C(=O)$C(CH_3)_3$, -$CH(CH_3)_2$, -$CH_2CH(CH_3)_2$, -C(=O)$CH_2C(CH_3)_3$, cyclopropyl, cyclobutyl, cyclopentyl, and cyclohexyl.

[00343] In one aspect, the invention provides compounds of Formula I wherein R1 is hydro.

[00344] In one aspect, the invention provides compounds of Formula I wherein L_1 is –S-.

[00345] In one aspect, the invention provides compounds of Formula I wherein L_2 $–CH_2CH_2$-.

[00346] In one aspect, the invention provides compounds of Formula I wherein wherein L_2 is $-(CH_2)_n-(CH_2)_n-$, and each n is independently chosen from 0, 1, 2, and 3 and wherein each carbon can be optionally substituted with one or more substituents independently chosen from hydroxyl, halo, alkoxy, alkyl, amino, cycloalkyl, $-NR_2R_3$, $-NSO_2R_4$, $-NC(=O)NR_2R_3$, heteroaryl, aryl, cycloalkyl, and heterocyclic; wherein $-R_2$ and $-R_3$ are independently chosen from –H, alkyl, and $-C(=O)OR_4$; and wherein R_4 is an alkyl group (*e.g.*, methyl, ethyl, propyl, isopropyl, butyl, isobutyl, or *tert*-butyl).

[00347] Examples of compounds of the invention are in the Examples. In some aspects, compounds of the invention include those in the Examples that have an IC50 of 10 μM or less. In some aspects, compounds of the invention include those in the Examples that have an IC50 of 5 μM or less. In some aspects, compounds of the invention include those in the Examples that have an IC50 of 1 μM or less. In some aspects, compounds of the invention include those in the Examples that have an IC50 of 0.5 μM or less.

[00348] In some aspects, compounds of the invention include those in the as in any aspect of embodiment of the invention and that have an IC50 of 10 μM or less. In some aspects, compounds of the invention include those in the as in any aspect of embodiment of the invention and that have an IC50 of 5 μM or less. In some aspects, compounds of the invention include those in the as in any aspect of embodiment of the invention and that have an IC50 of 1 μM or less. In some aspects, compounds of the invention include those in the as in any aspect of embodiment of the invention and that have an IC50 of 0.5 μM or less.

[00349] In some aspects, the inventions relates to compounds of the invention are linked to a resins. In a specific aspect, the resin is chosen from sephadex, tentagel and affigel.

[00350] As is understood by the skilled artisan, certain variables in the list of substituents are repetitive (different name for the same substituent), generic to other terms in the list, and/or partially overlap in content with other terms. In the compounds of the invention, the skilled artisan recognizes that substituents may be attached to the remainder

of the molecule via a number of positions and the preferred positions are as illustrated in the Examples.

[00351] Additionally, the compounds of Formulae I-III can contain asymmetric carbon atoms and can therefore exist in racemic and optically active forms. Thus, optical isomers or enantiomers, racemates, tautomers, and diastereomers are also encompassed in the compounds of Formulae I-III. The methods of present invention include the use of all such isomers and mixtures thereof. Methods of separation of enantiomeric and diastereomeric mixtures are well known to one skilled in the art. The present invention encompasses any isolated racemic or optically active form of compounds described in Formulae I, or any mixture thereof.

[00352] In one embodiment, the invention provides a compound or a pharmaceutical composition comprising the compound where the compound chosen from 8-(2,5-dimethoxy-phenylsulfanyl)-9-phenethyl-9H-purin-6-ylamine, 8-(2,5-dimethoxy-phenylsulfanyl)-3-phenethyl-3H-purin-6-ylamine, 8-(2,5-dimethoxy-phenylsulfanyl)-9-(3-phenyl-propyl)-9H-purin-6-ylamine, 8-(benzo[1,3]dioxol-5-ylsulfanyl)-9-phenethyl-9H-purin-6-ylamine, 8-(benzo[1,3]dioxol-5-ylsulfanyl)-3-phenethyl-3H-purin-6-ylamine, 8-(benzo[1,3]dioxol-5-ylsulfanyl)-9-(3-phenyl-propyl)-9H-purin-6-ylamine, 8-(benzo[1,3]dioxol-5-ylsulfanyl)-9-[2-(4-nitro-phenyl)-ethyl]-9H-purin-6-ylamine, 8-(2,5-dimethoxy-phenylsulfanyl)-9-[2-(4-nitro-phenyl)-ethyl]-9H-purin-6-ylamine, 8-(2,5-dimethoxy-phenylsulfanyl)-9-[2-(4-fluoro-phenyl)-ethyl]-9H-purin-6-ylamine, 8-(2,5-dimethoxy-phenylsulfanyl)-3-[2-(4-fluoro-phenyl)-ethyl]-3H-purin-6-ylamine, 8-(benzo[1,3]dioxol-5-ylsulfanyl)-9-[2-(4-fluoro-phenyl)-ethyl]-9H-purin-6-ylamine, 8-(benzo[1,3]dioxol-5-ylsulfanyl)-3-[2-(4-fluoro-phenyl)-ethyl]-3H-purin-6-ylamine, 8-(6-bromo-benzo[1,3]dioxol-5-ylsulfanyl)-9-phenethyl-9H-purin-6-ylamine, 8-(6-bromo-benzo[1,3]dioxol-5-ylsulfanyl)-3-phenethyl-3H-purin-6-ylamine, 8-(2,4-dimethoxy-phenylsulfanyl)-9-phenethyl-9H-purin-6-ylamine, 8-(2,4-dimethoxy-phenylsulfanyl)-3-phenethyl-3H-purin-6-ylamine, 8-(4-chloro-phenylsulfonyl)-9-phenethyl-9H-purin-6-ylamine, 8-(4-chloro-phenylsulfanyl)-3-phenethyl-3H-purin-6-ylamine, 4-(6-amino-9-phenethyl-9H-purin-8-ylsulfanyl)-benzonitrile, 4-(6-amino-3-phenethyl-3H-purin-8-ylsulfanyl)-benzonitrile, 9-[2-(3, 4-dimethoxy-phenyl)-ethyl]-8-(2, 5-dimethoxy-phenylsulfanyl)-9H-purin-6-ylamine, 3-[2-(3, 4-dimethoxy-phenyl)-ethyl]-8-(2, 5-dimethoxy-phenylsulfanyl)-3H-purin-6-ylamine, 8-(2, 5-dimethoxy-phenylsulfanyl)-9-(2-p-tolyl-ethyl)-9H-purin-6-ylamine, 8-(2,5-dimethoxy-phenylsulfanyl)-3-(2-p-tolyl-ethyl)-3H-purin-6-ylamine, 9-[2-(2-chloro-phenyl)-ethyl]-8-(2, 5-dimethoxy-phenylsulfanyl)-9H-

purin-6-ylamine, 3-[2-(2-chloro-phenyl)-ethyl]-8-(2, 5-dimethoxy-phenylsulfanyl)-3H-purin-6-ylamine, 9-[2-(2, 4-dichloro-phenyl)-ethyl]-8-(2, 5-dimethoxy-phenylsulfanyl)-9H-purin-6-ylamine, 3-[2-(2, 4-dichloro-phenyl)-ethyl]-8-(2, 5-dimethoxy-phenyl-sulfanyl)-3H-purin-6-ylamine, 8-(2, 5-dimethoxy-phenylsulfanyl)-9-[2-(2-fluoro-phenyl)-ethyl]-9H-purin-6-ylamine, 8-(2, 5-dimethoxy-phenylsulfanyl)-3-[2-(2-fluoro-phenyl)-ethyl]-3H-purin-6-ylamine, 9-[2-(4-chloro-phenyl)-ethyl]-8-(3,4,5-trimethoxy-phenylsulfanyl)-9H-purin-6-ylamine, 3-[2-(4-chloro-phenyl)-ethyl]-8-(3,4,5-trimethoxy-phenylsulfanyl)-3H-purin-6-ylamine, 8-(-6-iodo-benzo[1,3]dioxol-5-ylsulfanyl)-9-phenethyl-9H-purin-6-ylamine, 8-(6-iodo-benzo[1,3]dioxol-5-ylsulfanyl)-3-phenethyl-3H-purin-6-ylamine, 8-(2, 5-dimethoxy-phenylsulfanyl)-9-[2-(3-methoxy-phenyl)-ethyl]-9H-purin-6-ylamine, 8-(2, 5-dimethoxy-phenylsulfanyl)-3-[2-(3-methoxy-phenyl)-ethyl]-3H-purin-6-ylamine, 8-(2, 5-dimethoxy-phenylsulfanyl)-9-[2-(3-fluoro-phenyl)-ethyl]-9H-purin-6-ylamine, 8-(2, 5-dimethoxy-phenylsulfanyl)-3-[2-(3-fluoro-phenyl)-ethyl]-3H-purin-6-ylamine, 8-(6-bromo-benzo[1,3]dioxol-5-ylsulfanyl)-9-[2-(4chloro-2-fluorophenyl)-ethyl]-9H-purin-6-ylamine, 8-(6-bromo-benzo[1,3]dioxol-5-ylsulfanyl)-3-[2-(4chloro-2-fluoro-phenyl)-ethyl]-3H-purin-6-ylamine, 8-(6-bromo-benzo[1,3]dioxol-5-ylsulfanyl)-9-(2-pentafluorophenyl-ethyl)-9H-purin-6-ylamine, 8-(6-bromo-benzo[1,3]dioxol-5-ylsulfanyl)-3-(2-pentafluorophenyl-ethyl)-3H-purin-6-ylamine, 8-(6-bromo-benzo[1,3]dioxol-5-ylsulfanyl)-9-(3-phenyl-propyl)-9H-purin-6-ylamine, 8-(6-bromo-benzo[1,3]dioxol-5-ylsulfanyl)-3-(3-phenyl-propyl)-3H-purin-6-ylamine, 9-phenethyl-8-(3,4,5-trimethoxy-phensulfanyl)-9H-purin-6-ylamine, 3-phenethyl-8-(3,4,5-trimethoxy-phenylsulfanyl)-3H-purin-6-ylamine, 9-(3-phenyl-propyl)-8-(3,4,5-trimethoxy-phenylsulfanyl)-9H-purin-6-ylamine. 3-(3-phenyl-propyl)-8-(3,4,5-trimethoxy-phenylsulfanyl)-3H-purin-6-ylamine, 8-(benzo[1,3]dioxol-5-ylsulfanyl)-9-(2-pyrrol-1-yl-ethyl)-9H-purin-6-ylamine, 8-(benzo[1,3]dioxol-5-ylsulfanyl)-3-(2-pyrrol-1-yl-ethyl)-3H-purin-6-ylamine, 8-(benzo[1,3]dioxol-5-ylsulfanyl)-9-(3-pyrrol-1-yl-propyl)-9H-purin-6-ylamine, 8-(benzo[1,3]dioxol-5-ylsulfanyl)-3-(3-pyrrol-1-yl-propyl)-3H-purin-6-ylamine, 8-(6-bromo-benzo[1,3]dioxol-5-ylsulfanyl)-9-[2-(2-chloro-phenyl)-ethyl]-9H-purin-6-ylamine, 8-(6-bromo-benzo[1,3]dioxol-5-ylsulfanyl)-3-[2-(2-chloro-phenyl)-ethyl]-3H-purin-6-ylamine, 8-(2,5-dimethoxy-phenylsulfanyl)-9-[2-(2,4,6-trimethyl-phenyl)-ethyl]-9H-purin-6-ylamine, 8-(2, 5-dimethoxy-phenylsulfanyl)-3-[2-(2, 4, 6-trimethyl-phenyl)-ethyl]-3H-purin-6-ylamine, 8-(6-bromo-benzo[1,3]dioxol-5-ylsulfanyl)-9-(2-phenyl-butyl)-9H-purin-6-ylamine, 8-(6-bromo-benzo[1,3]dioxol-5-ylsulfanyl)-3-(2-phenyl-butyl)-3H-purin-6-ylamine, 8-(6-bromo-benzo[1,3]dioxol-5-ylsulfanyl)-9-[1-(4-methoxy-phenyl)-cyclopropylmethyl]-9H-purin-6-ylamine, 8-(6-bromo-

benzo[1,3]dioxol-5-ylsulfanyl)-3-[1-(4-methoxy-phenyl)-cyclopropylmethyl]-3H-purin-6-ylamine, 9-[1-(4-chloro-phenyl)-cyclobutylmethyl]-8-(2, 5-dimethoxy-phenylsulfanyl)-9H-purin-6-ylamine, 3-[1-(4-chloro-phenyl)-cyclobutylmethyl]-8-(2,5-dimethoxy-phenylsulfanyl)-3H-purin-6-ylamine, 1-(4-{2-[6-amino-8-(2,5-dimethoxy-phenylsulfanyl)-purin-9-yl]-ethyl}-phenyl)-ethanone, 1-(4-{2-[6-amino-8-(2,5-dimethoxy-phenylsulfanyl)-purin-3-yl]-ethyl}-phenyl)-ethanone, 8-(2, 5-dimethoxy-phenylsulfanyl)-9-(2-pyrrol-1-yl-ethyl)-9H-purin-6-ylamine, 8-(2, 5-dimethoxy-phenylsulfanyl)-3-(2-pyrrol-1-yl-ethyl)-3H-purin-6-ylamine, 8-(2, 5-dimethoxy-phenylsulfanyl)-9-(2-naphthalen-1-yl-ethyl)-9H-purin-6-ylamine, 8-(2, 5-dimethoxy-phenylsulfanyl)-3-(2-naphthalen-1-yl-ethyl)-3H-purin-6-ylamine, 8-(2, 5-dimethoxy-phenylsulfanyl)-9-(2-o-tolyl-ethyl)-9H-purin-6-ylamine,8-(2, 5-dimethoxy-phenylsulfanyl)-3-(2-o-tolyl-ethyl)-3H-purin-6-ylamine, 9-[2-(4-bromo-phenyl)-ethyl]-8-(2, 5-dimethoxy-phenylsulfanyl)-9H-purin-6-ylamine, 3-[2-(4-bromo-phenyl)-ethyl]-8-(2, 5-dimethoxy-phenylsulfanyl)-3H-purin-6-ylamine, 9-[2-(2, 3-dichloro-phenyl)-ethyl]-8-(2, 5-dimethoxy-phenylsulfanyl)-9H-purin-6-ylamine, 3-[2-(2, 3-dichloro-phenyl)-ethyl]-8-(2, 5-dimethoxy-phenylsulfanyl)-3H-purin-6-ylamine, 4-{2-[6-Amino-8-(2, 5-dimethoxy-phenylsulfanyl)-purin-9-yl]-ethyl}-phenol, 4-{2-[6-amino-8-(2, 5-dimethoxy-phenylsulfanyl)-purin-9-yl]-ethyl}-phenol, 8-(2, 5-dimethoxy-phenylsulfanyl)-9-[2-(3-trifluoromethyl-phenyl)-ethyl]-9H-purin-6-ylamine, 8-(2, 5-dimethoxy-phenylsulfanyl)-3-[2-(3-trifluoromethyl-phenyl)-ethyl]-3H-purin-6-ylamine, 4-{2-[6-amino-8-(2, 5-dimethoxy-phenylsulfanyl)-purin-9-yl]-ethyl}-benzoic acid, 4-{2-[6-amino-8-(2, 5-dimethoxy-phenylsulfanyl)-purin-3-yl]-ethyl}-benzoic acid, 8-(2,5-dimethoxy-phenylsulfanyl)-3-(4-fluoro-benzyl)-3H-purin-6-ylamine, 8-(2,5-dimethoxy-phenylsulfanyl)-9-(4-nitro-benzyl)-9H-purin-6-ylamine, 8-(2, 5-dimethoxy-phenylsulfanyl)-9-[2-(2-methoxy-phenyl)-ethyl]-9H-purin-6-ylamine, 8-(2, 5-dimethoxy-phenylsulfanyl)-3-[2-(2-methoxy-phenyl)-ethyl]-3H-purin-6-ylamine, 8-(2, 5-dimethoxy-phenylsulfanyl)-9-(2-phenyl-butyl)-9H-purin-6-ylamine, 8-(2, 5-dimethoxy-phenylsulfanyl)-3-(2-phenyl)-butyl)-3H-purin-6-ylamine, 8-(2, 5-dimethoxy-phenylsulfanyl)-9-[2-(3, 4, 5-trimethoxy-phenyl)-ethyl]-9H-purin-6-ylamine, 8-(2, 5-dimethoxy-phenylsulfanyl)-3-[2-(3, 4, 5-trimethoxy-phenyl)-ethyl]-3H-purin-6-ylamine, 8-(6-bromo-benzo[1,3]dioxol-5-ylsulfanyl)-9-[2-(3, 4, 5-trimethoxy-phenyl)-ethyl]-9H-purin-6-ylamine, 8-(6-bromo-benzo[1,3]dioxol-5-ylsulfanyl)-3-[2-(3, 4,5-trimethoxy-phenyl)-ethyl]-3H-purin-6-ylamine, 8-(6-bromo-benzo[1,3]dioxol-5-ylsulfanyl)-9-[2-(2,4,6-trimethyl-phenyl)-ethyl]-9H-purin-6-ylamine, 8-(6-bromo-benzo[1,3]dioxol-5-ylsulfanyl)-3-[2-(2,4,6-trimethyl-phenyl)-ethyl]-3H-purin-6-ylamine, 8-(6-bromo-benzo[1,3]dioxol-5-

ylsulfanyl)-9-[1-(4-chloro-phenyl)-cyclobutylmethyl]-9H-purin-6-ylamine, 8-(6-bromo-benzo[1,3]dioxol-5-ylsulfanyl)-3-[1-(4-chloro-phenyl)-cyclobutylmethyl]-3H-purin-6-ylamine, 9-[2-(4-chloro-2-fluoro-phenyl)-ethyl]-8-(2, 5-dimethoxy-phenylsulfanyl)-9H-purin-6-ylamine, 3-[2-(4-chloro-2-fluoro-phenyl)-ethyl]-8-(2, 5-dimethoxy-phenylsulfanyl)-3H-purin-6-ylamine, 8-(6-bromo-benzo[1,3]dioxol-5-ylsulfanyl)-9-(3-methyl-2-phenyl-pentyl)-9H-purin-6-ylamine, 8-(6-bromo-benzo[1,3]dioxol-5-ylsulfanyl)-3-(3-methyl-2-phenyl-pentyl)-3H-purin-6-ylamine, 8-(6-bromo-benzo[1,3]dioxol-5-ylsulfanyl)-9-(2-cyclopentyl-2-phenyl-ethyl)-9H-purin-6-ylamine, 8-(6-bromo-benzo[1,3]dioxol-5-ylsulfanyl)-3-(2-cyclopentyl-2-phenyl-ethyl)-3H-purin-6-ylamine, 9-(2-cyclopentyl-2-phenyl-ethyl)-8-(2, 5-dimethoxy-phenylsulfanyl)-9H-purin-6-ylamine, 3-(2-cyclopentyl-2-phenyl-ethyl)-8-(2, 5-dimethoxy-phenylsulfanyl)-3H-purin-6-ylamine, 8-(2, 5-dimethoxy-phenylsulfanyl)-9-(3-methyl-2-phenyl-pentyl)-9H-purin-6-ylamine, 8-(2, 5-dimethoxy-phenylsulfanyl)-3-(3-methyl-2-phenyl-pentyl)-3H-purin-6-ylamine, 2-[6-amino-8-(2, 5-dimethoxy-phenylsulfanyl)-purin-9-yl]-1-(2, 4-dichloro-phenyl)ethanol, 2-[6-amino-8-(2, 5-dimethoxy-phenylsulfanyl)-purin-3-yl]-1-(2, 4-dichloro-phenyl)ethanol, 8-(6-bromo-benzo[1,3]dioxol-5-ylsulfanyl)-9-[2-(3-fluoro-phenyl)-ethyl]-9H-purin-6-ylamine, 8-(6-bromo-benzo[1,3]dioxol-5-ylsulfanyl)-3-[2-(3-fluoro-phenyl)-ethyl]-3H-purin-6-ylamine, 8-(2,5-dimethoxy-phenylsulfanyl)-9-[2-(3-ethoxy-4-methoxy-phenyl)-ethyl]-9H-purin-6-ylamine, 8-(2, 5-dimethoxy-phenylsulfanyl)-3-[2-(3-ethoxy-4-methoxy-phenyl)-ethyl]-3H-purin-6-ylamine, 8-(2,5-Dimethoxy-phenylsulfanyl)-9-(3-methyl-2-phenyl-butyl)-9H-purin-6-ylamine, 8-(2, 5-dimethoxy-phenylsulfanyl)-3-(3-methyl-2-phenyl-butyl)-3H-purin-6-ylamine, 8-(2,5-dimethoxy-phenylsulfanyl)-9-[2-(2, 5-dimethyl-phenyl)-ethyl]-9H-purin-6-ylamine, 8-(2, 5-dimethoxy-phenylsulfanyl)-3-[2-(2, 5-dimethyl-phenyl)-ethyl]-3H-purin-6-ylamine, 8-(6-bromo-benzo[1,3]dioxol-5-ylsulfanyl)-9-[2-(3-ethoxy-4-methoxy-phenyl)-ethyl]-9H-purin-6-ylamine, 8-(6-bromo-benzo[1,3]dioxol-5-ylsulfanyl)-3-[2-(3-ethoxy-4-methoxy-phenyl)-ethyl]-3H-purin-6-ylamine, 9-[2-(4-Chloro-phenyl)-3-methyl-butyl]-8-(2, 5-dimethoxy-phenylsulfanyl)-9H-purine-6-ylamine, 3-[2-(4-chloro-phenyl)-3-methyl-butyl]-8-(2, 5-dimethoxy-phenylsulfanyl)-3H-purine-6-ylamine, 9-[2-(2, 4-difluoro-phenyl)-ethyl]-8-(2, 5-dimethoxy-phenylsulfanyl)-9H-purine-6-ylamine, 9-[2-(2-chloro-6-fluoro-phenyl)-ethyl]-8-(2, 5-dimethoxy-phenylsulfanyl)-9H-purine-6-ylamine, 3-[2-(2-chloro-6-fluoro-phenyl)-ethyl]-8-(2, 5-dimethoxy-phenylsulfanyl)-3H-purine-6-ylamine, 8-(6-bromo-benzo[1,3]dioxol-5-ylsulfanyl)-9-[2-(2,5-dimethyl-phenyl)-ethyl]-9H-purin-6-ylamine, 8-(6-bromo-benzo[1,3]dioxol-5-ylsulfanyl)-3-[2-(2,5-dimethyl-phenyl)-ethyl]-3H-purin-6-

ylamine, 8-(6-bromo-benzo[1,3]dioxol-5-ylsulfanyl)-9-(3-methyl-2-phenyl-butyl)-9H-purin-6-ylamine, 8-(6-bromo-benzo[1,3]dioxol-5-ylsulfanyl)-3-(3-methyl-2-phenyl-butyl)-3H-purin-6-ylamine, 8-(2,5-dimethoxy-phenylsulfanyl)-9-[2-(3,5-dimethyl-phenyl)-ethyl]-9H-purine-6-ylamine, 8-(2,5-dimethoxy-phenylsulfanyl)-3-[2-(3,5-dimethyl-phenyl)-ethyl]-3H-purine-6-ylamine, 8-(2,5-dimethoxy-phenylsulfanyl)-9-(2-pyridin-4-yl-ethyl)-9H-purin-6-ylamine, 8-(2, 5-dimethoxy-phenylsulfanyl)-9-(2-pyridin-2-yl-ethyl)-9H-purin-6-ylamine, 8-(2, 5-Dimethoxy-phenylsulfanyl)-3-(2-pyridin-2-yl-ethyl)-3H-purin-6-ylamine, 8-(2, 5-dimethoxy-phenylsulfanyl)-9-[2-(3-iodo-phenyl)-ethyl]-9H-purin-6-ylamine, 8-(2, 5-dimethoxy-phenylsulfanyl)-3-[2-(3-iodo-phenyl)-ethyl]-3H-purin-6-ylamine, 9-[2-(2-chloro-4-fluoro-phenyl)-ethyl]-8-(2,5-dimethoxy-phenylsulfanyl)-9H-purin-6-ylamine, 3-[2-(2-chloro-4-fluoro-phenyl)-ethyl]-8-(2,5-dimethoxy-phenylsulfanyl)-3H-purin-6-ylamine, 9-[2-(2-bromo-phenyl)-ethyl]-8-(2,5-dimethoxy-phenylsulfanyl)-9H-purin-6-ylamine, 3-[2-(2-bromo-phenyl)-ethyl]-8-(2, 5-dimethoxy-phenylsulfanyl)-3H-purin-6-ylamine, 9-[2-(3, 5-difluoro-phenyl)-ethyl]-8-(2,5-dimethoxy-phenylsulfanyl)-9H-purin-6-ylamine, 3-[2-(3,5-difluoro-phenyl)-ethyl]-8-(2, 5-dimethoxy-phenylsulfanyl)-3H-purin-6-ylamine, 9-[2-(2, 3-difluoro-phenyl)-ethyl]-8-(2, 5-dimethoxy-phenylsulfanyl)-9H-purin-6-ylamine, 3-[2-(2, 3-difluoro-phenyl)-ethyl]-8-(2, 5-dimethoxy-phenylsulfanyl)-3H-purin-6-ylamine, 8-(6-Bromo-1,3-benzodioxol-5-ylsulfanyl)-9-[2-(2-fluoro-phenyl)-ethyl]-9H-purin-6-ylamine, 8-(6-bromo-benzo[1,3]dioxol-5-ylsulfanyl)-3-[2-(2-fluoro-phenyl)-ethyl]-3H-purin-6-ylamine, 8-(6-bromo-benzo[1,3]dioxol-5-ylsulfanyl)-9-[2-(2-bromo-phenyl)-ethyl]-9H-purin-6-ylamine, 8-(6-bromo-benzo[1,3]dioxol-5-ylsulfanyl)-3-[2-(2-bromo-phenyl)-ethyl]-3H-purin-6-ylamine, 8-(6-bromo-benzo[1,3]dioxol-5-ylsulfanyl)-9-(2-pyridin-3-yl-ethyl)-9H-purin-6-ylamine, 8-(6-bromo-benzo[1,3]dioxol-5-ylsulfanyl)-3-(2-pyridin-3-yl-ethyl)-3H-purin-6-ylamine, 8-(6-bromo-benzo[1,3]dioxol-5-ylsulfanyl)-9-[2-(3-iodo-phenyl)-ethyl]-9H-purin-6-ylamine, 8-(6-bromo-benzo[1,3]dioxol-5-ylsulfanyl)-3-[2-(3-iodo-phenyl)-ethyl]-3H-purin-6-ylamine, 8-(6-bromo-benzo[1,3]dioxol-5-ylsulfanyl)-9-(2-o-tolyl-ethyl)-9H-purin-6-ylamine, 8-(6-bromo-benzo[1,3]dioxol-5-ylsulfanyl)-3-(2-o-tolyl-ethyl)-3H-purin-6-ylamine, 8-(6-bromo-benzo[1,3]dioxol-5-ylsulfanyl)-9-(2-naphthalen-1-yl-ethyl)-9H-purin-6-ylamine, 8-(6-bromo-benzo[1,3]dioxol-5-ylsulfanyl)-3-(2-naphthalen-1-yl-ethyl)-3H-purin-6-ylamine, 1-(4-{2-[6-amino-8-(6-bromo-benzo[1,3]dioxol-5-ylsulfanyl)-purin-9-yl]-ethyl}-phenyl)-ethanone, 1-(4-{2-[6-amino-8-(6-bromo-benzo[1,3]dioxol-5-ylsulfanyl)-purin-3-yl]-ethyl}-phenyl)-ethanone, 8-(6-bromo-benzo[1,3]dioxol-5-ylsulfanyl)-9-[2-(2,3-difluoro-phenyl)-ethyl]-9H-purin-6-ylamine, 8-(6-bromo-1,3-benzo[1,3]dioxol-5-ylsulfanyl)-3-[2-(2,3-difluoro-phenyl)-ethyl]-3H-purin-6-

ylamine, 8-(6-bromo-benzo[1,3]dioxol-5-ylsulfanyl)-9-(2-p-tolyl-ethyl)-9H-purin-6-ylamine, 8-(6-bromo-benzo[1,3]dioxol-5-ylsulfanyl)-3-(2-p-tolyl-ethyl)-3H-purin-6-ylamine, 8-(6-bromo-benzo[1,3]dioxol-5-ylsulfanyl)-9-[2-(3-trifluoromethyl-phenyl)-ethyl]-9H-purin-6-ylamine, 8-(6-bromo-benzo[1,3]dioxol-5-ylsulfanyl)-3-[2-(3-trifluoromethyl-phenyl)-ethyl]-3H-purin-6-ylamine, 9-(2-benzo[1,3]dioxol-5-yl-ethyl)-8-(2, 5-dimethoxy-phenylsulfanyl)-9H-purin-6-ylamine, 3-(2-benzo[1,3]dioxol-5-yl-ethyl)-8-(2, 5-dimethoxy-phenylsulfanyl)-3H-purin-6-ylamine, 9-(2-cyclohexyl-ethyl)-8-(2,5-dimethoxyphenyl-sulfanyl)-9H-purin-6-ylamine, 3-(2-cyclohexyl-ethyl)-8-(2,5-dimethoxy-phenylsulfanyl)-3H-purin-6-ylamine, 9-(2-biphenyl-4-yl-ethyl)-8-(6-bromo-benzo[1,3]dioxol-5-ylsulfanyl)-9H-purin-6-ylamine, 3-(2-biphenyl-4-yl-ethyl)-8-(6-bromo-benzo[1,3]dioxol-5-ylsulfanyl)-3H-purin-6-ylamine, 4-{2-[6-amino-8-(2, 5-dimethoxy-phenylsulfanyl)-purin-9-yl]-ethyl}-benzenesulfonic acid, 4-{2-[6-amino-8-(2, 5-dimethoxy-phenylsulfanyl)-purin-3-yl]-ethyl}-benzenesulfonic acid, 2-[6-Amino-8-(6-bromo-benzo[1,3]dioxol-5-ylsulfanyl)-purin-9-yl]-1-(2,4-dichloro-phenyl)-ethanol, 2-[6-amino-8-(6-bromo-benzo[1,3]dioxol-5-ylsulfanyl)-purin-3-yl]-1-(2,4-dichloro-phenyl)-ethanol, 9-(2-Cyclohexyl-2-phenyl-ethyl)-8-(2, 5-dimethoxy-phenylsulfanyl)-9H-purin-6-ylamine, 3-(2-cyclohexyl-2-phenyl-ethyl)-8-(2 5-dimethoxy-phenylsulfanyl)-3H-purin-6-ylamine, 9-(2-biphenyl-4-yl-ethyl)-8-(2,5-dimethoxy-phenylsulfanyl)-9H-purin-6-ylamine, 3-(2-biphenyl-4-yl-ethyl)-8-(2,5-dimethoxy-phenylsulfanyl)-3H-purin-6-ylamine, 8-(2,5-dimethoxy-phenylsulfanyl)-9-[2-(2-trifluoromethyl-phenyl)-ethyl]-9H-purin-6-ylamine, 8-(2, 5-dimethoxy-phenylsulfanyl)-3-[2-(2-trifluoromethyl-phenyl)-ethyl]-3H-purin-6-ylamine, 8-(2, 5-dimethoxy-phenylsulfanyl)-9-[2-(4-dimethylamino-phenyl)-ethyl]-9H-purin-6-ylamine, 8-(2, 5-dimethoxy-phenylsulfanyl)-3-[2-(4-dimethylamino-phenyl)-ethyl]-3H-purin-6-ylamine, 8-(6-bromo-benzo[1,3]dioxol-5-ylsulfanyl)-9-[2-(4-dimethylamino-phenyl)-ethyl]-9H-purin-6-ylamine, 8-(6-bromo-benzo[1,3]dioxol-5-ylsulfanyl)-3-[2-(4-dimethylamino-phenyl)-ethyl]-3H-purin-6-ylamine, 8-(2, 5-diethoxy-phenylsulfanyl)-9-phenethyl-9H-purin-6-ylamine, 8-(2,5-diethoxy-phenylsulfanyl)-3-phenethyl-3H-purin-6-ylamine, 9-[2-(2-chloro-phenyl)-ethyl]-8-(2, 5-diethoxy-phenylsulfanyl)-9H-purin-6-ylamine, 3-[2-(2-chloro-phenyl)-ethyl]-8-(2,5-diethoxy-phenylsulfanyl)-3H-purin-6-ylamine, 9-[2-(3,5-dimethoxy-phenyl)-ethyl]-8-(2,5-dimethoxy-phenylsulfanyl)-9H-purin-6-ylamine, 3-[2-(3,5-dimethoxy-phenyl)-ethyl]-8-(2,5-dimethoxy-phenylsulfanyl)-3H-purin-6-ylamine, 8-(6-bromo-benzo[1,3]dioxol-5-ylsulfanyl)-9-[2-(3,5-dimethoxy-phenyl)-ethyl]-9H-purin-6-ylamine, 8-(6-bromo-benzo[1,3]dioxol-5-ylsulfanyl)-3-[2-(3,5-dimethoxy-phenyl)-ethyl]-3H-purin-6-ylamine, 8-(2,5-dimethoxy-phenylsulfanyl)-9-(2-

thiophen-3-yl-ethyl)-9H-purin-6-ylamine, 8-(2, 5-dimethoxy-phenylsulfanyl)-3-(2-thiophen-3-yl-ethyl)-3H-purin-6-ylamine, 8-(2,5-dimethoxy-phenylsulfanyl)-9-2-thiophen-2-yl-ethyl)-9H-purin-6-ylamine, 8-(2,5-dimethoxy-phenylsulfanyl)-3-(2-thiophen-2-yl-ethyl)-3H-purin-6-ylamine, 8-(6-bromo-benzo[1,3]dioxol-5-ylsulfanyl)-9-(2-thiophen-3-yl-ethyl)-9H-purin-6-ylamine, 8-(6-bromo-benzo[1,3]dioxol-5-ylsulfanyl)-3-(2-thiophen-3-yl-ethyl)-3H-purin-6-ylamine, 8-(6-bromo-benzo[1,3]dioxol-5-ylsulfanyl)-9-(2-thiophen-2-yl-ethyl)-9H-purin-6-ylamine, 8-(6-bromo-benzo[1,3]dioxol-5-ylsulfanyl)-3-(2-thiophen-2-yl-ethyl)-3H-purin-6-ylamine, 8-(2,5-dimethoxy-phenylsulfanyl)-9-[2-(2-nitro-phenyl)-ethyl]-9H-purin-6-ylamine, 8-(2,5-dimethoxy-phenylsulfanyl)-3-[2-(2-nitro-phenyl)-ethyl]-3H-purin-6-ylamine, 8-(2, 5-dimethoxy-phenylsulfanyl)-9-[2-(2-nitro-phenyl)-ethyl]-9H-purin-6-ylamine, 8-(2,5-dimethoxy-phenylsulfanyl)-3-[2-(2-nitro-phenyl)-ethyl]-3H-purin-6-ylamine, 8-(6-bromo-benzo[1,3]dioxol-5-ylmethyl)-9-phenethyl-9H-purin-6-ylamine, 8-(6-bromo-benzo[1,3]dioxol-5-ylmethyl)-3-phenethyl-3H-purin-6-ylamine, (4-{2-[6-amino-8-(6-bromo-benzo[1,3]dioxol-5-ylsulfanyl)-purin-9-yl]-ethyl}-phenyl)carbamic acid tert-butyl ester, (4-{2-[6-amino-8-(6-bromo-benzo[1,3]dioxol-5-ylsulfanyl)-purin-3-yl]-ethyl}-phenyl)carbamic acid tert-butyl ester, 9-[2-(4-amino-phenyl)-ethyl]-8-(6-bromo-benzo[1,3]dioxol-5-ylsulfanyl)-9H-purin-6-ylamine, (4-{2-[6-amino-8-(2, 5-dimethoxy-phenylsulfanyl)-purin-9-yl]-ethyl}-phenyl)-carbamic acid tert-butyl ester, (4-{2-[6-amino-8-(2, 5-dimethoxy-phenylsulfanyl)-purin-3-yl]-ethyl}-phenyl)-carbamic acid tert-butyl ester, 9-[2-(4-amino-phenyl)-ethyl]-8-(2,5-dimethoxy-phenylsulfanyl)-9H-purin-6-ylamine, 8-(2,5-dimethoxy-phenylsulfanyl)-9-[2-(3-trifluoromethoxy-phenyl)-ethyl]-9H-purin-6-ylamine, 8-(2,5-dimethoxy-phenylsulfanyl)-9-(2-pentafluorophenyl-ethyl)-9H-purin-6-ylamine, 9-[2-(3,5-bistrifluoromethy-phenyl)-ethyl]-8-(2,5-dimethoxy-phenylsulfanyl)-9H-purin-6-ylamine, 9-[2-(3, 5-Bistrifluoromethyl-phenyl)-ethyl]-8-(6-bromo-benzo[1,3]dioxol-5-ylsulfanyl)-9H-purin-6-ylamine, 8-(6-bromo-benzo[1,3]dioxol-5-ylsulfanyl)-9-[1-(4-chloro-phenyl)-cyclopropylmethyl]-9H-purin-6-ylamine, 8-(6-bromo-benzo[1,3]dioxol-5-ylsulfanyl)-3-[2-(3-nitro-phenyl)-ethyl]-3H-purin-6-ylamine, 8-(2, 5-dimethoxy-phenylsulfanyl)-9-[2-(3-nitro-phenyl)-ethyl]-9H-purin-6-ylamine, 8-(benzo[1,3]dioxol-5-ylsulfanyl)-9-phenethyl-1,9-dihydro-purin-6-one, and 8-(6-bromo-benzo[1,3]dioxol-5-ylsulfanyl)-9-phenethyl-1,9-dihydro-purin-6-one.

[00353] In one embodiment, the invention provides a compound or a pharmaceutical composition comprising the compound where the compound is chosen from 8-(2,5-dimethoxy-phenylsulfanyl)-9-phenethyl-9H-purin-6-ylamine, 8-(2,5-dimethoxy-phenylsulfanyl)-9-(3-phenyl-propyl)-9H-purin-6-ylamine, 8-(benzo[1,3]dioxol-5-

ylsulfanyl)-9-phenethyl-9H-purin-6-ylamine, 8-(benzo[1,3]dioxol-5-ylsulfanyl)-9-(3-phenyl-propyl)-9H-purin-6-ylamine, 8-(benzo[1,3]dioxol-5-ylsulfanyl)-9-[2-(4-nitro-phenyl)-ethyl]-9H-purin-6-ylamine, 8-(2,5-dimethoxy-phenylsulfanyl)-9-[2-(4-nitro-phenyl)-ethyl]-9H-purin-6-ylamine, 8-(2,5-dimethoxy-phenylsulfanyl)-9-[2-(4-fluoro-phenyl)-ethyl]-9H-purin-6-ylamine, 8-(benzo[1,3]dioxol-5-ylsulfanyl)-9-[2-(4-fluoro-phenyl)-ethyl]-9H-purin-6-ylamine, 8-(6-bromo-benzo[1,3]dioxol-5-ylsulfanyl)-9-phenethyl-9H-purin-6-ylamine, 8-(2,4-dimethoxy-phenylsulfanyl)-9-phenethyl-9H-purin-6-ylamine, 8-(4-chloro-phenylsulfonyl)-9-phenethyl-9H-purin-6-ylamine, 4-(6-amino-9-phenethyl-9H-purin-8-ylsulfanyl)-benzonitrile 9-[2-(3, 4-dimethoxy-phenyl)-ethyl]-8-(2, 5-dimethoxy-phenylsulfanyl)-9H-purin-6-ylamine, 8-(2, 5-dimethoxy-phenylsulfanyl)-9-(2-p-tolyl-ethyl)-9H-purin-6-ylamine 9-[2-(2-chloro-phenyl)-ethyl]-8-(2, 5-dimethoxy-phenylsulfanyl)-9H-purin-6-ylamine, 9-[2-(2, 4-dichloro-phenyl)-ethyl]-8-(2, 5-dimethoxy-phenylsulfanyl)-9H-purin-6-ylamine, 8-(2, 5-dimethoxy-phenylsulfanyl)-9-[2-(2-fluoro-phenyl)-ethyl]-9H-purin-6-ylamine, 9-[2-(4-chloro-phenyl)-ethyl]-8-(3,4,5-trimethoxy-phenylsulfanyl)-9H-purin-6-ylamine, 8-(-6-iodo-benzo[1,3]dioxol-5-ylsulfanyl)-9-phenethyl-9H-purin-6-ylamine, 8-(2, 5-dimethoxy-phenylsulfanyl)-9-[2-(3-methoxy-phenyl)-ethyl]-9H-purin-6-ylamine, 8-(2, 5-dimethoxy-phenylsulfanyl)-9-[2-(3-fluoro-phenyl)-ethyl]-9H-purin-6-ylamine 8-(6-bromo-benzo[1,3]dioxol-5-ylsulfanyl)-9-[2-(4chloro-2-fluorophenyl)-ethyl]-9H-purin-6-ylamine, 8-(6-bromo-benzo[1,3]dioxol-5-ylsulfanyl)-9-(2-pentafluorophenyl-ethyl)-9H-purin-6-ylamine, 8-(6-bromo-benzo[1,3]dioxol-5-ylsulfanyl)-9-(3-phenyl-propyl)-9H-purin-6-ylamine, 9-phenethyl-8-(3,4,5-trimethoxy-phensulfanyl)-9H-purin-6-ylamine, 9-(3-phenyl-propyl)-8-(3,4,5-trimethoxy-phenylsulfanyl)-9H-purin-6-ylamine, 8-(benzo[1,3]dioxol-5-ylsulfanyl)-9-(2-pyrrol-1-yl-ethyl)-9H-purin-6-ylamine, 8-(benzo[1,3]dioxol-5-ylsulfanyl)-9-(3-pyrrol-1-yl-propyl)-9H-purin-6-ylamine, 8-(6-bromo-benzo[1,3]dioxol-5-ylsulfanyl)-9-[2-(2-chloro-phenyl)-ethyl]-9H-purin-6-ylamine, 8-(2,5-dimethoxy-phenylsulfanyl)-9-[2-(2,4,6-trimethyl-phenyl)-ethyl]-9H-purin-6-ylamine, 8-(6-bromo-benzo[1,3]dioxol-5-ylsulfanyl)-9-(2-phenyl-butyl)-9H-purin-6-ylamine, 8-(6-bromo-benzo[1,3]dioxol-5-ylsulfanyl)-9-[1-(4-methoxy-phenyl)-cyclopropylmethyl]-9H-purin-6-ylamine, 9-[1-(4-chloro-phenyl)-cyclobutylmethyl]-8-(2, 5-dimethoxy-phenylsulfanyl)-9H-purin-6-ylamine, 1-(4-{2-[6-amino-8-(2,5-dimethoxy-phenylsulfanyl)-purin-9-yl]-ethyl}-phenyl)-ethanone, 1-(4-{2-[6-amino-8-(2,5-dimethoxy-phenylsulfanyl)-purin-3-yl]-ethyl}-phenyl)-ethanone, 8-(2, 5-dimethoxy-phenylsulfanyl)-9-(2-pyrrol-1-yl-ethyl)-9H-purin-6-ylamine, 8-(2, 5-dimethoxy-phenylsulfanyl)-9-(2-naphthalen-1-yl-ethyl)-9H-purin-6-ylamine, 8-(2, 5-dimethoxy-

phenylsulfanyl)-9-(2-o-tolyl-ethyl)-9H-purin-6-ylamine, 9-[2-(4-bromo-phenyl)-ethyl]-8-(2, 5-dimethoxy-phenylsulfanyl)-9H-purin-6-ylamine, 9-[2-(2, 3-dichloro-phenyl)-ethyl]-8-(2, 5-dimethoxy-phenylsulfanyl)-9H-purin-6-ylamine, 4-{2-[6-Amino-8-(2, 5-dimethoxy-phenylsulfanyl)-purin-9-yl]-ethyl}-phenol, 4-{2-[6-amino-8-(2, 5-dimethoxy-phenylsulfanyl)-purin-9-yl]-ethyl}-phenol, 8-(2, 5-dimethoxy-phenylsulfanyl)-9-[2-(3-trifluoromethyl-phenyl)-ethyl]-9H-purin-6-ylamine, 4-{2-[6-amino-8-(2, 5-dimethoxy-phenylsulfanyl)-purin-9-yl]-ethyl}-benzoic acid, 4-{2-[6-amino-8-(2, 5-dimethoxy-phenylsulfanyl)-purin-3-yl]-ethyl}-benzoic acid, 8-(2,5-dimethoxy-phenylsulfanyl)-9-(4-nitro-benzyl)-9H-purin-6-ylamine, 8-(2, 5-dimethoxy-phenylsulfanyl)-9-[2-(2-methoxy-phenyl)-ethyl]-9H-purin-6-ylamine, 8-(2, 5-dimethoxy-phenylsulfanyl)-9-(2-phenyl-butyl)-9H-purin-6-ylamine, 8-(2, 5-dimethoxy-phenylsulfanyl)-9-[2-(3, 4, 5-trimethoxy-phenyl)-ethyl]-9H-purin-6-ylamine, 8-(6-bromo-benzo[1,3]dioxol-5-ylsulfanyl)-9-[2-(3, 4, 5-trimethoxy-phenyl)-ethyl]-9H-purin-6-ylamine, 8-(6-bromo-benzo[1,3]dioxol-5-ylsulfanyl)-9-[2-(2,4,6-trimethyl-phenyl)-ethyl]-9H-purin-6-ylamine, 8-(6-bromo-benzo[1,3]dioxol-5-ylsulfanyl)-9-[1-(4-chloro-phenyl)-cyclobutylmethyl]-9H-purin-6-ylamine, 9-[2-(4-chloro-2-fluoro-phenyl)-ethyl]-8-(2, 5-dimethoxy-phenylsulfanyl)-9H-purin-6-ylamine, 8-(6-bromo-benzo[1,3]dioxol-5-ylsulfanyl)-9-(3-methyl-2-phenyl-pentyl)-9H-purin-6-ylamine, 8-(6-bromo-benzo[1,3]dioxol-5-ylsulfanyl)-9-(2-cyclopentyl-2-phenyl-ethyl)-9H-purin-6-ylamine, 9-(2-cyclopentyl-2-phenyl-ethyl)-8-(2, 5-dimethoxy-phenylsulfanyl)-9H-purin-6-ylamine, 8-(2, 5-dimethoxy-phenylsulfanyl)-9-(3-methyl-2-phenyl-pentyl)-9H-purin-6-ylamine, 2-[6-amino-8-(2, 5-dimethoxy-phenylsulfanyl)-purin-9-yl]-1-(2, 4-dichloro-phenyl)ethanol, 2-[6-amino-8-(2, 5-dimethoxy-phenylsulfanyl)-purin-3-yl]-1-(2, 4-dichloro-phenyl)ethanol, 8-(6-bromo-benzo[1,3]dioxol-5-ylsulfanyl)-9-[2-(3-fluoro-phenyl)-ethyl]-9H-purin-6-ylamine, 8-(2,5-dimethoxy-phenylsulfanyl)-9-[2-(3-ethoxy-4-methoxy-phenyl)-ethyl]-9H-purin-6-ylamine, 8-(2,5-Dimethoxy-phenylsulfanyl)-9-(3-methyl-2-phenyl-butyl)-9H-purin-6-ylamine, 8-(2,5-dimethoxy-phenylsulfanyl)-9-[2-(2, 5-dimethyl-phenyl)-ethyl]-9H-purin-6-ylamine, 8-(6-bromo-benzo[1,3]dioxol-5-ylsulfanyl)-9-[2-(3-ethoxy-4-methoxy-phenyl)-ethyl]-9H-purin-6-ylamine, 9-[2-(4-Chloro-phenyl)-3-methyl-butyl]-8-(2, 5-dimethoxy-phenylsulfanyl)-9H-purine-6-ylamine, 9-[2-(2, 4-difluoro-phenyl)-ethyl]-8-(2, 5-dimethoxy-phenylsulfanyl)-9H-purine-6-ylamine, 9-[2-(2-chloro-6-fluoro-phenyl)-ethyl]-8-(2, 5-dimethoxy-phenylsulfanyl)-9H-purine-6-ylamine, 8-(6-bromo-benzo[1,3]dioxol-5-ylsulfanyl)-9-[2-(2,5-dimethyl-phenyl)-ethyl]-9H-purin-6-ylamine, 8-(6-bromo-benzo[1,3]dioxol-5-ylsulfanyl)-9-(3-methyl-2-phenyl-butyl)-9H-purin-6-ylamine, 8-(2,5-dimethoxy-phenylsulfanyl)-9-[2-(3,5-dimethyl-phenyl)-ethyl]-9H-

purine-6-ylamine, 8-(2,5-dimethoxy-phenylsulfanyl)-9-(2-pyridin-4-yl-ethyl)-9H-purin-6-ylamine, 8-(2, 5-dimethoxy-phenylsulfanyl)-9-(2-pyridin-2-yl-ethyl)-9H-purin-6-ylamine, 8-(2, 5-dimethoxy-phenylsulfanyl)-9-[2-(3-iodo-phenyl)-ethyl]-9H-purin-6-ylamine, 9-[2-(2-chloro-4-fluoro-phenyl)-ethyl]-8-(2,5-dimethoxy-phenylsulfanyl)-9H-purin-6-ylamine, 9-[2-(2-bromo-phenyl)-ethyl]-8-(2,5-dimethoxy-phenylsulfanyl)-9H-purin-6-ylamine, 9-[2-(3, 5-difluoro-phenyl)-ethyl]-8-(2,5-dimethoxy-phenylsulfanyl)-9H-purin-6-ylamine, 9-[2-(2, 3-difluoro-phenyl)-ethyl]-8-(2, 5-dimethoxy-phenylsulfanyl)-9H-purin-6-ylamine, 8-(6-Bromo-1,3-benzodioxol-5-ylsulfanyl)-9-[2-(2-fluoro-phenyl)-ethyl]-9H-purin-6-ylamine, 8-(6-bromo-benzo[1,3]dioxol-5-ylsulfanyl)-9-[2-(2-bromo-phenyl)-ethyl]-9H-purin-6-ylamine, 8-(6-bromo-benzo[1,3]dioxol-5-ylsulfanyl)-9-(2-pyridin-3-yl-ethyl)-9H-purin-6-ylamine, 8-(6-bromo-benzo[1,3]dioxol-5-ylsulfanyl)-9-[2-(3-iodo-phenyl)-ethyl]-9H-purin-6-ylamine, 8-(6-bromo-benzo[1,3]dioxol-5-ylsulfanyl)-9-(2-o-tolyl-ethyl)-9H-purin-6-ylamine, 8-(6-bromo-benzo[1,3]dioxol-5-ylsulfanyl)-9-(2-naphthalen-1-yl-ethyl)-9H-purin-6-ylamine, 1-(4-{2-[6-amino-8-(6-bromo-benzo[1,3]dioxol-5-ylsulfanyl)-purin-9-yl]-ethyl}-phenyl)-ethanone, 1-(4-{2-[6-amino-8-(6-bromo-benzo[1,3]dioxol-5-ylsulfanyl)-purin-3-yl]-ethyl}-phenyl)-ethanone, 8-(6-bromo-benzo[1,3]dioxol-5-ylsulfanyl)-9-[2-(2,3-difluoro-phenyl)-ethyl]-9H-purin-6-ylamine, 8-(6-bromo-benzo[1,3]dioxol-5-ylsulfanyl)-9-(2-p-tolyl-ethyl)-9H-purin-6-ylamine, 8-(6-bromo-benzo[1,3]dioxol-5-ylsulfanyl)-9-[2-(3-trifluoromethyl-phenyl)-ethyl]-9H-purin-6-ylamine, 9-(2-benzo[1,3]dioxol-5-yl-ethyl)-8-(2, 5-dimethoxy-phenylsulfanyl)-9H-purin-6-ylamine, 9-(2-cyclohexyl-ethyl)-8-(2,5-dimethoxyphenyl-sulfanyl)-9H-purin-6-ylamine, 9-(2-biphenyl-4-yl-ethyl)-8-(6-bromo-benzo[1,3]dioxol-5-ylsulfanyl)-9H-purin-6-ylamine, 4-{2-[6-amino-8-(2, 5-dimethoxy-phenylsulfanyl)-purin-9-yl]-ethyl}-benzenesulfonic acid, 4-{2-[6-amino-8-(2, 5-dimethoxy-phenylsulfanyl)-purin-3-yl]-ethyl}-benzenesulfonic acid, 2-[6-Amino-8-(6-bromo-benzo[1,3]dioxol-5-ylsulfanyl)-purin-9-yl]-1-(2,4-dichloro-phenyl)-ethanol, 2-[6-amino-8-(6-bromo-benzo[1,3]dioxol-5-ylsulfanyl)-purin-3-yl]-1-(2,4-dichloro-phenyl)-ethanol, 9-(2-Cyclohexyl-2-phenyl-ethyl)-8-(2, 5-dimethoxy-phenylsulfanyl)-9H-purin-6-ylamine, 9-(2-biphenyl-4-yl-ethyl)-8-(2,5-dimethoxy-phenylsulfanyl)-9H-purin-6-ylamine, 8-(2,5-dimethoxy-phenylsulfanyl)-9-[2-(2-trifluoromethyl-phenyl)-ethyl]-9H-purin-6-ylamine, 8-(2, 5-dimethoxy-phenylsulfanyl)-9-[2-(4-dimethylamino-phenyl)-ethyl]-9H-purin-6-ylamine, 8-(6-bromo-benzo[1,3]dioxol-5-ylsulfanyl)-9-[2-(4-dimethylamino-phenyl)-ethyl]-9H-purin-6-ylamine, 8-(2, 5-diethoxy-phenylsulfanyl)-9-phenethyl-9H-purin-6-ylamine, 9-[2-(2-chloro-phenyl)-ethyl]-8-(2, 5-diethoxy-phenylsulfanyl)-9H-purin-6-ylamine, 9-[2-(3,5-dimethoxy-phenyl)-ethyl]-8-(2,5-dimethoxy-phenylsulfanyl)-9H-purin-

6-ylamine, 8-(6-bromo-benzo[1,3]dioxol-5-ylsulfanyl)-9-[2-(3,5-dimethoxy-phenyl)-ethyl]-9H-purin-6-ylamine, 8-(2,5-dimethoxy-phenylsulfanyl)-9-(2-thiophen-3-yl-ethyl)-9H-purin-6-ylamine, 8-(2,5-dimethoxy-phenylsulfanyl)-9-2-thiophen-2-yl-ethyl)-9H-purin-6-ylamine, 8-(6-bromo-benzo[1,3]dioxol-5-ylsulfanyl)-9-(2-thiophen-3-yl-ethyl)-9H-purin-6-ylamine, 8-(6-bromo-benzo[1,3]dioxol-5-ylsulfanyl)-9-(2-thiophen-2-yl-ethyl)-9H-purin-6-ylamine, 8-(2,5-dimethoxy-phenylsulfanyl)-9-[2-(2-nitro-phenyl)-ethyl]-9H-purin-6-ylamine, 8-(2, 5-dimethoxy-phenylsulfanyl)-9-[2-(2-nitro-phenyl)-ethyl]-9H-purin-6-ylamine, 8-(6-bromo-benzo[1,3]dioxol-5-ylmethyl)-9-phenethyl-9H-purin-6-ylamine, (4-{2-[6-amino-8-(6-bromo-benzo[1,3]dioxol-5-ylsulfanyl)-purin-9-yl]-ethyl}-phenyl)carbamic acid tert-butyl ester, (4-{2-[6-amino-8-(6-bromo-benzo[1,3]dioxol-5-ylsulfanyl)-purin-3-yl]-ethyl}-phenyl)carbamic acid tert-butyl ester, 9-[2-(4-amino-phenyl)-ethyl]-8-(6-bromo-benzo[1,3]dioxol-5-ylsulfanyl)-9H-purin-6-ylamine, (4-{2-[6-amino-8-(2, 5-dimethoxy-phenylsulfanyl)-purin-9-yl]-ethyl}-phenyl)-carbamic acid tert-butyl ester, (4-{2-[6-amino-8-(2, 5-dimethoxy-phenylsulfanyl)-purin-3-yl]-ethyl}-phenyl)-carbamic acid tert-butyl ester, 9-[2-(4-amino-phenyl)-ethyl]-8-(2,5-dimethoxy-phenylsulfanyl)-9H-purin-6-ylamine, 8-(2,5-dimethoxy-phenylsulfanyl)-9-[2-(3-trifluoromethoxy-phenyl)-ethyl]-9H-purin-6-ylamine, 8-(2,5-dimethoxy-phenylsulfanyl)-9-(2-pentafluorophenyl-ethyl)-9H-purin-6-ylamine, 9-[2-(3,5-bistrifluoromethy-phenyl)-ethyl]-8-(2,5-dimethoxy-phenylsulfanyl)-9H-purin-6-ylamine, 9-[2-(3, 5-Bistrifluoromethyl-phenyl)-ethyl]-8-(6-bromo-benzo[1,3]dioxol-5-ylsulfanyl)-9H-purin-6-ylamine, 8-(6-bromo-benzo[1,3]dioxol-5-ylsulfanyl)-9-[1-(4-chloro-phenyl)-cyclopropylmethyl]-9H-purin-6-ylamine, 8-(2, 5-dimethoxy-phenylsulfanyl)-9-[2-(3-nitro-phenyl)-ethyl]-9H-purin-6-ylamine, 8-(benzo[1,3]dioxol-5-ylsulfanyl)-9-phenethyl-1,9-dihydro-purin-6-one, and 8-(6-bromo-benzo[1,3]dioxol-5-ylsulfanyl)-9-phenethyl-1,9-dihydro-purin-6-one.

[00354] In one aspect, the invention also provides compounds of Formula I and II wherein said compound is chosen from the group consisting of 2-{2-[6-Amino-8-(2, 5-dimethoxy-phenylsulfanyl)-purin-9-yl]-ethyl}-piperidine-1-carboxylic acid ethyl ester; 2-{2-[6-amino-8-(2, 5-dimethoxy-phenylsulfanyl)-purin-3-yl]-ethyl}-piperidine-1-carboxylic acid ethyl ester; Ethyl 2-(2-{6-amino-8-[(6-bromo-1,3-benzodioxol-5-yl)thio]-9H-purin-9-yl}ethyl)piperidine-1-carboxylate; Ethyl 2-(2-{6-amino-8-[(6-bromo-1,3-benzodioxol-5-yl)thio]-3H-purin-3-yl}ethyl)piperidine-1-carboxylate; *tert*-Butyl 4-(2-{6-amino-8-[(6-bromo-1,3-

benzodioxol-5-yl)thio]-9H-purin-9-yl}ethyl)piperidine-1-carboxylate; *tert*-Butyl 4-(2-{6-amino-8-[(2,5-dimethoxyphenyl)thio]-9H-purin-9-yl}ethyl)piperidine-1-carboxylate; *tert*-Butyl 4-(2-{6-amino-8-[(2,5-dimethoxyphenyl)thio]-3H-purin-3-yl}ethyl)piperidine-1-carboxylate; *tert*-Butyl 4-(2-{6-amino-8-[(6-bromo-1,3-benzodioxol-5-yl)thio]-3H-purin-3-yl}ethyl)piperidine-1-carboxylate; *tert*-Butyl 3-(2-{6-amino-8-[(6-bromo-1,3-benzodioxol-5-yl)thio]-3H-purin-3-yl}ethyl)piperidine-1-carboxylate; *tert*-Butyl 3-(2-{6-amino-8-[(6-bromo-1,3-benzodioxol-5-yl)thio]-9H-purin-9-yl}ethyl)piperidine-1-carboxylate; *tert*-Butyl 3-(2-{6-amino-8-[(2,5-dimethoxyphenyl)thio]-9H-purin-9-yl}ethyl)piperidine-1-carboxylate; 8-[(2,5-Dimethoxyphenyl)thio]-9-[2-(tetrahydro-2H-pyran-4-yl)ethyl]-9H-purin-6-amine; 8-[(2,5-Dimethoxyphenyl)thio]-3-[2-(tetrahydro-2H-pyran-4-yl)ethyl]-3H-purin-6-amine; 8-[(6-Bromo-1,3-benzodioxol-5-yl)thio]-3-[2-(tetrahydro-2H-pyran-4-yl)ethyl]-3H-purin-6-amine; 8-[(6-Bromo-1,3-benzodioxol-5-yl)thio]-3-[2-(2,2,6,6-tetramethylpiperidin-4-yl)ethyl]-3H-purin-6-amine; 8-[(6-Bromo-1,3-benzodioxol-5-yl)thio]-3-[2-(1-methylpyrrolidin-2-yl)ethyl]-3H-purin-6-amine; 8-[(6-Bromo-1,3-benzodioxol-5-yl)thio]-9-[2-(tetrahydro-2H-pyran-4-yl)ethyl]-9H-purin-6-amine; 8-[(6-Bromo-1,3-benzodioxol-5-yl)thio]-9-[2-(2,2,6,6-tetramethylpiperidin-4-yl)ethyl]-9H-purin-6-amine; 8-[(6-Bromo-1,3-benzodioxol-5-yl)thio]-9-[2-(1-methylpyrrolidin-2-yl)ethyl]-9H-purin-6-amine; 9-[2-(1-Adamantyl)ethyl]-8-[(6-bromo-1,3-benzodioxol-5-yl)thio]-9H-purin-6-amine; 3-[2-(1-Adamantyl)ethyl]-8-[(6-bromo-1,3-benzodioxol-5-yl)thio]-3H-purin-6-amine; 4-(2-{6-Amino-8-[(2,5-dimethoxyphenyl)thio]-9H-purin-9-yl}ethyl)piperidine-1-carbaldehyde; 4-(2-{6-Amino-8-[(2,5-dimethoxyphenyl)thio]-3H-purin-3-yl}ethyl)piperidine-1-carbaldehyde; 8-[(2,5-Dimethoxyphenyl)thio]-3-[2-(2,2,6,6-tetramethylpiperidin-4-yl)ethyl]-3H-purin-6-amine; 8-[(2,5-Dimethoxyphenyl)thio]-9-[2-(2,2,6,6-tetramethylpiperidin-4-yl)ethyl]-9H-purin-6-amine; *tert*-Butyl 4-(2-{6-amino-8-[(2,5-diethoxyphenyl)thio]-9H-purin-9-yl}ethyl)piperidine-1-carboxylate; 4-(2-{6-Amino-8-[(6-bromo-1,3-benzodioxol-5-yl)thio]-9H-purin-9-yl}ethyl)piperidine-1-carbaldehyde; 9-[2-(1-Acetylpiperidin-4-yl)ethyl]-8-[(6-bromo-1,3-benzodioxol-5-yl)thio]-9H-purin-6-amine; 3-[2-(1-Acetylpiperidin-4-yl)ethyl]-8-[(6-bromo-1,3-benzodioxol-5-yl)thio]-3H-purin-6-amine; 8-[(6-Bromo-

1,3-benzodioxol-5-yl)thio]-3-{2-[1-(methylsulfonyl)piperidin-4-yl]ethyl}-3H-purin-6-amine; *tert*-Butyl 2-(2-{6-amino-8-[(6-bromo-1,3-benzodioxol-5-yl)thio]-9H-purin-9-yl}ethyl)morpholine-4-carboxylate; *tert*-Butyl 2-(2-{6-amino-8-[(6-bromo-1,3-benzodioxol-5-yl)thio]-3H-purin-3-yl}ethyl)morpholine-4-carboxylate; 8-[(6-Bromo-1,3-benzodioxol-5-yl)thio]-9-{2-[1-(methylsulfonyl)piperidin-3-yl]ethyl}-9H-purin-6-amine; 8-[(6-Bromo-1,3-benzodioxol-5-yl)thio]-3-{2-[1-(methylsulfonyl)piperidin-3-yl]ethyl}-3H-purin-6-amine; 8-[(2,5-Dimethoxyphenyl)thio]-9-{2-[1-(methylsulfonyl)piperidin-2-yl]ethyl}-9H-purin-6-amine; 8-[(6-Bromo-1,3-benzodioxol-5-yl)thio]-9-{2-[1-(methylsulfonyl)piperidin-2-yl]ethyl}-9H-purin-6-amine; 8-[(6-Bromo-1,3-benzodioxol-5-yl)thio]-3-{2-[1-(methylsulfonyl)piperidin-2-yl]ethyl}-3H-purin-6-amine; 9-(2-Cycloheptylethyl)-8-[(2,5-dimethoxyphenyl)thio]-9H-purin-6-amine; 8-[(6-Bromo-1,3-benzodioxol-5-yl)thio]-9-[2-(undecafluorocyclohexyl)ethyl]-9H-purin-6-amine; 3-(2-Cycloheptylethyl)-8-[(2,5-dimethoxyphenyl)thio]-3H-purin-6-amine; 8-[(6-Bromo-1,3-benzodioxol-5-yl)thio]-3-[2-(undecafluorocyclohexyl)ethyl]-3H-purin-6-amine; 8-[(6-Bromo-1,3-benzodioxol-5-yl)thio]-9-{2-[1-(methylsulfonyl)piperidin-4-yl]ethyl}-9H-purin-6-amine; 8-(1,3-Benzodioxol-5-ylthio)-9-{2-[1-(methylsulfonyl)piperidin-4-yl]ethyl}-9H-purin-6-amine; 8-[(6-Bromo-1,3-benzodioxol-5-yl)thio]-3-[2-(1H-imidazol-1-yl)ethyl]-3H-purin-6-amine; 8-[(6-Bromo-1,3-benzodioxol-5-yl)thio]-9-[2-(1H-imidazol-1-yl)ethyl]-9H-purin-6-amine; 9-[2-(4-Acetylpiperazin-1-yl)ethyl]-8-[(6-bromo-1,3-benzodioxol-5-yl)thio]-9H-purin-6-amine; 3-[2-(4-Acetylpiperazin-1-yl)ethyl]-8-[(6-bromo-1,3-benzodioxol-5-yl)thio]-3H-purin-6-amine; 8-[(2,5-Dimethoxyphenyl)thio]-9-[2-(undecafluorocyclohexyl)ethyl]-9H-purin-6-amine; 8-[(2,5-Dimethoxyphenyl)thio]-3-[2-(undecafluorocyclohexyl)ethyl]-3H-purin-6-amine; 8-[(6-Bromo-1,3-benzodioxol-5-yl)thio]-9-[2-(1-propylpiperidin-2-yl)ethyl]-9H-purin-6-amine; 8-[(6-Bromo-1,3-benzodioxol-5-yl)thio]-9-(2-{1-[(trifluoromethyl)sulfonyl]piperidin-4-yl}ethyl)-9H-purin-6-amine; 8-[(6-Bromo-1,3-benzodioxol-5-yl)thio]-3-(2-{1-[(trifluoromethyl)sulfonyl]piperidin-4-yl}ethyl)-3H-purin-6-amine; *tert*-Butyl 4-(2-{6-amino-8-[(6-bromo-1,3-benzodioxol-5-yl)thio]-3H-purin-3-yl}ethylidene)piperidine-1-carboxylate; *tert*-Butyl 4-(2-{6-amino-8-[(6-bromo-1,3-

benzodioxol-5-yl)thio]-9H-purin-9-yl}ethylidene)piperidine-1-carboxylate; *tert*-Butyl (3S)-3-(2-{6-amino-8-[(6-bromo-1,3-benzodioxol-5-yl)thio]-9H-purin-9-yl}ethyl)piperidine-1-carboxylate; *tert*-Butyl (3R)-3-(2-{6-amino-8-[(6-bromo-1,3-benzodioxol-5-yl)thio]-9H-purin-9-yl}ethyl)piperidine-1-carboxylate; *tert*-Butyl (3R)-3-(2-{6-amino-8-[(6-bromo-1,3-benzodioxol-5-yl)thio]-3H-purin-3-yl}ethyl)piperidine-1-carboxylate; *tert*-Butyl (2R)-2-(2-{6-amino-8-[(6-bromo-1,3-benzodioxol-5-yl)thio]-9H-purin-9-yl}ethyl)piperidine-1-carboxylate; *tert*-Butyl (2R)-2-(2-{6-amino-8-[(6-bromo-1,3-benzodioxol-5-yl)thio]-3H-purin-3-yl}ethyl)piperidine-1-carboxylate; 8-[(6-Bromo-1,3-benzodioxol-5-yl)thio]-9-(2-{1-[(trifluoromethyl)sulfonyl]piperidin-2-yl}ethyl)-9H-purin-6-amine; 8-[(6-Bromo-1,3-benzodioxol-5-yl)thio]-3-(2-{1-[(trifluoromethyl)sulfonyl]piperidin-2-yl}ethyl)-3H-purin-6-amine; *tert*-Butyl [cis-4-(2-{6-amino-8-[(6-bromo-1,3-benzodioxol-5-yl)thio]-9H-purin-9-yl}ethyl)cyclohexyl]carbamate; *tert*-Butyl [cis-4-(2-{6-amino-8-[(6-bromo-1,3-benzodioxol-5-yl)thio]-3H-purin-3-yl}ethyl)cyclohexyl]carbamate; 9-[2-(1-Acetylpiperidin-3-yl)ethyl]-8-[(6-bromo-1,3-benzodioxol-5-yl)thio]-9H-purin-6-amine; 3-[2-(1-Acetylpiperidin-3-yl)ethyl]-8-[(6-bromo-1,3-benzodioxol-5-yl)thio]-3H-purin-6-amine; 8-[(6-Bromo-1,3-benzodioxol-5-yl)thio]-9-(2-{1-[(trifluoromethyl)sulfonyl]piperidin-3-yl}ethyl)-9H-purin-6-amine; 8-[(6-Bromo-1, 3-benzodioxol-5-yl)thio]-3-(2-{1-[(trifluoromethyl)sulfonyl]piperidin-3-yl}ethyl)-3H-purin-6-amine; 8-[(6-Bromo1, 3-benzodioxal-5-yl)thio]-3-[2-(6,6-dimethylbicyclo[3.1.1]hept-2-en-3-yl)ethyl]-3H-purin-6-amine; 8-[(2, 5-Dimethoxyphenyl)thio]-9-[2-(6,6-dimethylbicyclo[3.1.1]hept-2-en-3-yl)ethyl]-9H-purin-6-amine; 4-(2-{6-Amino-8-[(6-bromo-1,3-benzodioxol-5-yl)thio]-9H-purin-9-yl}ethyl)-5-methyl-2,4-dihydro-3H-pyrazol-3-one; 4-(2-{6-Amino-8-[(2,5-dimethoxyphenyl)thio]-9H-purin-9-yl}ethyl)-5-methyl-2,4-dihydro-3H-pyrazol-3-one; 4-(2-{6-Amino-8-[(2,5-dimethoxyphenyl)thio]-3H-purin-3-yl}ethyl)-5-methyl-2,4-dihydro-3H-pyrazol-3-one; Benzyl 4-(2-{6-amino-8-[(6-bromo-1,3-benzodioxol-5-yl)thio]-9H-purin-9-yl}ethyl)piperidine-1-carboxylate; Benzyl 4-(2-{6-amino-8-[(6-bromo-1,3-benzodioxol-5-yl)thio]-3H-purin-3-yl}ethyl)piperidine-1-carboxylate; 8-[(6-Bromo-1,3-benzodioxol-5-yl)thio]-9-(2-morpholin-4-ylethyl)-9H-purin-6-amine; *tert*-Butyl 2-(2-{6-amino-8-[(6-bromo-1,3-benzodioxol-5-yl)thio]-3H-purin-

3-yl}ethyl)pyrrolidine-1-carboxylate; *tert*-Butyl 3-(2-{6-amino-8-[(6-bromo-1,3-benzodioxol-5-yl)thio]-3H-purin-3-yl}ethyl)pyrrolidine-1-carboxylate; *tert*-Butyl 2-(2-{6-amino-8-[(6-bromo-1,3-benzodioxol-5-yl)thio]-9H-purin-9-yl}ethyl)pyrrolidine-1-carboxylate; *tert*-Butyl 3-(2-{6-amino-8-[(6-bromo-1,3-benzodioxol-5-yl)thio]-9H-purin-9-yl}ethyl)pyrrolidine-1-carboxylate; *tert*-Butyl (2S)-2-(2-{6-amino-8-[(6-bromo-1,3-benzodioxol-5-yl)thio]-9H-purin-9-yl}ethyl)piperidine-1-carboxylate; *tert*-Butyl (2S)-2-(2-{6-amino-8-[(6-bromo-1,3-benzodioxol-5-yl)thio]-3H-purin-3-yl}ethyl)piperidine-1-carboxylate; *tert*-Butyl (3R)-3-(2-{6-amino-8-[(6-bromo-1,3-benzodioxol-5-yl)thio]-9H-purin-9-yl}ethyl)pyrrolidine-1-carboxylate; Benzyl 2-(2-{6-amino-8-[(6-bromo-1,3-benzodioxol-5-yl)thio]-9H-purin-9-yl}ethyl)pyrrolidine-1-carboxylate; *tert*-Butyl (3S)-3-(2-{6-amino-8-[(6-bromo-1,3-benzodioxol-5-yl)thio]-3H-purin-3-yl}ethyl)pyrrolidine-1-carboxylate; Benzyl 2-(2-{6-amino-8-[(6-bromo-1,3-benzodioxol-5-yl)thio]-3H-purin-3-yl}ethyl)pyrrolidine-1-carboxylate; 1-*tert*-Butyl 2-ethyl (2S,4S)-4-(2-{6-amino-8-[(6-bromo-1,3-benzodioxol-5-yl)thio]-9H-purin-9-yl}ethyl)piperidine-1,2-dicarboxylate; 1-*tert*-Butyl 2-ethyl (2S,4R)-4-(2-{6-amino-8-[(6-bromo-1,3-benzodioxol-5-yl)thio]-3H-purin-3-yl}ethyl)piperidine-1,2-dicarboxylate; 9-[2-(1-Benzyl-1,2,3,6-tetrahydropyridin-4-yl)ethyl]-8-[(6-bromo-1,3-benzodioxol-5-yl)thio]-9H-purin-6-amine; 3-[2-(1-Benzyl-1,2,3,6-tetrahydropyridin-4-yl)ethyl]-8-[(6-bromo-1,3-benzodioxol-5-yl)thio]-3H-purin-6-amine; 8-[(6-Bromo-1,3-benzodioxol-5-yl)thio]-9-{2-[(3-endo)-8-methyl-8-azabicyclo[3.2.1]oct-3-yl]ethyl}-9H-purin-6-amine; 8-[(6-Bromo-1,3-benzodioxol-5-yl)thio]-3-{2-[(3-endo)-8-methyl-8-azabicyclo[3.2.1]oct-3-yl]ethyl}-3H-purin-6-amine; *tert*-Butyl(2R,4S)-4-(2-{6-amino-8-[(6-bromo-1,3-benzodioxol-5-yl)thio]-9H-purin-9-yl}ethyl)-2-isopropylpiperidine-1-carboxylate; *tert*-Butyl (2S,4S)-4-(2-{6-amino-8-[(6-bromo-1,3-benzodioxol-5-yl)thio]-9H-purin-9-yl}ethyl)-2-isopropylpiperidine-1-carboxylate; *tert*-Butyl (2S,4R)-4-(2-{6-amino-8-[(6-bromo-1,3-benzodioxol-5-yl)thio]-3H-purin-3-yl}ethyl)-2-isopropylpiperidine-1-carboxylate; 4-(2-{6-Amino-8-[(6-bromo-1,3-benzodioxol-5-yl)thio]-9H-purin-9-yl}ethyl)-N-ethylpiperidine-1-carboxamide; 4-(2-{6-Amino-8-[(6-bromo-1,3-benzodioxol-5-yl)thio]-9H-purin-9-yl}ethyl)-N-isopropylpiperidine-1-carboxamide;

4-(2-{6-Amino-8-[(6-bromo-1,3-benzodioxol-5-yl)thio]-9H-purin-9-yl}ethyl)-N-(*tert*-butyl)piperidine-1-carboxamide; Ethyl N-{[4-(2-{6-amino-8-[(6-bromo-1,3-benzodioxol-5-yl)thio]-9H-purin-9-yl}ethyl)piperidin-1-yl]carbonyl}glycinate; 3-(2-{6-Amino-8-[(6-bromo-1,3-benzodioxol-5-yl)thio]-9H-purin-9-yl}ethyl)-N-ethylpiperidine-1-carboxamide; 3-(2-{6-Amino-8-[(6-bromo-1,3-benzodioxol-5-yl)thio]-9H-purin-9-yl}ethyl)-N-isopropylpiperidine-1-carboxamide; 3-(2-{6-Amino-8-[(6-bromo-1,3-benzodioxol-5-yl)thio]-9H-purin-9-yl}ethyl)-N-(tert-butyl)piperidine-1-carboxamide; 4-(2-{6-Amino-8-[(6-bromo-1,3-benzodioxol-5-yl)thio]-3H-purin-3-yl}ethyl)-N-ethylpiperidine-1-carboxamide; 4-(2-{6-Amino-8-[(6-bromo-1,3-benzodioxol-5-yl)thio]-3H-purin-3-yl}ethyl)-N-isopropylpiperidine-1-carboxamide; 3-(2-{6-Amino-8-[(6-bromo-1,3-benzodioxol-5-yl)thio]-3H-purin-3-yl}ethyl)-N-ethylpiperidine-1-carboxamide; 3-(2-{6-Amino-8-[(6-bromo-1,3-benzodioxol-5-yl)thio]-3H-purin-3-yl}ethyl)-N-isopropylpiperidine-1-carboxamide; 3-(2-{6-Amino-8-[(6-bromo-1,3-benzodioxol-5-yl)thio]-3H-purin-3-yl}ethyl)-N-(tert-butyl)piperidine-1-carboxamide; Ethyl N-{[4-(2-{6-amino-8-[(6-bromo-1,3-benzodioxol-5-yl)thio]-3H-purin-3-yl}ethyl)piperidin-1-yl]carbonyl}glycinate; 8-[(2,5-Dimethoxyphenyl)thio]-9-{2-[4-(2,2-dimethylpropanoyl)piperazin-1-yl]ethyl}-9H-purin-6-amine; 8-[(6-Bromo-1,3-benzodioxol-5-yl)thio]-9-[2-(1-isopropylpiperidin-2-yl)ethyl]-9H-purin-6-amine; 8-[(6-Bromo-1,3-benzodioxol-5-yl)thio]-3-[2-(1-isopropylpiperidin-2-yl)ethyl]-3H-purin-6-amine; 8-[(6-Bromo-1,3-benzodioxol-5-yl)thio]-9-[2-(1-isobutylpiperidin-2-yl)ethyl]-9H-purin-6-amine; 8-[(6-Bromo-1,3-benzodioxol-5-yl)thio]-3-[2-(1-isobutylpiperidin-2-yl)ethyl]-3H-purin-6-amine; 8-[(6-Bromo-1,3-benzodioxol-5-yl)thio]-9-{2-[1-(2,2-dimethylpropanoyl)piperidin-3-yl]ethyl}-9H-purin-6-amine; 8-[(6-Bromo-1,3-benzodioxol-5-yl)thio]-3-{2-[1-(2,2-dimethylpropanoyl)piperidin-3-yl]ethyl}-3H-purin-6-amine; 8-[(6-Bromo-1,3-benzodioxol-5-yl)thio]-9-{2-[1-(2,2-dimethylpropanoyl)piperidin-4-yl]ethyl}-9H-purin-6-amine; 8-[(6-Bromo-1,3-benzodioxol-5-yl)thio]-3-{2-[1-(2,2-dimethylpropanoyl)piperidin-4-yl]ethyl}-3H-purin-6-amine; 8-[(6-Bromo-1,3-benzodioxol-5-yl)thio]-9-[2-(1-isobutylpiperidin-4-yl)ethyl]-9H-purin-6-amine; 8-[(6-Bromo-1,3-benzodioxol-5-yl)thio]-9-{2-[1-(3,3-dimethylbutanoyl)piperidin-3-yl]ethyl}-9H-purin-6-amine; 8-[(6-bromo-1,3-

benzodioxol-5-yl)thio]-9-(2-piperidin-4-ylethyl)-9H-purin-6-amine; 8-[(2,5-Dimethoxyphenyl)thio]-3-(2-piperidin-4-ylethyl)-3H-purin-6-amine; 8-[(6-Bromo-1,3-benzodioxol-5-yl)thio]-3-(2-piperidin-4-ylethyl)-3H-purin-6-amine; 8-[(2,5-Dimethoxyphenyl)thio]-9-(2-piperidin-4-ylethyl)-9H-purin-6-amine; 8-[(6-Bromo-1,3-benzodioxol-5-yl)thio]-9-(2-piperidin-3-yl ethyl)-9H-purin-6-amine; 8-[(2,5-dimethoxyphenyl)thio]-9-(2-piperidin-3-ylethyl)-9H-purin-6-amine; 8-[(6-bromo-1,3-benzodioxol-5-yl)thio]-9-(2-piperidin-4-ylideneethyl)-9H-purin-6-amine; 8-[(6-Bromo-1,3-benzodioxol-5-yl)thio]-9-{2-[(3R)-piperidin-3-yl]ethyl}-9H-purin-6-amine; 8-[(6-Bromo-1,3-benzodioxol-5-yl)thio]-9-{2-[(3S)-piperidin-3-yl]ethyl}-9H-purin-6-amine; 8-[(6-Bromo-1,3-benzodioxol-5-yl)thio]-9-{2-[(2R)-piperidin-2-yl]ethyl}-9H-purin-6-amine; 8-[(6-Bromo-1,3-benzodioxol-5-yl)thio]-9-(2-pyrrolidin-3-ylethyl)-9H-purin-6-amine; 8-[(6-Bromo-1,3-benzodioxol-5-yl)thio]-9-{2-[(2S)-piperidin-2-yl]ethyl}-9H-purin-6-amine; 8-[(6-bromo-1,3-benzodioxol-5-yl)thio]-9-{2-[(3R)-pyrrolidin-3-yl]ethyl}-9H-purin-6-amine; 8-[(6-bromo-1,3-benzodioxol-5-yl)thio]-9-{2-[(2R,4S)-2-isopropylpiperidin-4-yl]ethyl}-9H-purin-6-amine; 8-[(6-bromo-1,3-benzodioxol-5-yl)thio]-9-{2-[(2S)-2-isopropylpiperidin-4-yl]ethyl}-9H-purin-6-amine; 8-(2,5-dimethoxy-phenylsulfanyl)-9-(2-piperidine-1-yl-ethyl)-9H-purin-6-ylamine; 8-(2,5-dimethoxy-phenylsulfanyl)-3-(2-piperidine-1-yl-ethyl)-3H-purin-6-ylamine; 8-[(6-Bromo-1,3-benzodioxol-5-yl)thio]-9-[2-(4-isopropylpiperazin-1-yl)ethyl]-9H-purin-6-amine; 8-[(6-Bromo-1,3-benzodioxol-5-yl)thio]-3-[2-(4-isopropylpiperazin-1-yl)ethyl]-3H-purin-6-amine; 8-[(2,5-Dimethoxyphenyl)thio]-9-(2-piperidin-1-ylethyl)-9H-purin-6-amine; 8-[(2,5-Dimethoxyphenyl)thio]-3-(2-piperidin-1-ylethyl)-3H-purin-6-amine; 8-[(6-Bromo-1,3-benzodioxol-5-yl)thio]-9-(2-piperidin-1-ylethyl)-9H-purin-6-amine; 8-[(6-Bromo-1,3-benzodioxol-5-yl)thio]-3-(2-piperidin-1-ylethyl)-3H-purin-6-amine; 8-[(2,5-Dimethoxyphenyl)thio]-9-[2-(4-isopropylpiperazin-1-yl)ethyl]-9H-purin-6-amine; 9-[2-(4-Cyclopentylpiperazin-1-yl)ethyl]-8-[(2,5-dimethoxyphenyl)thio]-9H-purin-6-amine; 3-[2-(4-Cyclopentylpiperazin-1-yl)ethyl]-8-[(2,5-dimethoxyphenyl)thio]-3H-purin-6-amine; 1-(2-{6-Amino-8-[(6-bromo-1,3-benzodioxol-5-yl)thio]-9H-purin-9-yl}ethyl)piperidine-2,6-dione; 1-(2-{6-amino-8-

[(6-bromo-1,3-benzodioxol-5-yl)thio]-3H-purin-3-yl}ethyl)piperidine-2,6-dione; and a pharmaceutically acceptable salt thereof.

[00355] In one aspect, the invention also provides compounds of Formula I and II wherein said compound is chosen from *tert*-Butyl (3-{6-amino-8-[(6-bromo-1,3-benzodioxol-5-yl)thio]-9H-purin-9-yl}-1-cyclopropylpropyl)carbamate; *tert*-Butyl (3-{6-amino-8-[(6-bromo-1,3-benzodioxol-5-yl)thio]-3H-purin-3-yl}-1-cyclopropylpropyl)carbamate; *tert*-Butyl (3-{6-amino-8-[(2,5-dimethoxyphenyl)thio]-9H-purin-9-yl}-1-cyclopropylpropyl)carbamate; *tert*-Butyl (3-{6-amino-8-[(2,5-dimethoxyphenyl)thio]-3H-purin-3-yl}-1-cyclopropylpropyl)carbamate; *tert*-Butyl [3-{6-amino-8-[(6-bromo-1,3-benzodioxol-5-yl)thio]-9H-purin-9-yl}-1-(tetrahydro-2H-thiopyran-4-yl)propyl]carbamate; *tert*-Butyl [3-{6-amino-8-[(6-bromo-1,3-benzodioxol-5-yl)thio]-3H-purin-3-yl}-1-(tetrahydro-2H-thiopyran-4-yl)propyl]carbamate; *tert*-Butyl [3-{6-amino-8-[(2,5-dimethoxyphenyl)thio]-9H-purin-9-yl}-1-(tetrahydro-2H-thiopyran-4-yl)propyl]carbamate; *tert*-Butyl [3-{6-amino-8-[(2,5-dimethoxyphenyl)thio]-3H-purin-3-yl}-1-(tetrahydro-2H-thiopyran-4-yl)propyl]carbamate; *tert*-Butyl (3-{6-amino-8-[(6-bromo-1,3-benzodioxol-5-yl)thio]-9H-purin-9-yl}-1-cyclohexylpropyl)carbamate; *tert*-Butyl (3-{6-amino-8-[(6-bromo-1,3-benzodioxol-5-yl)thio]-3H-purin-3-yl}-1-cyclohexylpropyl)carbamate; *tert*-Butyl (3-{6-amino-8-[(6-bromo-1,3-benzodioxol-5-yl)thio]-9H-purin-9-yl}-1-cyclobutylpropyl)carbamate; *tert*-Butyl (3-{6-amino-8-[(6-bromo-1,3-benzodioxol-5-yl)thio]-3H-purin-3-yl}-1-cyclobutylpropyl)carbamate; N-(3-{6-Amino-8-[(6-bromo-1,3-benzodioxol-5-yl)thio]-9H-purin-9-yl}-1-cyclopropylpropyl)methanesulfonamide; N-(3-{6-Amino-8-[(6-bromo-1,3-benzodioxol-5-yl)thio]-3H-purin-3-yl}-1-cyclopropylpropyl)methanesulfonamide; N-(3-{6-Amino-8-[(2,5-dimethoxyphenyl)thio]-9H-purin-9-yl}-1-cyclopropylpropyl)methanesulfonamide; N-(3-{6-Amino-8-[(2,5-dimethoxyphenyl)thio]-3H-purin-3-yl}-1-cyclopropylpropyl)methanesulfonamide; N-(3-{6-Amino-8-[(6-bromo-1,3-benzodioxol-5-yl)thio]-9H-purin-9-yl}-1-cyclopropylpropyl)-N'-isopropylurea; N-(3-{6-Amino-8-[(6-bromo-1,3-benzodioxol-5-yl)thio]-3H-purin-3-yl}-1-cyclopropylpropyl)-N'-isopropylurea; {3-[6-Amino-8-

(6-bromo-benzo[1,3]dioxol-5-ylsulfanyl)-purin-3-yl]-1-cyclopentyl-propyl}-carbamic acid tert-butyl ester; {3-[6-Amino-8-(6-bromo-benzo[1,3]dioxol-5-ylsulfanyl)-purin-9-yl]-1-cyclopentyl-propyl}-carbamic acid *tert*-butyl ester; [3-[6-Amino-8-(6-bromo-benzo[1,3]dioxol-5-ylsulfanyl)-purin-9-yl]-1-(tetrahydro-pyran-4-yl)-propyl]-carbamic acid *tert*-butyl ester; [3-[6-Amino-8-(6-bromo-benzo[1,3]dioxol-5-ylsulfanyl)-9H-purin-3-yl]-1-(tetrahydro-pyran-4-yl)-propyl]-carbamic acid *tert*-butyl ester; [3-[6-Amino-8-(6-bromo-benzo[1,3]dioxol-5-ylsulfanyl)-9H-purin-3-yl]-1-(tetrahydro-pyran-4-yl)-propyl]-carbamic acid *tert*-butyl ester; 8-[(6-Bromo-1,3-benzodioxol-5-yl)thio]-3-[3-cyclohexyl-3-(1*H*-pyrrol-1-yl)propyl]-3*H*-purin-6-amine; 9-(3-amino-3-cyclobutylpropyl)-8-[(6-bromo-1,3-benzodioxol-5-yl)thio]-9H-purin-6-amine; 9-(3-Amino-3-cyclopropylpropyl)-8-[(6-bromo-1,3-benzodioxol-5-yl)thio]-9H-purin-6-amine; 3-(3-Amino-3-cyclopropylpropyl)-8-[(6-bromo-1,3-benzodioxol-5-yl)thio]-3H-purin-6-amine; 9-[3-Amino-3-(tetrahydro-2H-thiopyran-4-yl)propyl]-8-[(6-bromo-1,3-benzodioxol-5-yl)thio]-9H-purin-6-amine; 9-(3-Amino-3-cyclohexylpropyl)-8-[(6-bromo-1,3-benzodioxol-5-yl)thio]-9H-purin-6-amine; 9-(3-Amino-3-cyclopentyl-propyl)-8-(6-bromo-benzo[1,3]dioxol-5-ylsulfanyl)-9H-purin-6-ylamine; 9-[3-Amino-3-(tetrahydro-pyran-4-yl)-propyl]-8-(6-bromo-benzo[1,3]dioxol-5-ylsulfanyl)-9H-purin-6-ylamine; and a pharmaceutically acceptable salt thereof.

[00356] In another aspect, the invention is directed to pharmaceutical compositions comprising the compounds of the invention, in particular, one or more compounds of Formula I-III and one or more pharmaceutical excipients, for use in treatment or prevention of diseases that are HSP90-dependent.

[00357] In another aspect, the invention features a method of treating an individual having an HSP90-mediated disorder by administering to the individual a pharmaceutical composition that comprises a pharmaceutically effective amount of one or more compounds of Formulae I-III and/or a pharmaceutically acceptable salt thereof.

[00358] In one aspect, the invention provides a method for treating an individual having a disorder chosen from inflammatory diseases, infections, autoimmune disorders, stroke, ischemia, cardiac disorders, neurological disorders,

fibrogenetic disorders, proliferative disorders, tumors, leukemias, neoplasms, cancers, carcinomas, metabolic diseases, and malignant disease. In a specific aspect, the method involves indentifying a patient in need of treatment and administering to

[00359] In yet another aspect, the invention provides a method for treating an individual having a fibrogenetic disorder, such as, for example, scleroderma, polymyositis, systemic lupus, rheumatoid arthritis, liver cirrhosis, keloid formation, interstitial nephritis and pulmonary fibrosis.

[00360] The present invention also includes a therapeutic method comprising administering to an animal (e.g., a patient, in need of treatment) a therapeutically effective amount of one or more compounds of Formulae I-III and/or a pharmaceutically acceptable salt thereof. The therapeutic method is useful to treat cancer, which is a group of diseases characterized by the uncontrolled growth and spread of abnormal cells. Such diseases include, but are not limited to, Hodgkin's disease, non-Hodgkin's lymphoma, acute lymphocytic leukemia, chronic lymphocytic leukemia, multiple myeloma, neuroblastoma, breast carcinoma, ovarian carcinoma, lung carcinoma, Wilms' tumor, cervical carcinoma, testicular carcinoma, soft-tissue sarcoma, primary macroglobulinemia, bladder carcinoma, chronic granulocytic leukemia, primary brain carcinoma, malignant melanoma, small-cell lung carcinoma, stomach carcinoma, colon carcinoma, malignant pancreatic insulinoma, malignant carcinoid carcinoma, choriocarcinoma, mycosis fungoides, head or neck carcinoma, osteogenic sarcoma, pancreatic carcinoma, acute granulocytic leukemia, hairy cell leukemia, neuroblastoma, rhabdomyosarcoma, Kaposi's sarcoma, genitourinary carcinoma, thyroid carcinoma, esophageal carcinoma, malignant hypercalcemia, cervical hyperplasia, renal cell carcinoma, endometrial carcinoma, polycythemia vera, essential thrombocytosis, adrenal cortex carcinoma, skin cancer, and prostatic carcinoma.

[00361] Typically, compounds according to Formulae I-III can be effective at an amount of from about 0.01 μg/kg to about 100 mg/kg per day based on total body weight. The active ingredient may be administered at once, or may be divided into a number of smaller doses to be administered at predetermined intervals of time. The suitable dosage

unit for each administration can be, e.g., from about 1 μg to about 2000 mg, preferably from about 5 μg to about 1000 mg.

[00362] It should be understood that the dosage ranges set forth above are exemplary only and are not intended to limit the scope of this invention. The therapeutically effective amount for each active compound can vary with factors including but not limited to the activity of the compound used, stability of the active compound in the patient's body, the severity of the conditions to be alleviated, the total weight of the patient treated, the route of administration, the ease of absorption, distribution, and excretion of the active compound by the body, the age and sensitivity of the patient to be treated, and the like, as will be apparent to a skilled artisan. The amount of administration can be adjusted as the various factors change over time.

[00363] In the pharmaceutical compositions, the active agents can be in any pharmaceutically acceptable salt form. As used herein, the term "pharmaceutically acceptable salts" refers to the relatively non-toxic, organic or inorganic salts of the active compounds, including inorganic or organic acid addition salts of the compound. Examples of salts of basic active ingredient compounds include, but are not limited to, hydrochloride salts, hydrobromide salts, sulfate salts, bisulfate salts, nitrate salts, acetate salts, phosphate salts, nitrate salts, oxalate salts, valerate salts, oleate salts, borate salts, benzoate salts, laurate salts, stearate salts, palmitate salts, lactate salts, tosylate salts, citrate salts, maleate salts, succinate salts, tartrate salts, napththylate salts, fumarate salts, mesylate salts, laurylsuphonate salts, glucoheptonate salts, and the like. See, e.g., Berge, et al. J. Pharm. Sci., 66:1-19 (1977). Examples of salts of acidic active ingredient compounds include, e.g., alkali metal salts, alkaline earth salts, and ammonium salts. Thus, suitable salts may be salts of aluminum, calcium, lithium, magnesium, potassium, sodium and zinc. In addition, organic salts may also be used including, e.g., salts of lysine, N,N'-dibenzylethylenediamine, chloroprocaine, choline, diethanolamine, ethylenediamine, meglumine (N-methylglucamine), procaine and tris.

[00364] For oral delivery, the active compounds can be incorporated into a formulation that includes pharmaceutically acceptable carriers such as binders (e.g., gelatin, cellulose, gum tragacanth), excipients (e.g., starch, lactose), lubricants (e.g., magnesium stearate, silicon dioxide), disintegrating agents (e.g., alginate, Primogel, and corn starch), and sweetening or flavoring agents (e.g., glucose, sucrose, saccharin, methyl salicylate, and peppermint). The formulation can be orally delivered in the form of enclosed gelatin capsules or compressed tablets. Capsules and tablets can be prepared in

any conventional techniques. The capsules and tablets can also be coated with various coatings known in the art to modify the flavors, tastes, colors, and shapes of the capsules and tablets. In addition, liquid carriers such as fatty oil can also be included in capsules.

[00365] Suitable oral formulations can also be in the form of suspension, syrup, chewing gum, wafer, elixir, and the like. If desired, conventional agents for modifying flavors, tastes, colors, and shapes of the special forms can also be included. In addition, for convenient administration by enteral feeding tube in patients unable to swallow, the active compounds can be dissolved in an acceptable lipophilic vegetable oil vehicle such as olive oil, corn oil and safflower oil.

[00366] The active compounds can also be administered parenterally in the form of solution or suspension, or in lyophilized form capable of conversion into a solution or suspension form before use. In such formulations, diluents or pharmaceutically acceptable carriers such as sterile water and physiological saline buffer can be used. Other conventional solvents, pH buffers, stabilizers, anti-bacteria agents, surfactants, and antioxidants can all be included. For example, useful components include sodium chloride, acetates, citrates or phosphates buffers, glycerin, dextrose, fixed oils, methyl parabens, polyethylene glycol, propylene glycol, sodium bisulfate, benzyl alcohol, ascorbic acid, and the like. The parenteral formulations can be stored in any conventional containers such as vials and ampoules.

[00367] Routes of topical administration include nasal, bucal, mucosal, rectal, or vaginal applications. For topical administration, the active compounds can be formulated into lotions, creams, ointments, gels, powders, pastes, sprays, suspensions, drops and aerosols. Thus, one or more thickening agents, humectants, and stabilizing agents can be included in the formulations. Examples of such agents include, but are not limited to, polyethylene glycol, sorbitol, xanthan gum, petrolatum, beeswax, or mineral oil, lanolin, squalene, and the like. A special form of topical administration is delivery by a transdermal patch. Methods for preparing transdermal patches are disclosed, e.g., in Brown, et al., Annual Review of Medicine, 39:221-229 (1988), which is incorporated herein by reference.

[00368] Subcutaneous implantation for sustained release of the active compounds may also be a suitable route of administration. This entails surgical procedures for implanting an active compound in any suitable formulation into a subcutaneous space, e.g., beneath the anterior abdominal wall. See, e.g., Wilson et al., J. Clin. Psych. 45:242-247 (1984). Hydrogels can be used as a carrier for the sustained release of the active

compounds. Hydrogels are generally known in the art. They are typically made by crosslinking high molecular weight biocompatible polymers into a network, which swells in water to form a gel like material. Preferably, hydrogels are biodegradable or biosorbable. For purposes of this invention, hydrogels made of polyethylene glycols, collagen, or poly(glycolic-co-L-lactic acid) may be useful. See, e.g., Phillips et al., J. Pharmaceut. Sci., 73:1718-1720 (1984).

[00369] The active compounds can also be conjugated, to a water soluble non-immunogenic non-peptidic high molecular weight polymer to form a polymer conjugate. For example, an active compound is covalently linked to polyethylene glycol to form a conjugate. Typically, such a conjugate exhibits improved solubility, stability, and reduced toxicity and immunogenicity. Thus, when administered to a patient, the active compound in the conjugate can have a longer half-life in the body, and exhibit better efficacy. See generally, Burnham, Am. J. Hosp. Pharm., 15:210-218 (1994). PEGylated proteins are currently being used in protein replacement therapies and for other therapeutic uses. For example, PEGylated interferon (PEG-INTRON A®) is clinically used for treating Hepatitis B. PEGylated adenosine deaminase (ADAGEN®) is being used to treat severe combined immunodeficiency disease (SCIDS). PEGylated L-asparaginase (ONCAPSPAR®) is being used to treat acute lymphoblastic leukemia (ALL). It is preferred that the covalent linkage between the polymer and the active compound and/or the polymer itself is hydrolytically degradable under physiological conditions. Such conjugates known as "prodrugs" can readily release the active compound inside the body. Controlled release of an active compound can also be achieved by incorporating the active ingredient into microcapsules, nanocapsules, or hydrogels generally known in the art. Other pharmaceutically acceptable prodrugs of the compounds of this invention include, but are not limited to, esters, carbonates, thiocarbonates, N-acyl derivatives, N-acyloxyalkyl derivatives, quaternary derivatives of tertiary amines, N-Mannich bases, Schiff bases, aminoacid conjugates, phosphate esters, metal salts and sulfonate esters.

[00370] Liposomes can also be used as carriers for the active compounds of the present invention. Liposomes are micelles made of various lipids such as cholesterol, phospholipids, fatty acids, and derivatives thereof. Various modified lipids can also be used. Liposomes can reduce the toxicity of the active compounds, and increase their stability. Methods for preparing liposomal suspensions containing active ingredients therein are generally known in the art. See, e.g., U.S. Patent No. 4,522,811; Prescott, Ed., Methods in Cell Biology, Volume XIV, Academic Press, New York, N.Y. (1976).

[00371] The active compounds can also be administered in combination with another active agent that synergistically treats or prevents the same symptoms or is effective for another disease or symptom in the patient treated so long as the other active agent does not interfere with or adversely affect the effects of the active compounds of this invention. Such other active agents include but are not limited to anti-inflammation agents, antiviral agents, antibiotics, antifungal agents, antithrombotic agents, cardiovascular drugs, cholesterol lowering agents, anti-cancer drugs, hypertension drugs, and the like.

[00372] Examples of antineoplastic agents that can be used in combination with the compounds and methods of the present invention include, in general, and as appropriate, alkylating agents, anti-metabolites, epidophyllotoxins, antineoplastic enzymes, topoisomerase inhibitors, procarbazines, mitoxantrones, platinum coordination complexes, biological response modifiers and growth inhibitors, hormonal/anti-hormonal therapeutic agents and haematopoietic growth factors. Exemplary classes of antineoplastic include the anthracyclines, vinca drugs, mitomycins, bleomycins, cytotoxic nucleosides, epothilones, discodermolides, pteridines, diynenes and podophyllotoxins. Particularly useful members of those classes include, for example, carminomycin, daunorubicin, aminopterin, methotrexate, methopterin, dichloromethotrexate, mitomycin C, porfiromycin, 5-fluorouracil, 6-mercaptopurine, gemcitabine, cytosine arabinoside, podophyllotoxin or podo-phyllotoxin derivatives such as etoposide, etoposide phosphate or teniposide, melphalan, vinblastine, vincristine, leurosidine, vindesine, leurosine, paclitaxel and the like. Other useful antineoplastic agents include estramustine, carboplatin, cyclophosphamide, bleomycin, gemcitibine, ifosamide, melphalan, hexamethyl melamine, thiotepa, cytarabin, idatrexate, trimetrexate, dacarbazine, L-asparaginase, camptothecin, CPT-11, topotecan, ara-C, bicalutamide, flutamide, leuprolide, pyridobenzoindole derivatives, interferons and interleukins.

EXAMPLES

[00373] Chemicals were purchased from standard commercial vendors and used as received unless otherwise noted. Otherwise their preparation is facile and known to one of ordinary skill in the art, or it is referenced or described herein.

[00374] Abbreviations are consistent with those in the ACS Style Guide. "dry" glassware means oven/desiccator dried. Solvents were ACS grade unless

otherwise noted. Analytical TLC plates (Silica Gel 60 F254, EM Science, Gibbstown, NJ, or Merck # 5715) were used to follow the course of reactions, and the MPLC system used for purifications was from Isco (Foxy Jr fraction collector, UA-6 detector), using Isco silica gel flash columns (10 or 40 g). ^{1}H NMR spectra were recorded on a Varian Mercury 400 MHz instrument and chemical shifts are expressed in parts per million (ppm, δ) relative to TMS as the internal standard. Mass spectra were obtained on a Thermo Finnigan LCQ-Deca (injection volume 5 uL, XTerra MS-C_{18} 3.5 μm 2.1 x 50mm column, XTerra MS-C_{18} 5 μm 2.1 x 20mm guard column), ESI source, analytical HPLC was performed on an HP1050 (injection volume 5 μl, XTerra RP-C_{18} 5 μm 4.6 x 250 mm column, with an XTerra MS-C_{18} 5 μm 2.1 x 20mm guard column), and preparative HPLC was performed on an Agilent 1100 Prep-LC with various columns and conditions depending on the compound. GCMS was performed on either an Agilent Technology 6890N or Shimadzu QP5000/17A instrument.

[00375] All reactions were performed in flame-dried or oven-dried glassware under a positive pressure of dry nitrogen or dry argon and were stirred magnetically unless otherwise indicated. Chemicals were purchased from standard commercial vendors and used as received unless otherwise noted. Otherwise their preparation is facile and known to one of ordinary skill in the art, or it is referenced or described herein. Yields are not optimized. The chemical names were generated using the ISIS AutoNom and ACD labs software.

[00376] ABBREVIATIONS AND ACRONYMS

[00377] When the following abbreviations are used herein, they have the following meaning:

Ac_2O	acetic anhydride
anhy	Anhydrous
n-BuOH	*n*-butanol
t-BuOH	*t*-butanol
CD_3OD	methanol-d_4
Celite®	diatomaceous earth filter agent, ® Celite Corp.
CH_2Cl_2	methylene chloride
DCM	dichloromethane
CI-MS	chemical ionization mass spectroscopy
conc	concentrated

dec	decomposition
bs	broad singlet
br	broad
DME	dimethoxyethane
DMF	*N,N*-dimethylformamide
DMSO	dimethylsulfoxide
DMSO-d_6	dimethylsulfoxide-d_6
ELSD	evaporative light scattering device
EtOAc	ethyl acetate
EtOH	ethanol (100%)
Et_2O	diethyl ether
Et_3N	triethylamine
HPLC ESI-MS	high performance liquid chromatography-electrospray mass spectroscopy
MPLC	medium pressure liquid chromatography
NMR	nuclear magnetic resonance spectroscopy
TOF-MS	time-of-flight-mass spectroscopy
NMM	4-methylmorpholine
Ph_3P	triphenylphosphine
$Pd(dppf)Cl_2$	[1,1'-bis(diphenylphosphino)ferrocene]dichloropalladium(II)
$Pd(PPh_3)_4$	tetrakis(triphenylphosphine)palladium(0)
$Pd(OAc)_2$	palladium(II) acetate
$P(O)Cl_3$	phosphorous oxychloride
R_f	TLC retention factor
RT	retention time (HPLC)
rt	room temperature
THF	tetrahydrofuran
TFA	trifluoroacetic acid
TLC	thin layer chromatography
LC-MS (ESI)	liquid chromatography-mass spectroscopy (electrospray ionization)
DIEA	diisopropylethylamine
TFAA	trifluoroacetic anhydride
MsCl	methanesulfonylchloride
AcOH	acetic acid
HCl	hydrochloric acid
H_2SO_4	sulfuric acid
HNO_3	nitric acid
HBr	hydrobromic acid
$CDCl_3$	chloroform-d_3
$CHCl_3$	chloroform
H_2O	water
NaOAc	sodium acetate
KOH	potassium hydroxide

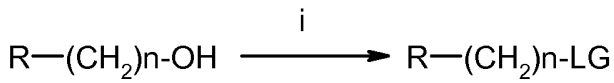
NaOH	sodium hydroxide
NaCl	sodium chloride
$NaHCO_3$	sodium bicarbonate
Na_2CO_3	sodium carbonate
K_2CO_3	potassium carbonate
Na_2SO_4	sodium sulfate
$MgSO_4$	magnesium sulfate
MeOH	methanol
SiO_2	silica gel
K_3PO_4	potassium phosphate
NH_4Cl	ammonium chloride
AIBN	2,2'-axo bisisobutyronitrile
Barton's base	2-t-butyl-1,1,3,3-tetramethylguanidine
DMAP	N,N-Dimethyl aminopyridine
LG	leaving group
MsCl	methanesulfonyl chloride
TsCl	p- toluenesulfonyl chloride
PG	protecting group
Xantphos	4,5-bis(diphenylphosphino)-9,9-dimethyl xanthane

[00378] General procedures

[00379] **General Method of preparation of Intermediates**

[00380] The substituted alcohols which are either commercially available or prepared according to known literature procedure. These substituted alcohols are converted to corresponding leaving group (Cl, Br, OMs or OTs) in accordance with synthetic methods well known to the skilled person. General methods for the preparation of the compounds are given below, and the preparation of representative compounds is specifically illustrated in the experimental section.

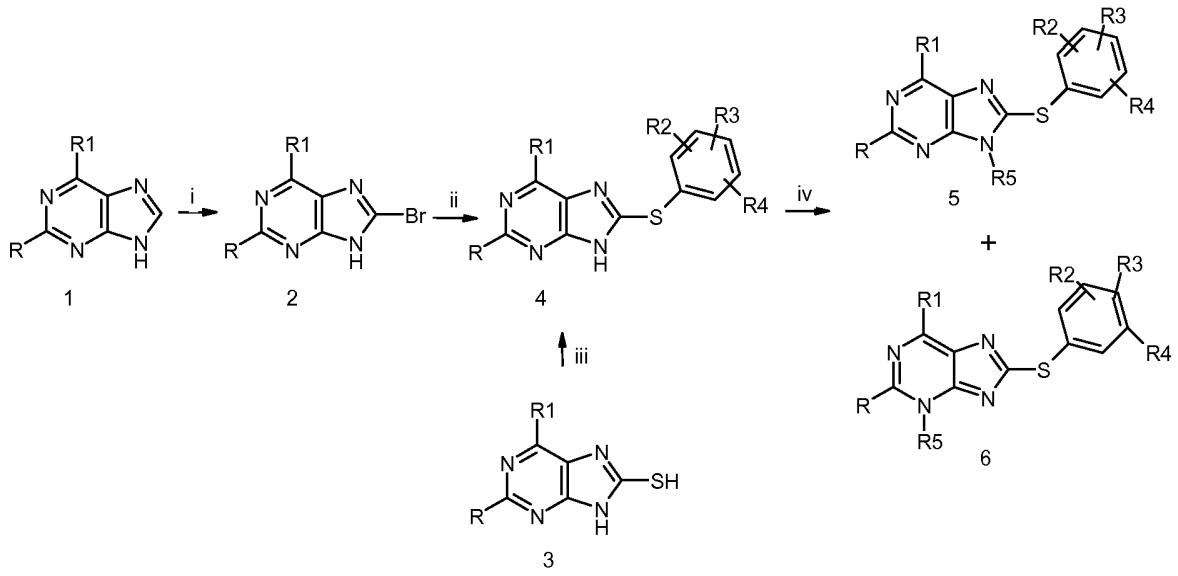
[00381] Figure 1



LG = Cl, Br, OMs, OTs

Reagents: i) $SOCl_2$, $CHCl_3$ or CBr_4, PPh_3 / PPh_3-polymer, DCM or CH_3SO_2Cl, NEt_3, DCM, or pTsCl, NEt_3, DMAP, DCM

[00382] Figure 2



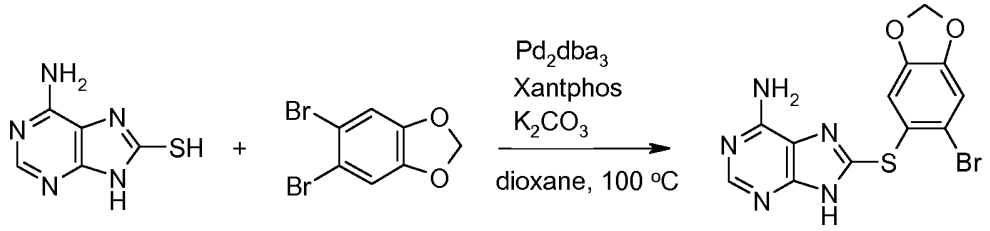
Reagents: i) $CHCl_3$, Br_2, rt; ii) NaH, substituted benzenethiol, DMF, 60 °C; iii) Ar-X, CuI, neocuproine, t-BuONa, DMF, 60-110°C;or Pd_2dba_3, Xanthpos, K_2CO_3 or Cs_2CO_3, dioxane, 100 °C
iv) R5-LG, Barton's base, DMF, 60- 110 °C.

[00383] The 8-bromoadenine **2** was prepared by known method (US 2005/0049263). The compound **4** may be obtained either by nucleophilic attack of the arylthiolate anion on bromoadenine (US 2005/0049263) or by copper-catalyzed coupling of aryliodides with mercaptoadenine **3** using CuI/neocuproine as catalyst and t-BuONa/DMF as the base/solvent combination at 60-110 °C (J. Med. Chem, 2005, **48**, 2892). Alternatively **4** can be prepared by palladium catalysed coupling of aryl halides with mercaptoadenine **3.** The derivatives of 8-arylsulfanyl adenine **4** were alkylated using various alkylating agents in the presence of base at 30-110 °C in DMF for 1-18 h. Formation of the mixture of regioisomers **5** and **6** were observed by HPLC and LC-MS analysis. At the end of this period solvent was evaporated or after aqueous and organic work up, the organic layer was collected and was dried over Na_2SO_4. After removal organic solvent and preparative HPLC [X-Terra prep-RP18 10 um, 19x250 mm(waters), Mobile phase: solvent A: Water HPLC grade containing 0.01% TFA, and solvent B: acetonitrile containing 0.01% TFA, general eluting gradient - solvent B 15% to 80% over 15 to 25 minutes run time] purification, N-3 and N-9 alkylated products are isolated as a trifluoroacetate salt.

[00384] General Method of preparation of Intermediates

Intermediate 1

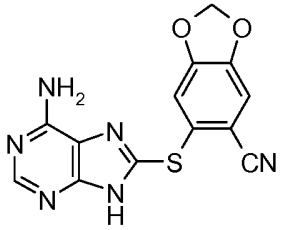
8-(6-Bromo-benzo[1,3]dioxol-5-ylsulfanyl)-9H-purin-6-ylamine

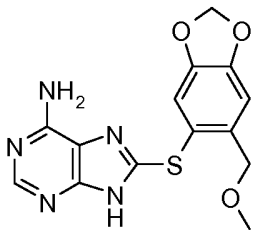
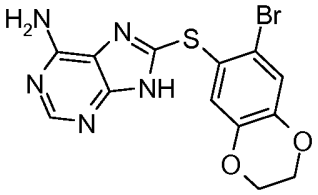
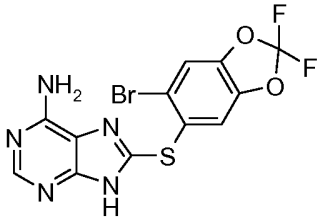
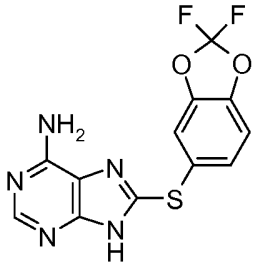
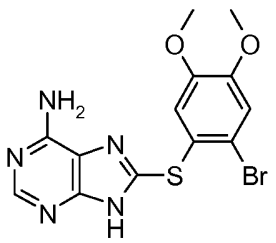
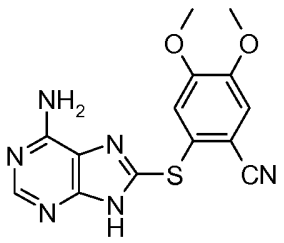


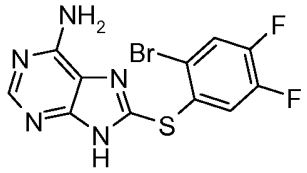
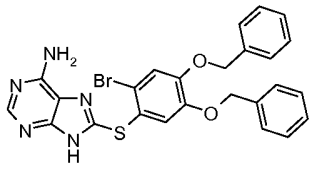
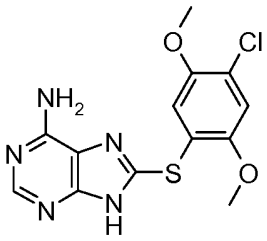
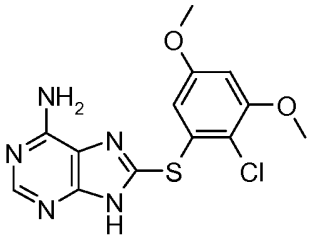
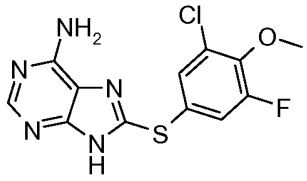
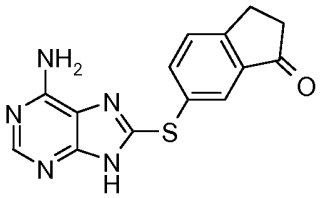
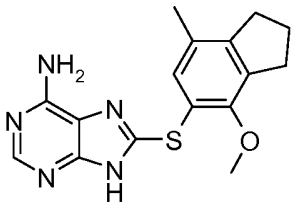
[00385] To 250 mL flask was charged with 8-mercaptoadenine (2.00 g, 11.98 mmol), 5, 6-dibromo-benzo-[1,3]dioxole (6.70 g, 24.0 mmol), Pd_2dba_3 (0.548 g, 0.599 mmol), Xantphos (0.693 g, 1.20 mmol), K_2CO_3 (3.31 g, 23.95 mmol), and dry dioxane (25 mL). The resulting mixture was heated at 100 °C for 16 h under nitrogen. After cooling, the reaction mixture was filtered and washed with a 2/2/0.5 mixture of CH_2Cl_2, EtOAc, and MeOH. The combined filtrates were concentrated in vacuo. The dark brown residue was purified by chromatography on SiO_2 (CH_2Cl_2/EtOAc/MeOH, 2/2/0/5) and subsequent recrystallization from MeOH provided the title compound (1.4 g, 32%). ^1H NMR (DMSO-d_6) δ 8.08 (s, 1H), 7.38 (s, 1H), 7.23 (s, 1H), 6.12 (s, 2H).

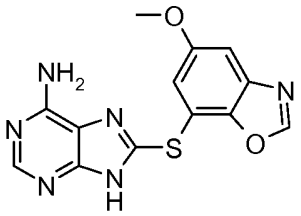
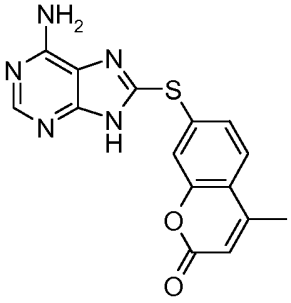
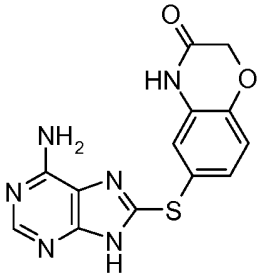
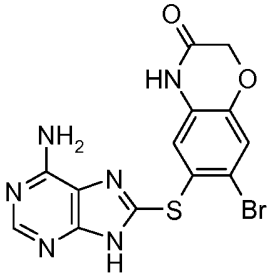
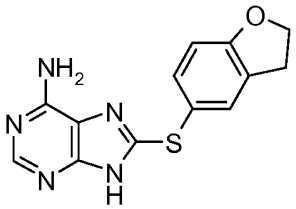
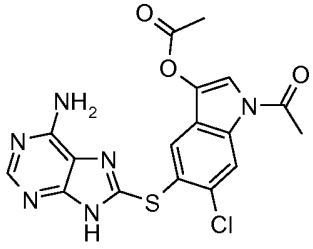
[00386] Intermediates 2-36 were prepared according to the procedure described for intermediate 1.

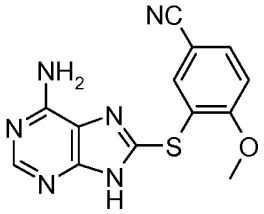
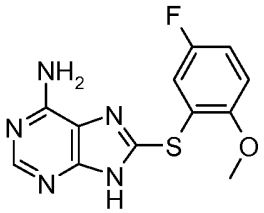
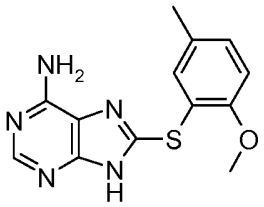
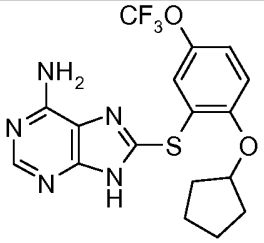
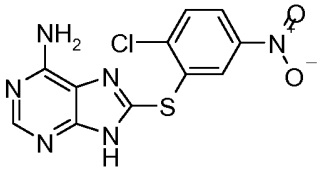
[00387] Table 1

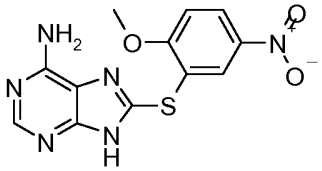
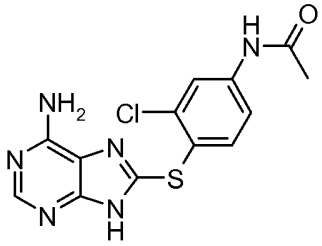
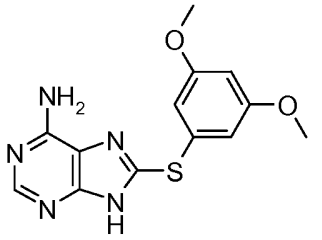
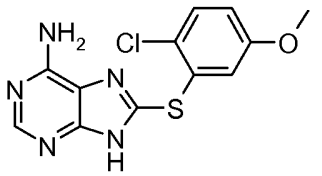
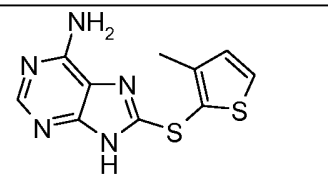
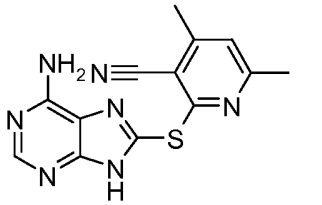
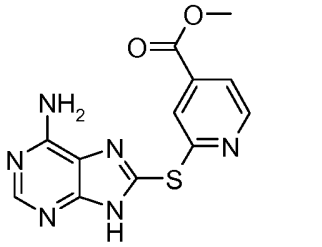
Intermediate	Structure	Name and analytical Data
2		056-[(6-Amino-9H-purin-8-yl)thio]-1,3-benzodioxole-5-carbonitrile. ^1H NMR (DMSO-d_6) δ 8.08 (s, 1H), 7.59 (s, 1H), 7.29 (s, 1H), 7.26-7.16 (brs, 2H), 6.23 (s, 2H); TOF-MS $[M+H]^+$ 315.

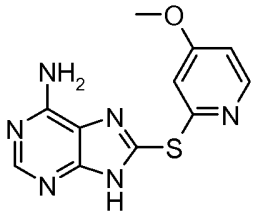
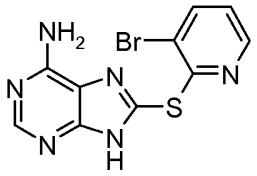
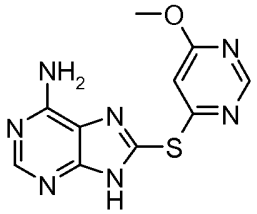
3		8-{[6-(Methoxymethyl)-1,3-benzodioxol-5-yl]thio}-9H-purin-6-amine.TOF-MS $[M+H]^+$ 332.08
4		8-[(7-Bromo-2,3-dihydro-1,4-benzodioxin-6-yl)thio]-9H-purin-6-amine. LC-MS $[M+H]^+$ 382.0
5		8-[(6-Bromo-2,2-difluoro-1,3-benzodioxol-5-yl)thio]-9H-purin-6-amine. LC-MS $[M+H]^+$ 403.9
6		8-[(2,2-Difluoro-1,3-benzodioxol-5-yl)thio]-9H-purin-6-amine.^{1}H NMR (DMSO-d_6) δ 8.08 (s, 1H), 7.70 (brs, 1H), 7.47 (m, 1H), 7.39 (m, 1H), 7.23 (brs, 2H); LC-MS $[M+H]^+$ 324.0
7		8-[(2-Bromo-4,5-dimethoxyphenyl)thio]-9H-purin-6-amine. ^{1}H NMR (CD3OD) δ 8.09 (s, 1H), 7.32 (s, 1H), 7.30 (s, 1H), 3.88 (s, 3H), 3.82 (s, 3H); LC-MS $[M+H]^+$ 382.0
8		2-[(6-Amino-9H-purin-8-yl)thio]-4,5-dimethoxybenzonitrile. TOF-MS $[M+H]^+$ 329.08

9		8-[(2-Bromo-4,5-difluorophenyl)thio]-9H-purin-6-amine. LC-MS $[M+H]^+$ 292.0
10		8-{[4,5-Bis(benzyloxy)-2-bromophenyl]thio}-9H-purin-6-amine. LC-MS $[M+H]^+$ 533.5
11		8-[(4-Chloro-2,5-dimethoxyphenyl)thio]-9H-purin-6-amine. LC-MS $[M+H]^+$ 338.1
12		8-[(2-Chloro-3,5-dimethoxyphenyl)thio]-9H-purin-6-amine. LC-MS $[M+H]^+$ 338.1
13		8-[(3-Chloro-5-fluoro-4-methoxyphenyl)thio]-9H-purin-6-amine. LC-MS $[M+H]^+$ 326.2
14		6-[(6-Amino-9H-purin-8-yl)thio]indan-1-one. LC-MS $[M+H]^+$ 298.0
15		8-[(4-Methoxy-7-methyl-2,3-dihydro-1H-inden-5-yl)thio]-9H-purin-6-amine. LC-MS $[M+H]^+$ 328.3

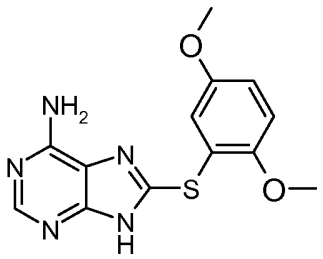
16		8-[(5-Methoxy-1,3-benzoxazol-7-yl)thio]-9H-purin-6-amine. LC-MS $[M+H]^+$ 315.0
17		7-[(6-Amino-9H-purin-8-yl)thio]-4-methyl-2H-chromen-2-one. LC-MS $[M+H]^+$ 326.0
18		6-[(6-Amino-9H-purin-8-yl)thio]-2H-1,4-benzoxazin-3(4H)-one. LC-MS $[M+H]^+$ 315.9
19		6-[(6-Amino-9H-purin-8-yl)thio]-7-bromo-2H-1,4-benzoxazin-3(4H)-one. TOF-MS $[M+H]^+$ 392.98
20		8-(2,3-Dihydro-1-benzofuran-5-ylthio)-9H-purin-6-amine. LC-MS $[M+H]^+$ 285.9
21		1-Acetyl-5-[(6-amino-9H-purin-8-yl)thio]-6-chloro-1H-indol-3-yl acetate. LC-MS [M+H]+ 416.0

22		3-[(6-Amino-9H-purin-8-yl)thio]-4-methoxybenzonitrile. ^{1}H NMR (DMSO-d_6) δ 8.10 (s, 1H), 7.83 (d, J = 8.8 Hz, 1H), 7.62 (brs, 1H), 7.31 (brs, 2H), 7.28 (d, J = 8.8 Hz, 2H), 3.91 (s, 1H); LC-MS $[M+H]^+$ 299.1
23		8-[(5-Fluoro-2-methoxyphenyl)thio]-9H-purin-6-amine. ^{1}H NMR (DMSO-d_6) δ 8.11 (s, 1H), 7.34 (brs, 2H), 7.17-7.11 (m, 2H), 6.89 (m, 1H), 3.82 (s, 3H); LC-MS $[M+H]^+$ 292.1
24		8-[(2-Methoxy-5-methylphenyl)thio]-9H-purin-6-amine. ^{1}H NMR (DMSO-d_6) δ 8.08 (s, 1H), 7.24 (brs, 2H), 7.11 (d, J = 8.4 Hz, 1H), 6.98 (d, J = 8.4 Hz, 1H), 6.91 (s, 1H), 3.77 (s, 3H), 2.17 (s, 3H); LC-MS $[M+H]^+$ 288.2
25		8-{[2-(Cyclopentyloxy)-5-(trifluoromethoxy)phenyl]thio}-9H-purin-6-amine. TOF-MS $[M+H]^+$ 412.11
26		8-[(2-Chloro-5-nitrophenyl)thio]-9H-purin-6-amine. LC-MS $[M+H]^+$ 323.2

27		8-[(2-Methoxy-5-nitrophenyl)thio]-9H-purin-6-amine. LC-MS $[M+H]^+$ 319.2
28		N-{4-[(6-Amino-9H-purin-8-yl)thio]-3-chlorophenyl}acetamide. LC-MS $[M+H]^+$ 335.0
29		8-[(3,5-Dimethoxyphenyl)thio]-9H-purin-6-amine. LC-MS $[M+H]^+$ 304.0
30		8-[(2-Chloro-5-methoxyphenyl)thio]-9H-purin-6-amine. LC-MS $[M+H]^+$ 308.0
31		8-[(3-Methyl-2-thienyl)thio]-9H-purin-6-amine. LC-MS $[M+H]^+$ 264.0
32		2-[(6-Amino-9H-purin-8-yl)thio]-4,6-dimethylnicotinonitrile. LC-MS $[M+H]^+$ 298.0
33		methyl 2-[(6-amino-9H-purin-8-yl)thio]isonicotinate. LC-MS $[M+H]^+$ 303.0

34		8-[(4-Methoxypyridin-2-yl)thio]-9H-purin-6-amine. LC-MS $[M+H]^+$ 275.0
35		8-[(3-Bromopyridin-2-yl)thio]-9H-purin-6-amine. LC-MS $[M+H]^+$ 323.1
36		8-[(6-Methoxypyrimidin-4-yl)thio]-9H-purin-6-amine. LC-MS $[M+H]^+$ 276.0

[00388] Intermediate 37



[00389] 8- (2, 5-dimethoxy-phenylsulfanyl)-9H-purin-6-ylamine

[00390] 8-(2, 5-Dimethoxy-phenylsulfonyl)-9H-purin-6-ylamine was prepared according to the know method (*J. Med. Chem.,* **2006,** 49, 817).

[00391] Intermediates 38-42 were prepared according to the known method (*J. Org. Chem.,* **2004**, 69, 3230

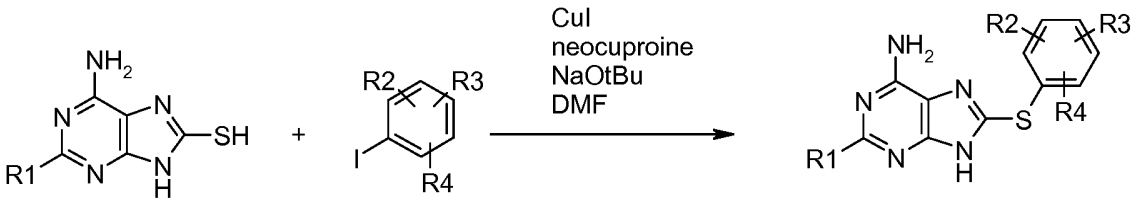
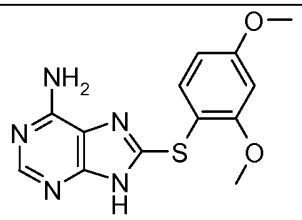
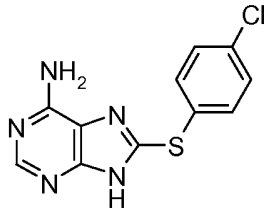
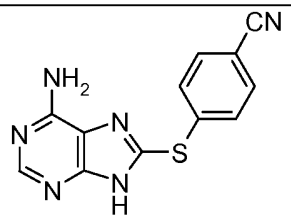
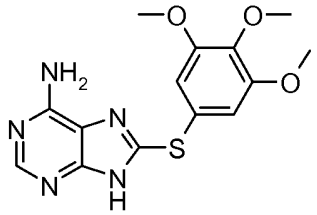
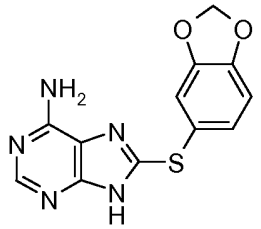
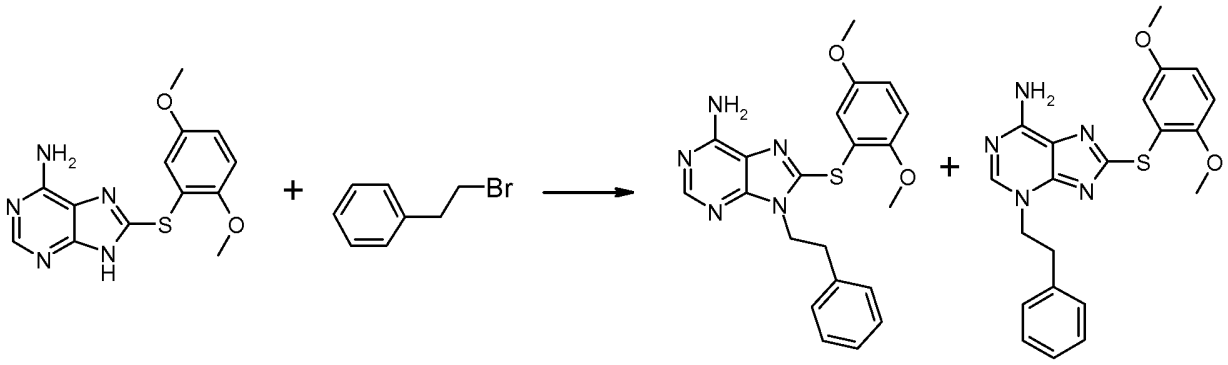


Table 2

Intermediate	Structure	Name and analytical Data
38		8-[(2,4-Dimethoxyphenyl)thio]-9H-purin-6-amine. LC-MS $[M+H]^+$ 304.1
39		8-[(4-Chlorophenyl)thio]-9H-purin-6-amine.LC-MS $[M+H]^+$ 278.13
40		4-[(6-Amino-9H-purin-8-yl)thio]benzonitrile.LC-MS $[M+H]^+$ 269.2
41		8-[(3,4,5-Trimethoxyphenyl)thio]-9H-purine-6-amine. LC-MS $[M+H]^+$ 334.1
42		8-(1,3-Benzodioxol-5-ylthio)-9H-purin-6-amine. LC-MS [M+H]+ 288.2

General alkylation procedure:

[00392] Examples 1 and 2

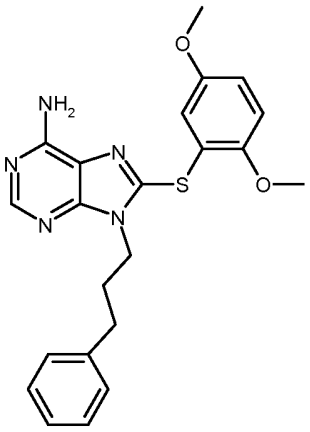


[00393] 8-(2, 5-Dimethoxy-phenylsulfanyl)-9-phenethyl-9H-purin-6-ylamine and 8-(2, 5-dimethoxy-phenylsulfanyl)-3-phenethyl-3H-purin-6-ylamine

[00394] A mixture of 8- (2, 5-dimethoxy-phenylsulfanyl)-9H-purin-6-ylamine (0.050 g, 0.165 mmol), (2-Bromo-ethyl)-benzene (0.032 g, 0.165 mmol), and Barton's base (3.00 mmol) in DMF (1.3 mL) was heated at 90-100 °C for 6-15 h. The reaction mixture was then allowed to reach ambient temperature. After removal of solvent under reduced pressure, the residue was purified by preparative HPLC and isolated via lyophilization to give the N-9 isomer and the N-3 isomer. 8-(2, 5-Dimethoxy-phenylsulfanyl)-9-phenethyl-9H-purin-6-ylamine: Yield 9.0%, ^{1}H NMR (DMSO-d_6) δ 8.18 (s, 1H), 7.43 (bs, 2H), 7.26 – 7.16 (m, 3H), 7.04 – 7.00 (m, 3H), 6.85 (dd, *J* = 8.8, 4.0 Hz, 1H), 6.45 (d, *J* = 2.8 Hz, 1H), 4.37 (t, *J* = 7.2 Hz, 2H), 3.74 (s, 3H), 3.60 (s, 3H), 2.97 (t, *J* = 7.2 Hz, 2H); LC-MS (MH^+) 408.1. 8-(2, 5-Dimethoxy-phenylsulfanyl)-3-phenethyl-3H-purin-6-ylamine: Yield 8.0%, ^{1}H NMR (DMSO-d_6) δ 7.71 (s, 1H), 7.29-7.12 (m, 5H), 6.90 (d, *J* = 8.8 Hz, 1H), 6.88 (d, *J* = 6.4 Hz, 1H), 6.68 (dd, *J* = 8.8, 2.8 Hz, 1H), 4.33 (t, *J* = 7.2 Hz, 2H), 3.77 (s, 3H), 3.58 (s, 3H), 3.15 (t, *J* = 7.2 Hz, 2H); LC-MS (MH^+) 408.1.

[00395] Examples 3 –223 listed below were prepared analogously to the procedure described for examples 1 and 2 and are isolated as a trifluoroacetate salts after preparative HPLC purification.

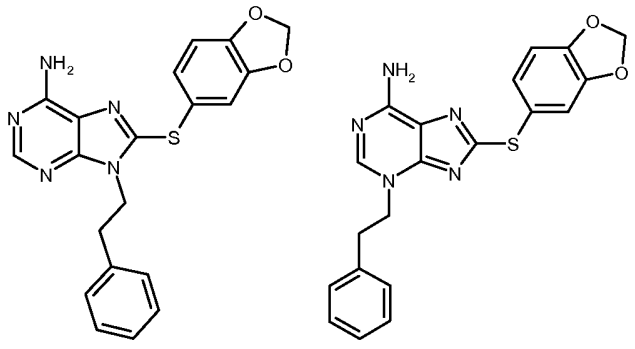
[00396] Example 3



[00397] The title compound was prepared from 8-(2, 5-dimethoxy-phenylsulfanyl)-9H-purin-6-ylamine and (3-bromo-propyl)-benzene by a procedure similar to examples 1 and 2.

[00398] 8-(2, 5-Dimethoxy-phenylsulfanyl)-9-(3-phenyl-propyl)-9H-purin-6-ylamine: Yield 21 %, ^{1}H NMR (DMSO-d_6) δ 8.17 (s, 1H), 7.45 (bs, 2H), 7.25 – 7.00 (m, 6H), 6.85 (dd, J = 8.8, 2.6, 1H), 6.74 (d, J = 2.8 Hz, 1H), 4.19 (t, J = 7.6 Hz, 2H), 3.75 (s, 3H), 3.59 (s, 3H), 2.60 (t, J = 7.6 Hz, 2H), 1.94 (m, 2H); LC-MS $[M+H]^+$ 422.1.

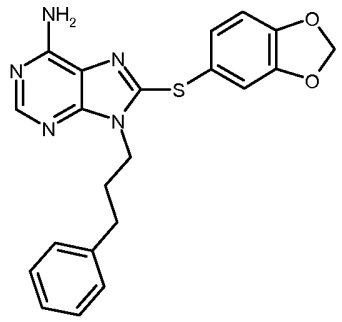
[00399] Examples 4 and 5



[00400] 8-(Benzo[1,3]dioxol-5-ylsulfanyl)-9-phenethyl-9H-purin-6-ylamine and 8-(benzo[1,3]dioxol-5-ylsulfanyl)-3-phenethyl-3H-purin-6-ylamine

[00401] The title compounds were prepared from 8-(benzo[1,3]dioxol-5-ylsulfanyl)-9H-purin-6-ylamine and (2-bromo-ethyl)-benzene by a procedure similar to examples 1 and 2. The isomers were separated by preparative HPLC. 8-(Benzo[1,3]dioxol-5-ylsulfanyl)-9-phenethyl-9H-purin-6-ylamine: Yield 31%, ^{1}H NMR (DMSO-d_6) δ 8.32 (s, 1H), 7.28 – 7.19 (m, 3H), 7.08-7.05 (m, 2H), 6.95 (m, 3H), 6.06 (s, 2H), 4.43 (t, J = 6.8 Hz, 2H), 3.02 (t, J = 6.8 Hz, 2H); LC-MS $[M+H]^+$ 392.1. 8-(Benzo[1,3]dioxol-5-ylsulfanyl)-3-phenethyl-3H-purin-6-ylamine. Yield 13%, ^{1}H NMR (DMSO-d_6) δ 8.35 (s, 1H), 8.17 (bs, 2H), 7.34 – 7.10 (m, 8H), 6.16 (s, 2H), 4.53 (t, J = 6.8 Hz, 2H), 3.16 (t, J = 6.8 Hz, 2H); LC-MS $[M+H]^+$ 392.1.

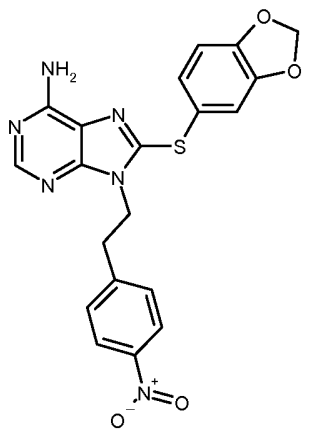
[00402] Example 6



[00403] 8-(Benzo[1,3]dioxol-5-ylsulfanyl)-9-(3-phenyl-propyl)-9H-purin-6-ylamine

[00404] The title compound was prepared from 8-(benzo[1,3]dioxol-5-ylsulfanyl)-9H-purin-6-ylamine and (3-bromo-propyl)-benzene by a procedure similar to example 1 and 2. 8-(Benzo[1,3]dioxol-5-ylsulfanyl)-9-(3-phenyl-propyl)-9H-purin-6-ylamine: ^{1}H NMR (DMSO-D_6) δ 8.37 (s, 1H), 7-29-7.11 (m, 5H), 7.05 (s, 1H), 6.96 (s, 2H), 7.07 (s, 2H), 4.21 (t, J = 7.4 Hz, 2H), 2.59 (t, J = 7.4 Hz, 2H), 1.97 (q, J = 8.4 Hz, 2H); LC-MS $[M+H]^+$ 406.13.

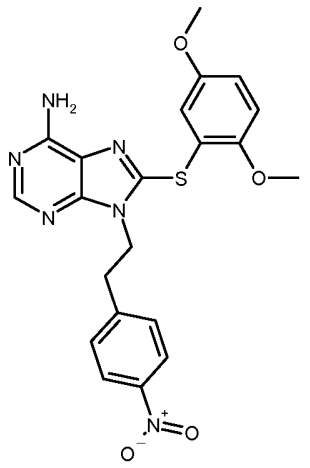
[00405] Example 7



[00406] 8-(Benzo[1,3]dioxol-5-ylsulfanyl)-9-[2-(4-nitro-phenyl)-ethyl]-9H-purin-6-ylamine

[00407] The title compound was prepared from 8-(benzo[1,3]dioxol-5-ylsulfanyl)-9H-purin-6-ylamine and 1-(2-bromo-ethyl)-4-nitro-benzene by a procedure similar to examples 1 and 2. 8-(Benzo[1,3]dioxol-5-ylsulfanyl)-9-[2(4-nitro-phenyl)-ethyl]-9H-purin-6-ylamine: Yield 43%, ^{1}H NMR (DMSO-d_6) δ 8.14 (s, 1H), 8.09 (d, J = 8.8 Hz, 2H), 7.38 (bs , 2H), 7.31 (d, J = 8.8 Hz, 2H), 6.88 -6.82 (m, 3H), 6.02 (s, 2H), 4.47 (t, J = 6.8 Hz, 2H), 3.20 (t, J = 6.8 Hz, 2H); LC-MS $[M+H]^+$ 437.1.

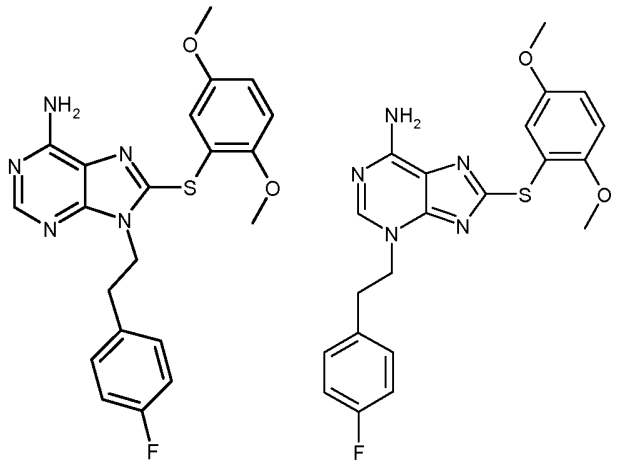
[00408] Example 8



[00409] 8-(2, 5-Dimethoxy-phenylsulfanyl)-9-[2-(4-nitro-phenyl)-ethyl]-9H-purin-6-ylamine

[00410] The title compound was prepared from 8-(2, 5-dimethoxy-phenylsulfanyl)-9H-purin-6-ylamine and 1-(2-bromo-ethyl)-4-nitro-benzene by a procedure similar to examples 1 and 2. The compound was purified by preparative HPLC. 8-(2, 5-Dimethoxy-phenylsulfanyl)-9-[2-(4-nitro-phenyl)-ethyl]-9H-purin-6-ylamine: Yield 35%, ^{1}H NMR (DMSO-d_6) δ 8.18 (s, 1H), 8.0 (d, J = 8.8 Hz, 2H), 7.46 (bs, 2H), 7.26 (d, J = 8.8 Hz, 2H), 6.96 (d, J = 9.2, 1H), 6.77 (dd, J = 8.8, 3.2 Hz, 1H), 6.27 (d, J = 3.2 Hz, 1H), 4.50 (t, J = 6.8 Hz, 2H), 3.75 (s, 3H), 3.56 (s, 3H), 3.22 (t, J = 6.8 Hz, 2H); LC –MS $[M+H]^+$ 453.5.

[00411] Examples 9 and 10

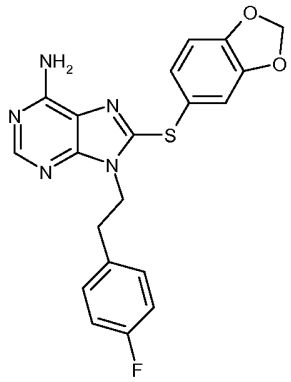


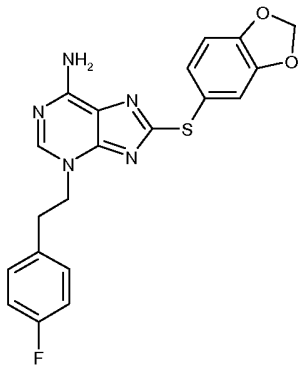
[00412] 8-(2, 5-Dimethoxy-phenylsulfanyl)-9-[2-(4-fluoro-phenyl)-ethyl]-9H-purin-6-ylamine and 8-(2, 5-dimethoxy-phenylsulfanyl)-3-[2-(4-fluoro-phenyl)-ethyl]-3H-purin-6-ylamine

[00413] The title compounds were prepared from 8-(2, 5-dimethoxy-phenylsulfanyl)-9H-purin-6-ylamine and 1-(2-bromo-ethyl)-4-fluoro-benzene by a procedure similar to examples 1 and 2. The isomers were separated by preparative HPLC. 8-(2, 5-Dimethoxy-phenylsulfanyl)-9-[2-(4-fluoro-phenyl)-ethyl]-9H-purin-

6-ylamine: Yield 20%, ^{1}H NMR (DMSO-d_6) δ 8.30 (s, 1H), 7.05-7.01 (m, 5H), 6.88 (dd, J = 8.8, 2.8 Hz, 1H), 6.56 (d, J = 2.8 Hz, 1H), 4.43 (t, J = 6.8 Hz, 2H), 3.73 (s, 3H), 3.62 (s, 3H), 3.02 (t, J = 6.8 Hz, 2H); LC-MS $[M+H]^+$ 426.1. 8-(2, 5-Dimethoxy-phenylsulfanyl)-3-[2-(4-fluoro-phenyl)-ethyl]-3H-purin-6-ylamine: Yield 17%, LC-MS $[M+H]^+$ 426.1.

[00414] Examples 11 and 12

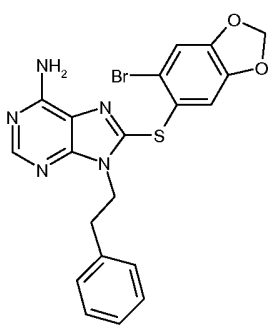


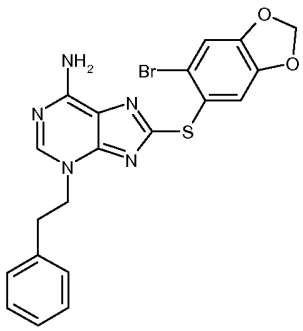


[00415] 8-(Benzo[1,3]dioxol-5-ylsulfanyl)-9-[2-(4-fluoro-phenyl)-ethyl]-9H-purin-6-ylamine and 8-(benzo[1,3]dioxol-5-ylsulfanyl)-3-[2-(4-fluoro-phenyl)-ethyl]-3H-purin-6-ylamine

[00416] The title compounds were prepared from 8-(benzo[1,3]dioxol-5-ylsulfanyl)-9H-purin-6-ylamine and 1-(2-bromo-ethyl)-4-fluoro-benzene by a procedure similar to examples 1 and 2. The isomers were separated by preparative HPLC. 8-(Benzo[1,3]dioxol-5-ylsulfanyl)-9-[2-(4-fluoro-phenyl)-ethyl]-9H-purin-6-ylamine: Yield 33%, ^{1}H NMR (DMSO-d_6) δ 8.27 (s, 1H), 8.10 (bs, 2H), 7.07 – 7.04 (m, 4H), 6.95-6.93 (m, 3H), 6.02 (s, 2H), 4.41(t, J = 6.8 Hz, 2H), 3.02 (t, J = 6.8 Hz, 2H); LC-MS $[M+H]^+$ 410.1. 8-(Benzo[1,3]dioxol-5-ylsulfanyl)-3-[2-(4-fluoro-phenyl)-ethyl]-3H-purin-6-ylamine: Yield 11%, ^{1}H NMR (DMSO-d_6) δ 8.35 (s, 1H), 8.23 (bs, 2H), 7.33-7.09 (m, 7H), 6.15 (s, 2H), 4.51 (t, J = 7.2 Hz, 2H), 3.15 (t, J = 7.2 Hz, 2H); LC-MS $[M+H]^+$ 410.1.

[00417] Examples 13 and 14

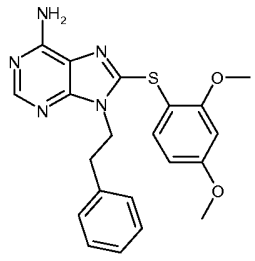


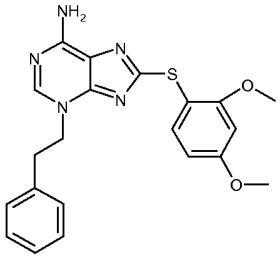


[00418] 8-(6-Bromo-benzo[1,3]dioxol-5-ylsulfanyl)-9-phenethyl-9H-purin-6-ylamine and 8-(6-bromo-benzo[1,3]dioxol-5-ylsulfanyl)-3-phenethyl-3H-purin-6-ylamine

[00419] The title compounds were prepared from 8-(6-bromo-benzo[1,3]dioxol-5-ylsulfanyl)-9H-purin-6-ylamine and (2-bromo-ethyl)-benzene by a procedure similar to examples 1 and 2. The isomers were separated by preparative HPLC. 8-(6-Bromo-benzo[1,3]dioxol-5-ylsulfanyl)-9-phenethyl-9H-purin-6-ylamine: Yield 38%, ^{1}H NMR (DMSO-d_6) δ 8.31 (s, 1H), 7.37 (s, 1H), 7.26 – 7.18 (m, 3H), 7.09-7.06 (m, 2H), 6.75 (s, 1H), 6.09 (s, 2H), 4.42 (t, J = 7.2 Hz, 2H), 3.05 (t, J = 7.2 Hz, 2H); LC-MS $[M+H]^+$ 472.0. 8-(6-Bromo-benzo[1,3]dioxol-5-ylsulfanyl)-3-phenethyl-3H-purin-6-ylamine: Yield 25%, ^{1}H NMR (DMSO-d_6) δ 8.33 (s, 1H), 7.52 (s, 1H), 7.41 (s, 1H), 7.30-7.12 (m, 5H), 6.18 (s, 2H), 4.52 (t, J = 6.8 Hz, 2H), 3.17 (t, J = 6.8 Hz, 2H); LC-MS $[M+H]^+$ 472.0.

[00420] Examples 15 and 16

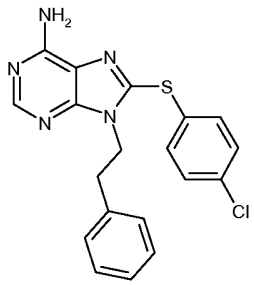


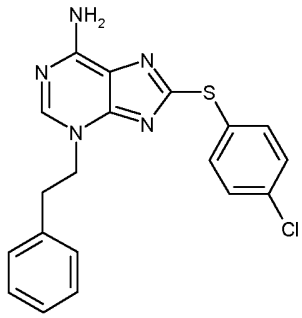


[00421] 8-(2,4-Dimethoxy-phenylsulfanyl)-9-phenethyl-9H-purin-6-ylamine and 8-(2,4-dimethoxy-phenylsulfanyl)-3-phenethyl-3H-purin-6-ylamine

[00422] The title compounds were prepared from 8-(2, 4-dimethoxy-phenylsulfanyl)-9H-purin-6-ylamine and (2-bromo-ethyl)-benzene by a procedure similar to examples 1 and 2. The isomers were separated by preparative HPLC. 8-(2, 4-Dimethoxy-phenylsulfanyl)-9-phenethyl-9H-purin-6-ylamine: Yield 29 %, ^{1}H NMR (DMSO-d_6) δ 8.23 (s, 1H), 7.82 (bs, 2H), 7.29-7.18 (m, 4H), 7.09 (dd, J = 8.4, 1.6 Hz, 2H), 6.65 (d, J = 2.4 Hz, 1H), 6.55 (dd, J = 8.8, 2.8, 1H), 4.42 (t, J = 7.2 Hz, 2H), 3.77 (s, 3H), 3.74 (s, 3H), 3.01 (t, J = 7.2 Hz, 2H); LC-MS $[M+H]^+$ 408.1. 8-(2, 4-Dimethoxy-phenylsulfanyl)-3-phenethyl-3H-purin-6-ylamine: Yield 15 %, ^{1}H NMR (DMSO-d_6) δ 7.62 (bs, 1H), 7.31-7.23 (m, 4H), 7.16-7.12 (m, 2H), 6.83 (bs, 1H), 6.73 (bs, 1H), 4.52 (t, J = 7.2 Hz, 2H), 3.86 (s, 3H), 3.81 (s, 3H), 3.16 (t, J = 7.2 Hz, 2H), LC-MS $[M+H]^+$ 408.1.

[00423] Examples 17 and 18



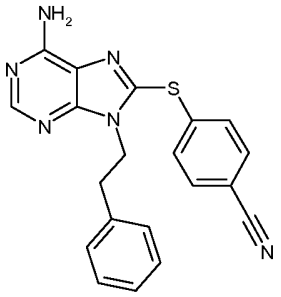


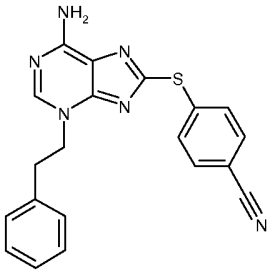
[00424] 8-(4-Chloro-phenylsulfonyl)-9-phenethyl-9H-purin-6-ylamine and 8-(4-chloro-phenylsulfanyl)-3-phenethyl-3H-purin-6-ylamine

[00425] The title compounds were prepared from 8-(4-chloro-phenylsulfanyl)-9H-purin-6-ylamine and (2-bromo-ethyl)-benzene by a procedure similar to examples 1 and 2. The isomers were separated by preparative HPLC. 8-

(4-Chloro-phenylsulfonyl)-9-phenethyl-9H-purin-6-ylamine: Yield 45 %, ^{1}H NMR (DMSO-d_6) δ 8.22 (s, 1H), 7.64 (bs, 2H), 7.44-7.40 (m, 2H), 7.32-7.17 (m, 5H), 7.03 (dd, J = 8.0, 1.6 Hz, 2H), 4.38 (t, J = 7.2 Hz, 2H), 3.01 (t, J = 7.2 Hz, 2H); LC-MS $[M+H]^+$ 382.0. 8-(4-Chloro-phenylsulfanyl)-3-phenethyl-3H-purin-6-ylamine: Yield 28 %, ^{1}H NMR (DMSO-d_6) δ 8.17 (s, 1H), 8.10 (bs, 2H), 7.60 (d, J = 8.4 Hz, 2H), 7.49 (d, J = 8.8 Hz, 2H), 7.28-7.22 (m, 3H), 7.12 (dd, J = 8.4, 1.6 Hz, 2H), 4.49 (t, J = 6.8 Hz, 2H), 3.16 (t, J = 6.8 Hz, 2H); LC-MS $[M+H]^+$ 382.0.

[00426] Examples 19 and 20



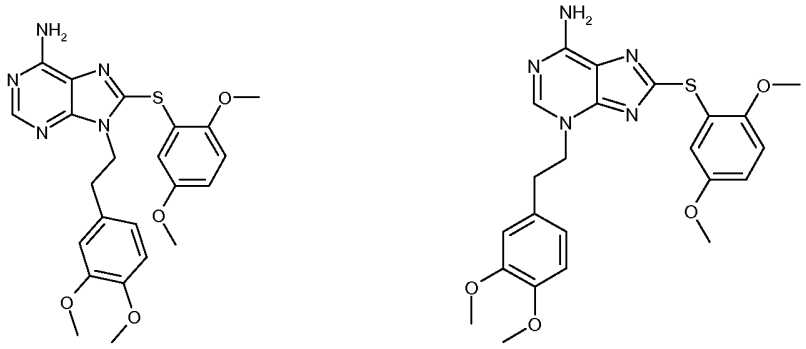


[00427] 4-(6-Amino-9-phenethyl-9H-purin-8-ylsulfanyl)-benzonitrile and 4-(6-amino-3-phenethyl-3H-purin-8-ylsulfanyl)-benzonitrile

[00428] The title compounds were prepared from 4-(6-amino-9H-ylsulfanyl)-benzonitrile and (2-bromo-ethyl)-benzene by a procedure similar to examples 1 and 2. The isomers were separated by preparative HPLC. 4-(6-Amino-9-phenethyl-9H-purin-8-ylsulfanyl)-benzonitrile: Yield 22 %, ^{1}H NMR (DMSO-d_6) δ 8.32 (s, 1H), 7.77 (dd, J = 6.8, 2.0 Hz, 2H), 7.33 (dd, J = 6.4, 2.0 Hz, 2H), 7.24 – 7.16 (m 3H), 7.01 (dd, J = 8.0, 2.0 Hz, 2H), 4.42 (t, J = 7.2 Hz, 2H), 3.04 (t, J = 7.2 Hz, 2H); LC-MS $[M+H]^+$ 373.0. 4-(6-Amino-3-phenethyl-3H-purin-8-ylsulfanyl)-benzonitrile: Yield, 16 %, ^{1}H NMR (DMSO-d_6) δ 8.47 (bs, 1H), 8.31 (bs, 1H), 8.25

(s, 1H), 7.85 (dd, J = 8.4, 1.6 Hz, 2H), 7.68 (d, J = 8.4 Hz, 2H), 7.30- 7.20 (m, 3H), 7.13 (dd, J = 8.4, 1.6 Hz, 2H), 4.52 (t, J = 7.2 Hz, 2H), 3.18 (t, J = 7.2 Hz, 2H); LC-MS $[M+H]^+$ 373.0.

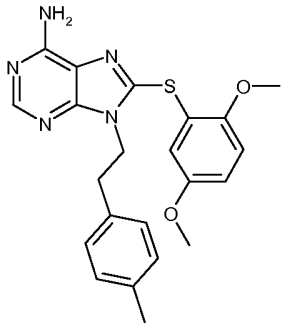
[00429] Examples 21 and 22

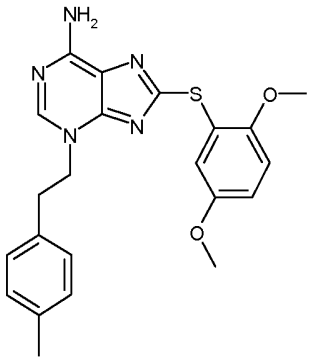


[00430] 9-[2-(3, 4-Dimethoxy-phenyl)-ethyl]-8-(2, 5-dimethoxy-phenylsulfanyl)-9H-purin-6-ylamine and 3-[2-(3, 4-dimethoxy-phenyl)-ethyl]-8-(2, 5-dimethoxy-phenylsulfanyl)-3H-purin-6-ylamine

[00431] The title compounds were prepared from 8-(2, 5-dimethoxy-phenylsulfanyl)-9H-purin-6-ylamine and 4-(2-bromo-ethyl)-1, 2-dimethoxy-benzene by a procedure similar to examples 1 and 2. The isomers were separated by preparative HPLC. 9-[2-(3, 4-Dimethoxy-phenyl)-ethyl]-8-(2, 5-dimethoxy-phenylsulfanyl)-9H-purin-6-ylamine: Yield 52 %, ^{1}H NMR (DMSO-d_6) δ 8.29 (s, 1H), 7.02 (d, J = 8.8 Hz, 1H), 6.87 (dd, J = 9.2, 2.8 Hz, 1H), 6.77 (d, J = 8.4 Hz, 1H), 6.58 (d, J = 1.6 Hz, 1H), 6.54 (d, J = 3.2 Hz, 1H), 6.49 (dd, J = 8.0, 2.4 Hz, 1H), 4.41 (t, J = 7.2 Hz, 2H), 3.73 (s, 3H), 3.68 (s, 3H), 3.64 (s, 3H), 3.61 (s, 3H), 2.94 (t, J = 7.2 Hz, 2H); LC-MS $[M+H]^+$ 468.2. 3-[2-(3, 4-Dimethoxy-phenyl)-ethyl]-8-(2, 5-dimethoxy-phenylsulfanyl)-3H-purin-6-ylamine. Yield 26 %, ^{1}H NMR (DMSO-d_6) δ 8.25 (s, 1H), 8.15 (bs, 2H), 6.82 (d, J = 8.4 Hz, 2H), 6.73 (bs, 2H), 6.58 (d, J = 6.4 Hz, 2H), 4.52 (t, J = 6.4 Hz, 2H), 3.77 (s, 3H), 3.71 (s, 3H), 3.70 (s, 3H), 3.68 (s, 3H), 3.09 (t, J = 6.4 Hz, 2H); LC-MS $[M+H]^+$ 468.1

[00432] Examples 23 and 24

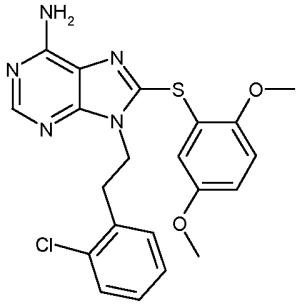


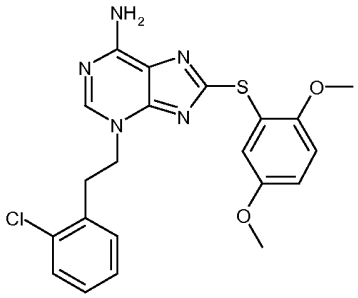


[00433] 8-(2, 5-Dimethoxy-phenylsulfanyl)-9-(2-p-tolyl-ethyl)-9H-purin-6-ylamine and 8-(2,5-dimethoxy-phenylsulfanyl)-3-(2-p-tolyl-ethyl)-3H-purin-6-ylamine

[00434] The title compounds were prepared from 8-(2, 5-dimethoxy-phenylsulfanyl)-9H-purin-6-ylamine and 1-(2-bromo-ethyl)-4-methyl-benzene by a procedure similar to examples 1and 2. The isomers were separated by preparative HPLC. 8-(2, 5-Dimethoxy-phenylsulfanyl)-9-(2-p-tolyl-ethyl)-9H-purin-6-ylamine: Yield 37 %, ^{1}H NMR (DMSO-d_6) δ 8.24 (s, 1H), 7.77 (bs, 2H), 7.03 (m, 3H), 6.92 (d, J = 8.0 Hz, 2H), 6.86 (dd, J = 8.8, 3.2 Hz, 1H), 6.50 (d, J = 2.8 Hz, 1H), 4.36 (t, J = 7.2 Hz, 2H), 3.74 (s, 3H), 3.60 (s, 3H), 2.94 (t, J = 7.2 Hz, 2H), 2.23 (s, 3H); LC-MS $[M+H]^+$ 422.1. 8-(2,5-Dimethoxy-phenylsulfanyl)-3-(2-p-tolyl-ethyl)-3H-purin-6-ylamine: Yield 28 %, ^{1}H NMR (DMSO-d_6) δ 8.84 (s, 1H), 8.34 (s, 1H), 8.20 (bs, 2H), 7.25- 6.99 (m, 7H), 4.50 (t, J = 7.2 Hz, 2H), 3.76 (s, 3H), 3.73 (s, 3H), 3.12 (t, J = 7.2 Hz, 2H) 2.25 (s, 3H); LC-MS $[M+H]^+$ 422.1.

[00435] Examples 25 and 26

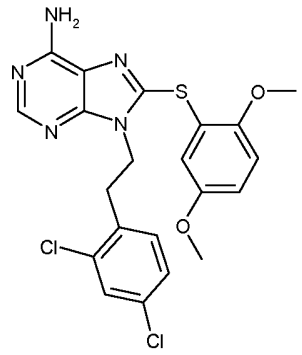


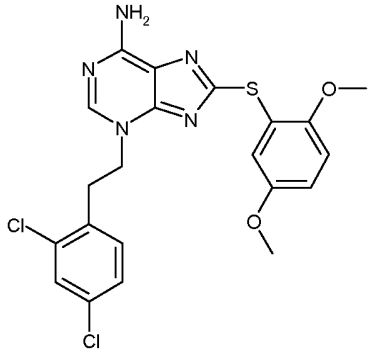


[00436] 9-[2-(2-Chloro-phenyl)-ethyl]-8-(2, 5-dimethoxy-phenylsulfanyl)-9H-purin-6-ylamine and 3-[2-(2-chloro-phenyl)-ethyl]-8-(2, 5-dimethoxy-phenylsulfanyl)-3H-purin-6-ylamine

[00437] The title compounds were prepared from 8-(2, 5-dimethoxy-phenylsulfanyl)-9H-purin-6-ylamine and 1-(2-bromo-ethyl)-2-chloro-benzene by a procedure similar to examples 1 and 2. The isomers were separated by preparative HPLC. 9-[2-(2-Chloro-phenyl)-ethyl]-8-(2, 5-dimethoxy-phenylsulfanyl)-9H-purin-6-ylamine: Yield 18 %, ^{1}H NMR (DMSO-d_6) δ 8.23 (s, 1H), 7.82 (bs, 2H), 7.36 (dd, J = 8.0, 1.2 Hz, 1H), 7.24-7.15 (m, 2H), 7.03-6.99 (m, 2H), 6.85 (dd, J = 9.2, 3.2 Hz, 1H), 6.47 (d, J = 2.8 Hz, 1H), 4.46 (t, J = 7.2 Hz, 2H), 3.73 (s, 3H), 3.61 (s, 3H), 3.16 (t, J = 7.2 Hz, 2H); LC-MS $[M+H]^+$ 442.1. 3-[2-(2-Chloro-phenyl)-ethyl]-8-(2, 5-dimethoxy-phenylsulfanyl)-3H-purin-6-ylamine: Yield, 11 %, ^{1}H NMR (DMSO-d_6) δ 8.34 (s, 1H), 8.16 (bs, 1H), 7.41 (m, 1H), 7.29-7.11 (m, 6H), 4.56 (t, J = 6.8 Hz, 2H), 3.76 (s, 3H), 3.72 (s, 3H), 3.30 (t, J = 6.8 Hz, 2H), LC-MS $[M+H]^+$ 442.1.

[00438] Examples 27 and 28

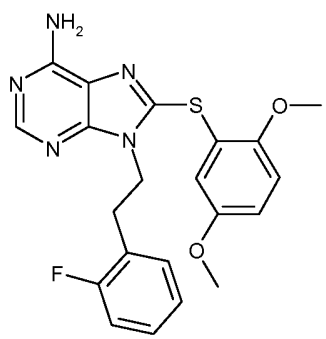


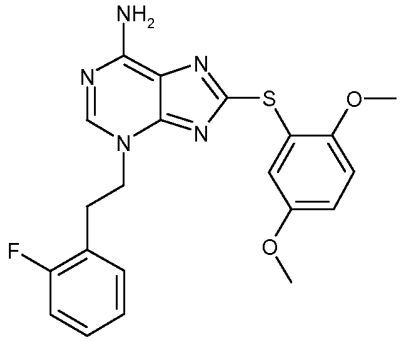


[00439] 9-[2-(2, 4-Dichloro-phenyl)-ethyl]-8-(2, 5-dimethoxy-phenylsulfanyl)-9H-purin-6-ylamine and 3-[2-(2, 4-dichloro-phenyl)-ethyl]-8-(2, 5-dimethoxy-phenyl-sulfanyl)-3H-purin-6-ylamine

[00440] The title compounds were prepared from 8-(2, 5-dimethoxy-phenylsulfanyl)-9H-purin-6-ylamine and 1-(2-bromo-ethyl)-2, 4-dichloro-benzene by a procedure similar to examples 1 and 2. The isomers were separated by preparative HPLC. 9-[2-(2, 4-Dichloro-phenyl)-ethyl]-8-(2, 5-dimethoxy-phenylsulfanyl)-9H-purin-6-ylamine: Yield 41 %, ^{1}H NMR (DMSO-d_6) δ 8.28 (s, 1H), 7.50 (d, J = 2.8 Hz, 1H), 7.25 (dd, J = 8.4, 2.0 Hz, 1H), 7.05 (d, J = 8.4 Hz, 1H), 7.01 (d, J = 9.2 Hz, 1H), 6.86 (dd, J = 9.2, 2.8 Hz, 1H), 6.52 (d, J = 2.8 Hz, 1H), 4.48 (t, J = 6.8 Hz, 2H), 3.73 (s, 3H), 3.62 (s, 3H), 3.17 (t, J = 6.8 Hz, 2H); LC-MS $[M+H]^+$ 476.1. 3-[2-(2, 4-Dichloro-phenyl)-ethyl]-8-(2, 5-dimethoxy-phenyl-sulfanyl)-3H-purin-6-ylamine: Yield 13 %, ^{1}H NMR (DMSO-d_6) δ 8.37 (s, 1H), 8.15 (bs, 2H), 7.58 (d, J = 2.0 Hz, 1H), 7.36 (dd, J = 8.4, 2.0 Hz, 1H), 7.26 (d, J = 8.0 Hz, 1H), 7.22-7.09 (m, 3H), 4.54 (t, J = 6.8 Hz, 2H), 3.76 (s, 3H), 3.73 (s, 3H), 3.29 (t, J = 6.8 Hz, 2H); LC-MS $[M+H]^+$ 476.1.

[00441] Examples 29 and 30

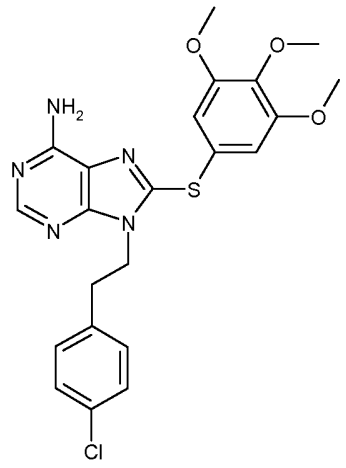


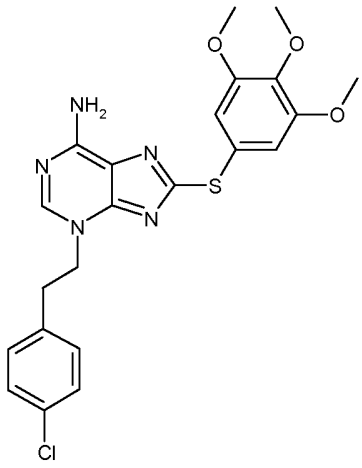


[00442] 8-(2, 5-Dimethoxy-phenylsulfanyl)-9-[2-(2-fluoro-phenyl)-ethyl]-9H-purin-6-ylamine and 8-(2, 5-dimethoxy-phenylsulfanyl)-3-[2-(2-fluoro-phenyl)-ethyl]-3H-purin-6-ylamine

[00443] The title compounds were prepared from 8-(2, 5-dimethoxy-phenylsulfanyl)-9H-purin-6-ylamine and 1-(2-bromo-ethyl)-2-fluoro-benzene by a procedure similar to examples 1 and 2. The isomers were separated by preparative HPLC. 8-(2, 5-Dimethoxy-phenylsulfanyl)-9-[2-(2-fluoro-phenyl)-ethyl]-9H-purin-6-ylamine: Yield 37 %, ^{1}H NMR (DMSO-d_6) δ 8.27 (s, 1H), 7.28-7.22 (m, 1H), 7.12-7.00 (m, 4H), 6.87 (dd, J = 8.8, 3.2 Hz, 1H), 6.55 (d, J = 3.2 Hz, 1H), 4.45 (t, J = 6.8, Hz, 2H), 3.72 (s, 3H), 3.62 (s, 3H), 3.08 (t, J = 6.8, 2H); LC-MS $[M+H]^+$ 426.1. 8-(2, 5-Dimethoxy-phenylsulfanyl)-3-[2-(2-fluoro-phenyl)-ethyl]-3H-purin-6-ylamine: Yield, 18 %, ^{1}H NMR (DMSO-d_6) δ 8.37 (s, 1H), 8.19 (bs, 2H), 7.33-7.08 (m, 7H), 4.55 (t, J = 7.2 Hz, 2H), 3.76 (s, 3H), 3.73 (s, 3H), 3.23 (t, J = 7.2 Hz, 2H); LC-MS $[M+H]^+$ 426.1.

[00444] Examples 31 and 32

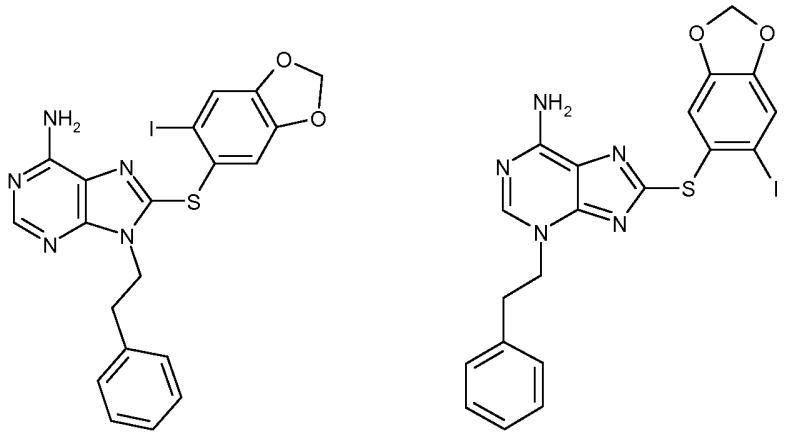




[00445] 9-[2-(4-Chloro-phenyl)-ethyl]-8-(3, 4, 5-trimethoxy-phenylsulfanyl)-9H-purin-6-ylamine and 3-[2-(4-chloro-phenyl)-ethyl]-8-(3, 4, 5-trimethoxy-phenylsulfanyl)-3H-purin-6-ylamine

[00446] The title compounds were prepared from 8-(3, 4, 5-trimethoxy-phenylsulfanyl)-9H-purin-6-ylamine and 1-(2-bromo-ethyl)-4-chloro-benzene by a procedure similar to examples 1 and 2. The isomers were separated by preparative HPLC. 9-[2-(4-Chloro-phenyl)-ethyl]-8-(3, 4, 5-trimethoxy-phenylsulfanyl)-9H-purin-6-ylamine: Yield 7 %, ^{1}H NMR (DMSO-d_6) δ 8.21 (s, 1H), 7.29 (br d, J = 8.8 Hz, 2H), 7.05 (br d, J = 8.8 Hz, 2H), 6.71 (s, 2H), 4.41 (t, J = 7.6 Hz, 2H), 3.71 (s, 6H), 3.63 (s, 3H), 2.99 (t, J = 7.6 Hz, 2H); LC-MS $[M+H]^+$ 472.0. 3-[2-(4-Chloro-phenyl)-ethyl]-8-(3, 4, 5-trimethoxy-phenylsulfanyl)-3H-purin-6-ylamine: Yield 7 %, ^{1}H NMR (DMSO-d_6) δ 8.19 (s, 1H), 7.29-7.26 (m, 2H), 7.13-7.10 (m, 4H), 4.60 (t, J = 6.8 Hz, 2H), 3.88 (s, 6H), 3.86 (s, 3H) 3.23 (t, J = 6.8 Hz, 2H); LC-MS $[M+H]^+$ 472.1.

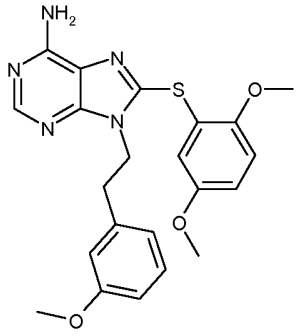
[00447] Examples 33 and 34

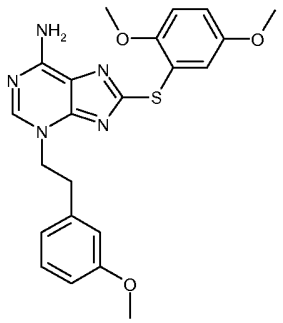


[00448] 8-(-6-Iodo-benzo[1,3]dioxol-5-ylsulfanyl)-9-phenethyl-9H-purin-6-ylamine and 8-(6-iodo-benzo[1,3]dioxol-5-ylsulfanyl)-3-phenethyl-3H-purin-6-ylamine

[00449] The title compounds were prepared from 8-(6-iodo-benzo[1,3]dioxol-5-ylsulfanyl)-9H-purin-6-ylamine and (2-bromo-ethyl)-benzene by a procedure similar to examples 1 and 2. The isomers were separated by preparative HPLC. 8-(-6-Iodo-benzo[1,3]dioxol-5-ylsulfanyl)-9-phenethyl-9H-purin-6-ylamine: Yield 11 %, ^{1}H NMR (DMSO-d_6) δ 8.31 (s, 1H), 7.49 (s, 1H), 7.27-7.19 (m, 3H), 7.10-7.09 (m, 2H), 6.74 (s, 1H), 6.07 (s, 2H), 4.41 (t, J = 7.2 Hz, 2H), 3.04 (t, J = 7.2 Hz, 2 H); LC-MS $[M+H]^+$ 518.0. 8-(6-Iodo-benzo[1,3]dioxol-5-ylsulfanyl)-3-phenethyl-3H-purin-6-ylamine: Yield 6 %, ^{1}H NMR (CD_3OD) δ 8.06 (s, 1H), 7.56 (s, 1H), 7.38 (s, 1H), 7.29-7.18 (m, 3H), 7.11-7.08 (m, 2H), 6.13 (s, 2H), 4.59 (t, J = 7.2 Hz, 2H), 3.22 (t, J = 7.2 Hz, 2H); LC-MS $[M+H]^+$ 518.0.

[00450] Examples 35 and 36

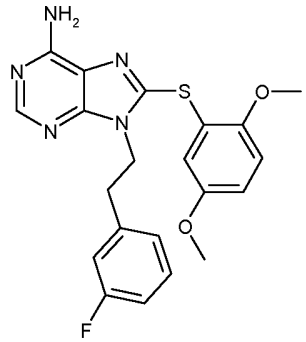


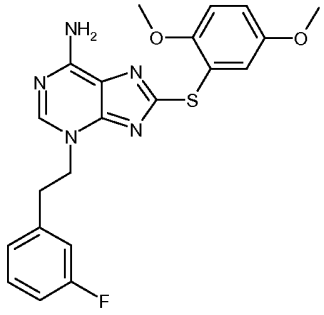


[00451] 8-(2, 5-Dimethoxy-phenylsulfanyl)-9-[2-(3-methoxy-phenyl)-ethyl]-9H-purin-6-ylamine and 8-(2, 5-dimethoxy-phenylsulfanyl)-3-[2-(3-methoxy-phenyl)-ethyl]-3H-purin-6-ylamine

[00452] The title compounds were prepared from 8-(2, 5-dimethoxy-phenylsulfanyl)-9H-purin-6-ylamine and 1-(2-bromo-ethyl)-3-methoxy-benzene by a procedure similar to examples 1 and 2. The isomers were separated by preparative HPLC. 8-(2, 5-Dimethoxy-phenylsulfanyl)-9-[2-(3-methoxy-phenyl)-ethyl]-9H-purin-6-ylamine: Yield 27%, ^{1}H NMR (DMSO-d_6) δ 8.24 (s, 1H), 7.13 (t, J = 8.0 Hz, 1H), 7.01 (d, J = 6.8 Hz, 1H), 6.86 (dd, J = 8.8, 3.2 Hz, 1H), 6.75 (m, 1H), 6.60-6.51 (m, 2H), 6.50 (d, J = 3.2 Hz, 1H), 4.40 (t, J = 7.2 Hz, 2H), 3.74 (s, 3H), 3.67 (s, 3H), 3.60 (s, 3H), 2.96 (t, J = 7.2 Hz, 2H); LC-MS $[M+H]^+$ 438.1. 8-(2, 5-Dimethoxy-phenylsulfanyl)-3-[2-(3-methoxy-phenyl)-ethyl]-3H-purin-6-ylamine: Yield 15 %, ^{1}H NMR (DMSO-d_6) δ 8.32 (bs, 1H), 7.24-7.09 (m, 4H), 6.79 (d, J= 8.0 Hz, 1H), 6.72 (bs, 1H), 6.67 (d, J= 7.6 Hz, 1H), 4.53 (t, J= 7.2 Hz, 2H), 3.77 (s, 3H), 3.71 (s, 3H), 3.70 (s, 3H), 3.15 (t, J= 7.2 Hz, 2H); LC-MS $[M+H]^+$ 438.1.

[00453] Examples 37 and 38

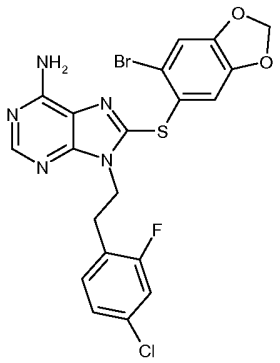


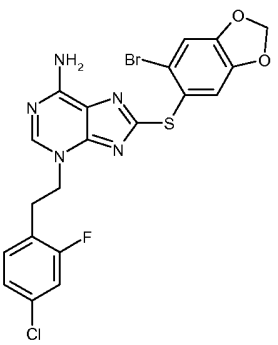


[00454] 8-(2, 5-Dimethoxy-phenylsulfanyl)-9-[2-(3-fluoro-phenyl)-ethyl]-9H-purin-6-ylamine and 8-(2, 5-dimethoxy-phenylsulfanyl)-3-[2-(3-fluoro-phenyl)-ethyl]-3H-purin-6-ylamine

[00455] The title compounds were prepared from 8-(2, 5-dimethoxy-phenylsulfanyl)-9H-purin-6-ylamine and 1-(2-bromo-ethyl)-3-fluoro-benzene by a procedure similar to examples 1 and 2. The isomers were separated by preparative HPLC. 8-(2, 5-Dimethoxy-phenylsulfanyl)-9-[2-(3-fluoro-phenyl)-ethyl]-9H-purin-6-ylamine: Yield 19%, ^{1}H NMR (DMSO-d_6) δ 8.23 (s, 1H), 7.82 (bs, 2H), 7.24 (dd, J = 6.0, 2.0 Hz 1H), 7.03-6.97 (m, 2H), 6.90- 6.85 (m, 2H), 6.82 (d, J = 7.2 Hz, 1H), 6.51 (d, J = 2.8 Hz, 1H), 4.43 (t, J = 7.2 Hz, 2H), 3.74 (s, 3H), 3.61 (s, 3H), 3.03 (t, J = 7.2 Hz, 2H); LC-MS $[M+H]^+$ 426.1. 8-(2,5-Dimethoxy-phenylsulfanyl)-3-[2-(3-fluoro-phenyl)-ethyl]-3H-purin-6-ylamine: Yield 9%, ^{1}H NMR (DMSO-d_6) δ 8.35 (s, 1H), 8.11 (bs, 2H), 7.31 (q, J =8.0 Hz, 1H), 7.23-7.01 (m, 5H), 6.94 (d, J = 7.2 Hz, 1H), 4.55 (t, J = 7.2 Hz, 2H), 3.77 (s, 3H), 3.72 (s, 3H), 3.20 (t, J = 7.2 Hz, 2H); LC-MS $[M+H]^+$ 426.1.

[00456] Examples 39 and 40

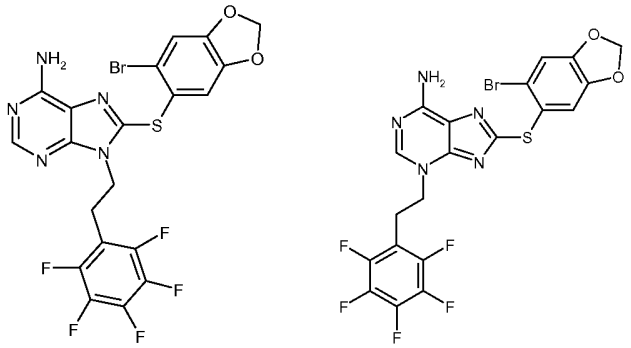




[00457] 8-(6-Bromo-benzo[1,3]dioxol-5-ylsulfanyl)-9-[2-(4chloro-2-fluorophenyl)-ethyl]-9H-purin-6-ylamine and 8-(6-bromo-benzo[1,3]dioxol-5-ylsulfanyl)-3-[2-(4chloro-2-fluoro-phenyl)-ethyl]-3H-purin-6-ylamine

[00458] The title compounds were prepared from 8-(6-bromo-benzo[1,3]dioxol-5-ylsulfanyl)-9H-purin-6-ylamine and 1-(2-bromo-ethyl)-4-chloro-2-fluoro-benzene by a procedure similar to examples 1 and 2. The isomers were separated by preparative HPLC. 8-(6-Bromo-benzo[1,3]dioxol-5-ylsulfanyl)-9-[2-(4chloro-2-fluorophenyl)-ethyl]-9H-purin-6-ylamine: Yield 20%, ^{1}H NMR (DMSO-d_6) δ 8.24 (s, 1H), 7.36 (s, 1H), 7.31-7.27 (m, 1H), 7.16-7.04 (m, 2H), 6.72 (s, 1H), 6.10 (s, 2H), 4.44 (t, *J*=7.1 Hz, 2H), 3.12 (t, *J*= 7.1, Hz, 2H); LC-MS $[M+H]^+$ 523.9. 8-(6-Bromo-benzo[1,3]dioxol-5-ylsulfanyl)-3-[2-(4chloro-2-fluoro-phenyl)-ethyl]-3H-purin-6-ylamine: Yield 9 %, ^{1}H NMR (DMSO-d_6) δ 8.37 (s, 1H), 7.49 (s, 1H), 7.39-7.30 (m, 2H), 7.22-7.19 (m, 2H), 6.18 (s, 2H), 4.58 (t, *J*=7.6 Hz, 2H), 3.22 (t, *J*=7.6 Hz, 2H); LC-MS $[M+H]^+$ 523.9.

[00459] Examples 41 and 42

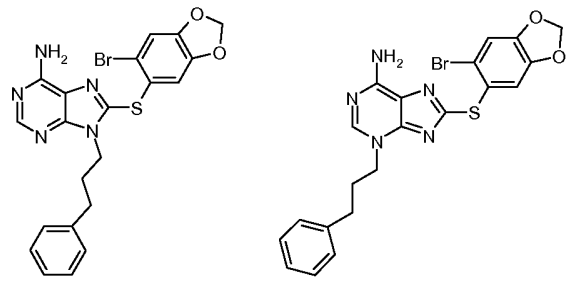


[00460] 8-(6-Bromo-benzo[1,3]dioxol-5-ylsulfanyl)-9-(2-pentafluorophenyl-ethyl)-9H-purin-6-ylamine and 8-(6-bromo-benzo[1,3]dioxol-5-ylsulfanyl)-3-(2-pentafluorophenyl-ethyl)-3H-purin-6-ylamine

[00461] The title compounds were prepared from 8-(6-bromo-benzo[1,3]dioxol-5-ylsulfanyl)-9H-purin-6-ylamine and 1-(2-bromo-ethyl)-2,3,4,5,6-pentafluoro-benzene by a procedure similar to examples 1 and 2. The isomers were separated by preparative HPLC. 8-(6-Bromo-benzo[1,3]dioxol-5-ylsulfanyl)-9-(2-pentafluorophenyl-ethyl)-9H-purin-6-ylamine: Yield 41 %, ^{1}H NMR (DMSO-d_6) δ 8.19 (s, 1H), 7.38 (s, 1H), 6.79 (s, 1H) 6.13 (s, 2H), 4.44 (t, *J*=7.4 Hz, 2H), 3.22 (t, *J*=7.4 Hz, 2H); LC-MS $[M+H]^+$ 561.9. 8-(6-Bromo-

benzo[1,3]dioxol-5-ylsulfanyl)-3-(2-pentafluorophenyl-ethyl)-3H-purin-6-ylamine: Yield 13%, LC-MS $[M+H]^+$ 561.9.

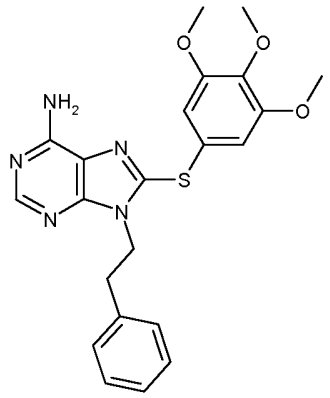
[00462] Examples 43 and 44

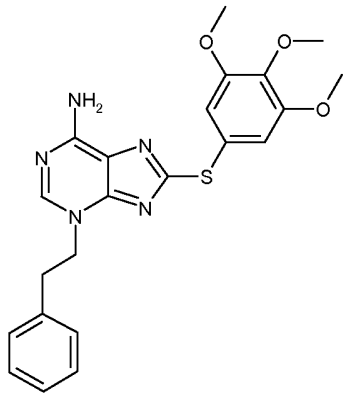


[00463] 8-(6-Bromo-benzo[1,3]dioxol-5-ylsulfanyl)-9-(3-phenyl-propyl)-9H-purin-6-ylamine and 8-(6-bromo-benzo[1,3]dioxol-5-ylsulfanyl)-3-(3-phenyl-propyl)-3H-purin-6-ylamine

[00464] The title compounds were prepared from 8-(6-bromo-benzo[1,3]dioxol-5-ylsulfanyl)-9H-purin-6-ylamine and (3-bromo-propyl)-benzene by a procedure similar to examples 1 and 2. The isomers were separated by preparative HPLC. 8-(6-Bromo-benzo[1,3]dioxol-5-ylsulfanyl)-9-(3-phenyl-propyl)-9H-purin-6-ylamine: Yield 20%, ^{1}H NMR (DMSO-d_6) δ 8.32 (s, 1H), 7.40 (s, 1H), 7.28-7.23 (m, 2H), 7.19-7.13 (m, 3H), 6.92 (s, 1H), 6.92 (s, 1H) 6.10 (s, 2H). 4.23 (t, *J*= 7.2 Hz, 2H), 2.59 (t, *J*=7.2 Hz, 2H), 2.03-1.95 (m, 2H); LC-MS $[M+H]^+$ 486.0. 8-(6-Bromo-benzo[1,3]dioxol-5-ylsulfanyl)-3-(3-phenyl-propyl)-3H-purin-6-ylamine: Yield 4%, ^{1}H NMR (DMSO-d_6) δ 8.59 (s, 1H), 8.20 (s, 1H), 7.49 (s, 1H), 7.38 (s, 1H), 7.27-7.23 (m, 2H), 7.18-7.15 (m, 3H), 6.17 (s, 2H). 4.33 (t, *J*= 6.8 Hz, 2H), 2.63 (t, *J*=7.6 Hz, 2H), 2.23-2.15 (m, 2H); LC-MS $[M+H]^+$ 486.0.

[00465] Examples 45 and 46

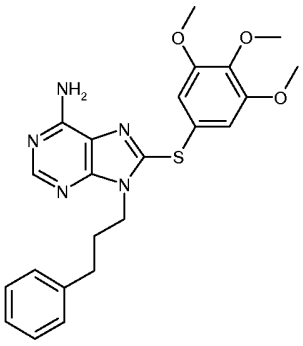


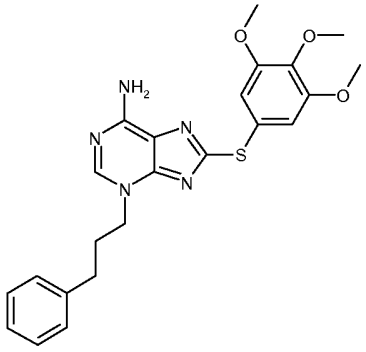


[00466] 9-Phenethyl-8-(3, 4, 5-trimethoxy-phensulfanyl)-9H-purin-6-ylamine and 3-phenethyl-8-(3, 4, 5-trimethoxy-phenylsulfanyl)-3H-purin-6-ylamine

[00467] The title compounds were prepared from 8-(3, 4, 5-trimethoxy-phenylsulfanyl)-9H-purin-6-ylamine and (2-bromo-ethyl)-benzene by a procedure similar to examples 1 and 2. The isomers were separated by preparative HPLC. 9-Phenethyl-8-(3, 4, 5-trimethoxy-phensulfanyl)-9H-purin-6-ylamine: Yield 38 %, ^{1}H NMR (DMSO-d_6) δ 8.29 (s, 1H), 7.27-7.18 (m, 3H), 7.06-7.04 (m, 2H), 6.74 (s, 2H), 4.17 (t, J = 6.8 Hz, 2H), 3.71 (s, 6H), 3.64 (s, 3H), 2.97 (t, J = 6.8 Hz, 2H); LC-MS $[M+H]^+$ 438.1. 3-Phenethyl-8-(3, 4, 5-trimethoxy-phenylsulfanyl)-3H-purin-6-ylamine: Yield 14 %, ^{1}H NMR (DMSO-d_6) δ 8.37 (s, 1H), 7.31-7.21 (m, 3H), 7.15-7.13 (m, 2H), 7.10 (s, 2H), 4.54 (t, J = 6.8 Hz, 2H), 3.80 (s, 6H), 3.73 (s, 3H) 3.17 (t, J = 6.8 Hz, 2H); LC-MS $[M+H]^+$ 438.1.

[00468] Examples 47 and 48

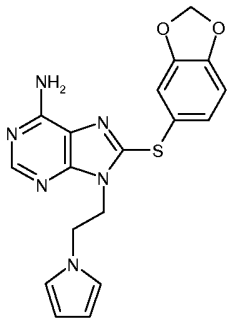


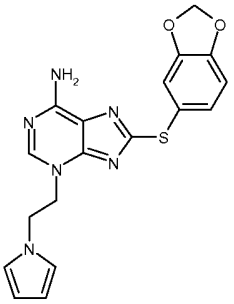


[00469] 9-(3-Phenyl-propyl)-8-(3, 4, 5-trimethoxy-phenylsulfanyl)-9H-purin-6-ylamine and 3-(3-phenyl-propyl)-8-(3, 4, 5-trimethoxy-phenylsulfanyl)-3H-purin-6-ylamine

[00470] The title compounds were prepared from 8-(3, 4, 5-trimethoxy-phenylsulfanyl)-9H-purin-6-ylamine and (3-bromo-propyl)-benzene by a procedure similar to examples 1 and 2. The isomers were separated by preparative HPLC. 9-(3-Phenyl-propyl)-8-(3, 4, 5-trimethoxy-phenylsulfanyl)-9H-purin-6-ylamine: Yield 34 %, ^{1}H NMR (DMSO-d_6) δ 8.30 (s, 1H), 7.26-7.22 (m, 2H), 7.16 (tt, J = 7.6, 1.2 Hz, 1H), 7.12-7.10 (m, 2H), 6.78 (s, 2H), 4.24 (t, J = 7.2 Hz, 2H), 3.72 (s, 6H), 3.63 (s, 3H), 2.56 (t, J = 7.6 Hz, 2H), 1.94 (tt, J =7.6, 7.2 Hz, 2H); LC-MS $[M+H]^+$ 452.0. 3-(3-Phenyl-propyl)-8-(3, 4, 5-trimethoxy-phenylsulfanyl)-3H-purin-6-ylamine: Yield, 13 %, ^{1}H NMR (DMSO-d_6) δ 8.61 (s, 1H), 7.27-7.23 (m, 2H), 7.18-7.15 (m, 3H), 7.06 (s, 2H), 4.35 (t, J = 7.2 Hz, 2H), 3.77 (s, 6H), 3.71 (s, 3H) 2.64 (t, J = 7.2 Hz, 2H), 2.20 (quintet, J =7.2 Hz, 2H); LC-MS $[M+H]^+$ 452.0.

[00471] Examples 49 and 50



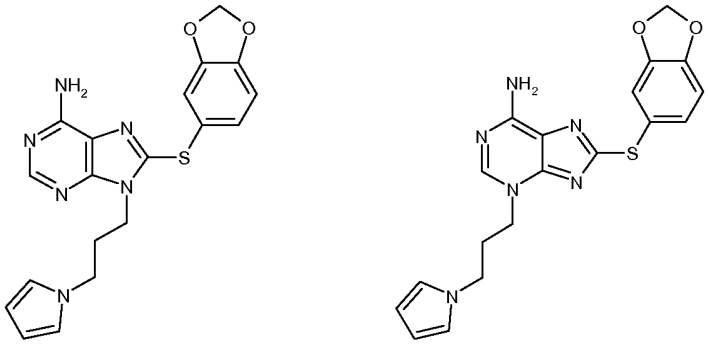


[00472] 8-(Benzo[1,3]dioxol-5-ylsulfanyl)-9-(2-pyrrol-1-yl-ethyl)-9H-purin-6-ylamine and 8-(benzo[1,3]dioxol-5-ylsulfanyl)-3-(2-pyrrol-1-yl-ethyl)-3H-purin-6-ylamine

[00473] The title compounds were prepared from 8-(benzo[1,3]dioxol-5-ylsulfanyl)-9H-purin-6-ylamine and 1-(2-bromo-ethyl)-1H-pyrrole by a procedure

similar to examples 1 and 2. The isomers were separated by preparative HPLC. 8-(Benzo[1,3]dioxol-5-ylsulfanyl)-9-(2-pyrrol-1-yl-ethyl)-9H-purin-6-ylamine: Yield 27 %, ^{1}H NMR (CD_3OD) δ 8.24 (s, 1H), 7.09 (dd, J = 8.0, 1.6 Hz, 1H), 7.00 (d, J = 1.6 Hz, 1H), 6.90 (d, J = 8.0 Hz, 1H), 6.42 (t, J = 2.0 Hz, 2H), 6.03 (s, 2H), 5.98 (t, J = 2.0 Hz, 2H), 4.58-4.55 (m, 2H), 4.41-4.38 (m, 2H); LC-MS $[M+H]^+$ 381.2. 8-(Benzo[1,3]dioxol-5-ylsulfanyl)-3-(2-pyrrol-1-yl-ethyl)-3H-purin-6-ylamine: Yield 16%, ^{1}H NMR (CD_3OD) δ 7.60 (s, 1H), 7.32 (dd, J = 8.0, 1.6 Hz, 1H), 7.25 (d, J = 1.6 Hz, 1H), 7.05 (d, J = 8.0 Hz, 1H), 6.49 (t, J = 2.4 Hz, 2H), 6.13 (s, 2H), 6.02 (t, J = 2.0 Hz, 2H), 4.67 (br t, J = 6.0 Hz, 2H), 4.40 (br t, J = 6.0 Hz, 2H); LC-MS $[M+H]^+$ 381.1.

[00474] Examples 51 and 52

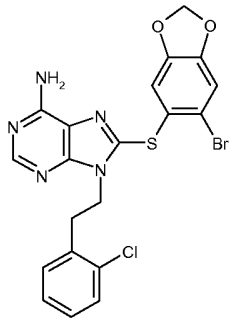


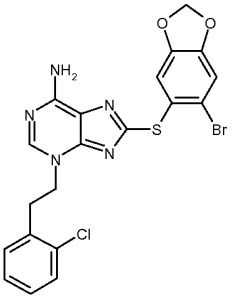
[00475] 8-(Benzo[1,3]dioxol-5-ylsulfanyl)-9-(3-pyrrol-1-yl-propyl)-9H-purin-6-ylamine and 8-(benzo[1,3]dioxol-5-ylsulfanyl)-3-(3-pyrrol-1-yl-propyl)-3H-purin-6-ylamine

[00476] The title compounds were prepared from 8-(benzo[1,3]dioxol-5-ylsulfanyl)-9H-purin-6-ylamine and 1-(3-bromo-propyl)-1H-pyrrole by a procedure similar to examples 1 and 2. The isomers were separated by preparative HPLC. 8-(Benzo[1,3]dioxol-5-ylsulfanyl)-9-(3-pyrrol-1-yl-propyl)-9H-purin-6-ylamine: Yield 23 %, ^{1}H NMR (CD_3OD) δ 8.18 (s, 1H), 7.06 (dd, J = 8.0, 1.6 Hz, 1H), 7.00 (d, J = 1.6 Hz, 1H), 6.88 (d, J = 8.0 Hz, 1H), 6.69 (t, J = 2.4 Hz, 2H), 6.04 (t, J =

2.4 Hz, 2H), 6.02 (s, 2H), 4.20 (br t, J = 7.6 Hz, 2H), 4.01 (t, J = 6.8 Hz, 2H), 2.21 (quintet, J = 6.8 Hz, 2H); LC-MS $[M+H]^+$ 395.1. 8-(Benzo[1,3]dioxol-5-ylsulfanyl)-3-(3-pyrrol-1-yl-propyl)-3H-purin-6-ylamine: Yield 11%, ^{1}H NMR (CD_3OD) δ 8.31 (s, 1H), 7.29 (dd, J = 8.0, 2.0 Hz, 1H), 7.21 (d, J = 2.0 Hz, 1H), 7.02 (d, J = 8.0 Hz, 1H), 6.60 (t, J = 2.4 Hz, 2H), 6.11 (s, 2H), 5.96 (t, J = 2.4 Hz, 2H), 4.35 (t, J = 6.8 Hz, 2H), 4.03 (t, J = 6.8 Hz, 2H), 2.45 (quintet, J = 6.8 Hz, 2H); LC-MS $[M+H]^+$ 395.1.

[00477] Examples 53 and 54



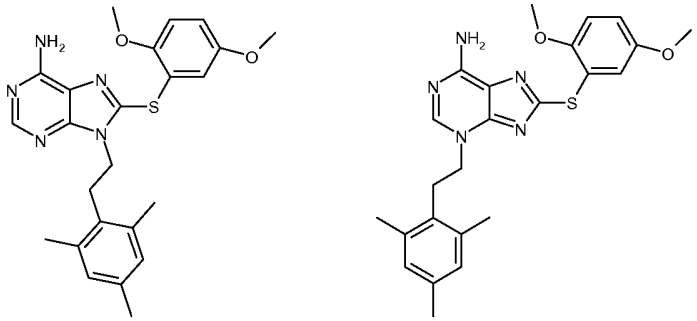


[00478] 8-(6-Bromo-benzo[1,3]dioxol-5-ylsulfanyl)-9-[2-(2-chloro-phenyl)-ethyl]-9H-purin-6-ylamine and 8-(6-bromo-benzo[1,3]dioxol-5-ylsulfanyl)-3-[2-(2-chloro-phenyl)-ethyl]-3H-purin-6-ylamine

[00479] The title compounds were prepared from 8-(6-bromo-benzo[1,3]dioxol-5-ylsulfanyl)-9H-purin-6-ylamine and 1-(2-bromo-ethyl)-2-chloro-benzene by a procedure similar to examples 1 and 2. The isomers were separated by preparative HPLC. 8-(6-Bromo-benzo[1,3]dioxol-5-ylsulfanyl)-9-[2-(2-chloro-phenyl)-ethyl]-9H-purin-6-ylamine: Yield 32%, ^{1}H NMR (CD_3OD) δ 8.18 (s, 1H), 7.34 (br d, J = 7.2 Hz, 1H), 7.22 (br t, J = 7.2 Hz, 1H), 7.20 (s, 1H), 7.14 (br t, J = 7.2 Hz, 1H), 7.02 (br d, J = 7.2 Hz, 1H), 6.89 (s, 1H), 6.05 (s, 2H), 4.57 (t, J = 6.4 Hz, 2H), 3.35 (t, J = 6.4 Hz, 2H); LC-MS $[M+H]^+$ 506.0. 8-(6-Bromo-benzo[1,3]dioxol-5-ylsulfanyl)-3-[2-(2-chloro-phenyl)-ethyl]-3H-purin-6-ylamine: Yield 16%, ^{1}H NMR (CD_3OD) δ 8.12 (s, 1H), 7.37-7.34 (m, 3H), 7.26-7.18 (m, 2H),

7.14 (m, 1H), 6.16 (s, 2H), 4.64 (t, J = 6.8 Hz, 2H), 3.38 (t, J = 6.8 Hz, 2H); LC-MS $[M+H]^+$ 506.0.

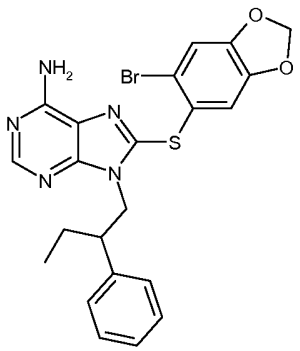
[00480] Examples 55 and 56

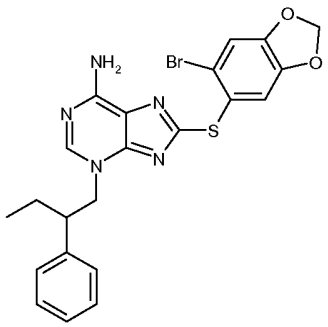


[00481] 8-(2, 5-Dimethoxy-phenylsulfanyl)-9-[2-(2, 4, 6-trimethyl-phenyl)-ethyl]-9H-purin-6-ylamine and 8-(2, 5-dimethoxy-phenylsulfanyl)-3-[2-(2, 4, 6-trimethyl-phenyl)-ethyl]-3H-purin-6-ylamine

[00482] The title compounds were prepared from 8-(2, 5-dimethoxy-phenylsulfanyl)-9H-purin-6-ylamine and 2-(2-bromo-ethyl)-1, 3, 5-trimethyl-benzene by a procedure similar to examples 1 and 2. The isomers were separated by preparative HPLC. 8-(2, 5-Dimethoxy-phenylsulfanyl)-9-[2-(2, 4, 6-trimethyl-phenyl)-ethyl]-9H-purin-6-ylamine: Yield 18%, ^{1}H NMR (DMSO-d_6) δ 8.39 (s, 1H), 7.04 (d, J = 9.0 Hz, 1H), 6.90-6.81 (m, 3H), 6.51 (s, 1H), 4.21 (t, J=8.8 Hz, 2H), 3.77 (s, 3H), 3.61 (s, 3H), 3.00-2.91 (m, 2H), 2.27 (s, 6H), 2.19 (s, 3H); LC-MS $[M+H]^+$ 450.20. 8-(2, 5-Dimethoxy-phenylsulfanyl)-3-[2-(2, 4, 6-trimethyl-phenyl)-ethyl]-3H-purin-6-ylamine: Yield 6%, ^{1}H NMR (DMSO-d_6) δ 8.52 (s, 1H), 7.28-7.09 (m, 3H), 6.82 (s, 2H), 4.30 (t, J=13.3 Hz, 2H), 3.78 (s, 3H), 3.76 (s, 3H), 3.10 (t, J=15.1 Hz, 2H), 2.19 (s, 9H); LC-MS $[M+H]^+$ 450.20.

[00483] Examples 57 and 58

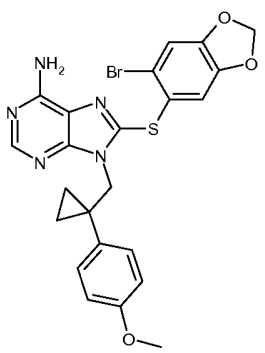


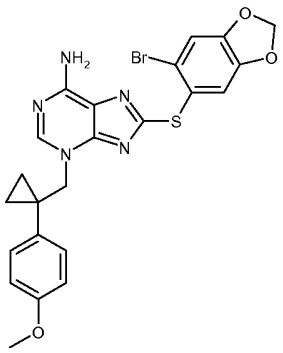


[00484] 8-(6-Bromo-benzo[1,3]dioxol-5-ylsulfanyl)-9-(2-phenyl-butyl)-9H-purin-6-ylamine and 8-(6-bromo-benzo[1,3]dioxol-5-ylsulfanyl)-3-(2-phenyl-butyl)-3H-purin-6-ylamine

[00485] The title compounds were prepared from 8-(6-bromo-benzo[1,3]dioxol-5-ylsulfanyl)-9H-purin-6-ylamine and (1-bromomethyl-propyl)-benzene by a procedure similar to examples 1 and 2. The isomers were separated by preparative HPLC. 8-(6-Bromo-benzo[1,3]dioxol-5-ylsulfanyl)-9-(2-phenyl-butyl)-9H-purin-6-ylamine: Yield 25%, ^{1}H NMR (DMSO-d_6) δ 8.29 (s, 1H), 7.36 (s, 1H), 7.27-7.09 (m, 5H), 6.69 (s, 1H), 6.10 (s, 2H), 4.49-4.30 (m, 2H), 3.21-3.11 (m, 1H), 1.72-1.63 (m, 2H), 0.70 (t, J = 7.6 Hz, 3H); LC-MS $[M+H]^+$ 499.0. 8-(6-Bromo-benzo[1,3]dioxol-5-ylsulfanyl)-3-(2-phenyl-butyl)-3H-purin-6-ylamine: Yield 8%, ^{1}H NMR (DMSO-d_6) δ 8.17 (s, 1H), 7.51 (s, 1H), 7.38 (s, 1H), 7.28-7.09 (m, 5H), 6.19 (s, 2H), 4.61-4.52 (m, 1H), 4.47-4.42 (m, 1H), 3.31-3.22 (m, 1H), 1.72-1.61 (m, 2H), 0.72 (t, J = 7.1 Hz, 3H); LC-MS $[M+H]^+$ 499.1.

[00486] Examples 59 and 60

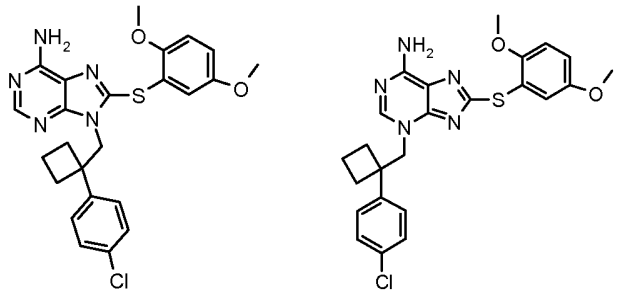




[00487] 8-(6-Bromo-benzo[1,3]dioxol-5-ylsulfanyl)-9-[1-(4-methoxy-phenyl)-cyclopropylmethyl]-9H-purin-6-ylamine and 8-(6-bromo-benzo[1,3]dioxol-5-ylsulfanyl)-3-[1-(4-methoxy-phenyl)-cyclopropylmethyl]-3H-purin-6-ylamine

[00488] The title compounds were prepared from 8-(6-bromo-benzo[1,3]dioxol-5-ylsulfanyl)-9H-purin-6-ylamine and 1-(1-bromomethyl-cyclopropyl)-4-methoxy-benzene by a procedure similar to examples 1 and 2. The isomers were separated by preparative HPLC. 8-(6-Bromo-benzo[1,3]dioxol-5-ylsulfanyl)-9-[1-(4-methoxy-phenyl)-cyclopropylmethyl]-9H-purin-6-ylamine: Yield 30%, ^{1}H NMR (CD_3OD) δ 7.45 (s, 1H), 7.26 (s, 1H), 7.19 (s, 1H), 7.02 (d, *J* = 8.8 Hz, 2H), 6.78 (d, *J*= 8.9 Hz, 2H), 6.10 (s, 2H) 4.49 (s, 2H), 3.72 (s, 3H), 1.20-1.18 (m, 2H), 0.91-0.88 (m, 2H); LC-MS $[M+H]^+$ 527.0. 8-(6-Bromo-benzo[1,3]dioxol-5-ylsulfanyl)-3-[1-(4-methoxy-phenyl)-cyclopropylmethyl]-3H-purin-6-ylamine: Yield 9%, ^{1}H NMR (CD_3OD) δ 8.16 (br s, 1H), 7.16 (s, 1H), 7.02 (d, *J* = 8.8 Hz, 2H), 6.81 (s, 1H), 6.76 (d, *J*= 8.8 Hz, 2H), 6.04 (s, 2H), 4.40 (s, 2H), 3.72 (s, 3H), 1.31-1.26 (m, 2H), 0.89-0.82 (m, 2H); LC-MS $[M+H]^+$ 527.0.

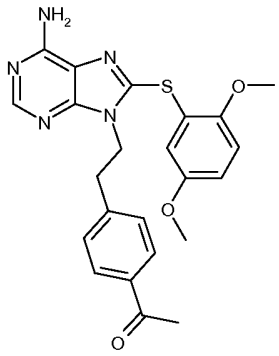
[00489] Examples 61 and 62

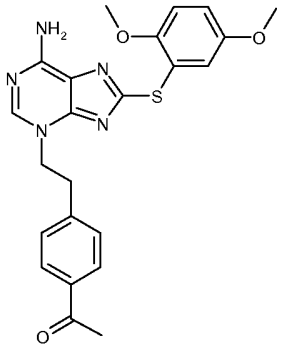


[00490] 9-[1-(4-Chloro-phenyl)-cyclobutylmethyl]-8-(2, 5-dimethoxy-phenylsulfanyl)-9H-purin-6-ylamine and) 3-[1-(4-chloro-phenyl)-cyclobutylmethyl]-8-(2, 5-dimethoxy-phenylsulfanyl)-3H-purin-6-ylamine

[00491] The title compounds were prepared from 8-(2, 5-dimethoxy-phenylsulfanyl)-9H-purin-6-ylamine and 1-(1-bromomethyl-cyclobutyl)-4-chloro-benzene by a procedure similar to examples 1 and 2. The isomers were separated by preparative HPLC. 9-[1-(4-Chloro-phenyl)-cyclobutylmethyl]-8-(2, 5-dimethoxy-phenylsulfanyl)-9H-purin-6-ylamine: Yield 10%, ^{1}H NMR (DMSO-d_6) δ 8.28 (s, 1H), 7.32-7.28 (m, 2H), 6.97-6.91 (m, 3H), 6.85-6.81 (m, 1H), 6.52 (d, *J*=3.0 Hz, 1H), 4.59 (s, 2H) 3.62 (s, 3H), 3.61 (s, 3H), 2.68-2.60 (m, 2H), 2.31-2.21 (m, 2H), 2.17-2.08 (m, 1H), 1.83-1.75 (m, 1H); LC-MS $[M+H]^+$ 482.10. 3-[1-(4-Chloro-phenyl)-cyclobutylmethyl]-8-(2, 5-dimethoxy-phenylsulfanyl)-3H-purin-6-ylamine: Yield 4%, ^{1}H NMR (DMSO-d_6) δ 8.19 (s, 1H), 7.35-7.29 (m, 2H), 7.22-7.05 (m, 3H), 6.98-6.95 (m, 2H), 4.66 (s, 2H) 3.78 (s, 3H), 3.76 (s, 3H), 2.52-2.41 (m, 2H), 2.32-2.21 (m, 2H), 2.07-1.99 (m, 1H), 1.81-1.70 (m, 1H); LC-MS $[M+H]^+$ 482.10.

[00492] Examples 63 and 64

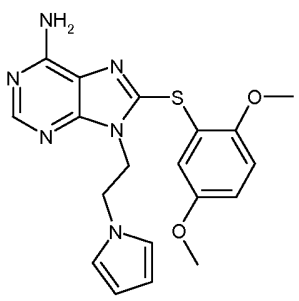


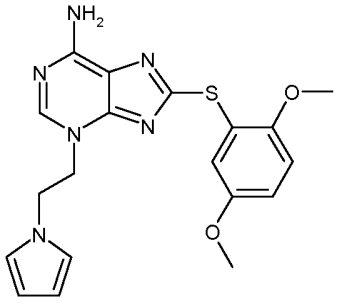


[00493] 1-(4-{2-[6-Amino-8-(2, 5-dimethoxy-phenylsulfanyl)-purin-9-yl]-ethyl}-phenyl)-ethanone and 1-(4-{2-[6-amino-8-(2, 5-dimethoxy-phenylsulfanyl)-purin-3-yl]-ethyl}-phenyl)-ethanone

[00494] The title compounds were prepared from 8-(2, 5-dimethoxy-phenylsulfanyl)-9H-purin-6-ylamine and 1-[4-(2-chloro-ethyl)-phenyl]-ethanone by a procedure similar to examples 1 and 2. The isomers were separated by preparative HPLC.1-(4-{2-[6-Amino-8-(2, 5-dimethoxy-phenylsulfanyl)-purin-9-yl]-ethyl}-phenyl)-ethanone: Yield 26 %, ^{1}H NMR (DMSO-d_6) δ 8.29 (s, 1H), 7.78 (d, J= 8.4Hz, 2H), 7.17 (d, J= 8.0, 2H), 7.01 (d, *J*= 8.8 Hz, 1H), 6.86 (dd, *J*= 9.2, 2.8 Hz, 1H), 6.49 (d, *J*= 3.2 Hz, 1H), 4.50 (t, *J*= 7.2 Hz, 2H), 3.74 (s, 3H), 3.60 (s, 3H), 3.12 (t, *J*= 7.2 Hz, 2H), 2.52(s, 3H); TOF LC- MS $[M+H]^+$ 450.16. 1-(4-{2-[6-Amino-8-(2, 5-dimethoxy-phenylsulfanyl)-purin-3-yl]-ethyl}-phenyl)-ethanone: Yield 11 %, ^{1}H NMR (DMSO-d_6) δ 8.37 (bs, 1H), 8.14 (bs, 2H), 7.88 (d, *J*= 8.4 Hz, 2H), 7.30 (d, *J*= 8.4 Hz, 2H), 7.26-7.06 (m, 3H), 4.57 (t, *J*= 6.8 Hz, 2H), 3.77 (s, 3H), 3.72 (s, 3H), 3.27 (t, *J*= 7.2 Hz, 2H), 2.56 (s, 3H); TOF LC-MS $[M+H]^+$ 450.16.

[00495] Examples 65 and 66

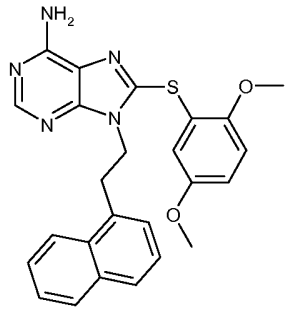


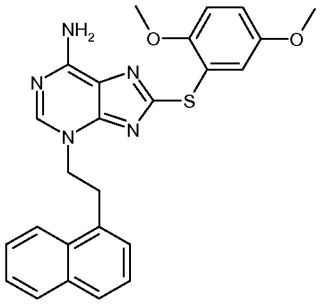


[00496] 8-(2, 5-Dimethoxy-phenylsulfanyl)-9-(2-pyrrol-1-yl-ethyl)-9H-purin-6-ylamine and 8-(2, 5-dimethoxy-phenylsulfanyl)-3-(2-pyrrol-1-yl-ethyl)-3H-purin-6-ylamine

[00497] The title compounds were prepared from 8-(2, 5-dimethoxy-phenylsulfanyl)-9H-purin-6-ylamine and 1-(2-bromo-ethyl)-1H-pyrrole by a procedure similar to examples 1 and 2. The isomers were separated by preparative HPLC. 8-(2, 5-Dimethoxy-phenylsulfanyl)-9-(2-pyrrol-1-yl-ethyl)-9H-purin-6-ylamine: Yield 26%, ^{1}H NMR (DMSO-d_6) δ 8.29 (s, 1H), 7.01 (d, *J*= 9.2 Hz, 1H), 6.88 (dd, *J*= 9.2, 3.2Hz, 1H), 6.55 (d, *J*=2.8 Hz, 1H), 6.43 (t, *J*=2.0 Hz, 2H), 5.90 (t, *J*= 2.0 Hz, 2H), 4.52 (t, J= 6.4 Hz, 2H), 4.29 (t, *J*= 6.4 Hz, 2H), 3.71 (s, 3H), 3.62 (s, 3H); TOF LC-MS $[M+H]^+$ 397.14. 8-(2, 5-Dimethoxy-phenylsulfanyl)-3-(2-pyrrol-1-yl-ethyl)-3H-purin-6-ylamine: Yield 16 %, ^{1}H NMR (DMSO-d_6) δ 8.16 (bs, 1H), 7.81 (bs, 1H), 7.24-7.02 (m, 3H), 6.56 (m, 2H), 5.95 (m, 2H), 4.62 (m, 2H), 4.46-4.34 (m, 2H), 3.77 (s, 3H), 3.73 (s, 3H); TOF LC-MS $[M+H]^+$ 397.14.

[00498] Examples 67 and 68

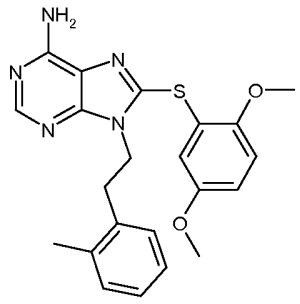


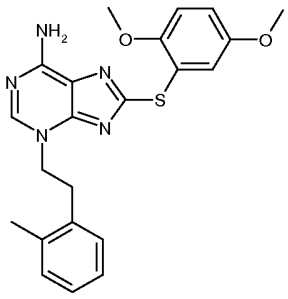


[00499] 8-(2, 5-Dimethoxy-phenylsulfanyl)-9-(2-naphthalen-1-yl-ethyl)-9H-purin-6-ylamine and 8-(2, 5-dimethoxy-phenylsulfanyl)-3-(2-naphthalen-1-yl-ethyl)-3H-purin-6-ylamine

[00500] The title compounds were prepared from 8-(2, 5-dimethoxy-phenylsulfanyl)-9H-purin-6-ylamine and 1-(2-bromo-ethyl)-naphthalene by a procedure similar to examples 1 and 2. The isomers were separated by preparative HPLC. 8-(2, 5-Dimethoxy-phenylsulfanyl)-9-(2-naphthalen-1-yl-ethyl)-9H-purin-6-ylamine: Yield 28 %, ^{1}H NMR (DMSO-d_6) δ 8.33 (s, 1H), 8.13-8.10 (m, 1H), 7.94-7.92 (m, 1H), 7.81 (d, *J*= 8.4 Hz, 1H), 7.56-7.52 (m, 2H), 7.37 (t, *J*= 7.2 Hz, 1H), 7.14 (d, *J*= 6.0 Hz, 1H), 7.02 (d, *J*= 8.8 Hz, 1H), 6.86 (dd, *J*= 9.2, 2.8 Hz, 1H), 6.50 (d, *J*= 3.2 Hz, 1H), 4.50 (t, *J*= 6.4 Hz, 2H), 3.72 (s, 3H), 3.60 (s, 3H), 3.45 (t, *J*= 7.2 Hz, 2H); TOF LC-MS $[M+H]^+$ 458.1. 8-(2, 5-Dimethoxy-phenylsulfanyl)-3-(2-naphthalen-1-yl-ethyl)-3H-purin-6-ylamine: Yield 14 %, ^{1}H NMR (DMSO-d_6) δ 8.19 (d, *J*= 8.4 Hz, 1H), 8.11 (bs, 1H), 7.95 (d, *J*= 8.0 Hz, 1H), 7.85 (d, *J*=8.0 Hz, 1H), 7.58-7.40 (m, 3H), 7.32-7.26 (m, 2H), 7.17 (bs, 1H), 7.09 (bs, 1H), 4.60 (t, *J*= 7.2 Hz, 2H), 3.78 (s, 3H), 3.72 (s, 3H), 3.64 (t, *J*= 7.2 Hz, 2H); TOF LC-MS $[M+H]^+$ 458.1.

[00501] Examples 69 and 70



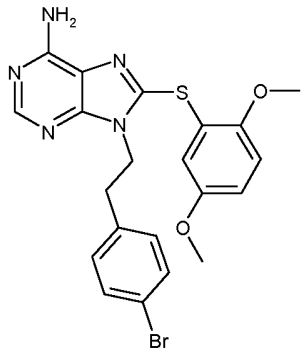


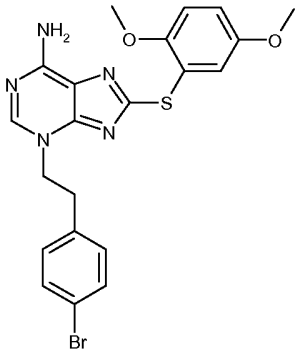
[00502] 8-(2, 5-Dimethoxy-phenylsulfanyl)-9-(2-o-tolyl-ethyl)-9H-purin-6-ylamine and 8-(2, 5-dimethoxy-phenylsulfanyl)-3-(2-o-tolyl-ethyl)-3H-purin-6-ylamine

[00503] The title compounds were prepared from 8-(2, 5-dimethoxy-phenylsulfanyl)-9H-purin-6-ylamine and1-(2-bromo-ethyl)-2-methyl-benzene by a procedure similar to examples 1 and 2. The isomers were separated by preparative HPLC. 8-(2, 5-Dimethoxy-phenylsulfanyl)-9-(2-o-tolyl-ethyl)-9H-purin-6-ylamine: Yield 23 %, ^{1}H NMR (DMSO-d_6) δ 8.31 (bs, 1H), 7.18- 7.00 (m, 4H), 6.90-6.84 (m, 2H), 6.56 (bs, 1H), 4.36 (t, *J*= 7.2 Hz, 2H), 3.74 (s, 3H), 3.61 (s, 3H), 2.98 (t, *J*= 7.2 Hz, 2H), 2.26 (s, 3H); TOF LC-MS $[M+H]^+$ 422.1. 8-(2, 5-Dimethoxy-phenylsulfanyl)-3-(2-o-tolyl-ethyl)-3H-purin-6-ylamine: Yield 15 %, ^{1}H NMR (DMSO-d_6) δ 8.15 (bs, 1H), 7.24 (bs, 1H), 7.20-7.06 (m, 5H), 6.99 (d, *J*= 7.6 Hz, 1H), 4.46 (t, *J*= 7.2 Hz, 2H), 3.76 (s, 3H), 3.72 (s, 3H), 3.16 (t, *J*= 7.2 Hz, 2H), 2.32 (s, 3H); TOF LC-MS $[M+H]^+$ 422.1.

[00504] Examples 71 and 72

:



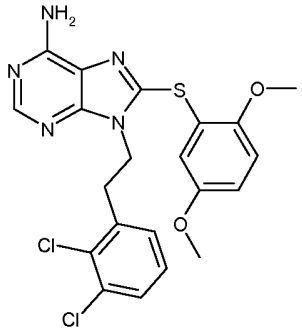


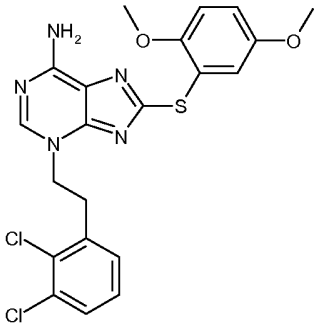
[00505] 9-[2-(4-Bromo-phenyl)-ethyl]-8-(2, 5-dimethoxy-phenylsulfanyl)-9H-purin-6-ylamine and 3-[2-(4-bromo-phenyl)-ethyl]-8-(2, 5-dimethoxy-phenylsulfanyl)-3H-purin-6-ylamine

[00506] The title compounds were prepared from 8-(2, 5-dimethoxy-phenylsulfanyl)-9H-purin-6-ylamine and 1-(2-bromo-ethyl)-4-bromo-benzene by a procedure similar to examples 1 and 2. The isomers were separated by preparative HPLC. 9-[2-(4-Bromo-phenyl)-ethyl]-8-(2, 5-dimethoxy-phenylsulfanyl)-9H-purin-6-ylamine: Yield 27 %, ^{1}H NMR (DMSO-d_6) δ 8.24 (bs, 1H), 7.40 (dd, *J*= 6.8, 2.0

Hz, 2H), 7.02 (d, *J*= 8.8 Hz, 1H), 6.98 (dd, *J*= 6.4, 2.0 Hz, 2H), 6.87 (dd, *J*= 8.8, 2.8 Hz, 1H), 6.50 (d, *J*= 2.8 Hz, 1H), 4.41 (t, *J*= 7.2 Hz, 2H), 3.74 (s, 3H), 3.61 (s, 3H), 2.98 (t, *J*= 7.2 Hz, 2H); TOF LC-MS $[M+H]^+$ 488.05. 3-[2-(4-Bromo-phenyl)-ethyl]-8-(2, 5-dimethoxy-phenylsulfanyl)-3H-purin-6-ylamine: Yield 13 %, ^{1}H NMR (DMSO-d_6) δ 8.15 (bs, 1H), 7.51-7.44 (m, 2H), 7.24 (bs, 1H), 7.18 (d, *J*= 8.4 Hz, 1H), 7.14-7.09 (m, 3H), 4.53 (t, *J*= 6.8 Hz, 2H), 3.76 (s, 3H), 3.73 (s, 3H), 3.16 (t, *J*= 6.8 Hz, 2H); TOF LC-MS $[M+H]^+$ 488.05.

[00507] Examples 73 and 74



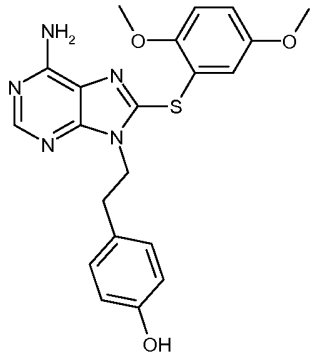


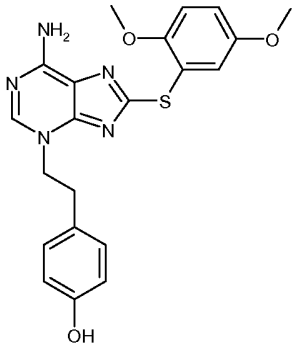
[00508] 9-[2-(2, 3-Dichloro-phenyl)-ethyl]-8-(2, 5-dimethoxy-phenylsulfanyl)-9H-purin-6-ylamine and 3-[2-(2, 3-dichloro-phenyl)-ethyl]-8-(2, 5-dimethoxy-phenylsulfanyl)-3H-purin-6-ylamine

[00509] The title compounds were prepared from 8-(2, 5-dimethoxy-phenylsulfanyl)-9H-purin-6-ylamine and 1-(2-bromo-ethyl)-2, 3-dichloro-benzene by a procedure similar to examples 1 and 2. The isomers were separated by preparative HPLC. 9-[2-(2, 3-Dichloro-phenyl)-ethyl]-8-(2, 5-dimethoxy-phenylsulfanyl)-9H-purin-6-ylamine: Yield 14 %, ^{1}H NMR (DMSO-d_6) δ 8.23 (s, 1H), 7.46 (dd, *J*= 8.0, 1.6 Hz, 1H), 7.16 (t, *J*= 8.0 Hz, 1H), 7.0 (d, *J*= 9.4 Hz, 1H), 6.95 (dd, *J*= 7.6, 1.6 Hz, 1H), 6.85 (dd, *J*= 8.8, 3.2 Hz, 1H), 6.45 (d, *J*= 2.8 Hz, 1H), 4.48 (t, *J*= 7.2 Hz, 2H), 3.74 (s, 3H), 3.60 (s, 3H), 3.22 (t, *J*= 7.2 Hz, 2H); TOF LC-MS $[M+H]^+$ 476.0. 3-[2-(2, 3-Dichloro-phenyl)-ethyl]-8-(2, 5-dimethoxy-phenylsulfanyl)-3H-purin-6-ylamine: Yield 10%, ^{1}H NMR (DMSO-d_6) δ 8.09 (bs,

2H), 7.50 (d, *J*= 7.2Hz, 1H), 7.31-7.24 (m, 1H), 7.22-7.10 (m, 3H), 4.60-4.52 (m, 2H), 3.76 (s, 3H), 3.71 (s, 3H), 3.40-3.30 (m, 2H); TOF LC-MS $[M+H]^+$ 476.0.

[00510] Example 75 and 76

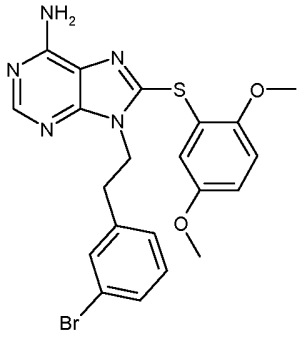


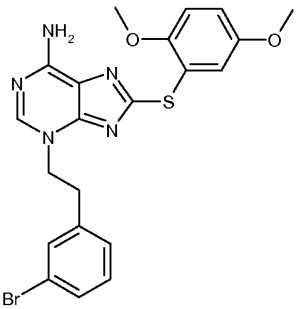


[00511] 4-{2-[6-Amino-8-(2, 5-dimethoxy-phenylsulfanyl)-purin-9-yl]-ethyl}-phenol and 4-{2-[6-amino-8-(2, 5-dimethoxy-phenylsulfanyl)-purin-9-yl]-ethyl}-phenol

[00512] The title compounds were prepared from 8-(2, 5-dimethoxy-phenylsulfanyl)-9H-purin-6-ylamine and 4-(2-bromo-ethyl)-phenol by a procedure similar to examples 1 and 2. 4-{2-[6-Amino-8-(2, 5-dimethoxy-phenylsulfanyl)-purin-9-yl]-ethyl}-phenol: Yield 15%, ^{1}H NMR (DMSO-d_6) δ 9.24 (s, 1H), 8.19 (s, 1H), 7.53 (bs, 2H), 7.02 (d, *J*= 9.2 Hz, 1H), 6.85 (dd, *J*= 8.0, 2.8 Hz, 2H), 6.81 (d, *J*= 8.4 Hz, 2H), 6.62 (d, *J*= 8.4 Hz, 1H), 6.46 (d, *J*= 2.8 Hz, 1H), 4.30 (t, *J*= 7.6 Hz, 2H), 3.74 (s, 3H), 3.60 (s, 3H), 2.85 (t, *J*= 7.6 Hz, 2H); LC-MS $[M+H]^+$ 424.1. 4-{2-[6-Amino-8-(2, 5-dimethoxy-phenylsulfanyl)-purin-9-yl]-ethyl}-phenol: Yield 7%, ^{1}H NMR (DMSO-d_6) δ 9.31 (bs, 1H), 8.28 (bs, 1H), 7.3-7.0 (m, 3H), 6.90 (d, *J*= 8.8 Hz, 2H), 6.66-6.59 (m, 2H), 4.46 (t, *J*= 7.2 Hz, 2H), 3.76 (s, 3H), 3.72 (s, 3H), 3.04 (t, *J*= 7.2 Hz, 2H); LC-MS $[M+H]^+$ 424.1.

[00513] Examples 77 and 78

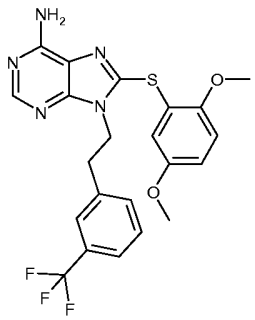


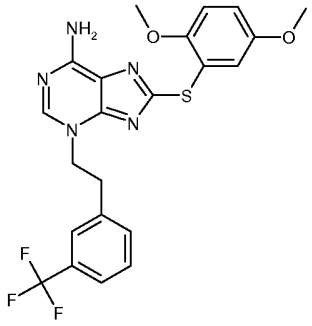


[00514] 9-[2-(3-Bromo-phenyl)-ethyl]-8-(2, 5-dimethoxy-phenylsulfanyl)-9H-purin-6-ylamine and 3-[2-(3-bromo-phenyl)-ethyl]-8-(2, 5-dimethoxy-phenylsulfanyl)-3H-purin-6-ylamine

[00515] The title compounds were prepared from 8-(2, 5-dimethoxy-phenylsulfanyl)-9H-purin-6-ylamine and 1-(2-bromo-ethyl)-3-bromo-benzene by a procedure similar to examples 1 and 2. The isomers were separated by preparative HPLC. 9-[2-(3-Bromo-phenyl)-ethyl]-8-(2, 5-dimethoxy-phenylsulfanyl)-9H-purin-6-ylamine: Yield 24 %, ^{1}H NMR (DMSO-d_6) δ 8.24 (s, 1H), 7.89 (bs, 2H), 7.37 (dd, *J*= 8.0, 0.8Hz, 1H), 7.24 (bs, 1H), 7.17 (t, *J*= 8.0 Hz, 1H), 7.04-6.98 (m, 2H), 6.88 (dd, *J*= 8.8, 3.2 Hz, 1H), 6.53 (d, *J*= 3.2 Hz, 1H), 4.41 (t, *J*= 7.2 Hz, 2H), 3.75 (s, 3H), 3.62 (s, 3H), 3.00 (t, *J*= 7.2 Hz, 2H); LC-MS $[M+H]^+$ 486.1. 3-[2-(3-Bromo-phenyl)-ethyl]-8-(2, 5-dimethoxy-phenylsulfanyl)-3H-purin-6-ylamine: Yield 13%, ^{1}H NMR (DMSO-d_6) δ 8.39 (bs, 1H), 8.15 (bs, 2H), 7.45-7.43 (m, 2H), 7.29-7.12 (m, 2H), 7.19-7.09 (m, 3H), 4.54 (t, *J*= 7.2 Hz, 2H), 3.77 (s, 3H), 3.72 (s, 3H), 3.18 (t, *J*= 7.2 Hz, 2H); LC-MS $[M+H]^+$ 486.1.

[00516] Examples 79 and 80

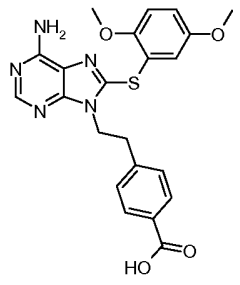


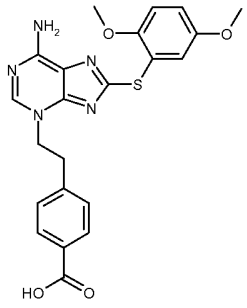


[00517] 8-(2, 5-Dimethoxy-phenylsulfanyl)-9-[2-(3-trifluoromethyl-phenyl)-ethyl]-9H-purin-6-ylamine and 8-(2, 5-dimethoxy-phenylsulfanyl)-3-[2-(3-trifluoromethyl-phenyl)-ethyl]-3H-purin-6-ylamine

[00518] The title compounds were prepared from 8-(2, 5-dimethoxy-phenylsulfanyl)-9H-purin-6-ylamine and 1-(2-chloro-ethyl)-3-trifluoromethyl-benzene by a procedure similar to examples 1 and 2. The isomers were separated by preparative HPLC. 8-(2, 5-Dimethoxy-phenylsulfanyl)-9-[2-(3-trifluoromethyl-phenyl)-ethyl]-9H-purin-6-ylamine: Yield 10 %, ^{1}H NMR (DMSO-d_6) δ 8.16 (s, 1H), 7.59 (bs, 2H), 7.52 (d, *J*= 8.0 Hz, 1H), 7.43 (t, *J*= 8.0 Hz, 1H), 7.34 (s, 1H), 7.28 (d, *J*= 8.0 Hz, 1H), 7.01 (d, *J*= 9.2 Hz, 1H), 6.85 (d, *J*= 6.0 Hz, 1H), 6.46 (bs, 1H), 4.44 (t, *J*= 6.8 Hz, 2H), 3.74 (s, 3H), 3.60 (s, 3H), 3.12 (t, *J*= 6.8 Hz, 2H); LC-MS $[M+H]^+$ 476.1. 8-(2, 5-Dimethoxy-phenylsulfanyl)-3-[2-(3-trifluoromethyl-phenyl)-ethyl]-3H-purin-6-ylamine: Yield 5 %, ^{1}H NMR (DMSO-d_6) δ 8.38 (bs, 1H), 8.12 (bs, 1H), 7.64-7.42 (m, 3H), 7.26-7.02 (m, 3H), 4.58 (m, 2H), 3.76 (s, 3H), 3.71 (s, 3H), 3.29 (m, 2H); LC-MS $[M+H]^+$ 476.1.

[00519] Examples 81 and 82





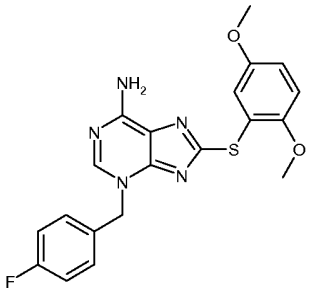
[00520] 4-{2-[6-Amino-8-(2, 5-dimethoxy-phenylsulfanyl)-purin-9-yl]-ethyl}-benzoic acid and

[00521] 4-{2-[6-Amino-8-(2, 5-dimethoxy-phenylsulfanyl)-purin-3-yl]-ethyl}-benzoic acid

[00522] The title compounds were prepared from 8-(2, 5-dimethoxy-phenylsulfanyl)-9H-purin-6-ylamine and 4-(2-chloro-ethyl)-benzoic acid by a procedure similar to examples 1 and 2. The isomers were separated by preparative HPLC. ^{1}H NMR (Acetone-d_6) δ 8.27 (s, 1H), 7.91 (d, *J*= 8.0 Hz, 2H), 7.24 (d, *J*= 8.0 Hz, 2H), 7.00 (d, *J*= 8.8Hz, 1H), 6.86 (dd, *J*= 8.8, 3.2 Hz, 1H), 6.69 (d, *J*= 3.2 Hz, 1H), 4.55 (t, *J*= 7.6 Hz, 2H), 3.81 (s, 3H), 3.67 (s, 3H), 3.21 (t, *J*= 7.6 Hz, 2H); TOF LC-MS $[M+H]^+$ 452.14.

[00523] 4-{2-[6-Amino-8-(2, 5-dimethoxy-phenylsulfanyl)-purin-3-yl]-ethyl}-benzoic acid: Yield 11 %, ^{1}H NMR (CD_3OD) δ 8.19 (s, 1H), 7.93(d, *J* = 7.2 Hz, 2H), 7.29 (s, 1H), 7.24 (d, *J* = 7.6 Hz, 2H), 7.19 (s, 2H), 4.64 (t, *J* = 8.0 Hz, 2H), 3.81 (s, 6H), 3.36 -3.28 (m, 2H); LC-MS $[M+H]^+$ 452.1.

[00524] Example 83

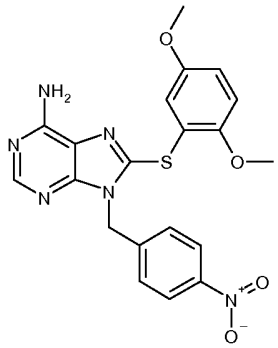


[00525] 8-(2,5-Dimethoxy-phenylsulfanyl)-3-(4-fluoro-benzyl)-3H-purin-6-ylamine

[00526] The title compound was prepared from 8-(2, 5-dimethoxy-phenylsulfanyl)-9H-purin-6-ylamine and 1-bromomethyl-4-fluoro-benzene by a procedure similar to examples 1 and 2. The compound was purified by preparative

HPLC. 8-(2, 5-Dimethoxy-phenylsulfanyl)-3-(4-fluoro-benzyl)-3H-purin-6-ylamine: Yield 34%, ^{1}H NMR (DMSO-d_6) δ 8.55 (s, 1H), 8.1 (bs, 2H), 7.51 (m, 2H), 7.15 (m, 2H), 6.97 (m, 2H), 6.76 (dd, *J* = 8.8, 2.8 Hz, 1H), 5.44 (s, 2H), 3.74 (s, 3H), 3.50 (s, 3H); LC-MS $[M+H]^+$ 412.1.

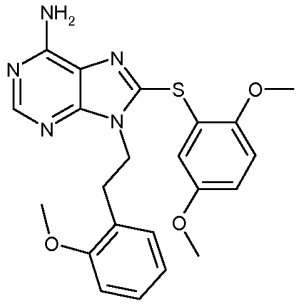
[00527] Example 84

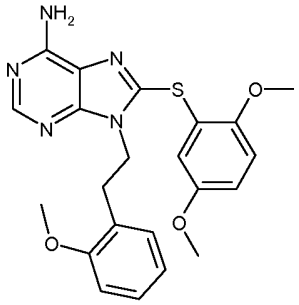


[00528] 8-(2,5-Dimethoxy-phenylsulfanyl)-9-(4-nitro-benzyl)-9H-purin-6-ylamine

[00529] The title compound was prepared from 8-(2, 5-dimethoxy-phenylsulfanyl)-9H-purin-6-ylamine and 1-bromomethyl-4-nitro-benzene by a procedure similar to examples 1 and 2. The compound was purified by preparative HPLC. 8-(2, 5-Dimethoxy-phenylsulfanyl)-9-(4-nitro-benzyl)-9H-purin-6-ylamine: Yield 10%, ^{1}H NMR (DMSO-d_6) δ 8.20 (s, 1H), 8.04 (d, *J* = 6.8 Hz, 2H), 7.57 (bs, 2H), 7.30 (d, 6.8 Hz, 2H), 6.88 (d, J = 8.4 Hz, 1H), 6.70 (dd, *J* = 9.2, 3.2 Hz, 1H), 6.25 (d, *J* = 2.8 Hz, 1H), 5.52 (s, 2H), 3.71 (s, 3H), 3.52 (s, 3H); LC-MS $[M+H]^+$ 439.1.

[00530] Examples 85 and 86

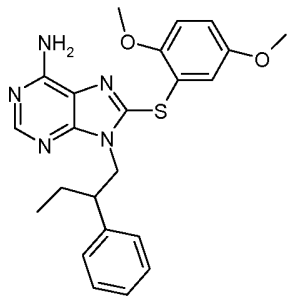


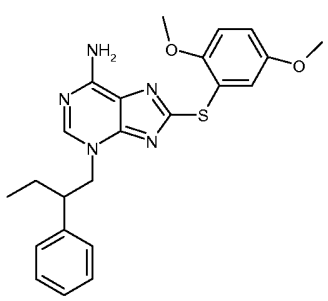


[00531] 8-(2, 5-Dimethoxy-phenylsulfanyl)-9-[2-(2-methoxy-phenyl)-ethyl]-9H-purin-6-ylamine and 8-(2, 5-dimethoxy-phenylsulfanyl)-3-[2-(2-methoxy-phenyl)-ethyl]-3H-purin-6-ylamine

[00532] The title compounds were prepared from 8-(2, 5-dimethoxy-phenylsulfanyl)-9H-purin-6-ylamine and 1-(2-bromo-ethyl)-3-methoxy-benzene by a procedure similar to examples 1 and 2. The isomers were separated by preparative HPLC. 8-(2, 5-Dimethoxy-phenylsulfanyl)-9-[2-(2-methoxy-phenyl)-ethyl]-9H-purin-6-ylamine: Yield 27 %, ^{1}H NMR (DMSO-d_6) δ 8.26 (s, 1H), 7.19-7.15 (m, 1H), 7.00 (d, J = 8.8 Hz, 1H), 6.89-6.73 (m, 4H), 6.47 (d, J = 2.4 Hz, 1H), 4.42 (t, J = 7.2 Hz, 2H), 3.73 (s, 3H), 3.67 (s, 3H), 3.61 (s, 3H), 3.01 (t, J = 7.2 Hz, 2H); LC-MS $[M+H]^+$ 438.1. 8-(2, 5-Dimethoxy-phenylsulfanyl)-3-[2-(2-methoxy-phenyl)-ethyl]-3H-purin-6-ylamine: Yield 11 %, ^{1}H NMR (DMSO-d_6) δ 8.20 (bs, 1H), 7.26-7.16 (m, 3H), 7.15-7.08 (m, 1H), 6.98 (dd, J = 7.2, 1.6 Hz, 1H), 6.91 (d, J = 7.2 Hz, 1H), 6.83 (t, J = 7.2 Hz, 1H), 4.51 (t, J = 6.8 Hz, 2H), 3.76 (s, 3H), 3.70 (s, 3H), 3.58 (s, 3H), 3.13 (t, J = 6.8 Hz, 2H); LC-MS $[M+H]^+$ 438.1.

[00533] Examples 87 and 88

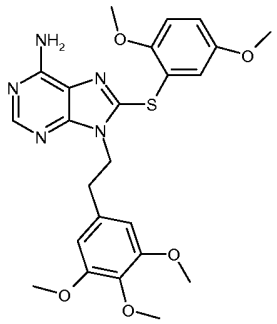


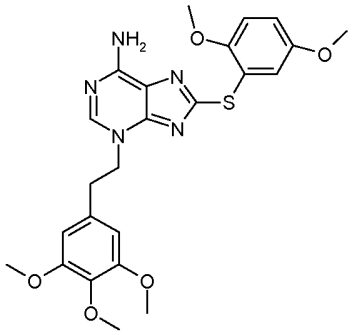


[00534] 8-(2, 5-Dimethoxy-phenylsulfanyl)-9-(2-phenyl-butyl)-9H-purin-6-ylamine and 8-(2, 5-dimethoxy-phenylsulfanyl)-3-(2-phenyl)-butyl)-3H-purin-6-ylamine

[00535] The title compounds were prepared from 8-(2, 5-dimethoxy-phenylsulfanyl)-9H-purin-6-ylamine and (1-bromomethyl-propyl)-benzene by a procedure similar to examples 1 and 2. The isomers were separated by preparative HPLC. 8-(2, 5-Dimethoxy-phenylsulfanyl)-9-(2-phenyl-butyl)-9H-purin-6-ylamine: ^{1}H NMR (DMSO-d_6) δ 8.28 (s, 1H), 7.26-7.18 (m, 3H), 7.08-7.01 (m, 3H), 6.88 (dd, J = 3.2, 9.0 Hz, 1H), 6.50 (d, J, = 2.9Hz, 1H), 4.45-4.29 (m, 2H), 3.74 (s, 3H), 3.60 (s, 3H), 3.15-3.05 (m, 1H), 1.71-1.59 (m, 2H), 0.65 (t, J = 7.3 Hz, 3H); LC-MS $[M+H]^+$) 436.1. 8-(2, 5-Dimethoxy-phenylsulfanyl)-3-(2-phenyl)-butyl)-3H-purin-6-ylamine: Yield 31%, ^{1}H NMR (DMSO-d_6) δ 8.20 (s, 1H), 7.31-7.08 (m, 8H), 4.63-4.51 (m, 1H), 4.48-4.39 (m, 1H), 3.79 (s, 3H), 3.77 (s, 3H), 3.29-3.20 (m, 1H), 1.75-1.61 (m, 2H), 0.73 (t, J = 7.0 Hz, 3H); LC-MS $[M+H]^+$ 436.1.

[00536] Examples 89 and 90



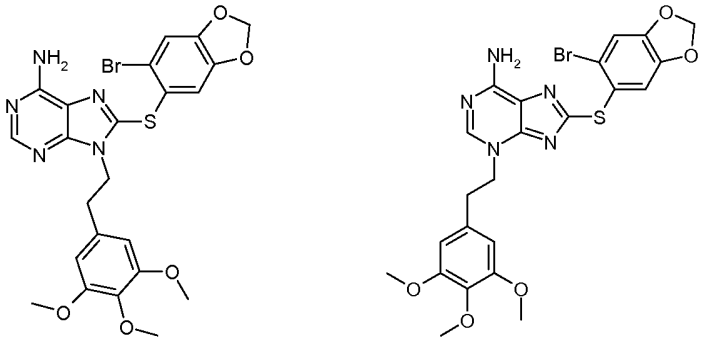


[00537] 8-(2, 5-Dimethoxy-phenylsulfanyl)-9-[2-(3, 4, 5-trimethoxy-phenyl)-ethyl]-9H-purin-6-ylamine and 8-(2, 5-dimethoxy-phenylsulfanyl)-3-[2-(3, 4, 5-trimethoxy-phenyl)-ethyl]-3H-purin-6-ylamine

[00538] The title compounds were prepared from 8-(2, 5-dimethoxy-phenylsulfanyl)-9H-purin-6-ylamine and 5-(2-bromo-ethyl)-1, 2, 3-trimethoxy-

benzene by a procedure similar to examples 1 and 2. The isomers were separated by preparative HPLC. 8-(2, 5-Dimethoxy-phenylsulfanyl)-9-[2-(3, 4, 5-trimethoxy-phenyl)-ethyl]-9H-purin-6-ylamine: Yield 22%, ^{1}H NMR (DMSO-d_6) δ 8.30 (s, 1H), 7.04 (d, J = 9.0 Hz, 1H), 6.88 (dd, J = 9.0, 3.0 Hz, 1H), 6.58 (d, J = 2.9 Hz, 1H), 6.26 (s, 2H), 4.42 (t, J=6.9 Hz, 2H), 3.77 (s, 3H), 3.66 (s, 6H), 3.62 (s, 3H), 3.59 (s, 3H), 2.96 (t, J=6.9 Hz, 2H); LC-MS $[M+H]^+$ 498.2. 8-(2, 5-Dimethoxy-phenylsulfanyl)-3-[2-(3, 4, 5-trimethoxy-phenyl)-ethyl]-3H-purin-6-ylamine: Yield 5%, ^{1}H NMR (DMSO-d_6) δ 8.36 (s, 1H), 7.26-7.04 (m, 3H), 6.41 (s, 2H), 4.56 (t, J=6.8 Hz, 2H), 3.77 (s, 3H), 3.74 (s, 3H), 3.69 (s, 6H), 3.61 (s, 3H), 3.09 (t, J=6.8 Hz, 2H); LC-MS $[M+H]^+$ 498.2.

[00539] Examples 91 and 92

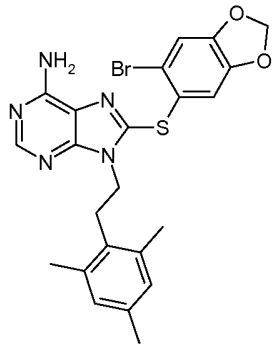


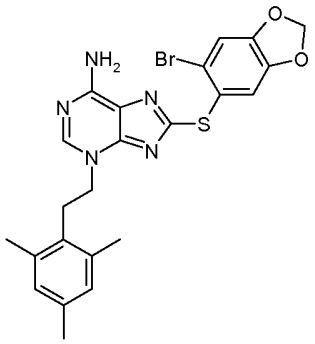
[00540] 8-(6-Bromo-benzo[1,3]dioxol-5-ylsulfanyl)-9-[2-(3, 4, 5-trimethoxy-phenyl)-ethyl]-9H-purin-6-ylamine and 8-(6-bromo-benzo[1,3]dioxol-5-ylsulfanyl)-3-[2-(3, 4, 5-trimethoxy-phenyl)-ethyl]-3H-purin-6-ylamine

[00541] The title compounds were prepared from 8-(6-bromo-benzo[1,3]dioxol-5-ylsulfanyl)-9H-purin-6-ylamine and 5-(2-bromo-ethyl)-1, 2, 3-trimethoxy-benzene by a procedure similar to examples 1 and 2. The isomers were separated by preparative HPLC. 8-(6-Bromo-benzo[1,3]dioxol-5-ylsulfanyl)-9-[2-(3, 4, 5-trimethoxy-phenyl)-ethyl]-9H-purin-6-ylamine: Yield 23%, ^{1}H NMR (DMSO-d_6) δ 8.28 (s, 1H), 7.38 (s, 1H), 6.74 (s, 1H), 6.27 (s, 2H), 6.19 (s, 2H), 4.40 (t, J=7.4 Hz, 2H), 3.67 (s, 6H), 3.59 (s, 3H), 2.96 (t, J=7.2 Hz, 2H); LC-MS $[M+H]^+$ 561.10. 8-(6-Bromo-benzo[1,3]dioxol-5-ylsulfanyl)-3-[2-(3, 4, 5-

trimethoxy-phenyl)-ethyl]-3H-purin-6-ylamine: Yield 8%, ^{1}H NMR (DMSO-d_6) δ 8.28 (s, 2H), 7.47 (s, 1H), 7.38 (s, 1H), 6.39 (s, 2H), 6.17 (s, 2H), 4.53 (t, *J*=6.8 Hz, 2H), 3.69 (s, 6H), 3.60 (s, 3H), 3.11 (t, *J*=6.9 Hz, 2H); LC-MS $[M+H]^+$ 561.1.

[00542] Examples 93 and 94

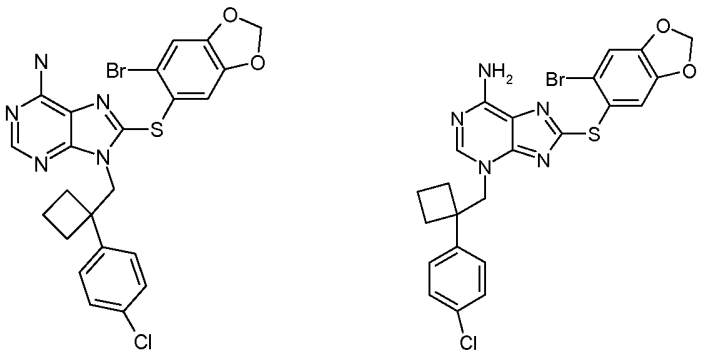




[00543] 8-(6-Bromo-benzo[1,3]dioxol-5-ylsulfanyl)-9-[2-(2,4,6-trimethyl-phenyl)-ethyl]-9H-purin-6-ylamine and 8-(6-bromo-benzo[1,3]dioxol-5-ylsulfanyl)-3-[2-(2,4,6-trimethyl-phenyl)-ethyl]-3H-purin-6-ylamine

[00544] The title compounds were prepared from 8-(6-bromo-benzo[1,3]dioxol-5-ylsulfanyl)-9H-purin-6-ylamine and 2-(2-bromo-ethyl)-1,3,5-trimethyl-benzene by a procedure similar to examples 1 and 2. The isomers were separated by preparative HPLC. 8-(6-Bromo-benzo[1,3]dioxol-5-ylsulfanyl)-9-[2-(2, 4, 6-trimethyl-phenyl)-ethyl]-9H-purin-6-ylamine: Yield 23%, ^{1}H NMR (DMSO-d_6) δ 8.38 (s, 1H), 7.38 (s, 1H), 6.84 (s, 2H), 6.76 (s, 1H), 6.09 (s, 2H), 4.25 (t, *J*=7.8 Hz, 2H), 3.01 (t, *J* = 7.8 Hz, 2H), 2.27 (s, 6H), 2.19 (s, 3H); LC-MS $[MH]^+$ 513.1. 8-(6-Bromo-benzo[1,3]dioxol-5-ylsulfanyl)-3-[2-(2, 4, 6-trimethyl-phenyl)-ethyl]-3H-purin-6-ylamine: Yield 10%, ^{1}H NMR (DMSO-d_6) δ 8.52 (s, 1H), 7.50 (s, 1H), 7.42 (s, 1H), 6.82 (s, 2H), 6.20 (s, 2H), 4.28 (t, *J*=8.4 Hz, 2H), 3.19 (t, *J* = 8.3 Hz, 2H), 2.19 (s, 9H); LC-MS $[M+H]^+$ 513.1.

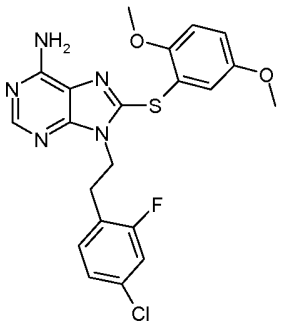
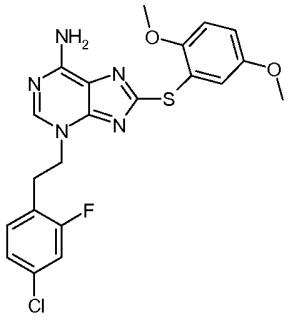
[00545] Examples 95 and 96



[00546] 8-(6-Bromo-benzo[1,3]dioxol-5-ylsulfanyl)-9-[1-(4-chloro-phenyl)-cyclobutylmethyl]-9H-purin-6-ylamine and 8-(6-bromo-benzo[1,3]dioxol-5-ylsulfanyl)-3-[1-(4-chloro-phenyl)-cyclobutylmethyl]-3H-purin-6-ylamine

[00547] The title compounds were prepared from 8-(6-bromo-benzo[1,3]dioxol-5-ylsulfanyl)-9H-purin-6-ylamine and 1-(1-bromomethyl-cyclobutyl)-4-chloro-benzene by a procedure similar to examples 1 and 2. The isomers were separated by preparative HPLC. 8-(6-Bromo-benzo[1,3]dioxol-5-ylsulfanyl)-9-[1-(4-chloro-phenyl)-cyclobutylmethyl]-9H-purin-6-ylamine: Yield 16%, ^{1}H NMR (CD_3OD) δ 8.16 (br s, 1H), 7.26 (d, J = 8.8 Hz, 2H), 7.14 (s, 1H), 6.95 (d, J= 8.9 Hz, 2H), 6.82 (s, 1H) 6.04 (s, 2H), 4.59 (s, 2H), 2.77-2.69 (m, 2H), 2.42-2.36 (m, 2H), 2.35-2.26 (m, 1H), 1.95-1.85 (m, 1H); LC-MS $[M+H]^+$ 545.0. 8-(6-Bromo-benzo[1,3]dioxol-5-ylsulfanyl)-3-[1-(4-chloro-phenyl)-cyclobutylmethyl]-3H-purin-6-ylamine: Yield 7%, ^{1}H NMR (CD_3OD) δ 7.39 (br s, 1H), 7.29-7.24 (m, 3H), 7.19 (br s, 1H), 6.97-6.92 (m, 2H), 6.09 (s, 2H) 4.69 (s, 2H), 2.58-2.50 (m, 2H), 2.44-2.34 (m, 2H), 2.24-2.17 (m, 1H), 1.91-1.82 (m, 1H); LC-MS $[M+H]^+$ 545.0.

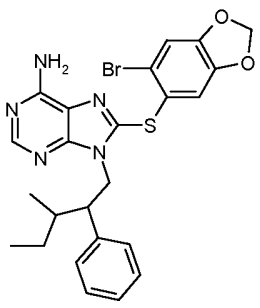
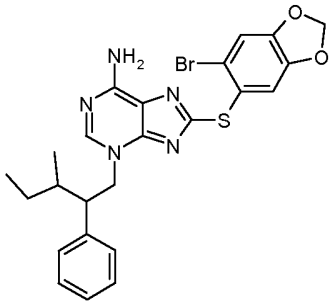
[00548] Examples 97 and 98

[00549] 9-[2-(4-Chloro-2-fluoro-phenyl)-ethyl]-8-(2, 5-dimethoxy-phenylsulfanyl)-9H-purin-6-ylamine and 3-[2-(4-chloro-2-fluoro-phenyl)-ethyl]-8-(2, 5-dimethoxy-phenylsulfanyl)-3H-purin-6-ylamine

[00550] The title compounds were prepared from 8-(2,5-dimethoxy-phenylsulfanyl)-9H-purin-6-ylamine and 1-(2-bromo-ethyl)-4-chloro-2-fluoro-benzene by a procedure similar to examples 1 and 2. The isomers were separated by preparative HPLC. 9-[2-(4-Chloro-2-fluoro-phenyl)-ethyl]-8-(2, 5-dimethoxy-phenylsulfanyl)-9H-purin-6-ylamine: Yield 34%, ^{1}H NMR (DMSO-d_6) δ 8.29 (s, 1H), 7.30 (dd, *J* = 10.0, 2.1, Hz, 1H), 7.16-7.00 (m, 3H), 6.88 (dd, *J* = 8.8, 3.0, Hz, 1H), 6.57 (d, *J* = 2.9 Hz, 1H), 4.46 (t, *J*=6.8 Hz, 2H), 3.74 (s, 3H), 3.62 (s, 3H), 3.10 (t, *J*=6.8 Hz, 2H); LC-MS $[M+H]^+$ 460.1. 3-[2-(4-Chloro-2-fluoro-phenyl)-ethyl]-8-(2, 5-dimethoxy-phenylsulfanyl)-3H-purin-6-ylamine: Yield 12%, ^{1}H NMR (DMSO-d_6) δ 8.39 (s, 1H), 7.40-7.38 (m, 1H), 7.25-7.02 (m, 5H), 4.53 (t, *J*=6.4 Hz, 2H), 3.77 (s, 3H), 3.71 (s, 3H), 3.21 (t, *J*=6.4 Hz, 2H); LC-MS $[M+H]^+$ 460.1.

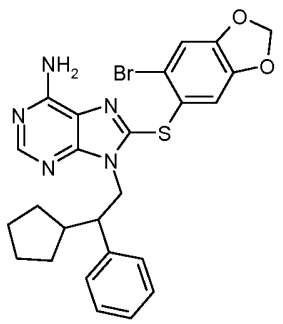
[00551] Examples 99 and 100

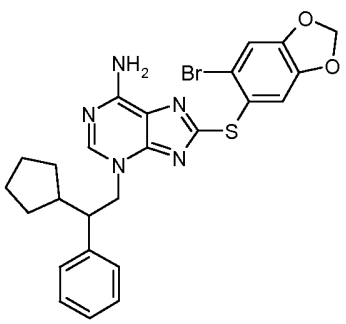



[00552] 8-(6-Bromo-benzo[1,3]dioxol-5-ylsulfanyl)-9-(3-methyl-2-phenyl-pentyl)-9H-purin-6-ylamine and 8-(6-bromo-benzo[1,3]dioxol-5-ylsulfanyl)-3-(3-methyl-2-phenyl-pentyl)-3H-purin-6-ylamine

[00553] The title compounds were prepared from 8-(6-bromo-benzo[1,3]dioxol-5-ylsulfanyl)-9H-purin-6-ylamine and (1-bromomethyl-2-methyl-butyl)-benzene by a procedure similar to examples 1 and 2. 8-(6-Bromo-benzo[1,3]dioxol-5-ylsulfanyl)-9-(3-methyl-2-phenyl-pentyl)-9H-purin-6-ylamine, a mixture of diastereomers: Yield 19 %, ^{1}H NMR (DMSO-d_6) δ 8.23 (s, 1H), 8.21(s, 1H), 7.36 (s, 2H), 7.15-7.10 (m, 6H), 7.04-6.99 (m, 4H), 6.59 (s, 2H), 6.08 (s, 4H), 4.59 (m, 2H), 4.50 (m, 2H), 3.30 (m, 2H), 3.20 (m, 2H), 2.45 (m, 4H), 1.05 (d, J = 6.4 Hz, 3H), 0.90 (t, J = 7.2 Hz, 3H), 0.76-0.70 (m, 6H); LC- MS $[M+H]^+$ 528.1. 8-(6-Bromo-benzo[1,3]dioxol-5-ylsulfanyl)-3-(3-methyl-2-phenyl-pentyl)-3H-purin-6-ylamine, a mixture of diastereomers: Yield 3%, ^{1}H NMR (DMSO-d_6) δ 8.01 (s, 1H), 7.99 (s, 1H) 7.48 (s, 2H), 7.39 (s, 2H), 7.24-7.10 (m, 6H), 7.05-7.03 (m, 4H), 6.19 (s, 2H), 6.17 (s, 2H), 4.70 (m, 1H), 4.47 (m, 1H), 3.39 (m, 2H), 2.45 (m, 2H), 1.78 (m, 2H), 1.24 (m, 2H), 1.01 (d, J= 6.4 Hz, 3H), 0.85 (t, J = 7.6 Hz, 3H), 0.76 (t, J= 7.6 Hz, 3H), 0.68 (d, J= 6.4 Hz, 3H); LC- MS $[M+H]^+$ 528.1.

[00554] Examples 101 and 102

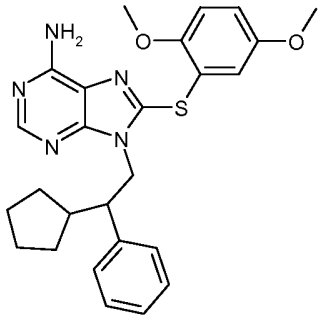


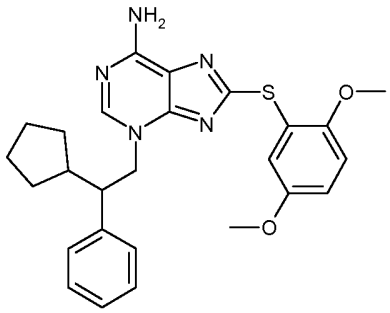


[00555] 8-(6-Bromo-benzo[1,3]dioxol-5-ylsulfanyl)-9-(2-cyclopentyl-2-phenyl-ethyl)-9H-purin-6-ylamine and 8-(6-bromo-benzo[1,3]dioxol-5-ylsulfanyl)-3-(2-cyclopentyl-2-phenyl-ethyl)-3H-purin-6-ylamine

[00556] The title compounds were prepared from 8-(6-bromo-benzo[1,3]dioxol-5-ylsulfanyl)-9H-purin-6-ylamine and (2-bromo-1-cyclopentyl-ethyl)-benzene by a procedure similar to examples 1 and 2. The isomers were separated by preparative HPLC. 8-(6-Bromo-benzo[1,3]dioxol-5-ylsulfanyl)-9-(2-cyclopentyl-2-phenyl-ethyl)-9H-purin-6-ylamine: Yield 20 %, ^{1}H NMR (DMSO-d_6) δ 8.21 (s, 1H), 7.34 (s, 1H), 7.14-7.06 (m, 3H), 6.99 (d, *J*= 8.0 Hz, 2H), 6.57 (s, 1H), 6.08 (bs, 2H), 4.47 (d, *J*= 8.0 Hz, 2H), 3.20 (m, 1H), 2.55 (m, 1H), 2.01-1.80 (m, 4H), 1.49-1.30 (m, 4H); LC- MS $[M+H]^+$ 540.1. 8-(6-Bromo-benzo[1,3]dioxol-5-ylsulfanyl)-3-(2-cyclopentyl-2-phenyl-ethyl)-3H-purin-6-ylamine: Yield 11 %, ^{1}H NMR (DMSO-d_6) δ 7.91 (bs, 1H), 7.48 (bs, 1H), 7.40 (bs, 1H), 7.21-7.12 (m, 3H), 7.02 (d, *J*= 7.2 Hz, 2H), 6.16 (s, 1H), 4.65 (dd, *J*= 9.2, 4.4Hz, 1H), 4.41 (t, *J*= 12 Hz, 1H), 3.21 (m, 2H), 2.43-2.23 (m, 1H), 1.99-1.80 (m, 1H), 1.70-1.20 (m, 6H), 0.96-0.91 (m, 1H); LC- MS $[M+H]^+$ 540.1.

[00557] Examples 103 and 104



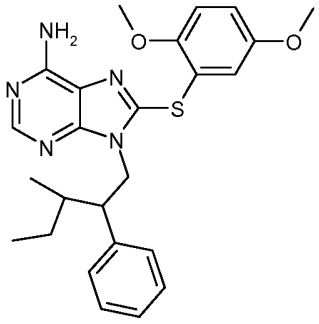


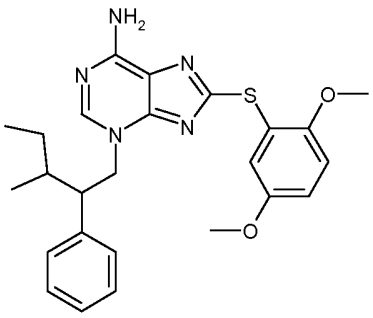
[00558] 9-(2-Cyclopentyl-2-phenyl-ethyl)-8-(2, 5-dimethoxy-phenylsulfanyl)-9H-purin-6-ylamine and 3-(2-cyclopentyl-2-phenyl-ethyl)-8-(2, 5-dimethoxy-phenylsulfanyl)-3H-purin-6-ylamine

[00559] The title compounds were prepared from 8-(2, 5-dimethoxy-phenylsulfanyl)-9H-purin-6-ylamine and (2-bromo-1-cyclopentyl-ethyl)-benzene by a procedure similar to examples 1 and 2. The isomers were separated by preparative HPLC. 9-(2-Cyclopentyl-2-phenyl-ethyl)-8-(2, 5-dimethoxy-

phenylsulfanyl)-9H-purin-6-ylamine: Yield 15 %, ^{1}H NMR (DMSO-d_6) δ 8.20 (s, 1H), 7.12-7.06 (m, 3H), 7.01 (d, *J*= 8.8 Hz, 1H), 6.96-6.93 (m, 2H), 6.86 (dd, *J*= 8.8, 2.8 Hz, 1H), 6.45 (d, *J*= 2.4 Hz, 1H), 4.49-4.45 (m, 2H), 3.74 (s, 3H), 3.60 (s, 3H), 3.18-3.01 (m, 1H), 2.23-2.22 (m, 1H), 2.00-1.25 (m, 6H), 0.80-0.61 (m, 2H); LC-MS $[M+H]^+$ 476.2. 3-(2-Cyclopentyl-2-phenyl-ethyl)-8-(2,5-dimethoxy-phenylsulfanyl)-3H-purin-6-ylamine: Yield 15 %, ^{1}H NMR (DMSO-d_6) δ 7.99 (bs, 1H), 7.24-7.10 (m, 6H), 7.03 (d, *J*= 6.8 Hz, 2H), 4.65 (m, 2H), 3.77 (s, 3H), 3.72 (s, 3H), 2.60-2.40 (m, 2H), 2.00-1.25 (m, 8H); LC- MS $[M+H]^+$ 476.2.

[00560] Examples 105 and 106



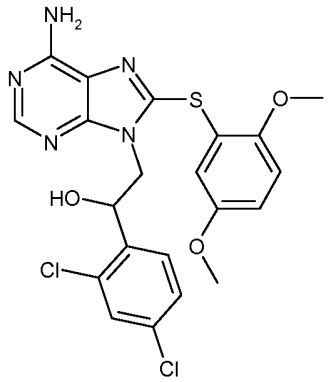


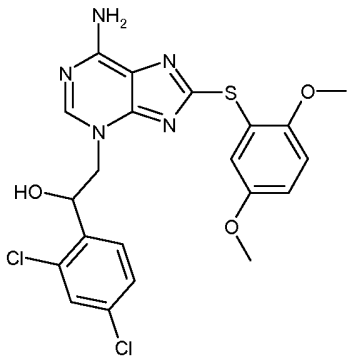
[00561] 8-(2, 5-Dimethoxy-phenylsulfanyl)-9-(3-methyl-2-phenyl-pentyl)-9H-purin-6-ylamine and 8-(2, 5-dimethoxy-phenylsulfanyl)-3-(3-methyl-2-phenyl-pentyl)-3H-purin-6-ylamine

[00562] The title compounds were prepared from 8-(2, 5-dimethoxy-phenylsulfanyl)-9H-purin-6-ylamine and (1-bromomethyl-2-methyl-butyl)-benzene by a procedure similar to examples 1 and 2. The isomers were separated by preparative HPLC. 8-(2, 5-Dimethoxy-phenylsulfanyl)-9-(3-methyl-2-phenyl-pentyl)-9H-purin-6-ylamine, a mixture of diastereomers: Yield 25 %, ^{1}H NMR (DMSO-d_6) δ 8.18 (s, 1H), 8.16 (s, 1H), 7.24-7.06 (m, 6H), 7.03-6.94 (m, 6H), 6.86-6.84 (m, 2H), 6.39 (m, 2H), 4.60-4.45 (m, 2H), 3.75 (s, 6H), 3.59 (s, 6H), 3.50 (m, 4H), 2.43 (m, 4H), 0.98 (d, *J*= 6.4 Hz, 6H), 0.90-0.88 (m, 2H), 0.72-0.67 (m, 6H); LC- MS $[M+H]^+$ 464.2. 8-(2, 5-Dimethoxy-phenylsulfanyl)-3-(3-methyl-2-phenyl-

pentyl)-3H-purin-6-ylamine, a mixture of diasereomers: Yield 9%, ^{1}H NMR (DMSO-d_6) δ 7.99 (s, 2H), 7.24-7.10 (m, 10H), 7.06-7.04 (m, 6H), 4.70 (m, 1H), 4.50 (m, 1H), 3.77 (s, 6H), 3.74 (m, 2H), 3.73 (s, 6H), 2.45 (m, 4H), 1.02 (d, *J*= 6.4 Hz, 3H), 0.88-0.88 (m, 3H), 0.79-0.72 (m, 3H), 0.69 (d, *J*= 6.4 Hz, 3H); LC-MS $[M+H]^+$ 464.2.

[00563] Examples 107 and 108

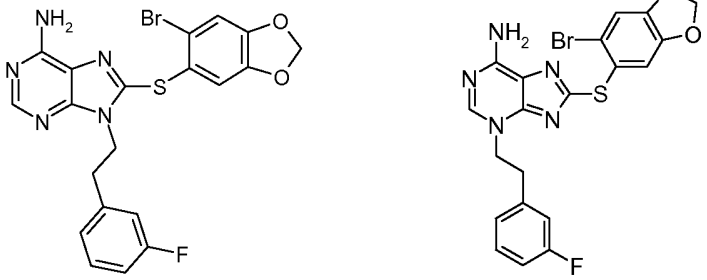




[00564] 2-[6-Amino-8-(2, 5-dimethoxy-phenylsulfanyl)-purin-9-yl]-1-(2, 4-dichloro-phenyl)ethanol and 2-[6-amino-8-(2, 5-dimethoxy-phenylsulfanyl)-purin-3-yl]-1-(2, 4-dichloro-phenyl)ethanol

[00565] The title compounds were prepared from 8-(2, 5-dimethoxy-phenylsulfanyl)-9H-purin-6-ylamine and 2-chloro-1-(2, 4-dichloro-phenyl)-ethanol by a procedure similar to examples 1 and 2. The isomers were separated by preparative HPLC. 2-[6-Amino-8-(2, 5-dimethoxy-phenylsulfanyl)-purin-9-yl]-1-(2, 4-dichloro-phenyl)ethanol: Yield 17%, ^{1}H NMR (DMSO-d_6) δ 10.10 (s, 1H), 7.98 (s, 1H), 7.61 (d, *J*= 8.8 Hz, 1H), 7.53 (d, *J*= 2.0 Hz, 1H), 6.95 (d, *J*= 3.2Hz, 1H), 6.87 (d, *J*= 8.8 Hz, 1H), 6.76 (dd, *J*= 8.8, 3.2 Hz, 1H), 6.54 (bs, 2H), 6.42 (bs, 1H), 5.54 (t, *J*= 8.8 Hz, 1H), 4.21 (t, *J*= 8.8 Hz, 2H) 3.68 (s, 3H), 3.67 (s, 3H); TOF LC-MS $[M+H]^+$ 492.0. 2-[6-Amino-8-(2, 5-dimethoxy-phenylsulfanyl)-purin-3-yl]-1-(2, 4-dichloro-phenyl)ethanol: Yield 1.0%, ^{1}H NMR (DMSO-d_6) δ 8.10 (bs, 1H), 7.63-7.58 (m, 2H), 7.49 (dd, *J* = 8.0, 2.4 Hz, 1H), 6.58 (bs, 1H), 6.17 (bs, 2H), 5.63 (m, 1H), 4.50 (m, 2H), 3.76 (s, 3H), 3.68 (s, 3H); LC-MS $[M+H]^+$ 492.1.

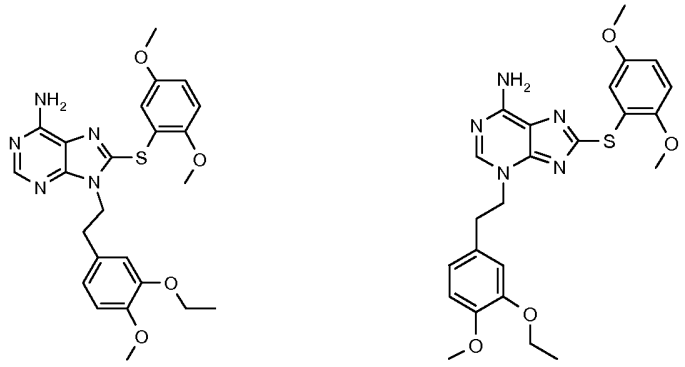
[00566] Examples 109 and 110



[00567] 8-(6-Bromo-benzo[1,3]dioxol-5-ylsulfanyl)-9-[2-(3-fluoro-phenyl)-ethyl]-9H-purin-6-ylamine and 8-(6-bromo-benzo[1,3]dioxol-5-ylsulfanyl)-3-[2-(3-fluoro-phenyl)-ethyl]-3H-purin-6-ylamine

[00568] The title compounds were prepared from 8-(6-bromo-benzo[1, 3]dioxol-5-ylsulfanyl)-9H-purin-6-ylamine and 1-(2-bromo-ethyl)-3-fluoro-benzene by a procedure similar to examples 1 and 2. The isomers were separated by preparative HPLC. 8-(6-Bromo-benzo[1,3]dioxol-5-ylsulfanyl)-9-[2-(3-fluoro-phenyl)-ethyl]-9H-purin-6-ylamine: Yield 22%, ^{1}H NMR (DMSO-d_6) δ 8.18 (s, 1H), 7.34 (s, 1H), 7.27-7.21 (m, 1H), 7.02-6.97 (m, 1H), 6.93-6.89 (m, 1H), 6.83 (d, *J*= 7.6 Hz, 1H), 6.65 (s, 1H), 6.08 (s, 2H), 4.41 (t, *J*= 7.2 Hz, 2H), 3.07 (t, *J*= 7.2 Hz, 2H); LC- MS $[M+H]^+$ 490.0. 8-(6-Bromo-benzo[1,3]dioxol-5-ylsulfanyl)-3-[2-(3-fluoro-phenyl)-ethyl]-3H-purin-6-ylamine: Yield 17 %, ^{1}H NMR (DMSO-d_6) δ 8.10 (bs, 1H), 7.50-7.26 (m, 3H), 7.10-7.00 (m, 2H), 6.93 (d, *J*= 7.6 Hz, 1H), 6.16 (bs, 2H), 4.53 (t, *J*= 6.4 Hz, 2H), 3.201 (t, *J*= 6.4 Hz, 2H); LC-MS $[M+H]^+$ 490.0.

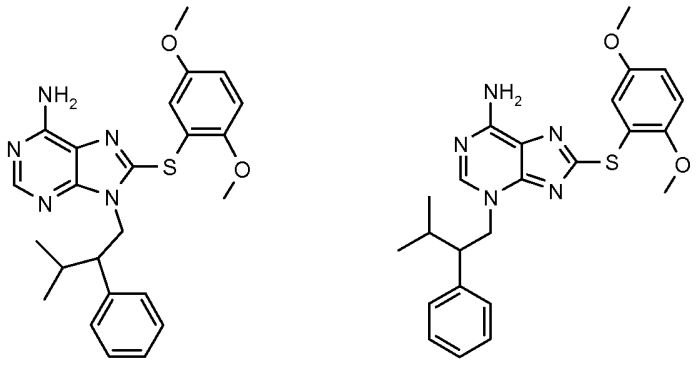
[00569] Examples 111 and 112



[00570] 8-(2, 5-Dimethoxy-phenylsulfanyl)-9-[2-(3-ethoxy-4-methoxy-phenyl)-ethyl]-9H-purin-6-ylamine and 8-(2, 5-dimethoxy-phenylsulfanyl)-3-[2-(3-ethoxy-4-methoxy-phenyl)-ethyl]-3H-purin-6-ylamine

[00571] The title compounds were prepared from 8-(2, 5-dimethoxy-phenylsulfanyl)-9H-purin-6-ylamine and 4-(2-chloro-ethyl)-2-ethoxy-1-methoxy-benzene by a procedure similar to examples 1 and 2. The isomers were separated by preparative HPLC. 8-(2, 5-Dimethoxy-phenylsulfanyl)-9-[2-(3-ethoxy-4-methoxy-phenyl)-ethyl]-9H-purin-6-ylamine: ^{1}H NMR (DMSO-d_6) δ 8.32 (s, 1H), 7.03 (d, *J*=9.2 Hz, 1H), 6.88 (dd, *J*=8.8, 2.8 Hz, 1H), 6.76 (d, *J*=8.4 1H), 6.59-6.56 (m, 2H), 6.48-6.46 (m, 1H), 4.42 (t, *J*= 6.8 Hz, 2H) 3.95-3.89 (m, 2H), 3.73 (s, 3H), 3.65 (s, 3H), 3.62 (s, 3H), 2.94 (t, *J*=6.8 Hz, 2H), 1.28 (t, *J*= 6.8 Hz, 2H); LC-MS $[M+H]^+$ 482.2. 8-(2, 5-Dimethoxy-phenylsulfanyl)-3-[2-(3-ethoxy-4-methoxy-phenyl)-ethyl]-3H-purin-6-ylamine: ^{1}H NMR (DMSO-d_6) δ 8.32 (s, 1H), 7.24 (d, *J*=2.8 Hz, 1H), 7.19-7.18 (m,1H), 7.13-7.12 (m, 1H), 6.82 (d, *J*= 8.40Hz, 1H) 6.72 (d, *J*= 2.0 Hz, 1H), 6.56 (dd, *J*=8.0, 2.0 Hz,1H), 4.52 (t, *J*= 6.8 Hz, 2H) 3.97-3.92 (m, 2H), 3.77 (s, 3H), 3.73 (s, 3H), 3.69 (s, 3H), 3.08 (t, *J*=6.8 Hz, 2H), 1.29 (t, *J*= 6.8 Hz, 3H); LC-MS $[M+H]^+$ 482.2.

[00572] Examples 113 and 114

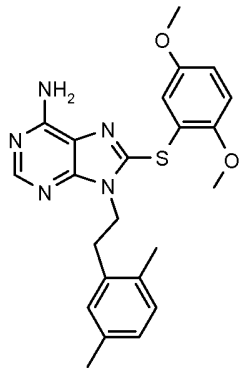


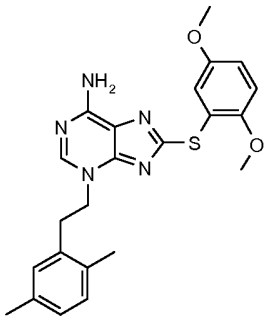
[00573] 8-(2, 5-Dimethoxy-phenylsulfanyl)-9-(3-methyl-2-phenyl-butyl)-9H-purin-6-ylamine and 8-(2, 5-dimethoxy-phenylsulfanyl)-3-(3-methyl-2-phenyl-butyl)-3H-purin-6-ylamine

[00574] The title compounds were prepared from 8-(2, 5-dimethoxy-phenylsulfanyl)-9H-purin-6-ylamine and (1-chloromethyl-2-methyl-propyl)-benzene by a procedure similar to examples 1 and 2. The isomers were separated by preparative HPLC.

[00575] 8-(2, 5-Dimethoxy-phenylsulfanyl)-9-(3-methyl-2-phenyl-butyl)-9H-purin-6-ylamine: ^{1}H NMR (DMSO-d_6) δ 8.23 (s, 1H), 7.15-7.07 (m, 3H), 7.03 (d, *J*=9.2 Hz, 1H), 6.98-6.96 (m, 2H), 6.87 (dd, *J*=6.0, 3.2 Hz, 1H), 6.46 (d, *J*= 2.4 Hz, 1H) 4.60-4.47 (m, 1H), 3.74 (s, 3H), 3.60 (s, 3H), 3.17-3.04 (m, 2H), 1.99-1.94 (m, 1H), 1.0 (d, *J*=6.8 Hz, 3H), 0.92 (d, *J*= 6.4 Hz, 3H); LC-MS $[M+H]^+$ 450.2. 8-(2, 5-Dimethoxy-phenylsulfanyl)-3-(3-methyl-2-phenyl-butyl)-3H-purin-6-ylamine: ^{1}H NMR (DMSO-d_6) δ 8.06 (s, 1H), 7.23-7.14 (m, 5H), 7.09-7.04 (m, 2H), 4.79-4.75 (m, 1H), 4.54-4.48 (m, 2H), 3.8 (s, 3H), 3.74 (s, 3H), 3.17-3.13 (m, 1H), 2.0-1.96 (m, 1H), 1.03 (d, *J*= 6.8 Hz, 3H), 0.718 (d, *J*=6.4 Hz, 3H); LC-MS $[M+H]^+$ 450.2.

[00576] Examples 115 and 116

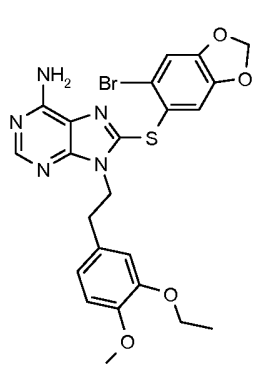


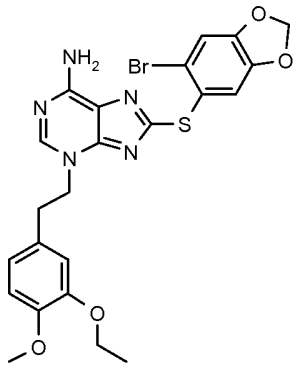


[00577] 8-(2, 5-Dimethoxy-phenylsulfanyl)-9-[2-(2, 5-dimethyl-phenyl)-ethyl]-9H-purin-6-ylamine and 8-(2, 5-dimethoxy-phenylsulfanyl)-3-[2-(2, 5-dimethyl-phenyl)-ethyl]-3H-purin-6-ylamine

[00578] The title compounds were prepared from 8-(2, 5-dimethoxy-phenylsulfanyl)-9H-purin-6-ylamine and 2-(2-chloro-ethyl)-1, 4-dimethyl-benzene by a procedure similar to examples 1 and 2. The isomers were separated by preparative HPLC. 8-(2, 5-Dimethoxy-phenylsulfanyl)-9-[2-(2, 5-dimethyl-phenyl)-ethyl]-9H-purin-6-ylamine: ^{1}H NMR (DMSO-d_6) δ 8.36 (s, 1H), 7.06-7.01 (m, 2H), 6.93-6.88 (m, 2H), 6.71(s, 1H), 6.59 (d, *J*=2.8 Hz, 1H), 4.33 (t, *J*=7.6 Hz, 2H), 3.75 (s, 3H), 3.63 (s, 3H), 2.92 (t, *J*=7.6 Hz, 2H), 2.21 (s, 3H), 2.17 (s, 3H); LC-MS $[M+H]^+$ 436.2. 8-(2, 5-Dimethoxy-phenylsulfanyl)-3-[2-(2, 5-dimethyl-phenyl)-ethyl]-3H-purin-6-ylamine: ^{1}H NMR (DMSO-d_6) δ 8.43 (s, 1H), 7.25 (s, 1H), 7.16 (s, 1H), 7.04 (d, *J*=8.0 Hz, 2H), 6.96-6.94 (m, 1H), 6.84 (s, 1H), 4.44 (t, *J*=7.6 Hz, 2H), 3.76 (s, 3H), 3.73 (s, 3H), 3.10 (t, *J*=7.6 Hz, 2H), 2.19 (s, 3H), 2.17 (s, 3H); LC-MS $[M+H]^+$ 436.2.

[00579] Examples 117 and 118

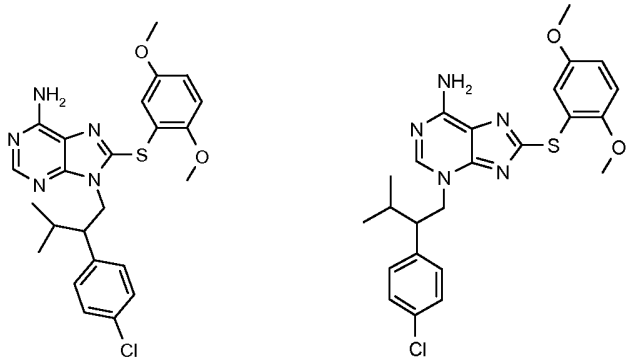




[00580] 8-(6-Bromo-benzo[1,3]dioxol-5-ylsulfanyl)-9-[2-(3-ethoxy-4-methoxy-phenyl)-ethyl]-9H-purin-6-ylamine and 8-(6-bromo-benzo[1,3]dioxol-5-ylsulfanyl)-3-[2-(3-ethoxy-4-methoxy-phenyl)-ethyl]-3H-purin-6-ylamine

[00581] The title compounds were prepared from 8-(6-bromo-benzo[1,3]dioxol-5-ylsulfanyl)-9H-purin-6-ylamine and 4-(2-chloro-ethyl)-2-ethoxy-1-methoxy-benzene by a procedure similar to examples 1 and 2. The isomers were separated by preparative HPLC. 8-(6-Bromo-benzo[1,3]dioxol-5-ylsulfanyl)-9-[2-(3-ethoxy-4-methoxy-phenyl)-ethyl]-9H-purin-6-ylamine: LC-MS $[M+H]^+$ 546.0. 8-(6-bromo-benzo[1,3]dioxol-5-ylsulfanyl)-3-[2-(3-ethoxy-4-methoxy-phenyl)-ethyl]-3H-purin-6-ylamine: ^{1}H NMR (DMSO-d_6) δ 8.25 (s, 1H), 7.50 (s, 1H), 7.38 (s, 1H), 6.80 (d, *J*=8.4 Hz, 1H), 6.69 (d, *J*= 1.6 Hz, 1H), 6.55 (dd, *J*=8.4, 1.6 Hz, 1H), 6.17 (s, 2H), 4.51 (t, *J*=7.2 Hz, 2H), 3.96-3.91 (m, 2H), 3.68 (s, 3H), 3.09 (t, *J*=7.2 Hz, 2H), 1.31-1.27 (m, 3H); LC-MS $[M+H]^+$ 546.05.

[00582] Examples 119 and 120

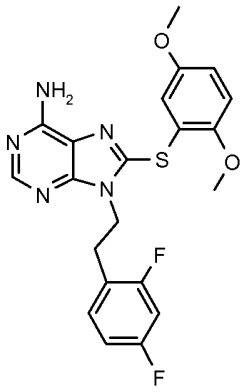


[00583] 9-[2-(4-Chloro-phenyl)-3-methyl-butyl]-8-(2, 5-dimethoxy-phenylsulfanyl)-9H-purine-6-ylamine and 3-[2-(4-chloro-phenyl)-3-methyl-butyl]-8-(2, 5-dimethoxy-phenylsulfanyl)-3H-purine-6-ylamine

[00584] The title compounds were prepared from 8-(2, 5-dimethoxy-phenylsulfanyl)-9H-purin-6-ylamine and 1-chloro-4-(1-chloromethyl-2-methyl-propyl)-benzene by a procedure similar to examples 1 and 2. The isomers were separated by preparative HPLC.

[00585] 9-[2-(4-Chloro-phenyl)-3-methyl-butyl]-8-(2, 5-dimethoxy-phenylsulfanyl)-9H-purine-6-ylamine: ^{1}H NMR (DMSO-d_6) δ 8.25 (s, 1H), 7.16-7.15 (m, 2H), 7.04-6.99 (m, 2H), 6.88 (s, 2H), 6.44 (s, 1H), 4.52 (d, *J*= 6.2 Hz, 2H), 3.75 (s, 3H), 3.61 (s, 3H), 3.06 (m, 1H), 1.98 (s, 1H), 1.01 (d, *J*=5.6 Hz, 3H), 0.67 (d, *J*=6.0 Hz, 3H); LC-MS $[M+H]^+$ 484.1. 3-[2-(4-Chloro-phenyl)-3-methyl-butyl]-8-(2, 5-dimethoxy-phenylsulfanyl)-3H-purine-6-ylamine: LC-MS $[M+H]^+$ 484.1.

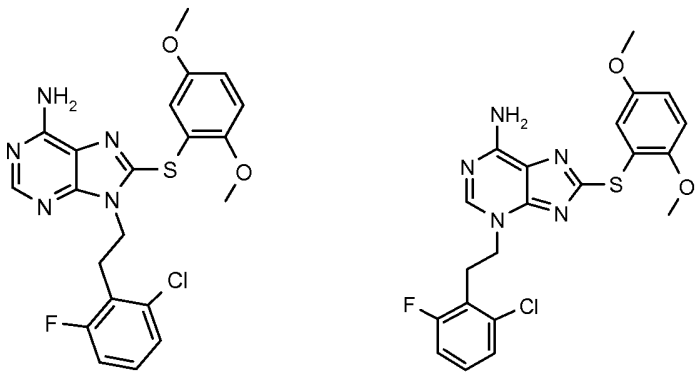
[00586] Example 121



[00587] 9-[2-(2, 4-Difluoro-phenyl)-ethyl]-8-(2, 5-dimethoxy-phenylsulfanyl)-9H-purine-6-ylamine

[00588] The title compound was prepared from 8-(2, 5-dimethoxy-phenylsulfanyl)-9H-purin-6-ylamine and 1-(2-chloro-ethyl)-2, 4-difluoro-benzene by a procedure similar to examples 1 and 2. The compound was purified by preparative HPLC. LC-MS $[M+H]^+$444.1.

[00589] Examples 122 and 123

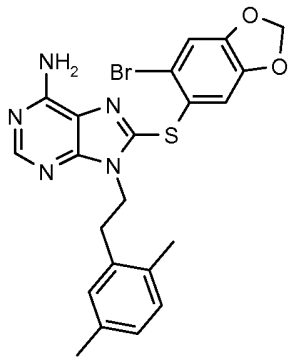


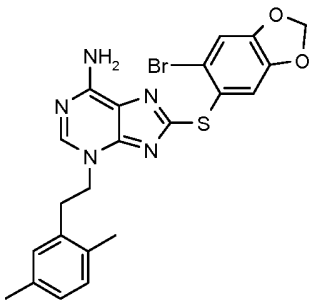
[00590] 9-[2-(2-chloro-6-fluoro-phenyl)-ethyl]-8-(2, 5-dimethoxy-phenylsulfanyl)-9H-purine-6-ylamine and 3-[2-(2-chloro-6-fluoro-phenyl)-ethyl]-8-(2, 5-dimethoxy-phenylsulfanyl)-3H-purine-6-ylamine

[00591] The title compounds were prepared from 8-(2, 5-dimethoxy-phenylsulfanyl)-9H-purin-6-ylamine and 1-chloro-2-(2-chloro-ethyl)-3-fluoro-benzene by a procedure similar to examples 1 and 2. The isomers were separated

by preparative HPLC. 9-[2-(2-chloro-6-fluoro-phenyl)-ethyl]-8-(2, 5-dimethoxy-phenylsulfanyl)-9H-purine-6-ylamine: ^{1}H NMR (DMSO-d_6) δ 8.23 (s, 1H), 7.30-7.21 (m, 2H), 7.13-7.08 (m, 1H), 7.08 (d, *J*=3.2 Hz, 1H), 6.86 (dd, *J*=9.2, 3.2 Hz, 1H), 6.53 (d, *J*=3.2 Hz, 1H), 4.48 (t, *J*=6.6 Hz, 2H), 3.73 (s, 3H), 3.62 (s, 3H), 3.30 (t, *J*=6.0 Hz, 2H); LC-MS $[M+H]^+$ 460.1. 3-[2-(2-chloro-6-fluoro-phenyl)-ethyl]-8-(2, 5-dimethoxy-phenylsulfanyl)-3H-purine-6-ylamine: ^{1}H NMR (DMSO-d_6) δ 8.37 (s, 1H), 7.36-7.26 (m, 2H), 7.19-7.15 (m, 3H), 7.11-7.09 (m, 1H), 7.57 (t, *J*=6.4 Hz, 2H), 3.75 (s, 3H), 3.73 (s, 3H), 3.34 (t, *J*=6.0 Hz, 2H); LC-MS $[M+H]^+$ 486.1.

[00592] Examples 124 and 125



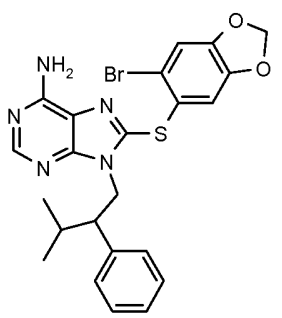


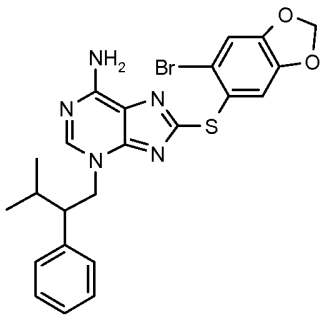
[00593] 8-(6-Bromo-benzo[1,3]dioxol-5-ylsulfanyl)-9-[2-(2,5-dimethyl-phenyl)-ethyl]-9H-purin-6-ylamine and 8-(6-bromo-benzo[1,3]dioxol-5-ylsulfanyl)-3-[2-(2,5-dimethyl-phenyl)-ethyl]-3H-purin-6-ylamine

[00594] The title compounds were prepared from 8-(6-bromo-benzo[1,3]dioxol-5-ylsulfanyl)-9H-purin-6-ylamine and 2-(2-chloro-ethyl)-1, 4-dimethyl-benzene by a procedure similar to examples 1 and 2. The isomers were separated by preparative HPLC. 8-(6-Bromo-benzo[1,3]dioxol-5-ylsulfanyl)-9-[2-(2,5-dimethyl-phenyl)-ethyl]-9H-purin-6-ylamine: ^{1}H NMR (DMSO-d_6) δ 8.30 (s, 1H), 7.37 (s, 1H), 7.01 (d, *J* = 7.6 Hz, 1H), 6.84 (d, *J*=7.6 Hz, 1H), 6.74 (s, 1H), 6.70 (s, 1H), 6.09 (s, 2H), 4.33 (t, *J*=7.6 Hz, 2H), 3.20 (t, *J*=7.6 Hz, 2H), 2.21 (s, 3H), 2.17 (s, 3H); LC-MS $[M+H]^+$ 500.0. 8-(6-bromo-benzo[1,3]dioxol-5-ylsulfanyl)-3-[2-(2,5-dimethyl-phenyl)-ethyl]-3H-purin-6-ylamine: ^{1}H NMR

(DMSO-d_6) δ 8.43 (s, 1H), 7.50 (s, 1H), 7.41 (s, 1H), 7.04 (d, *J*=7.6 Hz, 1H), 6.95-6.93 (m, 1H), 6.85 (s, 1H), 6.18 (s, 2H), 4.41 (t, *J*=7.6 Hz, 2H), 3.12 (t, *J*=8.0 Hz, 2H), 2.19 (s, 3H), 2.16 (s, 3H); LC-MS $[M+H]^+$ 500.0.

[00595] Examples 126 and 127

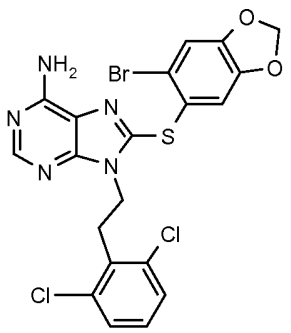


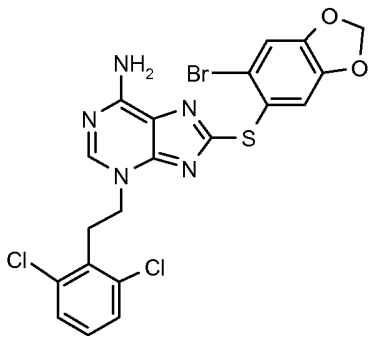


[00596] 8-(6-Bromo-benzo[1,3]dioxol-5-ylsulfanyl)-9-(3-methyl-2-phenyl-butyl)-9H-purin-6-ylamine and 8-(6-bromo-benzo[1,3]dioxol-5-ylsulfanyl)-3-(3-methyl-2-phenyl-butyl)-3H-purin-6-ylamine

[00597] The title compounds were prepared from 8-(6-bromo-benzo[1,3]dioxol-5-ylsulfanyl)-9H-purin-6-ylamine and 1-chloro-4-(1-chloromethyl-2-methyl-propyl)-benzene by a procedure similar to examples 1 and 2. The isomers were separated by preparative HPLC. 8-(6-Bromo-benzo[1,3]dioxol-5-ylsulfanyl)-9-(3-methyl-2-phenyl-butyl)-9H-purin-6-ylamine: ^{1}H NMR (DMSO-d_6) δ 8.14 (s, 1H), 7.13-7.07 (m, 3H), 7.00-6.98 (m, 2H), 6.56-6.52 (m, 2H), 6.08 (s, 2H), 4.53-4.44 (m, 2H), 3.17-3.13 (m, 1H), 1.99-1.97 (m, 1H), 1.04 (d, *J*=6.8 Hz, 3H), 0.70 (d, *J*=6.8 Hz, 3H); LC-MS $[M+H]^+$ 514.0. 8-(6-bromo-benzo[1,3]dioxol-5-ylsulfanyl)-3-(3-methyl-2-phenyl-butyl)-3H-purin-6-ylamine: ^{1}H NMR (DMSO-d_6) δ 8.0 (s, 1H), 7.39 (s, 1H), 7.24-7.19 (m, 3H), 7.18-7.11 (m, 1H), 7.09-7.02 (m, 2H), 6.12 (s, 2H), 4.75-4.71 (m, 1H), 4.50-4.43 (m, 1H), 3.25-3.19(m, 1H), 1.98-1.90 (m, 1H), 1.02 (d, *J*=6.8 Hz, 3H), 0.710 (d, *J*=6.8 Hz, 3H); LC-MS $[M+H]^+$ 514.0.

[00598] Examples 128 and 129

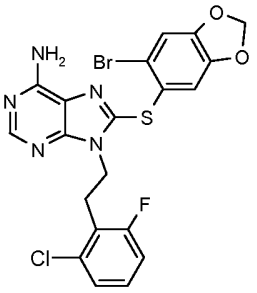


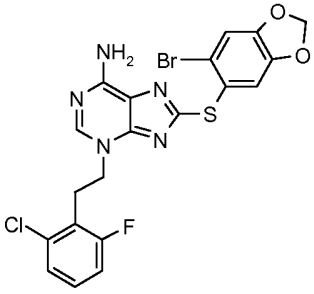


[00599] 8-(6-Bromo-benzo[1,3]dioxol-5-ylsulfanyl)-9-[2-(2,6-dichloro-phenyl)-ethyl]-9H-purin-6-ylamine and 8-(6-bromo-benzo[1,3]dioxol-5-ylsulfanyl)-3-[2-(2,6-dichloro-phenyl)-ethyl]-3H-purin-6-ylamine

[00600] The title compounds were prepared from 8-(6-bromo-benzo[1,3]dioxol-5-ylsulfanyl)-9H-purin-6-ylamine and 1,3-dichloro-2-(2-chloro-ethyl)-benzene by a procedure similar to examples 1 and 2. The isomers were separated by preparative HPLC. 8-(6-Bromo-benzo[1,3]dioxol-5-ylsulfanyl)-9-[2-(2,6-dichloro-phenyl)-ethyl]-9H-purin-6-ylamine: ^{1}H NMR (Acetone-d_6) δ 8.23 (s, 1H), 7.36-7.34 (m, 2H), 7.28-7.24 (m, 1H), 7.18 (s, 1H), 6.81 (s, 1H), 6.09 (s, 2H), 4.64 (t, *J*=6.4 Hz, 2H), 3.52 (t, *J*=6.4 Hz, 2H); LC-MS $[M+H]^+$ 539.9. 8-(6-bromo-benzo[1,3]dioxol-5-ylsulfanyl)-3-[2-(2,6-dichloro-phenyl)-ethyl]-3H-purin-6-ylamine. LC-MS $[M+H]^+$ 539.9.

[00601] Examples 130 and 131

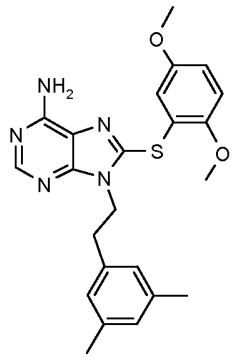


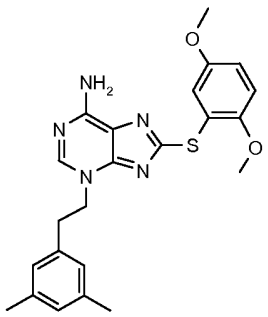


[00602] 8-(6-Bromo-benzo[1,3]dioxol-5-ylsulfanyl)-9-[2-(2-chloro-6-fluoro-phenyl)-ethyl]-9H-purin-6-ylamine and 8-(6-bromo-benzo[1,3]dioxol-5-ylsulfanyl)-3-[2-(2-chloro-6-fluoro-phenyl)-ethyl]-3H-purin-6-ylamine

[00603] The title compounds were prepared from 8-(6-bromo-benzo[1,3]dioxol-5-ylsulfanyl)-9H-purin-6-ylamine and 1-chloro-2-(2-chloro-ethyl)-3-fluoro-benzene by a procedure similar to examples 1 and 2. The isomers were separated by preparative HPLC. 8-(6-Bromo-benzo[1,3]dioxol-5-ylsulfanyl)-9-[2-(2-chloro-6-fluoro-phenyl)-ethyl]-9H-purin-6-ylamine: ^{1}H NMR (Acetone-d_6) δ 8.24 (s, 1H), 7.32-7.27 (m, 1H), 7.22-7.20 (m, 2H), 7.07-7.03 (m, 1H), 6.82 (s, 1H), 6.10 (s, 2H), 4.60 (t, *J*=8.0 Hz, 2H), 3.41 (t, *J*=6.4 Hz, 2H); LC-MS $[M+H]^+$ 523.9. 8-(6-bromo-benzo[1,3]dioxol-5-ylsulfanyl)-3-[2-(2-chloro-6-fluoro-phenyl)-ethyl]-3H-purin-6-ylamine: ^{1}H NMR (Acetone-d_6) δ 8.34 (s, 1H), 7.36-7.29 (m, 2H), 7.26-7.23 (m, 2H), 7.09-7.05 (m, 1H), 6.17 (s, 2H), 4.68 (t, *J*=6.8 Hz, 2H), 3.46 (t, *J*=6.8 Hz, 2H); LC-MS $[M+H]^+$ 523.9.

[00604] Examples 132 and 133



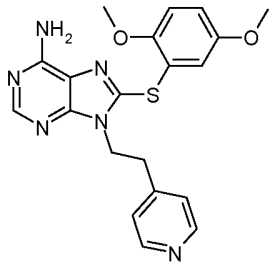


[00605] 8-(2, 5-Dimethoxy-phenylsulfanyl)-9-[2-(3, 5-dimethyl-phenyl)-ethyl]-9H-purine-6-ylamine and 8-(2, 5-dimethoxy-phenylsulfanyl)-3-[2-(3, 5-dimethyl-phenyl)-ethyl]-3H-purine-6-ylamine

[00606] The title compounds were prepared from 8-(2, 5-dimethoxy-phenylsulfanyl)-9H-purin-6-ylamine and 1-(2-chloro-ethyl)-3, 5-dimethyl-benzene

by a procedure similar to examples 1 and 2. The isomers were separated by preparative HPLC. 8-(2, 5-Dimethoxy-phenylsulfanyl)-9-[2-(3, 5-dimethyl-phenyl)-ethyl]-9H-purine-6-ylamine: ^{1}H NMR (DMSO-d_6) δ 8.33 (s, 1H), 7.05 (d, J=8.8 Hz, 1H), 6.90 (dd, *J*= 6.0, 3.2 Hz, 1H), 6.60 (d, *J*=3.2 Hz, 1H), 6.82 (s, 1H), 6.65 (s, 2H), 4.37 (t, *J*=7.2 Hz, 2H), 3.75 (s, 3H), 3.63 (s, 3H), 2.87 (t, *J*=7.2 Hz, 2H), 2.18 (s, 6H); LC-MS $[M+H]^+$ 436.2. 8-(2, 5-dimethoxy-phenylsulfanyl)-3-[2-(3, 5-dimethyl-phenyl)-ethyl]-3H-purine-6-ylamine: ^{1}H NMR (DMSO-d_6) δ 8.42 (s, 1H), 7.25 (d, *J*=2.8 Hz, 1H), 7.19-7.17 (m, 1H), 7.11-7.09 (m, 1H), 6.87 (s, 1H), 6.87 (s, 2H), 4.49 (t, *J*=6.4 Hz, 2H), 3.77 (s, 3H), 3.73 (s, 3H), 3.07 (t, *J*=6.4 Hz, 2H), 2.21 (s, 6H); LC-MS $[M+H]^+$ 436.2.

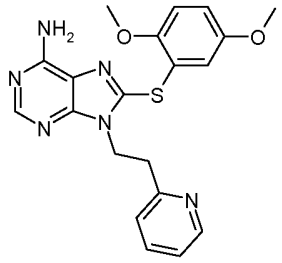
[00607] Example 134

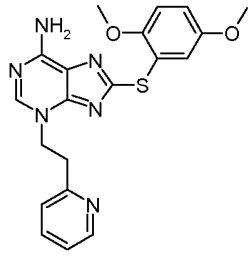


[00608] 8-(2, 5-Dimethoxy-phenylsulfanyl)-9-(2-pyridin-4-yl-ethyl)-9H-purin-6-ylamine

[00609] The title compound was prepared from 8-(2, 5-dimethoxy-phenylsulfanyl)-9H-purin-6-ylamine and 4-(2-chloro-ethyl)-pyridine by a procedure similar to examples 1 and 2. The compound was purified by preparative HPLC. ^{1}H NMR (CD3OD) δ 8.68 (d, *J*= 6.4 Hz, 2H), 8.27 (s, 1H), 7.84 (d, *J*= 6.4Hz, 2H), 7.06-6.98 (m, 3H), 4.75 (t, *J*= 6.8 Hz, 2H), 3.75 (s, 3H), 3.74 (s, 3H), 3.53 (t, *J*= 6.8 Hz, 2H); LC-MS $[M+H]^+$ 409.1

[00610] Examples 135 and 136

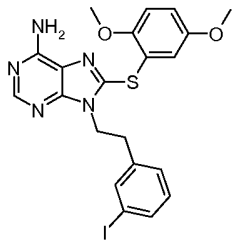


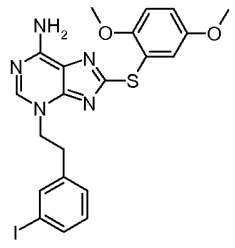


[00611] 8-(2, 5-Dimethoxy-phenylsulfanyl)-9-(2-pyridin-2-yl-ethyl)-9H-purin-6-ylamine and 8-(2, 5-Dimethoxy-phenylsulfanyl)-3-(2-pyridin-2-yl-ethyl)-3H-purin-6-ylamine

[00612] The title compounds were prepared from 8-(2, 5-dimethoxy-phenylsulfanyl)-9H-purin-6-ylamine and 2-(2-bromo-ethyl)-pyridine by a procedure similar to example 1 and 2. The isomers were separated by preparative HPLC. 8-(2, 5-Dimethoxy-phenylsulfanyl)-9-(2-pyridin-2-yl-ethyl)-9H-purin-6-ylamine: ^{1}H NMR (CD_3OD) δ 8.63-8.60 (m, 2H), 8.22 (s, 1H), 8.18 (dt, *J*= 8.0, 2.0 Hz, 1H), 7.77 (dd, *J*= 8.0, 2.0 Hz, 1H), 7.07-6.99 (m, 3H), 4.69 (t, *J*= 6.8Hz, 2H), 3.75 (s, 3H), 3.74 (s, 3H), 3.41 (t, *J*= 6.8 Hz, 2H); TOF LC-MS $[M+H]^+$ 409.1. 8-(2, 5-Dimethoxy-phenylsulfanyl)-3-(2-pyridin-2-yl-ethyl)-3H-purin-6-ylamine: ^{1}H NMR (CD_3OD) δ 8.70-8.50 (m, 2H), 8.40 (s, 1H), 8.11 (d, *J*= 7.6 Hz, 1H), 7.72 (m, 1H), 7.29 (dd, *J*= 6.8, 1.2 Hz, 1H), 7.23-7.17 (m, 2H), 4.69 (t, *J*= 7.2 Hz, 2H), 3.81 (s, 3H), 3.80 (s, 3H), 3.41 (t, *J*= 7.2 Hz, 2H); LC-MS $[M+H]^+$ 409.1.

[00613] Examples 137 and 138

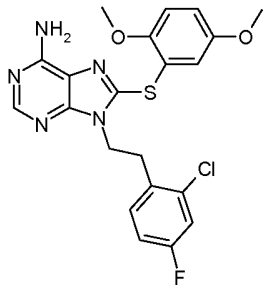


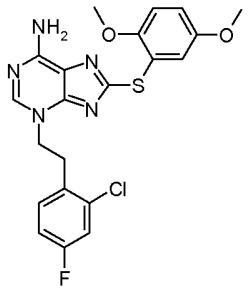


[00614] 8-(2, 5-Dimethoxy-phenylsulfanyl)-9-[2-(3-iodo-phenyl)-ethyl]-9H-purin-6-ylamine and 8-(2, 5-dimethoxy-phenylsulfanyl)-3-[2-(3-iodo-phenyl)-ethyl]-3H-purin-6-ylamine

[00615] The title compounds were prepared from 8-(2, 5-dimethoxy-phenylsulfanyl)-9H-purin-6-ylamine and 1-(2-bromo-ethyl)-3-iodo-benzene by a procedure similar to examples 1 and 2. The isomers were separated by preparative HPLC. 8-(2, 5-Dimethoxy-phenylsulfanyl)-9-[2-(3-iodo-phenyl)-ethyl]-9H-purin-6-ylamine: ^{1}H NMR (CD_3OD) δ 8.23 (s, 1H), 7.56-7.52 (m, 1H), 7.41 (s, 1H), 7.04-7.01 (m, 3H), 6.88 (d, *J*= 8.8 Hz, 1H), 6.53 (s, 1H), 4.39 (t, *J*= 6.8 Hz, 2H), 3.76 (s, 3H), 3.62 (s, 3H), 2.97 (t, *J*= 6.8 Hz, 2H); LC-MS $[M+H]^+$ 534.0. 8-(2, 5-Dimethoxy-phenylsulfanyl)-3-[2-(3-iodo-phenyl)-ethyl]-3H-purin-6-ylamine: ^{1}H NMR (CD_3OD) δ 8.21 (s, 1H), 7.60 (d, *J*= 8.4 Hz, 1H), 7.49 (s, 1H), 7.30 (s, 1H), 7.20-7.14 (m, 3H), 7.06 (t, *J*= 7.6 Hz, 1H), 4.58 (t, *J*= 7.2 Hz, 2H), 3.82 (s, 3H), 3.81 (s, 3H), 3.18 (t, *J*= 7.2 Hz, 2H); LC-MS $[M+H]^+$ 534.0.

[00616] Examples 139 and 140



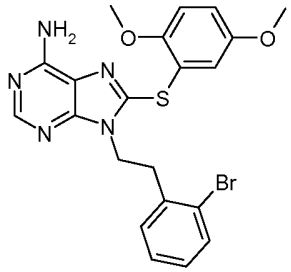


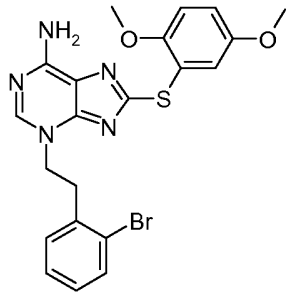
[00617] 9-[2-(2-Chloro-4-fluoro-phenyl)-ethyl]-8-(2, 5-dimethoxy-phenylsulfanyl)-9H-purin-6-ylamine and 3-[2-(2-chloro-4-fluoro-phenyl)-ethyl]-8-(2, 5-dimethoxy-phenylsulfanyl)-3H-purin-6-ylamine

[00618] The title compounds were prepared from 8-(2, 5-dimethoxy-phenylsulfanyl)-9H-purin-6-ylamine and 1-(2-bromo-ethyl)-2-chloro-4-fluoro-benzene by a procedure similar to examples 1 and 2. The isomers were separated by preparative HPLC. 9-[2-(2-chloro-4-fluoro-phenyl)-ethyl]-8-(2, 5-dimethoxy-phenylsulfanyl)-9H-purin-6-ylamine: ^{1}H NMR (CD_3OD) δ 8.21 (s, 1H), 7.17 (dd, *J*= 8.8, 2.8Hz, 1H), 7.08-6.92 (m, 5H), 4.59 (t, *J*= 6.8 Hz, 2H), 3.73 (s, 6H), 3.31 (t,

J= 6.8 Hz, 2H); LC- MS $[M+H]^+$ 460.1. 3-[2-(2-Chloro-4-fluoro-phenyl)-ethyl]-8-(2, 5-dimethoxy-phenylsulfanyl)-3H-purin-6-ylamine: ^{1}H NMR (CD_3OD) δ 8.19 (s, 1H), 7.28 (s, 1H), 7.21-7.18 (m, 4H), 7.03-6.97 (m, 1H), 4.63 (t, *J*= 6.8 Hz, 2H), 3.81 (s, 3H), 3.80 (s, 3H), 3.36 (t, *J*= 6.8 Hz, 2H); LC-MS $[M+H]^+$ 460.1.

[00619] Examples 141 and 142

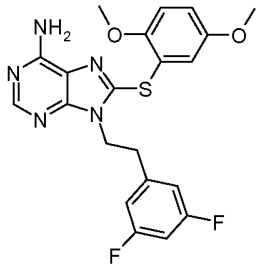


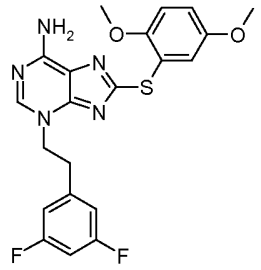


[00620] 9-[2-(2-Bromo-phenyl)-ethyl]-8-(2, 5-dimethoxy-phenylsulfanyl)-9H-purin-6-ylamine and 3-[2-(2-bromo-phenyl)-ethyl]-8-(2, 5-dimethoxy-phenylsulfanyl)-3H-purin-6-ylamine

[00621] The title compounds were prepared from 8-(2, 5-dimethoxy-phenylsulfanyl)-9H-purin-6-ylamine and 1-bromo-2-(2-bromo-ethyl)-benzene by a procedure similar to examples 1 and 2. The isomers were separated by preparative HPLC. 9-[2-(2-Bromo-phenyl)-ethyl]-8-(2, 5-dimethoxy-phenylsulfanyl)-9H-purin-6-ylamine: ^{1}H NMR (DMSO-d6) δ 8.27 (s, 1H), 7.54 (dd, *J*= 8.0, 1.2 Hz, 1H), 7.22 (t, *J*= 7.2 Hz, 1H), 7.14 (t, *J*= 7.6 Hz, 1H), 7.00 (t, *J*= 7.8 Hz, 1H), 6.99 (d, *J*= 8.8 Hz, 1H), 6.86 (dd, *J*= 8.8, 2.8 Hz, 1H), 6.51 (s, 1H), 4.48 (t, *J*= 6.8 Hz, 2H), 3.72 (s, 3H), 3.61 (s, 3H), 3.18 (t, *J*= 6.8 Hz, 2H); LC-MS $[M+H]^+$ 486.1. 3-[2-(2-Bromo-phenyl)-ethyl]-8-(2, 5-dimethoxy-phenylsulfanyl)-3H-purin-6-ylamine: ^{1}H NMR (CD_3OD) δ 8.27 (s, 1H), 7.54 (d, *J*= 7.6 Hz, 1H), 7.30-7.25 (m, 2H), 7.19-7.14 (m, 4H), 4.65 (t, *J*= 6.8 Hz, 2H), 3.81 (s, 3H), 3.80 (s, 3H), 3.39 (t, *J*= 6.8 Hz, 2H); LC-MS $[M+H]^+$ 486.1.

[00622] Examples 143 and 144

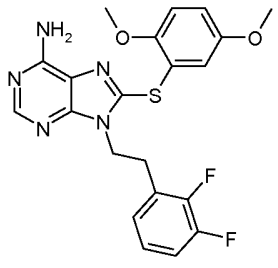


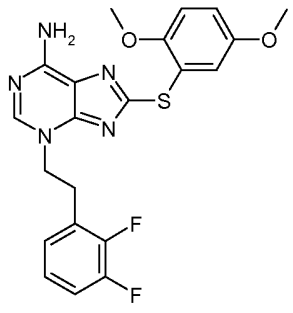


[00623] 9-[2-(3, 5-Difluoro-phenyl)-ethyl]-8-(2, 5-dimethoxy-phenylsulfanyl)-9H-purin-6-ylamine and 3-[2-(3, 5-difluoro-phenyl)-ethyl]-8-(2, 5-dimethoxy-phenylsulfanyl)-3H-purin-6-ylamine

[00624] The title compounds were prepared from 8-(2, 5-dimethoxy-phenylsulfanyl)-9H-purin-6-ylamine and 1-(2-bromo-ethyl)-3, 5-difluoro-benzene by a procedure similar to examples 1 and 2. The isomers were separated by preparative HPLC. 9-[2-(3, 5-difluoro-phenyl)-ethyl]-8-(2,5-dimethoxy-phenylsulfanyl)-9H-purin-6-ylamine: ^{1}H NMR (CD_3OD) δ 8.28 (s, 1H), 7.07-7.03 (m, 3H), 6.81-6.72 (m, 3H), 4.58 (t, *J*= 6.8 Hz, 2H), 3.75 (s, 3H), 3.74 (s, 3H), 3.20 (t, *J*= 6.8 Hz, 2H); LC-MS $[M+H]^+$ 444.1. 3-[2-(3, 5-difluoro-phenyl)-ethyl]-8-(2, 5-dimethoxy-phenylsulfanyl)-3H-purin-6-ylamine: ^{1}H NMR (CD_3OD) δ 8.28 (s, 1H), 7.31 (s, 1H), 7.20-7.19 (m, 2H), 6.90-6.80 (m, 3H), 4.61 (t, *J*= 7.2 Hz, 2H), 3.81 (s, 3H), 3.80 (s, 3H), 3.26 (t, *J*= 7.2 Hz, 2H); LC- MS $[M+H]^+$ 444.1.

[00625] Examples 145 and 146

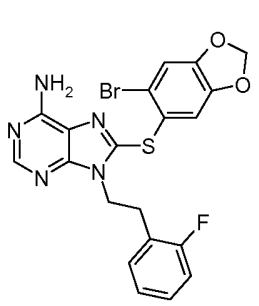


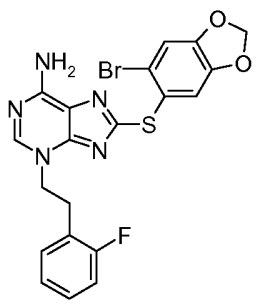


[00626] 9-[2-(2, 3-Difluoro-phenyl)-ethyl]-8-(2, 5-dimethoxy-phenylsulfanyl)-9H-purin-6-ylamine and 3-[2-(2, 3-difluoro-phenyl)-ethyl]-8-(2, 5-dimethoxy-phenylsulfanyl)-3H-purin-6-ylamine

[00627] The title compounds were prepared from 8-(2, 5-dimethoxy-phenylsulfanyl)-9H-purin-6-ylamine and 1-(2-bromo-ethyl)-2, 3-difluoro-benzene by a procedure similar to examples 1 and 2. The isomers were separated by preparative HPLC. 9-[2-(2, 3-Difluoro-phenyl)-ethyl]-8-(2, 5-dimethoxy-phenylsulfanyl)-9H-purin-6-ylamine: ^{1}H NMR (CD_3OD) δ 8.26 (s, 1H), 7.14-7.10 (m, 1H), 7.03-6.98 (m, 4H), 6.85-6.81 (m, 1H), 4.61 (t, *J*= 6.8 Hz, 2H), 3.75 (s, 3H), 3.74 (s, 3H), 3.30 (t, *J*= 6.8Hz, 2H); LC- MS $[M+H]^+$ 444.1. 3-[2-(2, 3-difluoro-phenyl)-ethyl]-8-(2,5-dimethoxy-phenylsulfanyl)-3H-purin-6-ylamine: ^{1}H NMR (CD_3OD) δ 8.24 (s, 1H), 7.29 (dd, *J*= 2.8, 0.8 Hz, 1H), 7.19-7.13 (m, 3H), 7.10-7.05 (m, 1H), 6.94 (dt, *J*= 7.6, 1.2 Hz, 1H), 4.64 (t, *J*= 6.8 Hz, 2H), 3.81 (s, 3H), 3.80 (s, 3H), 3.34 (t, *J*= 6.8 Hz, 2H); LC- MS $[M+H]^+$ 444.1.

[00628] Examples 147 and 148





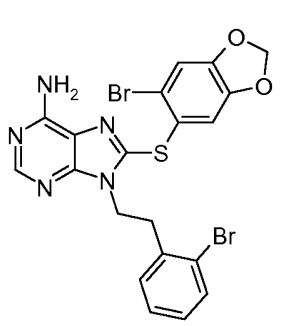
[00629] 8-(6-Bromo-1,3-benzodioxol-5-ylsulfanyl)-9-[2-(2-fluoro-phenyl)-ethyl]

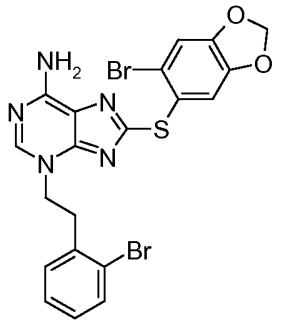
[00630] -9H-purin-6-ylamine and 8-(6-bromo-benzo[1,3]dioxol-5-ylsulfanyl)-3-[2-(2-fluoro-phenyl)-ethyl]-3H-purin-6-ylamine

[00631] The title compounds were prepared from 8-(6-bromo-benzo[1,3]dioxol-5-ylsulfanyl)-9H-purin-6-ylamine and 1-(2-bromo-ethyl)-2-fluoro-

benzene by a procedure similar to examples 1 and 2. The isomers were separated by preparative HPLC. 8-(6-Bromo-benzo[1,3]dioxol-5-ylsulfanyl)-9-[2-(2-fluoro-phenyl)-ethyl]-9H-purin-6-ylamine: ^{1}H NMR (DMSO-d_6) δ 8.17 (s, 1H), 7.33 (s, 1H), 7.25-7.22 (m, 1H), 7.11-7.02 (m, 3H), 6.65 (s, 1H), 6.08 (s, 2H), 4.41 (t, *J*= 7.2 Hz, 2H), 3.10 (t, *J*= 7.2 Hz, 2H); LC- MS $[M+H]^+$ 489.9. 8-(6-Bromo-benzo[1,3]dioxol-5-ylsulfanyl)-3-[2-(2-fluoro-phenyl)-ethyl]-3H-purin-6-ylamine: ^{1}H NMR (CD_3OD) δ 8.19 (s, 1H), 7.37 (s, 1H), 7.36 (s, 1H), 7.30-7.22 (m, 1H), 7.14-7.00 (m, 3H), 6.16 (s, 2H), 4.62 (t, *J*= 6.8 Hz, 2H), 3.29 (t, *J*= 6.8 Hz, 2H); LC-MS $[M+H]^+$ 489.9.

[00632] Examples 149 and 150



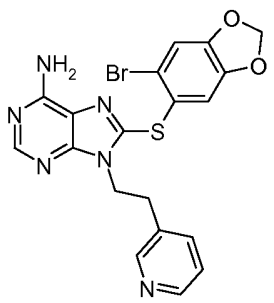


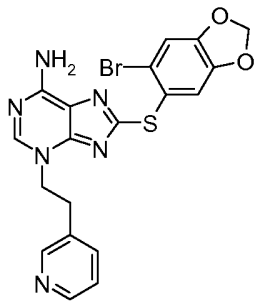
[00633] 8-(6-Bromo-benzo[1,3]dioxol-5-ylsulfanyl)-9-[2-(2-bromo-phenyl)-ethyl]-9H-purin-6-ylamine and 8-(6-bromo-benzo[1,3]dioxol-5-ylsulfanyl)-3-[2-(2-bromo-phenyl)-ethyl]-3H-purin-6-ylamine

[00634] The title compounds were prepared from 8-(6-bromo-benzo[1,3]dioxol-5-ylsulfanyl)-9H-purin-6-ylamine and 1-bromo-2-(2-bromo-ethyl)-benzene by a procedure similar to examples 1 and 2. The isomers were separated by preparative HPLC. 8-(6-Bromo-benzo[1,3]dioxol-5-ylsulfanyl)-9-[2-(2-bromo-phenyl)-ethyl]-9H-purin-6-ylamine: ^{1}H NMR (CD_3OD) δ 8.22 (s, 1H), 7.52 (dd, *J*= 8.0, 1.2 Hz, 1H), 7.21-7.11 (m, 3H), 7.04 (dd, *J*= 7.8, 1.6 Hz, 1H), 6.95 (s, 1H), 6.06 (s, 2H), 4.60 (t, *J*= 6.8 Hz, 2H), 3.31 (t, *J*= 6.8 Hz, 2H); LC- MS $[M+H]^+$ 550.0. 8-(6-bromo-benzo[1,3]dioxol-5-ylsulfanyl)-3-[2-(2-bromo-phenyl)-ethyl]-3H-purin-6-ylamine: ^{1}H NMR (CD_3OD) δ 8.16 (s, 1H), 7.52 (dd, *J*= 8.0, 1.6 Hz, 1H), 7.37 (s,

1H), 7.36 (s, 1H), 7.30-7.23 (m, 1H), 7.17-7.14 (m, 2H), 6.16 (s, 2H), 4.64 (t, *J*= 6.8 Hz, 2H), 3.38 (t, *J*= 6.8 Hz, 2H); LC- MS $[M+H]^+$ 550.0.

[00635] Examples 151 and 152

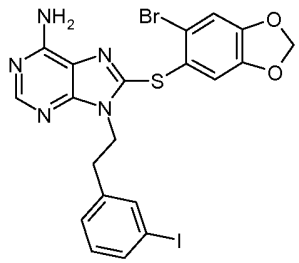


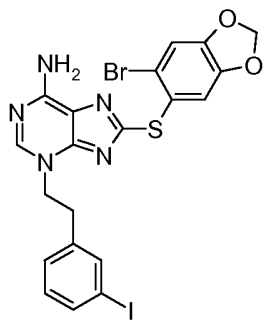


[00636] 8-(6-Bromo-benzo[1,3]dioxol-5-ylsulfanyl)-9-(2-pyridin-3-yl-ethyl)-9H-purin-6-ylamine and 8-(6-bromo-benzo[1,3]dioxol-5-ylsulfanyl)-3-(2-pyridin-3-yl-ethyl)-3H-purin-6-ylamine

[00637] The title compounds were prepared from 8-(6-bromo-benzo[1,3]dioxol-5-ylsulfanyl)-9H-purin-6-ylamine and 3-(2-chloro-ethyl)-pyridine by a procedure similar to examples 1 and 2. The isomers were separated by preparative HPLC. 8-(6-Bromo-benzo[1,3]dioxol-5-ylsulfanyl)-9-(2-pyridin-3-yl-ethyl)-9H-purin-6-ylamine: ^{1}H NMR (CD_3OD) δ 8.75-7.74 (m, 2H), 8.38 (d, *J*= 8.0 Hz, 1H), 8.27 (s, 1H), 7.93 (t, *J*= 8.0 Hz, 1H), 7.26 (s, 1H), 7.15 (s, 1H), 6.09 (s, 2H), 4.70 (t, *J*= 6.8 Hz, 2H), 3.49 (t, *J*= 6.8 Hz, 2H); LC- MS $[M+H]^+$ 473.0. 8-(6-bromo-benzo[1,3]dioxol-5-ylsulfanyl)-3-(2-pyridin-3-yl-ethyl)-3H-purin-6-ylamine: ^{1}H NMR (CD_3OD) δ 8.65-7.84 (m, 1H), 8.43 (s, 1H), 8.17 (d, *J*= 8.0 Hz, 1H), 7.90 (s, 1H), 7.76 (m, 1H), 7.38 (s, 1H), 7.36 (s, 1H), 6.16 (s, 2H), 4.70 (t, *J*= 7.2 Hz, 2H), 3.43 (t, *J*= 7.2 Hz, 2H); LC-MS $[M+H]^+$ 473.0.

[00638] Examples 153 and 154



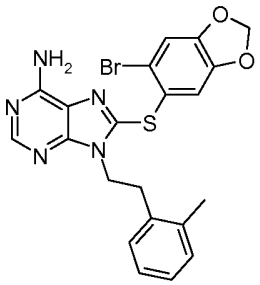
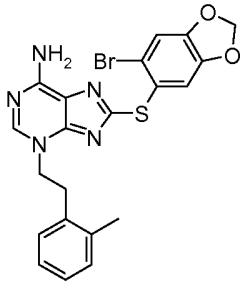


[00639] 8-(6-Bromo-benzo[1,3]dioxol-5-ylsulfanyl)-9-[2-(3-iodo-phenyl)-ethyl]-9

[00640] H-purin-6-ylamine and 8-(6-Bromo-benzo[1,3]dioxol-5-ylsulfanyl)-3-[2-(3-iodo-phenyl)-ethyl]-3H-purin-6-ylamine

[00641] The title compound was prepared from 8-(6-bromo-benzo[1,3]dioxol-5-ylsulfanyl)-9H-purin-6-ylamine and 1-(2-bromo-ethyl)-3-iodo-benzene by a procedure similar to examples 1 and 2. The isomers were separated by preparative HPLC. 8-(6-Bromo-benzo[1,3]dioxol-5-ylsulfanyl)-9-[2-(3-iodo-phenyl)-ethyl]-9H-purin-6-ylamine: ^{1}H NMR ($CDCl_3$) δ 8.18 (s, 1H), 7.58 (dd, *J*= 7.6, 1.2 Hz, 1H), 7.52 (s, 1H), 7.15 (s, 1H), 7.07 (d, *J*=8.0 Hz, 1H), 7.01 (t, *J*= 7.6, 1.2 Hz, 1H), 7.00 (s, 1H), 6.07 (s, 2H), 4.46 (t, *J*= 7.6 Hz, 2H), 3.08 (t, *J*= 7.6 Hz, 2H); TOF LC-MS $[M+H]^+$ 597.9. 8-(6-Bromo-benzo[1,3]dioxol-5-ylsulfanyl)-3-[2-(3-iodo-phenyl)-ethyl]-3H-purin-6-ylamine: ^{1}H NMR ($CDCl_3$) δ 7.64-7.58 (m, 2H), 7.46 (s, 1H), 7.19(s, 1H), 7.18 (s, 1H), 7.04-6.98 (m, 1H), 6.94-6.89 (m, 1H), 6.08 (s, 2H), 4.48 (t, *J*= 9.2 Hz, 2H), 3.18 (t, *J*= 9.2 Hz, 2H); TOF LC-MS $[M+H]^+$ 597.9.

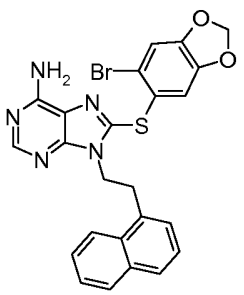
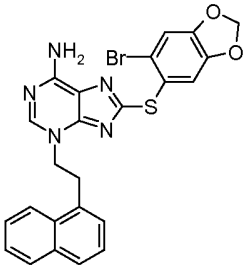
[00642] Examples 155 and 156

[00643] 8-(6-Bromo-benzo[1,3]dioxol-5-ylsulfanyl)-9-(2-o-tolyl-ethyl)-9H-purin-6-ylamine and 8-(6-bromo-benzo[1,3]dioxol-5-ylsulfanyl)-3-(2-o-tolyl-ethyl)-3H-purin-6-ylamine

[00644] The title compound was prepared from 8-(6-bromo-benzo[1,3]dioxol-5-ylsulfanyl)-9H-purin-6-ylamine and 1-(2-bromo-ethyl)-2-methyl-benzene by a procedure similar to examples 1 and 2. The isomers were separated by preparative HPLC. 8-(6-Bromo-benzo[1,3]dioxol-5-ylsulfanyl)-9-(2-o-tolyl-ethyl)-9H-purin-6-ylamine: ^{1}H NMR (CD_3OD) δ 8.27 (s, 1H), 7.24 (s, 1H), 7.15 (d, *J*= 7.2 Hz, 1H), 7.11 (dt, *J*= 7.2, 1.2 Hz, 1H), 7.03 (s, 1H), 7.01 (dt, *J*= 7.2, 1.6 Hz, 1H), 6.87 (d, *J*= 7.6 Hz, 1H), 6.07 (s, 2H), 4.51 (t, *J*= 7.2 Hz, 2H), 3.20 (t, *J*= 7.2 Hz, 2H), 2.37 (s, 3H); TOF LC-MS $[M+H]^+$ 486.0. 8-(6-Bromo-benzo[1,3]dioxol-5-ylsulfanyl)-3-(2-o-tolyl-ethyl)-3H-purin-6-ylamine: ^{1}H NMR (CD_3OD) δ 8.18 (s, 1H), 7.37 (s, 1H), 7.36 (s, 1H), 7.17-7.09 (m, 2H), 7.04 (dt, *J*= 7.2, 1.6 Hz, 1H), 6.93 (d, *J*= 7.2 Hz, 1H), 6.16 (s, 2H), 4.54 (t, *J*= 7.2 Hz, 2H), 3.23 (t, *J*= 7.2 Hz, 2H), 2.26 (s, 3H); TOF LC-MS $[M+H]^+$ 486.0.

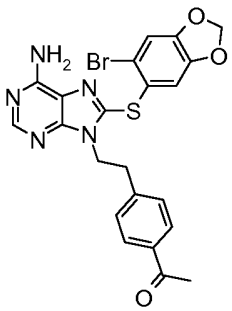
[00645] Examples 157 and 158

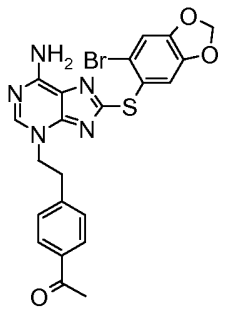



[00646] 8-(6-Bromo-benzo[1,3]dioxol-5-ylsulfanyl)-9-(2-naphthalen-1-yl-ethyl)-9H-purin-6-ylamine and 8-(6-bromo-benzo[1,3]dioxol-5-ylsulfanyl)-3-(2-naphthalen-1-yl-ethyl)-3H-purin-6-ylamine

[00647] The title compound was prepared from 8-(6-bromo-benzo[1,3]dioxol-5-ylsulfanyl)-9H-purin-6-ylamine and 1-(2-bromo-ethyl)-naphthalene by a procedure similar to examples 1 and 2. The isomers were separated by preparative HPLC. 8-(6-Bromo-benzo[1,3]dioxol-5-ylsulfanyl)-9-(2-naphthalen-1-yl-ethyl)-9H-purin-6-ylamine: ^{1}H NMR ($CDCl_3$) δ 8.14 (s, 1H), 8.09 (d, *J*=7.6 Hz, 1H), 7.88 (d, *J*=8.0 Hz, 1H), 7.79 (d, *J*=8.0 Hz, 1H), 7.58 (dt, *J*=8.4, 1.6 Hz, 1H), 7.52 (dt, *J*=8.4, 1.6 Hz, 1H), 7.36 (t, *J*=8.0 Hz, 1H), 7.22 (d, *J*=7.6 Hz, 1H), 7.13 (s, 1H), 6.95 (s, 1H), 6.06 (s, 2H), 4.62 (t, *J*=7.2 Hz, 2H), 3.60 (t, *J*= 7.2 Hz, 2H); TOF LC-MS $[M+H]^+$ 522.0. 8-(6-bromo-benzo[1,3]dioxol-5-ylsulfanyl)-3-(2-naphthalen-1-yl-ethyl)-3H-purin-6-ylamine: ^{1}H NMR (Acetone-d_6) δ 8.33 (s, 1H), 8.18 (d, *J*= 8.0 Hz, 1H), 8.28-7.83 (m, 2H), 7.57-7.39 (m, 4H), 7.35-7.32 (m, 2H), 6.13 (s, 2H), 4.73 (t, *J*= 8.0 Hz, 2H), 3.77 (t, *J*= 8.0 Hz, 2H); TOF LC-MS $[M+H]^+$ 522.0.

[00648] Examples 159 and 160



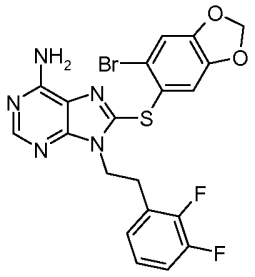


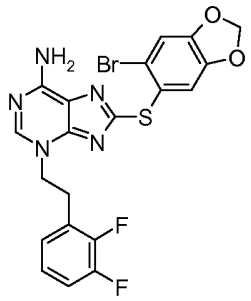
[00649] 1-(4-{2-[6-Amino-8-(6-bromo-benzo[1,3]dioxol-5-ylsulfanyl)-purin-9-yl]-

[00650] ethyl}-phenyl)-ethanone and 1-(4-{2-[6-amino-8-(6-bromo-benzo[1,3]dioxol-5-ylsulfanyl)-purin-3-yl]-ethyl}-phenyl)-ethanone

[00651] The title compound was prepared from 8-(6-bromo-benzo[1,3]dioxol-5-ylsulfanyl)-9H-purin-6-ylamine and 1-[4-(2-chloro-ethyl)-phenyl]-ethanone by a procedure similar to examples 1 and 2. The isomers were separated by preparative HPLC. 1-(4-{2-[6-Amino-8-(6-bromo-benzo[1,3]dioxol-5-ylsulfanyl)-purin-9-yl]-ethyl}-phenyl)-ethanone: ^{1}H NMR ($CDCl_3$) δ 8.18 (s, 1H), 7.98 (d, *J*=8.4 Hz, 2H), 7.24 (d, *J*=8.4 Hz, 2H), 7.13 (s, 1H), 6.96 (s, 1H), 6.06 (s, 2H), 4.53 (t, *J*=7.6 Hz, 2H), 3.24 (t, *J*= 7.6 Hz, 2H), 2.59 (s, 3H); TOF LC-MS $[M+H]^+$ 514.05. 1-(4-{2-[6-amino-8-(6-bromo-benzo[1,3]dioxol-5-ylsulfanyl)-purin-3-yl]-ethyl}-phenyl)-ethanone: ^{1}H NMR ($CDCl_3$) δ 7.89 (d, *J*=8.0 Hz, 2H), 7.61 (s, 1H), 7.25 (s, 1H), 7.19 (s, 1H), 7.11 (d, *J*=8.0 Hz, 2H), 6.11 (s, 2H), 4.54 (t, *J*=7.2 Hz, 2H), 3.30 (t, *J*= 7.2 Hz, 2H), 2.59 (s, 3H); TOF LC-MS $[M+H]^+$ 514.05.

[00652] Examples 161 and 162



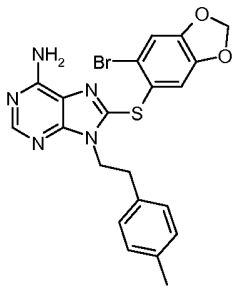


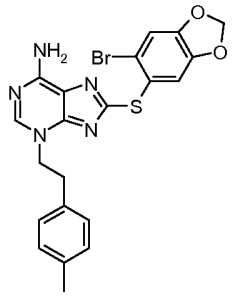
[00653] 8-(6-Bromo-benzo[1,3]dioxol-5-ylsulfanyl)-9-[2-(2,3-difluoro-phenyl)-ethyl]-9H-purin-6-ylamine and 8-(6-bromo-1,3-benzo[1,3]dioxol-5-ylsulfanyl)-3-[2-(2,3-difluoro-phenyl)-ethyl]-3H-purin-6-ylamine

[00654] The title compound was prepared from 8-(6-bromo-benzo[1,3]dioxol-5-ylsulfanyl)-9H-purin-6-ylamine and 1-(2-bromo-ethyl)-2, 3-difluoro-benzene by a procedure similar to examples 1 and 2. The isomers were separated by preparative HPLC. 8-(6-Bromo-benzo[1,3]dioxol-5-ylsulfanyl)-9-[2-(2,3-difluoro-phenyl)-ethyl]-9H-purin-6-ylamine: ^{1}H NMR ($CDCl_3$) δ 8.30 (s, 1H), 7.07 (s, 1H), 7.03 (dt, *J*= 7.6,1.6 Hz, 1H), 6.93-6.90 (m, 1H), 6.80 (s, 1H), 6.70 (dt,

J= 7.6,1.6 Hz, 1H), 6.00 (s, 2H), 4.50 (t, *J*= 6.8 Hz, 2H), 3.21 (t, *J*= 6.8 Hz, 2H); TOF LC-MS $[M+H]^+$ 508.0. 8-(6-bromo-benzo[1,3]dioxol-5-ylsulfanyl)-3-[2-(2,3-difluoro-phenyl)-ethyl]-3H-purin-6-ylamine: ^{1}H NMR ($CDCl_3$) δ 7.70 (s, 1H), 7.24 (s, 1H), 7.19 (s, 1H), 7.15-7.07 (m, 1H), 7.01-6.95 (m, 1H), 6.63 (dt, *J*= 8.0,1.6 Hz, 1H), 6.10 (s, 2H), 4.54 (t, *J*= 6.8 Hz, 2H), 3.30 (t, *J*= 6.8 Hz, 2H); TOF LC-MS $[M+H]^+$ 508.0.

[00655] Examples 163 and 164



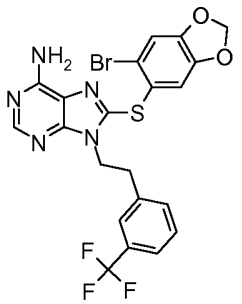


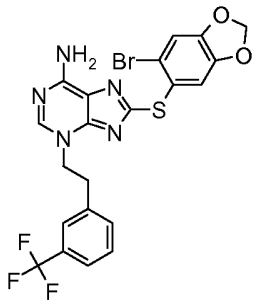
[00656] 8-(6-Bromo-benzo[1,3]dioxol-5-ylsulfanyl)-9-(2-p-tolyl-ethyl)-9H-purin-6-ylamine and 8-(6-bromo-benzo[1,3]dioxol-5-ylsulfanyl)-3-(2-p-tolyl-ethyl)-3H-purin-

[00657] 6-ylamine

[00658] The title compound was prepared from 8-(6-bromo-benzo[1,3]dioxol-5-ylsulfanyl)-9H-purin-6-ylamine and 1-(2-bromo-ethyl)-4-methyl-benzene by a procedure similar to examples 1 and 2. The isomers were separated by preparative HPLC. 8-(6-Bromo-benzo[1,3]dioxol-5-ylsulfanyl)-9-(2-p-tolyl-ethyl)-9H-purin-6-ylamine: ^{1}H NMR ($CDCl_3$) δ 8.16 (s, 1H), 7.14 (s, 1H), 7.09 (d, *J*= 7.6 Hz, 2H), 7.00 (d, *J*= 7.6 Hz, 2H), 6.99 (s, 1H), 6.07 (s, 2H), 4.47 (t, *J*=7.6Hz, 2H), 3.11 (t, *J*= 7.6Hz, 2H), 2.31 (s, 3H); TOF LC-MS $[M+H]^+$ 486.0. 8-(6-bromo-benzo[1,3]dioxol-5-ylsulfanyl)-3-(2-p-tolyl-ethyl)-3H-purin-6-ylamine: ^{1}H NMR ($CDCl_3$) δ 8.26 (s, 1H), 7.40 (s, 1H), 7.33 (s, 1H), 7.09 (d, *J*= 7.6 Hz, 2H), 7.02 (d, *J*= 7.6 Hz, 2H), 6.19 (s, 2H), 4.61 (t, *J*=7.2Hz, 2H), 3.21 (t, *J*= 7.2 Hz, 2H), 2.27 (s, 3H); TOF LC-MS $[M+H]^+$ 486.0.

[00659] Examples 165 and 166

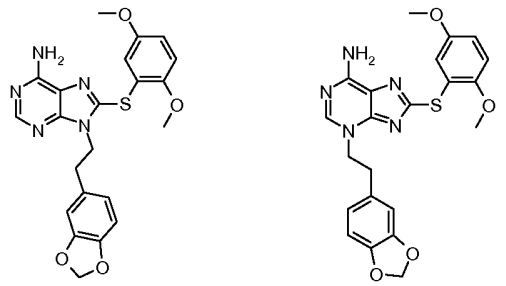




[00660] 8-(6-Bromo-benzo[1,3]dioxol-5-ylsulfanyl)-9-[2-(3-trifluoromethyl-phenyl)-ethyl]-9H-purin-6-ylamine and 8-(6-Bromo-benzo[1,3]dioxol-5-ylsulfanyl)-3-[2-(3-trifluoromethyl-phenyl)-ethyl]-3H-purin-6-ylamine

[00661] The title compound was prepared from 8-(6-bromo-benzo[1,3]dioxol-5-ylsulfanyl)-9H-purin-6-ylamine and 1-(2-bromo-ethyl)-3-trifluoromethyl-benzene by a procedure similar to examples 1 and 2. The isomers were separated by preparative HPLC. 8-(6-Bromo-benzo[1,3]dioxol-5-ylsulfanyl)-9-[2-(3-trifluoromethyl-phenyl)-ethyl]-9H-purin-6-ylamine: ^{1}H NMR ($CDCl_3$) δ 8.16 (s, 1H), 7.54 (d, *J*=8.0 Hz, 1H), 7.41 (t, *J*= 7.2 Hz, 2H), 7.32 (d, *J*= 7.6 Hz, 1H), 7.15 (s, 1H), 7.04 (s, 1H), 6.08 (s, 2H), 4.53 (t, *J*=7.6Hz, 2H), 3.23 (t, *J*= 7.6 Hz, 2H); TOF LC-MS $[M+H]^+$ 540.0. 8-(6-Bromo-benzo[1,3]dioxol-5-ylsulfanyl)-3-[2-(3-trifluoromethyl-phenyl)-ethyl]-3H-purin-6-ylamine: ^{1}H NMR ($CDCl_3$) δ 7.71 (s, 1H), 7.56 (d, *J*=8.0 Hz, 1H), 7.43 (t, *J*= 7.6 Hz, 1H), 7.38 (s, 1H), 7.25 (s, 1H), 7.20 (s, 1H), 7.18 (d, *J*= 7.6 Hz, 1H), 6.10 (s, 2H), 4.53 (t, *J*=7.2 Hz, 2H), 3.31 (t, *J*= 7.2 Hz, 2H); TOF LC-MS $[M+H]^+$ 540.0.

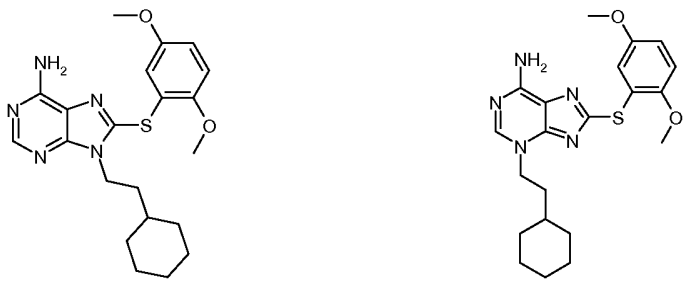
[00662] Examples 167 and 168



[00663] 9-(2-Benzo[1,3]dioxol-5-yl-ethyl)-8-(2, 5-dimethoxy-phenylsulfanyl)-9H-purin-6-ylamine and 3-(2-benzo[1,3]dioxol-5-yl-ethyl)-8-(2, 5-dimethoxy-phenylsulfanyl)-3H-purin-6-ylamine

[00664] The title compounds were prepared from 8-(2, 5-dimethoxy-phenylsulfanyl)-9H-purin-6-ylamine and 5-(2-bromo-ethyl)-benzo[1,3]-dioxole by a procedure similar to examples 1 and 2. The isomers were separated by preparative HPLC. 9-(2-Benzo[1,3]dioxol-5-yl-ethyl)-8-(2, 5-dimethoxy-phenylsulfanyl)-9H-purin-6-ylamine: ^{1}H NMR (Acetone-d_6) δ 8.39 (s, 1H), 7.04 (d, *J*=8.8 Hz, 1H), 6.94 (dd, *J*=8.8, 3.2 Hz, 1H), 6.83 (d, *J*= 3.3 Hz, 1H), 6.90 (d, *J*= 8.0 Hz, 1H), 6.68 (s, 1H), 6.54 (dd, *J*= 8.0, 1.6 Hz, 1H), 5.94 (s, 2H), 4.54 (t, *J*=7.2 Hz, 2H), 3.79 (s, 3H), 3.71 (s, 3H), 3.08 (t, *J*= 7.2 Hz, 2H); TOF LC-MS $[M+H]^+$ 452.1. 3-(2-Benzo[1,3]dioxol-5-yl-ethyl)-8-(2, 5-dimethoxy-phenylsulfanyl)-3H-purin-6-ylamine: ^{1}H NMR (Acetone-d_6) δ 8.26 (s, 1H), 7.34 (d, *J*=2.8 Hz, 1H), 7.22-7.05 (m, 2H), 6.74-6.70 (m, 2H), 6.53 (dd, *J*=8.0, 2.0 Hz, 1H), 5.97 (s, 2H), 4.58 (t, *J*=7.2 Hz, 2H), 3.81 (s, 3H), 3.79 (s, 3H), 3.16 (t, *J*= 7.2 Hz, 2H); TOF LC-MS $[M+H]^+$ 452.1.

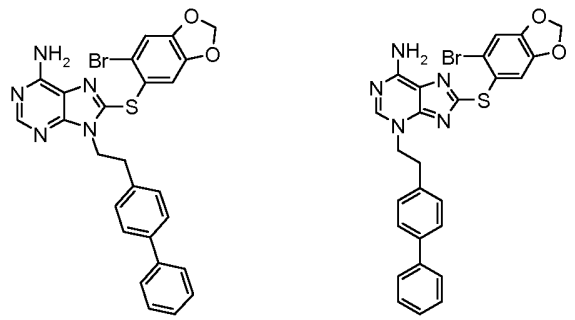
[00665] Examples 169 and 170



[00666] 9-(2-Cyclohexyl-ethyl)-8-(2, 5-dimethoxyphenyl-sulfanyl)-9H-purin-6-ylamine and 3-(2-cyclohexyl-ethyl)-8-(2,5-dimethoxy-phenylsulfanyl)-3H-purin-6-ylamine

[00667] The title compounds were prepared from 8-(2, 5-dimethoxy-phenylsulfanyl)-9H-purin-6-ylamine and (2-bromo-ethyl)-cyclohexane by a procedure similar to examples 1 and 2. The isomers were separated by preparative HPLC. 9-(2-Cyclohexyl-ethyl)-8-(2,5-dimethoxyphenyl-sulfanyl)-9H-purin-6-ylamine: ^{1}H NMR ($CDCl_3$) δ 8.24 (s, 1H), 6.96 (d, *J*=9.2 Hz, 1H), 6.84 (dd, *J*=9.2, 2.8 Hz, 1H), 6.80 (d, *J*=2.8 Hz, 1H), 4.26 (t, *J*=7.6 Hz, 2H), 3.81 (s, 3H), 3.67 (s, 3H), 2.09-2.07 (m, 2H), 1.79-1.70 (m, 1H), 1.68-1.60 (m, 4H), 0.99-0.82 (m, 6H); TOF LC-MS $[M+H]^+$ 414.2. 3-(2-cyclohexyl-ethyl)-8-(2, 5-dimethoxy-phenylsulfanyl)-3H-purin-6-ylamine: ^{1}H NMR ($CDCl_3$) δ 8.04 (s, 1H), 7.20 (d, *J*=2.8 Hz, 1H), 7.02 (dd, *J*=9.2, 2.8 Hz, 1H), 6.93 (d, *J*=9.2 Hz, 1H), 4.31 (t, *J*=7.6 Hz, 2H), 3.794 (s, 3H), 3.79 (s, 3H), 1.9-1.6 (m, 3H), 1.38-1.20 (m, 4H), 0.99-0.82 (m, 6H); TOF LC-MS $[M+H]^+$ 414.2.

[00668] Examples 171 and 172

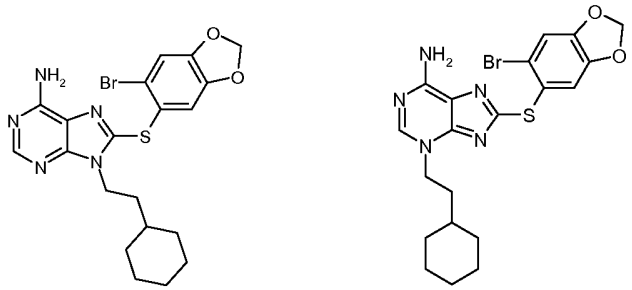


[00669] 9-(2-Biphenyl-4-yl-ethyl)-8-(6-bromo-benzo[1,3]dioxol-5-ylsulfanyl)-9H-purin-6-ylamine and 3-(2-biphenyl-4-yl-ethyl)-8-(6-bromo-benzo[1,3]dioxol-5-ylsulfanyl)-3H-purin-6-ylamine

[00670] The title compound was prepared from 8-(6-bromo-benzo[1,3]dioxol-5-ylsulfanyl)-9H-purin-6-ylamine and 4-(2-bromo-ethyl)-biphenyl

by a procedure similar to examples 1 and 2. The isomers were separated by preparative HPLC. 9-(2-Biphenyl-4-yl-ethyl)-8-(6-bromo-benzo[1,3]dioxol-5-ylsulfanyl)-9H-purin-6-ylamine: ^{1}H NMR ($CDCl_3$) δ 8.19 (s, 1H), 7.58-7.51 (m, 4H), 7.46-7.42 (m,1H), 7.30-7.28 (m, 3H), 7.14 (s, 1H), 6.99 (d, *J*= 2.8 Hz, 2H), 6.04 (s, 2H), 4.54 (t, *J*=7.6 Hz, 2H), 3.20 (t, *J*= 7.6 Hz, 2H); TOF LC-MS $[M+H]^+$ 548.0. 3-(2-biphenyl-4-yl-ethyl)-8-(6-bromo-benzo[1,3]dioxol-5-ylsulfanyl)-3H-purin-6-ylamine: ^{1}H NMR ($CDCl_3$) δ 7.63 (s, 1H), 7.58-7.51 (m, 4H), 7.46-7.42 (m, 2H), 7.39-7.36 (m, 1H), 7.25 (s, 1H), 7.20 (s, 1H), 7.06 (d, *J*= 8.4 Hz, 2H), 6.09 (s, 2H), 4.55 (t, *J*=6.8 Hz, 2H), 3.26 (t, *J*= 6.8 Hz, 2H); TOF LC-MS $[M+H]^+$ 548.0.

[00671] Examples 173 and 174

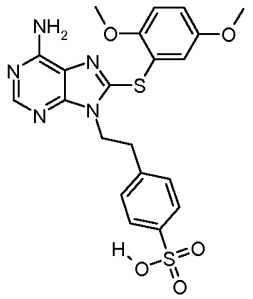


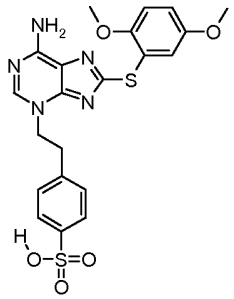
[00672] 8-(6-Bromo-benzo[1,3]dioxol-5-ylsulfanyl)-9-(2-cyclohexyl-ethyl)-9H-purin-6-ylamine and 8-(6-bromo-benzo[1,3]dioxol-5-ylsulfanyl)-3-(2-cyclohexyl-ethyl)-3H-purin-6-ylamine

[00673] The title compound was prepared from 8-(6-bromo-benzo[1,3]dioxol-5-ylsulfanyl)-9H-pruin-6-ylamine and (2-bromo-ethyl)-cyclohexane by a procedure similar to examples 1 and 2. The isomers were separated by preparative HPLC. 8-(6-Bromo-benzo[1,3]dioxol-5-ylsulfanyl)-9-(2-cyclohexyl-ethyl)-9H-purin-6-ylamine: ^{1}H NMR ($CDCl_3$) δ 8.19 (s, 1H), 7.14 (s, 1H), 7.10 (s, 1H), 6.06 (s, 2H), 4.28 (t, *J*=7.6 Hz, 2H), 1.84-1.60 (m, 7H), 1.30-1.18 (m, 4H), 0.99-0.80 (m, 2H); TOF LC-MS $[M+H]^+$ 487.0. 8-(6-Bromo-benzo[1,3]dioxol-5-ylsulfanyl)-3-(2-cyclohexyl-ethyl)-3H-purin-6-ylamine: ^{1}H NMR ($CDCl_3$) δ 8.03 (s, 1H), 7.22 (s, 1H), 7.17 (s, 1H), 6.08 (s, 2H), 4.33 (t, *J*=7.2

Hz, 2H), 1.84-1.80 (m, 2H), 1.79-1.70 (m, 5H), 1.30-1.18 (m, 4H), 0.99-0.80 (m, 2H); TOF LC-MS $[M+H]^+$ 487.0.

[00674] Examples 175 and 176

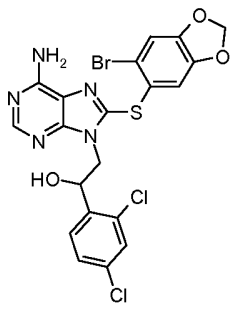


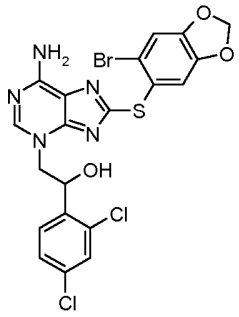


[00675] 4-{2-[6-Amino-8-(2, 5-dimethoxy-phenylsulfanyl)-purin-9-yl]-ethyl}-benzenesulfonic acid and 4-{2-[6-amino-8-(2, 5-dimethoxy-phenylsulfanyl)-purin-3-yl]-ethyl}-benzenesulfonic acid

[00676] The title compounds were prepared from 8-(2, 5-dimethoxy-phenylsulfanyl)-9H-purin-6-ylamine and 4-(2-bromo-ethyl)-benzenesulfonic acid by a procedure similar to examples 1 and 2. The isomers were separated by preparative HPLC. 4-{2-[6-Amino-8-(2, 5-dimethoxy-phenylsulfanyl)-purin-9-yl]-ethyl}-benzenesulfonic acid: ^{1}H NMR (DMSO-d6) δ 8.40 (s, 1H), 7.47 (d, *J*= 8.0Hz, 2H), 7.06 (d, *J*= 9.2Hz, 1H), 7.01 (d, *J*= 8.0Hz, 2H), 6.93 (dd, *J*= 9.2, 3.2 Hz, 1H), 6.75 (d, *J*= 3.2 Hz, 1H), 4.45 (t, J= 7.2Hz, 2H), 3.73 (s, 3H), 3.65 (s, 3H), 3.01 (t, *J*= 7.2 Hz, 2H); TOF LC-MS $[M+H]^+$ 488.1. 4-{2-[6-amino-8-(2, 5-dimethoxy-phenylsulfanyl)-purin-3-yl]-ethyl}-benzenesulfonic acid: ^{1}H NMR (DMSO-d6) δ 8.24 (s, 1H), 7.56 (d, *J*= 8.4 Hz, 2H), 7.30 (s, 1H), 7.23-7.16 (m, 2H), 7.10 (d, *J*= 8.4 Hz, 2H), 4.59 (t, *J*= 7.2Hz, 2H), 3.79 (s, 3H), 3.77 (s, 3H), 3.21 (t, *J*= 7.2 Hz, 2H); TOF LC-MS $[M+H]^+$ 488.1.

[00677] Examples 177 and 178



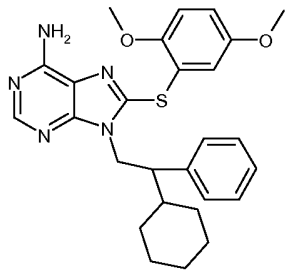


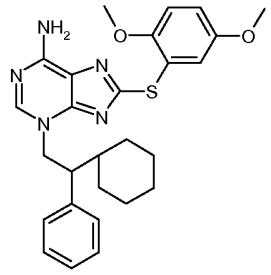
[00678] 2-[6-Amino-8-(6-bromo-benzo[1,3]dioxol-5-ylsulfanyl)-purin-9-yl]-1-(2,4

[00679] -dichloro-phenyl)-ethanol and 2-[6-amino-8-(6-bromo-benzo[1,3]dioxol-5-ylsulfanyl)-purin-3-yl]-1-(2,4-dichloro-phenyl)-ethanol

[00680] The title compound was prepared from 8-(6-bromo-benzo[1,3]dioxol-5-ylsulfanyl)-9H-purin-6-ylamine and 2-chloro-1-(2,4-dichloro-phenyl)-ethanol by a procedure similar to examples 1 and 2. The isomers were separated by preparative HPLC. 2-[6-Amino-8-(6-bromo-benzo[1,3]dioxol-5-ylsulfanyl)-purin-9-yl]-1-(2,4-dichloro-phenyl)-ethanol: ^{1}H NMR (Acetone-d_6) δ 8.13 (s, 1H), 7.66 (d, *J*= 8.2 Hz, 1H), 7.43 (d, *J*= 2.0 Hz, 1H), 7.39 (dd, *J*= 8.2, 2.0 Hz, 1H), 7.23 (s, 1H), 7.11 (s, 1H), 6.10 (s, 2H), 5.51 (t, *J*= 8.0 Hz, 1H), 4.39 (d, *J*= 8.0 Hz, 2H); TOF LC-MS $[M+H]^+$ 555.9. 2-[6-amino-8-(6-bromo-benzo[1,3]dioxol-5-ylsulfanyl)-purin-3-yl]-1-(2,4-dichloro-phenyl)-ethanol: ^{1}H NMR (Acetone-d_6) δ 8.53 (s, 1H), 7.62 (d, *J*= 8.2 Hz, 1H), 7.48 (d, *J*= 2.0 Hz, 1H), 7.39 (dd, *J*= 8.2, 2.0 Hz, 1H), 7.33 (s, 1H), 7.30 (s, 1H), 6.22 (s, 2H), 5.51 (dd, 8.4, 3.2 Hz, 1H), 4.74 (dd, *J*= 13.2, 3.2 Hz, 1H), 4.37 (dd, *J*= 13.2, 3.2 Hz, 1H); TOF LC-MS $[M+H]^+$ 555.9.

[00681] Examples 179 and 180

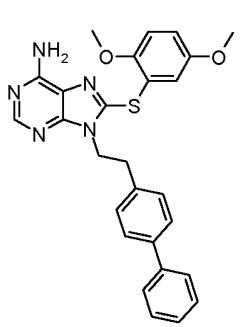


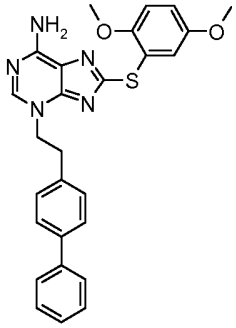


[00682] 9-(2-Cyclohexyl-2-phenyl-ethyl)-8-(2, 5-dimethoxy-phenylsulfanyl)-9H-purin-6-ylamine and 3-(2-cyclohexyl-2-phenyl-ethyl)-8-(2, 5-dimethoxy-phenylsulfanyl)-3H-purin-6-ylamine

[00683] The title compounds were prepared from 8-(2, 5-dimethoxy-phenylsulfanyl)-9H-purin-6-ylamine and (2-bromo-1-cyclohexyl-ethyl)-benzene by a procedure similar to examples 1 and 2. The isomers were separated by preparative HPLC. 9-(2-Cyclohexyl-2-phenyl-ethyl)-8-(2, 5-dimethoxy-phenylsulfanyl)-9H-purin-6-ylamine: ^{1}H NMR (Acetone-d_6) δ 8.33 (s, 1H), 7.16-7.03 (m, 6H), 6.94 (dd, *J*= 8.8, 2.8 Hz, 1H), 6.79 (d, *J*=2.8 Hz, 1H), 4.75 (dd, *J*= 9.2, 6.0 Hz, 1H), 4.65 (dd, *J*= 9.2, 6.0 Hz, 1H), 3.79 (s, 3H), 3.70 (s, 3H), 3.30-3.20 (m, 1H), 2.07-2.04 (m, 2H), 1.82-1.78 (m, 1H), 1.64-1.54 (m, 2H), 1.36-1.27 (m, 2H), 1.20-1.13 (m, 2H), 0.9-0.84 (m, 2H); LC-MS $[M+H]^+$ 490.2. 3-(2-cyclohexyl-2-phenyl-ethyl)-8-(2, 5-dimethoxy-phenylsulfanyl)-3H-purin-6-ylamine: ^{1}H NMR (Acetone-d_6) δ 7.81 (s, 1H), 7.37 (d, *J*= 2.8 Hz, 1H), 7.26-7.10 (m, 7H), 4.92 (dd, *J*= 9.2, 4.4 Hz, 1H), 4.42 (dd, *J*= 9.2, 2.8 Hz, 1H), 3.87 (s, 3H), 3.83 (s, 3H), 3.79 (m, 1H), 2.0-1.0 (m, 11H); LC-MS $[M+H]^+$ 490.2.

[00684] Examples 181 and 182

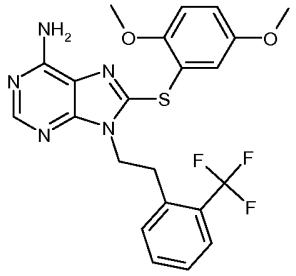


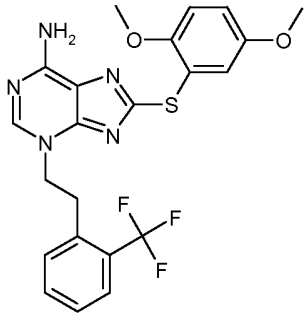


[00685] 9-(2-Biphenyl-4-yl-ethyl)-8-(2, 5-dimethoxy-phenylsulfanyl)-9H-purin-6-ylamine and 3-(2-biphenyl-4-yl-ethyl)-8-(2, 5-dimethoxy-phenylsulfanyl)-3H-purin-6-ylamine

[00686] The title compounds were prepared from 8-(2, 5-dimethoxy-phenylsulfanyl)-9H-purin-6-ylamine and 4-(2-bromo-ethyl)-biphenyl by a procedure similar to examples 1 and 2. The isomers were separated by preparative HPLC. 9-(2-Biphenyl-4-yl-ethyl)-8-(2, 5-dimethoxy-phenylsulfanyl)-9H-purin-6-ylamine: ^{1}H NMR (Acetone-d_6) δ 8.28 (s, 1H), 7.63 (d, *J*= 8.4 Hz, 2H), 7.56 (d, *J*= 8.4 Hz, 2H), 7.46 (t, *J*= 8.0 Hz, 2H), 7.35 (t, *J*= 8.0 Hz, 1H), 7.23 (d, *J*= 8.8 Hz, 2H), 6.88 (dd, *J*= 8.8, 2.8 Hz, 1H), 6.70(d, *J*= 2.8 Hz, 1H), 4.54 (t, *J*=7.2 Hz, 2H), 3.82 (s, 3H), 3.64 (s, 3H), 3.15 (t, *J*= 7.2 Hz, 2H); TOF LC-MS $[M+H]^+$ 484.1. 3-(2-biphenyl-4-yl-ethyl)-8-(2, 5-dimethoxy-phenylsulfanyl)-3H-purin-6-ylamine: ^{1}H NMR (Acetone-d_6) δ 8.27 (s, 1H), 7.63 (d, *J*= 8.0 Hz, 2H), 7.59 (d, *J*= 8.4 Hz, 2H), 7.46 (d, *J*= 8.4 Hz, 2H), 7.37 (d, *J*= 7.2 Hz, 1H), 7.35 (t, *J*= 8.0 Hz, 1H), 7.24 (d, *J*= 8.4 Hz, 2H), 7.10 (d, *J*= 9.2 Hz, 1H), 7.06 (dd, *J*= 9.2, 2.8 Hz, 1H), 4.66 (t, *J*=7.6 Hz, 2H), 3.82 (s, 3H), 3.79 (s, 3H), 3.12 (t, *J*= 7.6 Hz, 2H); TOF LC-MS $[M+H]^+$484.1.

[00687] Examples 183 and 184

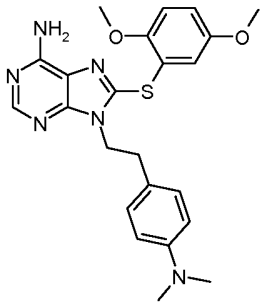


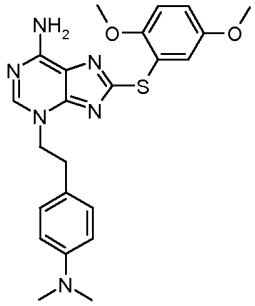


[00688] 8-(2, 5-Dimethoxy-phenylsulfanyl)-9-[2-(2-trifluoromethyl-phenyl)-ethyl]-9H-purin-6-ylamine and 8-(2, 5-dimethoxy-phenylsulfanyl)-3-[2-(2-trifluoromethyl-phenyl)-ethyl]-3H-purin-6-ylamine

[00689] The title compounds were prepared from 8-(2, 5-dimethoxy-phenylsulfanyl)-9H-purin-6-ylamine and 1-(2-bromo-ethyl)-2-trifluoromethyl-benzene by a procedure similar to examples 1 and 2. The isomers were separated by preparative HPLC. 8-(2, 5-Dimethoxy-phenylsulfanyl)-9-[2-(2-trifluoromethyl-phenyl)-ethyl]-9H-purin-6-ylamine: ^{1}H NMR (Acetone-d_6) δ 8.36 (s, 1H), 7.72 (d, *J*= 8.0 Hz, 1H), 7.52 (t, *J*= 7.6Hz, 1H), 7.45 (t, *J*= 7.6 Hz, 1H), 7.20 (d, *J*= 7.6 Hz, 1H), 7.02 (d, *J*= 9.2 Hz, 1H), 6.92 (dd, *J*= 9.2, 2.8 Hz, 1H), 6.81 (d, *J*= 2.8 Hz, 1H), 4.63 (t, *J*= 7.2 Hz, 2H), 3.78 (s, 3H), 3.70 (s, 3H), 3.37 (t, *J*= 7.2 Hz, 2H); TOF LC-MS $[M+H]^+$476.1. 8-(2, 5-dimethoxy-phenylsulfanyl)-3-[2-(2-trifluoromethyl-phenyl)-ethyl]-3H-purin-6-ylamine: ^{1}H NMR (Acetone-d_6) δ 8.38 (s, 1H), 7.72 (d, *J*= 8.0 Hz, 1H), 7.56 (t, *J*= 7.6 Hz, 1H), 7.48 (t, *J*= 7.6 Hz, 1H), 7.32 (d, *J*= 2.4 Hz, 1H), 7.27 (d, *J*= 7.6 Hz, 1H), 7.13-7.07 (m, 2H), 4.64 (t, *J*= 7.2 Hz, 2H), 3.80 (s, 3H), 3.79 (s, 3H), 3.44 (t, *J*= 7.2 Hz, 2H); TOF LC-MS $[M+H]^+$ 476.1.

[00690] Examples 185 and 186

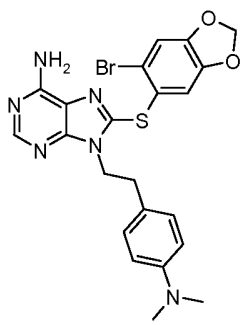


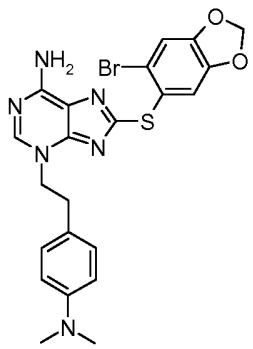


[00691] 8-(2, 5-Dimethoxy-phenylsulfanyl)-9-[2-(4-dimethylamino-phenyl)-ethyl]-9H-purin-6-ylamine and 8-(2, 5-dimethoxy-phenylsulfanyl)-3-[2-(4-dimethylamino-phenyl)-ethyl]-3H-purin-6-ylamine

[00692] The title compounds were prepared from 8-(2, 5-dimethoxy-phenylsulfanyl)-9H-purin-6-ylamine and [4-(2-bromo-ethyl)-phenyl]-dimethyl-amine by a procedure similar to examples 1 and 2. The isomers were separated by preparative HPLC. 8-(2, 5-Dimethoxy-phenylsulfanyl)-9-[2-(4-dimethylamino-phenyl)-ethyl]-9H-purin-6-ylamine: ^{1}H NMR (Acetone-d_6) δ 8.43 (s, 1H), 7.13 (d, *J*= 8.8 Hz, 2H), 7.07 (d, *J*= 8.8 Hz, 2H), 7.05 (d, *J*= 8.8 Hz, 1H), 6.97 (dd, *J*= 8.8, 2.8 Hz, 1H), 6.90 (d, *J*= 2.8Hz, 1H), 4.57 (t, *J*= 7.2 Hz, 2H), 3.78 (s, 3H), 3.72 (s, 3H), 3.13 (t, *J*= 7.2 Hz, 2H), 3.04 (s, 6H); TOF LC-MS $[M+H]^+$ 451.1. 8-(2, 5-dimethoxy-phenylsulfanyl)-3-[2-(4-dimethylamino-phenyl)-ethyl]-3H-purin-6-ylamine: ^{1}H NMR (Acetone-d_6) δ 8.27 (s, 1H), 7.13 (dd, *J*= 2.4, 0.8 Hz, 1H), 7.20-7.04 (m, 6H), 4.60 (t, *J*= 7.2 Hz, 2H), 3.81 (s, 3H), 3.80 (s, 3H), 3.20 (t, *J*= 7.2 Hz, 2H), 3.03 (s, 6H); TOF LC-MS $[M+H]^+$ 451.1.

[00693] Examples 187 and 188

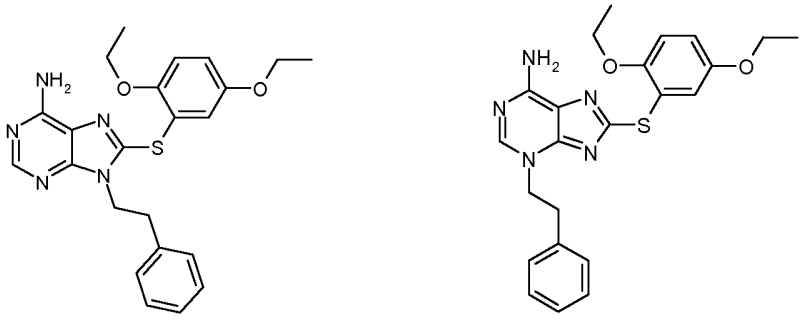




[00694] 8-(6-Bromo-benzo[1,3]dioxol-5-ylsulfanyl)-9-[2-(4-dimethylamino-phenyl)-ethyl]-9H-purin-6-ylamine and 8-(6-bromo-benzo[1,3]dioxol-5-ylsulfanyl)-3-[2-(4-dimethylamino-phenyl)-ethyl]-3H-purin-6-ylamine

[00695] The title compound was prepared from 8-(6-bromo-benzo[1,3]dioxol-5-ylsulfanyl)-9H-purin-6-ylamine and [4-(2-bromo-ethyl)-phenyl]-dimethyl-amine by a procedure similar to examples 1 and 2. The isomers were separated by preparative HPLC. 8-(6-bromo-benzo[1,3]dioxol-5-ylsulfanyl)-9-[2-(4-dimethylamino-phenyl)-ethyl]-9H-purin-6-ylamine: ^{1}H NMR (Acetone-d_6) δ 8.45 (s, 1H), 7.25 (s, 1H), 7.13 (d, *J*= 8.8 Hz, 2H), 7.05 (d, *J*= 8.8 Hz, 2H), 6.93 (s, 1H), 6.13 (s, 2H), 4.58 (t, *J*= 7.2 Hz, 2H), 3.16 (t, *J*= 7.2 Hz, 2H), 3.02 (s, 6H); TOF LC-MS $[M+H]^+$ 515.0. 8-(6-Bromo-benzo[1,3]dioxol-5-ylsulfanyl)-3-[2-(4-dimethylamino-phenyl)-ethyl]-3H-purin-6-ylamine: ^{1}H NMR (Acetone-d_6) δ 8.24 (s, 1H), 7.40 (s, 1H), 7.34 (s, 1H), 6.96 (d, *J*= 8.4 Hz, 2H), 6.71 (d, *J*= 8.4 Hz, 2H), 6.19 (s, 2H), 4.57 (t, *J*= 7.2 Hz, 2H), 3.13 (t, *J*= 7.2 Hz, 2H), 2.91 (s, 6H); TOF LC-MS $[M+H]^+$ 515.0.

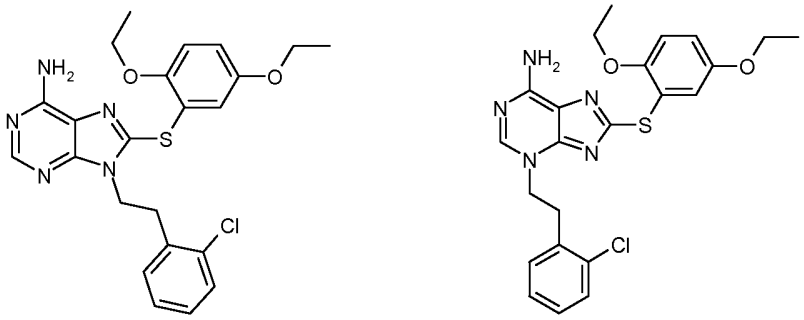
[00696] Examples 189 and 190



[00697] 8-(2, 5-Diethoxy-phenylsulfanyl)-9-phenethyl-9H-purin-6-ylamine and 8-(2, 5-diethoxy-phenylsulfanyl)-3-phenethyl-3H-purin-6-ylamine

[00698] The title compounds were prepared from 8-(2, 5-diethoxy-phenylsulfanyl)-9H-purin-6-ylamine and (2-bromo-ethyl)-benzene by a procedure similar to examples 1 and 2. The isomers were separated by preparative HPLC. 8-(2, 5-Diethoxy-phenylsulfanyl)-9-phenethyl-9H-purin-6-ylamine: ^{1}H NMR (CD_3OD) δ 8.25 (s, 1H), 7.26-7.20 (m, 3H), 7.11-7.07 (m, 2H), 7.00-6.96 (m, 3H), 4.55 (t, *J*= 7.2 Hz, 2H), 4.00-3.91 (m, 4H), 3.13 (t, *J*= 7.2 Hz, 2H), 1.35 (t, *J*= 7.2 Hz, 3H), 1.56 (t, *J*= 6.8Hz, 3H); LC-MS $[M+H]^+$ 436.5. 8-(2, 5-Diethoxy-phenylsulfanyl)-3-phenethyl-3H-purin-6-ylamine: ^{1}H NMR (CD_3OD) δ 8.12 (s, 1H), 7.30-7.25 (m, 4H), 7.16-7.15 (m, 2H), 7.11-7.08 (m, 2H), 4.61 (t, *J*= 7.2 Hz, 2H), 4.08-4.01 (m, 4H), 3.23 (t, *J*= 7.2 Hz, 2H), 1.38 (t, *J*= 7.2 Hz, 3H), 1.21 (t, *J*= 6.8 Hz, 3H); LC-MS $[M+H]^+$ 436.5.

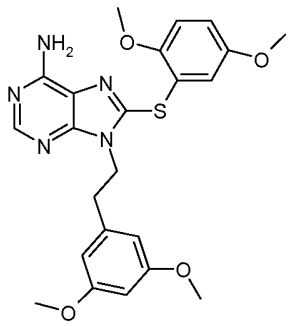
[00699] Examples 191 and 192

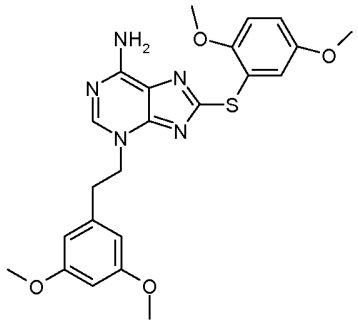


[00700] 9-[2-(2-Chloro-phenyl)-ethyl]-8-(2, 5-diethoxy-phenylsulfanyl)-9H-purin-6-ylamine and 3-[2-(2-chloro-phenyl)-ethyl]-8-(2, 5-diethoxy-phenylsulfanyl)-3H-purin-6-ylamine

[00701] The title compounds were prepared from 8-(2, 5-diethoxy-phenylsulfanyl)-9H-purin-6-ylamine and 1-(2-bromo-ethyl)-2-chloro-benzene by a procedure similar to examples 1 and 2. The isomers were separated by preparative HPLC. 9-[2-(2-Chloro-phenyl)-ethyl]-8-(2, 5-diethoxy-phenylsulfanyl)-9H-purin-6-ylamine: ^{1}H NMR (CD_3OD) δ 8.25 (s, 1H), 7.35 (dd, *J*= 8.0, 1.2 Hz, 1H), 7.23 (dt, *J*= 7.6, 2.0 Hz, 1H), 7.15 (dt, *J*= 7.6, 1.2 Hz, 1H), 7.05 (dd, *J*= 7.6, 2.0 Hz, 1H), 6.96-6.94 (m, 3H), 4.63 (t, *J*= 6.8 Hz, 2H), 3.99-3.91 (m, 4H), 3.33 (t, *J*= 6.8 Hz, 2H), 1.35 (t, *J*= 6.4 Hz, 3H), 1.17 (t, *J*= 6.4 Hz, 3H); LC-MS $[M+H]^+$ 470.5. 3-[2-(2-Chloro-phenyl)-ethyl]-8-(2, 5-diethoxy-phenylsulfanyl)-3H-purin-6-ylamine: ^{1}H NMR (CD_3OD) δ 8.11 (s, 1H), 7.36 (dd, *J*= 7.6, 2.0 Hz, 1H), 7.28-7.27 (bs, 1H), 7.25-7.20 (m, 2H), 7.18-7.14 (m, 3H), 4.66 (t, *J*= 7.2 Hz, 2H), 4.07-4.02 (m, 4H), 3.41 (t, *J*= 7.2 Hz, 2H), 1.38 (t, *J*= 6.0 Hz, 3H), 1.21 (t, *J*= 6.0 Hz, 3H); LC-MS $[M+H]^+$ 470.5.

[00702] Examples 193 and 194

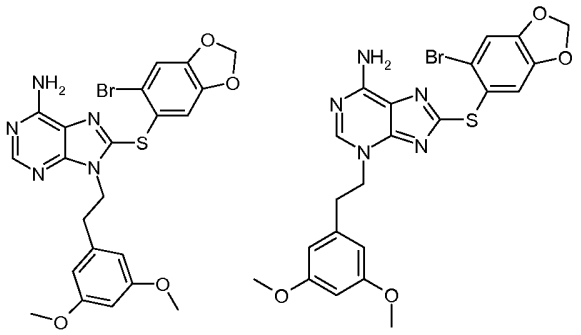




[00703] 9-[2-(3, 5-dimethoxy-phenyl)-ethyl]-8-(2, 5-dimethoxy-phenylsulfanyl)-9H-purin-6-ylamine and 3-[2-(3, 5-dimethoxy-phenyl)-ethyl]-8-(2, 5-dimethoxy-phenylsulfanyl)-3H-purin-6-ylamine

[00704] The title compounds were prepared from 8-(2, 5-dimethoxy-phenylsulfanyl)-9H-purin-6-ylamine and 1-(2-bromo-ethyl)-3, 5-dimethoxy-benzene by a procedure similar to examples 1 and 2. The isomers were separated by preparative HPLC. 9-[2-(3, 5-dimethoxy-phenyl-ethyl]-8-(2, 5-dimethoxy-phenylsulfanyl)-9H-purin-6-ylamine: ^{1}H NMR (DMSO-d_6) δ 8.33 (s, 1H), 7.03 (d, J = 9.0 Hz, 1H), 6.91-6.86 (m, 1H), 6.58 (d, J = 2.9 Hz, 1H), 6.30 (t, J = 1.9 Hz, 1H), 6.17 (d, J = 2.2 Hz, 2H), 4.42 (t, J = 7.0 Hz, 2H), 3.75 (s, 3H), 3.66 (s, 6H), 3.20 (s, 3H), 2.95 (t, J = 7.0 Hz, 2H); LC-MS $[M+H]^+$ 468.1. 3-[2-(3, 5-dimethoxy-phenyl-ethyl]-8-(2,5-dimethoxy-phenylsulfanyl)-3H-purin-6-ylamine: ^{1}H NMR (DMSO-d_6) δ 8.37 (s, 1H), 7.25-7.03 (m, 3H), 6.37 (t, J = 2.1 Hz, 1H), 6.29 (d, J = 2.3 Hz, 2H), 4.55 (t, J = 7.1 Hz, 2H), 3.78 (s, 3H), 3.73 (s, 3H), 3.69 (s, 6H), 3.10 (t, J = 7.1 Hz, 2H); LC-MS $[M+H]^+$ 468.1.

[00705] Examples 195 and 196

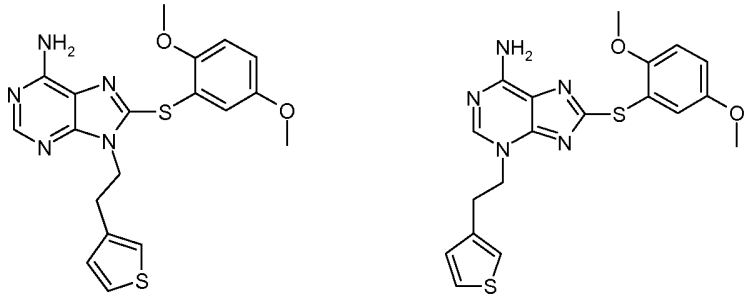


[00706] 8-(6-Bromo-benzo[1,3]dioxol-5-ylsulfanyl)-9-[2-(3,5-dimethoxy-phenyl)-ethyl]-9H-purin-6-ylamine and 8-(6-Bromo-benzo[1,3]dioxol-5-ylsulfanyl)-3-[2-(3, 5-dimethoxy-phenyl)-ethyl]-3H-purin-6-ylamine

[00707] The title compound was prepared from 8-(6-bromo-benzo[1,3]dioxol-5-ylsulfanyl)-9H-purin-6-ylamine and 1-(2-bromo-ethyl)-3, 5-dimethoxy-benzene by a procedure similar to examples 1 and 2. The isomers were separated by preparative HPLC. 8-(6-Bromo-benzo[1,3]dioxol-5-ylsulfanyl)-9-[2-(3,5-dimethoxy-phenyl)-ethyl]-9H-purin-6-ylamine: ^{1}H NMR (DMSO-d_6) δ 8.21 (s,

1H), 7.35 (s, 1H), 6.20 (s, 1H), 6.29 (t, J = 2.2 Hz, 1H), 6.18 (d, J = 2.2 Hz, 2H), 6.07 (s, 2H), 4.39 (t, J = 7.2 Hz, 2H), 3.64 (s, 6H), 2.97 (t, J = 7.2 Hz, 2H); LC-MS $[M+H]^+$ 531.0. 8-(6-Bromo-benzo[1,3]dioxol-5-ylsulfanyl)-3-[2-(3,5-dimethoxy-phenyl)-ethyl]-3H-purin-6-ylamine: ^{1}H NMR (DMSO-d_6) δ 8.31 (s, 1H), 7.49 (s, 1H), 7.39 (s, 1H), 6.36 (t, J = 2.3 Hz, 1H), 6.27 (d, J = 2.2 Hz, 2H), 6.17 (s, 2H), 4.52 (t, J = 7.2 Hz, 2H), 3.67 (s, 6H), 3.10 (t, J = 7.2 Hz, 2H); LC-MS $[M+H]^+$ 531.0.

[00708] Examples 197 and 198

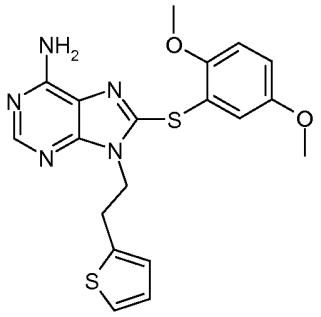


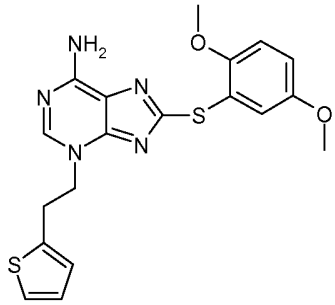
[00709] 8-(2, 5-Dimethoxy-phenylsulfanyl)-9-(2-thiophen-3-yl-ethyl)-9H-purin-6-ylamine and 8-(2, 5-dimethoxy-phenylsulfanyl)-3-(2-thiophen-3-yl-ethyl)-3H-purin-6-ylamine

[00710] The title compound was prepared from 8-(2, 5-dimethoxy-phenylsulfanyl)-9H-purin-6-ylamine and 3-(2-bromo-ethyl)-thiophene by a procedure similar to examples 1 and 2. The isomers were separated by preparative HPLC. 8-(2,5-Dimethoxy-phenylsulfanyl)-9-(2-thiophen-3-yl-ethyl)-9H-purin-6-ylamine: ^{1}H NMR (DMSO-d_6) δ 8.26 (s,1H), 7.34 (dd, J = 1.2, 5.1 Hz, 1H), 7.01 (d, J = 9.0 Hz, 1H), 6.92-6.85 (m, 2H), 6.73 (dd, J = 3.3, 1.0 Hz, 1H), 6.57 (d, J = 3.1 Hz, 1H), 4.41 (t, J = 6.8 Hz, 2H), 3.74 (s, 3H), 3.61 (s, 3H), 3.25 (t, J = 7.4 Hz, 2H); LC-MS $[M+H]^+$ 414.1. 8-(2, 5-Dimethoxy-phenylsulfanyl)-3-(2-thiophen-3-yl-ethyl)-3H-purin-6-ylamine: ^{1}H NMR (DMSO-d_6) δ 8.41 (s, 1H), 7.38 (dd, J = 5.1, 1.2 Hz, 1H), 7.26-7.05 (m, 3H), 6.96-6.93 (m, 1H), 6.82-6.80 (m, 1H), 4.57 (t, J =

7.1 Hz, 2H), 3.78 (s, 3H), 3.73 (s, 3H), 3.42 (t, J = 6.9 Hz, 2H); LC-MS $[M+H]^+$ 414.1.

[00711] Examples 199 and 200

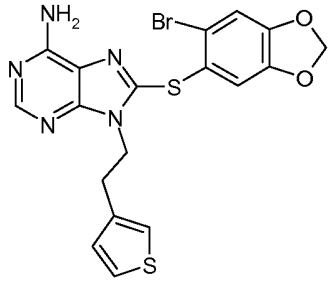


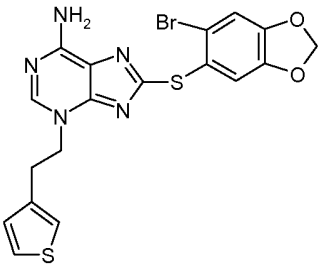


[00712] 8-(2, 5-Dimethoxy-phenylsulfanyl)-9-2-thiophen-2-yl-ethyl)-9H-purin-6-ylamine and 8-(2, 5-dimethoxy-phenylsulfanyl)-3-(2-thiophen-2-yl-ethyl)-3H-purin-6-ylamine

[00713] The title compound was prepared from 8-(2, 5-dimethoxy-phenylsulfanyl)-9H-purin-6-ylamine and 2-(2-bromo-ethyl)-thiophene by a procedure similar to examples 1 and 2. The isomers were separated by preparative HPLC. 8-(2,5-Dimethoxy-phenylsulfanyl)-9-2-thiophen-2-yl-ethyl)-9H-purin-6-ylamine: ^{1}H NMR (DMSO-d_6) δ 8.35 (s,1H), 7.44 (dd, J = 4.9, 2.9 Hz, 1H), 7.11-7.02 (m, 2H), 6.93-6.83 (m, 2H), 6.62 (d, J = 3.0 Hz, 1H), 4.43 (t, J = 6.8 Hz, 2H), 3.72 (s, 3H), 3.63 (s, 3H), 3.02 (t, J = 6.8 Hz, 2H); LC-MS $[M+H]^+$ 414.1. 8-(2, 5-Dimethoxy-phenylsulfanyl)-3-(2-thiophen-2-yl-ethyl)-3H-purin-6-ylamine: ^{1}H NMR (DMSO-d_6) δ 8.37 (s, 1H), 7.51 (dd, J = 4.9, 2.7 Hz, 1H), 7.28-7.02 (m, 4H), 6.98 (dd, J = 4.9, 1.2 Hz, 1H), 4.57 (t, J = 6.8 Hz, 2H), 3.78 (s, 3H), 3.73 (s, 3H), 3.21 (t, J = 6.8 Hz, 2H); LC-MS $[M+H]^+$ 414.1.

[00714] Examples 201 and 202

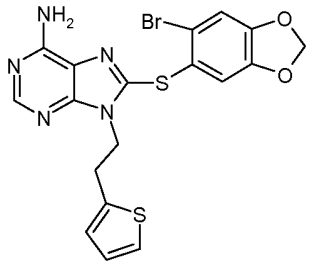


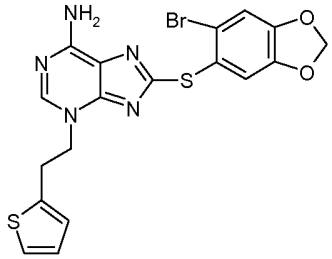


[00715] 8-(6-Bromo-benzo[1,3]dioxol-5-ylsulfanyl)-9-(2-thiophen-3-yl-ethyl)-9H-purin-6-ylamine and 8-(6-bromo-benzo[1,3]dioxol-5-ylsulfanyl)-3-(2-thiophen-3-yl-ethyl)-3H-purin-6-ylamine

[00716] The title compound was prepared from 8-(6-bromo-benzo[1,3]dioxol-5-ylsulfanyl)-9H-purin-6-ylamine and 3-(2-bromo-ethyl)-thiophene by a procedure similar to examples 1 and 2. The isomers were separated by preparative HPLC. 8-(6-Bromo-benzo[1,3]dioxol-5-ylsulfanyl)-9-(2-thiophen-3-yl-ethyl)-9H-purin-6-ylamine: ^{1}H NMR (DMSO-d_6) δ 8.26 (s, 1H), 7.38-7.31 (m, 2H), 6.90 (dd, J = 5.1, 3.5 Hz, 1H), 6.79-6.76 (m, 2H), 6.10 (s, 2H), 4.41 (t, J = 6.8 Hz, 2H), 3.29 (t, J = 6.8 Hz, 2H); LC-MS $[M+H]^+$ 477.9. 8-(6-Bromo-benzo[1,3]dioxol-5-ylsulfanyl)-3-(2-thiophen-3-yl-ethyl)-3H-purin-6-ylamine: ^{1}H NMR (DMSO-d_6) δ 8.39 (s, 1H), 7.50 (s, 1H), 7.38-7.35 (m, 2H), 6.95 (dd, J = 5.1, 3.3 Hz, 1H), 6.81 (dd, J = 3.5, 1.2 Hz, 1H), 6.19 (s, 2H), 4.55 (t, J = 6.8 Hz, 2H), 3.42 (t, J = 6.8 Hz, 2H); LC-MS $[M+H]^+$ 477.9.

[00717] Examples 203 and 204



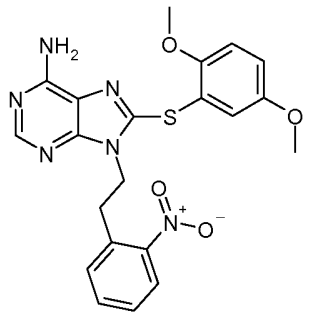


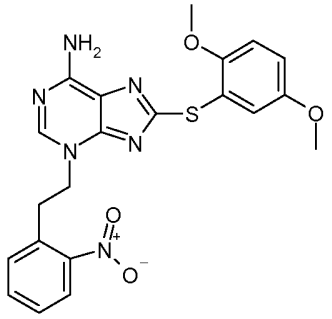
[00718] 8-(6-Bromo-benzo[1,3]dioxol-5-ylsulfanyl)-9-(2-thiophen-2-yl-ethyl)-9H-purin-6-ylamine and 8-(6-bromo-benzo[1,3]dioxol-5-ylsulfanyl)-3-(2-thiophen-2-yl-ethyl)-3H

[00719] -purin-6-ylamine

[00720] The title compound was prepared from 8-(6-bromo-benzo[1,3]dioxol-5-ylsulfanyl)-9H-purin-6-ylamine and 2-(2-bromo-ethyl)-thiophene by a procedure similar to examples 1 and 2. The isomers were separated by preparative HPLC. 8-(6-Bromo-benzo[1,3]dioxol-5-ylsulfanyl)-9-(2-thiophen-2-yl-ethyl)-9H-purin-6-ylamine: ^{1}H NMR (DMSO-d_6) δ 8.29 (s, 1H), 7.45 (dd, J = 4.9, 2.9 Hz, 1H), 7.39 (s, 1H), 7.12 (dd, J = 3.0, 1.2 Hz, 1H), 6.89 (dd, J = 4.9, 1.4 Hz, 1H), 6.80 (s, 1H), 6.10 (s, 2H), 4.40 (t, J = 7.2 Hz, 2H), 3.18(t, J = 7.2 Hz, 2H); LC-MS $[M+H]^+$ 477.9. 8-(6-Bromo-benzo[1,3]dioxol-5-ylsulfanyl)-3-(2-thiophen-2-yl-ethyl)-3H-purin-6-ylamine: ^{1}H NMR (DMSO-d_6) δ 8.36 (s, 1H), 7.52-7.48 (m, 2H), 7.39 (s, 1H), 7.18 (dd, J= 3.0, 1.2 Hz, 1H), 6.98-6.95 (m, 1H), 6.19 (s, 2H), 4.54 (t, J = 7.2 Hz, 2H), 3.20 (t, J = 7.2 Hz, 2H); LC-MS $[M+H^+$ 477.9.

[00721] Examples 205 and 206



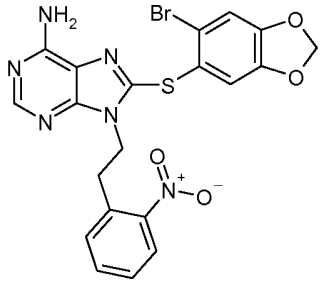


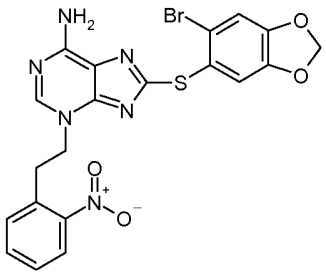
[00722] 8-(2, 5-Dimethoxy-phenylsulfanyl)-9-[2-(2-nitro-phenyl)-ethyl]-9H-purin-6-ylamine and 8-(2, 5-dimethoxy-phenylsulfanyl)-3-[2-(2-nitro-phenyl)-ethyl]-3H-purin-6-ylamine

[00723] The title compound was prepared from 8-(2, 5-dimethoxy-phenylsulfanyl)-9H-purin-6-ylamine and 1-(2-bromo-ethyl)-2-nitro-benzene by a procedure similar to examples 1 and 2. The isomers were separated by preparative

HPLC. 8-(2, 5-Dimethoxy-phenylsulfanyl)-9-[2-(2-nitro-phenyl)-ethyl]-9H-purin-6-ylamine: ^{1}H NMR (DMSO-d_6) δ 8.25 (s, 1H), 8.02-7.97 (m, 1H), 7.92-7.89 (m, 1H), 7.48-7.41 (m, 2H), 7.00 (d, J = 9.0 Hz, 1H), 6.85 (dd, J = 9.0, 3.1 Hz, 1H), 6 .42 (d, J = 3.0 Hz, 1H), 4.53 (t, J = 6.9 Hz, 2H), 3.75 (s, 3H), 3.60 (s, 3H), 3.21 (t, J = 6.9 Hz, 2H); LC-MS [M+H$^+$ 453.13. 8-(2, 5-Dimethoxy-phenylsulfanyl)-3-[2-(2-nitro-phenyl)-ethyl]-3H-purin-6-ylamine: ^{1}H NMR (DMSO-d_6) δ 8.43 (s, 1H), 8.14-8.10 (m, 2H), 7.60-7.57 (m, 2H), 7.26-7.05 (m, 3H), 4.60 (t, J = 6.9 Hz, 2H), 3.78 (s, 3H), 3.74 (s, 3H), 3.35 (t, J = 6.9 Hz, 2H); LC-MS [M+H]$^+$ 453.13.

[00724] Examples 207 and 208



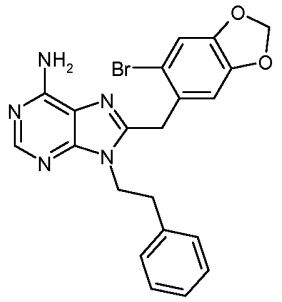


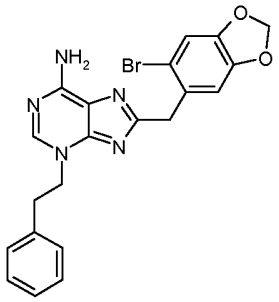
[00725] 8-(6-Bromo-benzo[1,3]dioxol-5-ylsulfanyl)-9-[2-(2-nitro-phenyl)-ethyl]-9H-purin-6-ylamine and 8-(6-bromo-benzo[1,3]dioxol-5-ylsulfanyl)-3-[2-(2-nitro-phenyl)-ethyl]-3H-purin-6-ylamine

[00726] The title compound was prepared from 8-(6-bromo-benzo[1,3]dioxol-5-ylsulfanyl)-9H-purin-6-ylamine and 1-(2-bromo-ethyl)-2-nitro-benzene by a procedure similar to examples 1 and 2. The isomers were separated by preparative HPLC. 8-(6-Bromo-benzo[1,3]dioxol-5-ylsulfanyl)-9-[2-(2-nitro-phenyl)-ethyl]-9H-purin-6-ylamine: ^{1}H NMR (DMSO-d_6) δ 8.19 (s, 1H), 8.02-7.90 (m, 1H), 7.93-7.91 (m, 1H), 7.50-7.40 (m, 2H), 7.29 (s, 1H), 6.53 (s, 1H), 6.18 (s, 2H), 4.49 (t, J = 6.9 Hz, 2H), 3.26 (t, J = 7.0 Hz, 2H); LC-MS [M+H]$^+$ 516.0. 8-(6-Bromo-benzo[1,3]dioxol-5-ylsulfanyl)-3-[2-(2-nitro-phenyl)-ethyl]-3H-purin-6-ylamine: ^{1}H NMR (DMSO-d_6) δ 8.41 (s, 1H), 8.12-8.09 (m, 2H), 7.59-7.54 (m, 2H),

7.50 (s, 1H), 7.39 (s, 1H), 6.19 (s, 2H), 4.59 (t, J = 6.9 Hz, 2H), 3.36 (t, J = 7.0 Hz, 2H); LC-MS $[M+H]^+$ 516.0.

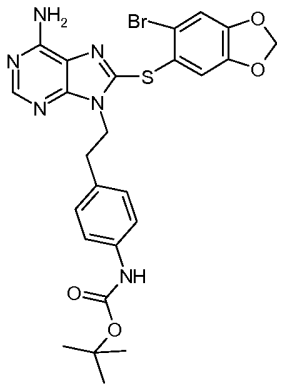
[00727] Examples 209 and 210

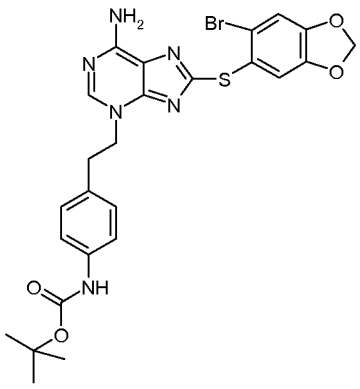




[00728] The title compounds were prepared from 8-(6-bromo-benzo[1, 3]dioxol-5-ylsulfanyl)-9H-purin-6-ylamine (J. Comb. Chem, 2001, 3, 518) and (2-bromo-ethyl)-benzene by a procedure similar to example 1 and 2. The isomers were separated by preparative HPLC. 8-(6-Bromo-benzo[1,3]dioxol-5-ylmethyl)-9-phenethyl-9H-purin-6-ylamine: Yield 11 %, ^{1}H NMR (DMSO-d6) δ 8.24 (s, 1H), 7.30-7.20 (m, 4H), 7.11-7.09 (m, 2H), 6.69 (s, 1H), 6.05 (s, 2H), 4.40-4.34 (m, 2H), 3.97 (s, 2H), 3.04-2.98 (m, 2H); LC-MS $[M+H]^+$ 452.0. 8-(6-Bromo-benzo[1,3]dioxol-5-ylmethyl)-3-phenethyl-3H-purin-6-ylamine: Yield 8 %, (CD_3OD) δ 8.19 (s, 1H), 7.26-7.20 (m, 3H), 7.17 (s, 1H), 7.11-7.07 (m, 2H), 7.06 (s, 1H), 6.05 (s, 2H), 4.67 (t, J= 6.8 Hz, 2H), 4.45 (s, 2H), 3.26 (t, J= 6.8 Hz, 2H); LC-MS $[M+H]^+$ 452.1.

[00729] Examples 211 and 212

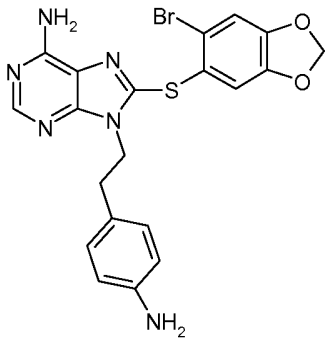




[00730] (4-{2-[6-Amino-8-(6-bromo-benzo[1,3]dioxol-5-ylsulfanyl)-purin-9-yl]-ethyl}-phenyl)carbamic acid tert-butyl ester and (4-{2-[6-amino-8-(6-bromo-benzo[1,3]dioxol-5-ylsulfanyl)-purin-3-yl]-ethyl}-phenyl)carbamic acid tert-butyl ester

[00731] The title compound was prepared from 8-(6-bromo-benzo[1,3]dioxol-5-ylsulfanyl)-9H-purin-6-ylamine and [4-(2-bromo-ethyl)-phenyl]-carbamic acid tert-butyl ester by a procedure similar to examples 1 and 2. The isomers were separated by preparative HPLC. (4-{2-[6-Amino-8-(6-bromo-benzo[1,3]dioxol-5-ylsulfanyl)-purin-9-yl]-ethyl}-phenyl)carbamic acid *tert*-butyl ester: ^{1}H NMR (DMSO-d_6) δ 9.30 (s, 1H), 8.35 (s, 1H),7.36 (s, 1H), 7.30 (d, J = 8.2 Hz, 2H), 6.99 (d, J = 8.4 Hz, 2H), 6.71 (s, 1H), 6.09 (s, 2H), 4.39 (t, J = 6.6 Hz, 2H), 2.99 (t, J = 6.8 Hz, 2H), 1.48 (s, 9H); LC-MS $[M+H]^+$ 586.0. (4-{2-[6-amino-8-(6-bromo-benzo[1,3]dioxol-5-ylsulfanyl)-purin-3-yl]-ethyl}-phenyl)carbamic acid *tert*-butyl ester: ^{1}H NMR (DMSO-d_6) δ 9.30 (s, 1H), 8.29 (s, 1H), 7.68-7.31 (m, 4H), 6.99 (d, J = 8.4 Hz, 2H), 6.19 (s, 2H), 4.99 (t, J = 6.6 Hz, 2H), 3.09 (t, J = 6.8 Hz, 2H), 1.48 (s, 9H); LC-MS $[M+H]^+$ 586.0.

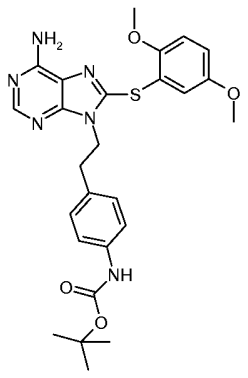
[00732] Example 213

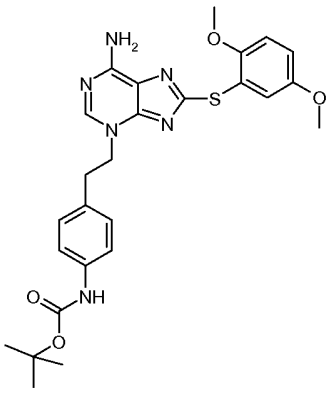


[00733] 9-[2-(4-Amino-phenyl)-ethyl]-8-(6-bromo-benzo[1,3]dioxol-5-ylsulfanyl)-9H-purin-6-ylamine

[00734] To a solution of (4-{2-[6-Amino-8-(6-bromo-benzo[1,3]dioxol-5-ylsulfanyl) purin-9-yl]-ethyl}-phenyl)-carbamic acid tert-butyl ester (0.03g, 0.04 mmol) in dichloromethane (4.3 mL) was added TFA (0.02 mL, 0.22 mmol) and the reaction mixture was stirred at rt overnight. At the end of this period, reaction was diluted with 100 mL of toluene and then concentrated under reduced pressure. This process was repeated 3 more times to yield the title product (0.03 g, 95%) as TFA salt. ^{1}H NMR (DMSO-d_6) δ 8.19 (s, 1H), 7.24 (s, 1H), 7.19-7.02 (m, 4H), 7.00 (s, 1H), 6.13 (s, 2H), 4.45 (t, J = 6.8 Hz, 2H), 3.18 (t, J = 6.8 Hz, 2H); LC-MS $[M+H]^+$ 486.3.

[00735] Examples 214 and 215

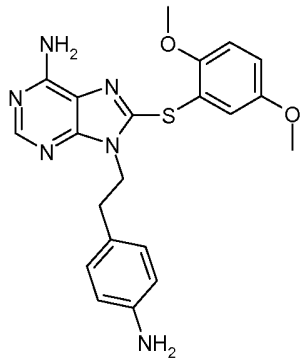




[00736] (4-{2-[6-Amino-8-(2, 5-dimethoxy-phenylsulfanyl)-purin-9-yl]-ethyl}-phenyl)-carbamic acid *tert*-butyl ester and (4-{2-[6-amino-8-(2, 5-dimethoxy-phenylsulfanyl)-purin-3-yl]-ethyl}-phenyl)-carbamic acid *tert*-butyl ester

[00737] The title compound was prepared from 8-(2, 5-dimethoxy-phenylsulfanyl)-9H-purin-6-ylamine and [4-(2-bromo-ethyl)-phenyl]-carbamic acid tert-butyl ester by a procedure similar to examples 1 and 2. The isomers were separated by preparative HPLC. (4-{2-[6-Amino-8-(2, 5-dimethoxy-phenylsulfanyl)-purin-9-yl]-ethyl}-phenyl)-carbamic acid *tert*-butyl ester: ^{1}H NMR (DMSO-d_6) δ 9.28 (s, 1H), 8.28 (s, 1H), 7.31 (d, J = 8.4 Hz, 2H), 7.03 (d, J = 8.4 Hz, 1H), 6.92-6.84 (m, 3H), 6.58 (d, J = 3.0 Hz, 1H), 4.39 (t, J = 6.8 Hz, 2H), 3.74 (s, 3H), 3. 61 (s, 3H), 2.91 (t, J = 6.8 Hz, 2H), 1.49 (s, 9H); LC-MS $[M+H]^+$ 523.22. (4-{2-[6-amino-8-(2, 5-dimethoxy-phenylsulfanyl)-purin-3-yl]-ethyl}-phenyl)-carbamic acid *tert*-butyl ester: ^{1}H NMR (DMSO-d_6) δ 9.32 (s, 1H), 8.31 (s, 1H), 7.38 (d, J = 8.4 Hz, 2H), 7.29-7.10 (m, 3H), 7.01 (d, J = 8.6 Hz, 2H), 4.50 (t, J = 6.8 Hz, 2H), 3.79 (s, 3H), 3. 65 (s, 3H), 3.09 (t, J = 6.8 Hz, 2H), 1.49 (s, 9H); LC-MS $[M+H]^+$ 523.2.

[00738] Example 216

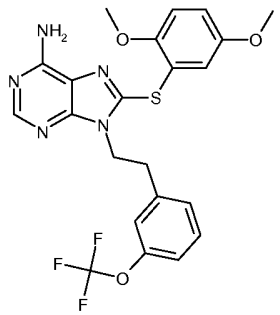


[00739] 9-[2-(4-Amino-phenyl)-ethyl]-8-(2, 5-dimethoxy-phenylsulfanyl)-9H-purin-6-ylamine

[00740] The title compound was prepared from (4-{2-[6-Amino-8-(2, 5-dimethoxy-phenylsulfanyl)-purin-9-yl]-ethyl}-phenyl)-carbamic acid *tert*-butyl ester

by a procedure similar to example 213. ^{1}H NMR (DMSO-d_6) δ 8.19 (s, 1H), 7.19-6.92 (m, 7H), 4.45 (t, *J* = 6.8 Hz, 2H), 3.78 (s, 6H), 3.17 (t, *J* = 6.8 Hz, 2H); LC-MS $[M+H]^+$ 423.1.

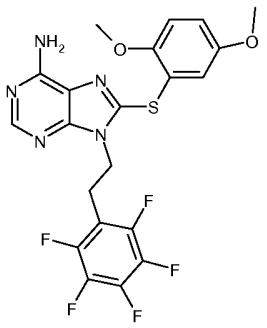
[00741] Example 217



[00742] 8-(2, 5-Dimethoxy-phenylsulfanyl)-9-[2-(3-trifluoromethoxy-phenyl)-ethyl]-9H-purin-6-ylamine

[00743] The title compound was prepared from 8-(2, 5-dimethoxy-phenylsulfanyl)-9H-purin-6-ylamine and. 1-(2-bromo-ethyl)-3-trifluoromethoxy-benzene by a procedure similar to examples1 and 2. The compound was purified by preparative HPLC. 8-(2, 5-Dimethoxy-phenylsulfanyl)-9-[2-(3-trifluoromethoxy-phenyl)-ethyl]-9H-purin-6-ylamine: Yield 17 %, ^{1}H NMR (CD_3OD) δ 8.18 (s, 1H), 7.33 (t, J= 8.0 Hz, 1H), 7.12-7.10 (m, 2H), 7.04-7.01 (m, 3H), 6.95 (bs, 1H), 4.57 (t, *J*= 7.2 Hz, 2H), 3.75 (s, 3H), 3.74 (s, 3H), 3.24 (t, *J*= 7.2 Hz, 2H); LC-MS $[M+H]^+$ 492.1.

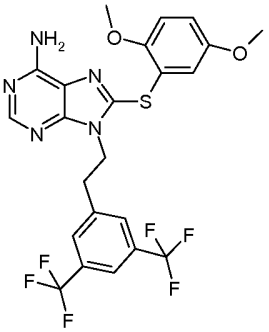
[00744] Example 218



[00745] 8-(2, 5-Dimethoxy-phenylsulfanyl)-9-(2-pentafluorophenyl-ethyl)-9H-purin-6-ylamine

[00746] The title compound was prepared from 8-(2, 5-dimethoxy-phenylsulfanyl)-9H-purin-6-ylamine and 1-(2-bromo-ethyl)-2, 3, 4, 5, 6-pentafluoro-benzene by a procedure similar to examples 1 and 2. The compound was purified by preparative HPLC. 8-(2, 5-Dimethoxy-phenylsulfanyl)-9-(2-pentafluorophenyl-ethyl)-9H-purin-6-ylamine. Yield 23%, LC-MS $[M+H]^+$ 498.1.

[00747] Example 219

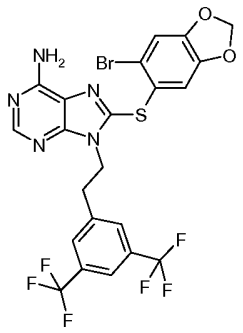


[00748] 9-[2-(3, 5-Bistrifluoromethy-phenyl)-ethyl]-8-(2, 5-dimethoxy-phenylsulfanyl)-9H-purin-6-ylamine

[00749] The title compound was prepared from 8-(2, 5-dimethoxy-phenylsulfanyl)-9H-purin-6-ylamine and 1-(2-bromo-ethyl)-3, 5-bis-trifluoromethyl-benzene by a procedure similar to examples 1 and 2. The compound was purified by preparative HPLC. 9-[2-(3, 5-Bistrifluoromethy-phenyl)-ethyl]-8-(2,5-

dimethoxy-phenylsulfanyl)-9H-purin-6-ylamine: ^{1}H NMR (DMSO-d_6) δ 8.10 (s, 1H), 7.86 (s, 1H), 7.54 (s, 2H), 7.01 (d, J = 9.0 Hz, 1H), 6.83 (dd, J = 11.0, 3.0 Hz, 1H), 6.40 (d, J = 2.9 Hz, 1H), 4.50 (t, J = 7.2 Hz, 2H), 3.75 (s, 3H), 3.59 (s, 3H), 3.24 (t, J = 7.2 Hz, 2H); LC-MS $[M+H]^+$ 544.1.

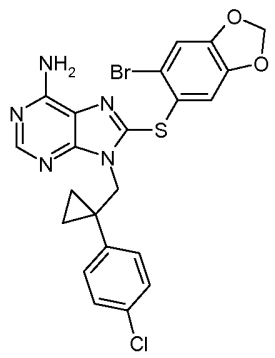
[00750] Example 220



[00751] 9-[2-(3, 5-Bistrifluoromethyl-phenyl)-ethyl]-8-(6-bromo-benzo[1,3]dioxol-5-ylsulfanyl)-9H-purin-6-ylamine

[00752] The title compound was prepared from 8-(6-bromo-benzo[1,3]dioxol-5-ylsulfanyl)-9H-purin-6-ylamine and 1-(2-bromo-ethyl)-3, 5-bis-trifluoromethyl-benzene by a procedure similar to examples 1 and 2. The compound was purified by preparative HPLC. ^{1}H NMR (DMSO-d_6) δ 8.13 (s, 1H), 7.79 (s, 1H), 7.66 (s, 2H), 7.23 (s, 1H), 7.01 (s, 1H), 6.09 (s, 2H), 4.59 (t, J=7.4 Hz, 2H), 3.35 (t, J=7.4 Hz, 2H); LC-MS $[M+H]^+$ 607.0

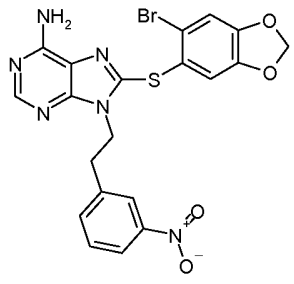
[00753] Example 221



[00754] 8-(6-Bromo-benzo[1,3]dioxol-5-ylsulfanyl)-9-[1-(4-chloro-phenyl)-cyclopropylmethyl]-9H-purin-6-ylamine

[00755] The title compound was prepared from 8-(6-bromo-benzo[1,3]dioxol-5-ylsulfanyl)-9H-purin-6-ylamine and 1-(-bromomethyl-cyclopropyl)-4-chloro-benzene by a procedure similar to examples 1 and 2. The compound was purified by preparative HPLC. 8-(6-Bromo-benzo[1,3]dioxol-5-ylsulfanyl)-9-[1-(4-chloro-phenyl)-cyclopropylmethyl]-9H-purin-6-ylamine: ^{1}H NMR (CD_3OD) δ 8.24 (s, 1H), 7.24 (d, J = 9.3 Hz, 2H), 7.19 (s, 1H), 714 (d, J = 8.6 Hz, 2H), 6.93 (s, 1H), 6.08 (s, 2H) 4.49 (s, 2H), 1.41-1.35 (m, 2H), 0.95-0.91 (m, 2H); LC-MS $[M+H]^+$ 531.8.

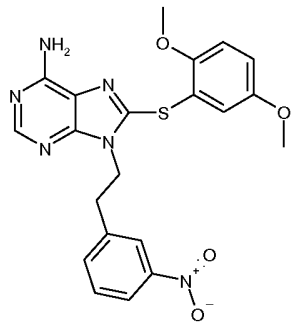
[00756] Example 222



[00757] 8-(6-Bromo-benzo[1,3]dioxol-5-ylsulfanyl)-3-[2-(3-nitro-phenyl)-ethyl]-3H-purin-6-ylamine

[00758] The title compound was prepared from 8-(6-bromo-benzo[1,3]dioxol-5-ylsulfanyl)-9H-purin-6-ylamine and 1-(2-bromo-ethyl)-3-nitro-benzene by a procedure similar to examples 1 and 2. The compound was purified by preparative HPLC. ^{1}H NMR (DMSO-d_6) δ 8.29 (s, 1H), 7.99-7.95 (m, 1H), 7.56-7.42 (m, 2H), 7.33 (s, 1H), 7.10-7.05 (m, 1H), 6.72 (s, 1H), 6.10 (s, 2H), 4.60 (t, *J* = 6.9 Hz, 2H), 3.36 (t, *J* = 7.0 Hz, 2H); LC-MS $[M+H]^+$ 516.0.

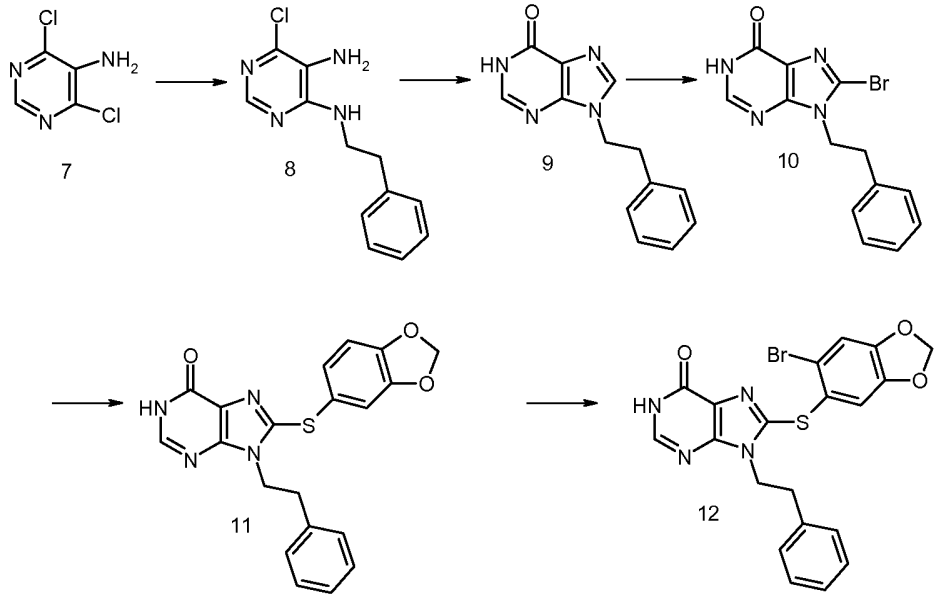
[00759] Example 223



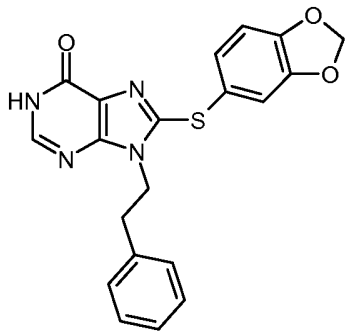
[00760] 8-(2, 5-Dimethoxy-phenylsulfanyl)-9-[2-(3-nitro-phenyl)-ethyl]-9H-purin-6-ylamine

[00761] The title compound was prepared from 8-(2, 5-dimethoxy-phenylsulfanyl)-9H-purin-6-ylamine and 1-(2-bromo-ethyl)-3-nitro-benzene by a procedure similar to examples 1 and 2. The compound was purified by preparative HPLC. ^{1}H NMR (DMSO-d_6) δ 8.28 (s, 1H), 7.96 (dd, *J* = 8.0, 1.3 Hz, 1H), 7.53-7.42 (m, 2H), 7.07-7.03 (m, 1H), 7.00 (d, *J* = 9.0 Hz, 1H), 6.87 (dd, *J* = 3.1, 9.0 Hz, 1H), 6.53 (d, *J* = 2.8 Hz, 1H), 4.60 (t, *J* = 6.9 Hz, 2H), 3.71 (s, 3H), 3.62 (s, 3H), 3.33 (t, *J* = 6.9 Hz, 2H); LC-MS $[M+H]^+$ 453.13.

[00762] Figure 2



[00763] Example 224



[00764] 8-(Benzo[1,3]dioxol-5-ylsulfanyl)-9-phenethyl-1,9-dihydro-purin-6-one

[00765] Step1: 6-Chloro-N^4-phenethyl-pyrimidine-4, 5-diamine

[00766] To a flask with dichloropyrimidine (2.8g, 17.0 mmol) in *n*-BuOH (0.1 M) was added amine (2.3 mL, 18.6 mmol) and TEA (4.7 mL, 33.9 mmol). The resulting reaction mixture was then heated to 120 °C until starting material was gone as judged by TLC (ca. 4h). The reaction was then cooled to rt and poured into hexanes at which point a solid formed. The solid was filtered off using a fritted

funnel and the solid cake washed with hexanes. The solid (3.8 g, 90% yield) was used without further purification. ^{1}H NMR ($CDCl_3$) δ 8.07 (s, 1H), 7.38-7.21 (m, 5H), 5.29 (bs, 1H), 3.81 (t, J = 7.1 Hz, 2H), 3.60 (bs, 2H), 2.97 (t, J = 7.3 Hz, 2H).

[00767] Step 2: 9-Phenethyl-1, 9-dihydro-purin-6-one

[00768] To a flask with chloropyrimidine product above (1.0 g, 4.0 mmol) in formamide (0.25 M) was added 2 mL of formic acid. The resulting reaction mixture was then heated to 175 °C for 4h at which time HPLC showed consumption of starting material. The reaction was allowed to cool and water (0.80 M) is added. The resulting solid is filtered off using a fritted funnel and the solid cake washed with toluene. The solid (0.6 g, 64%) was then used in the next reaction without further purification. ^{1}H NMR (DMSO-d_6) δ 12.29 (s, 1H), 8.04 (s, 1H), 7.90 (s, 1H), 7.31-7.7.10 (m, 5H), 4.39 (t, J = 7.0 Hz, 2H), 3.13 (t, J = 7.3 Hz, 2H).

[00769] Step 3: 8-Bromo-9-phenethyl-1, 9-dihydro-purin-6-one

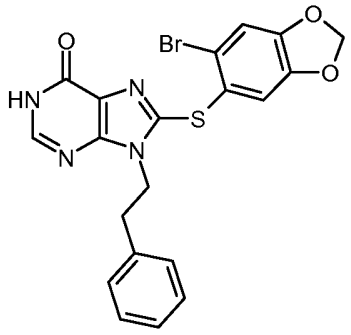
[00770] To a solution of purinone from step 2 (0.29 g, 1.21 mmol) from above reaction in dioxane (0.1M) is added NBS (0.32g, 1.81 mmol). The resulting reaction mixture was heated to 105 °C until HPLC shows consumption of starting material (ca. 2h). The reaction was cooled to rt and purified by MPLC using a solvent gradient of 0 – 20% MeOH/CH_2Cl_2. The product containing fractions were collected and concentrated to provide the desired product (0.22 g, 57% yield). ^{1}H NMR (DMSO-d_6) δ 12.49 (s, 1H), 8.08 (s, 1H), 7.30-7.21 (m, 3H), 7.10-7.04 (m, 2H), 4.36 (t, J = 7.0 Hz, 2H), 3.17 (t, J = 7.3 Hz, 2H).

[00771] Step 4: 8-(Benzo[1,3]dioxol-5-ylsulfanyl)-9-phenethyl-1,9-dihydro-purin-6-one

[00772] To a solution of sodium hydride (0.035 g, 0.882 mmol, 60% in mineral oil) in DMF (0.1 M) at 0 °C was added the desired thiophenol (0.140 g,

0.882 mmol). The reaction mixture was allowed to warm to rt and mixed 15 min at which time the bromo-purinone from step 3 (0.113 g, 0.353 mmol) from the above reaction was added. The resulting reaction mixture was then heated to 90°C overnight. The reaction was then cooled to rt, concentrated, and then purified by MPLC using 0 – 20% MeOH/ CH_2Cl_2. The product containing fractions were collected and concentrated to provide the desired product (0.098 g, 71% yield). ^1H NMR ($CDCl_3$) δ 12.95 (s, 1H), 8.02 (s, 1H), 7.29-6.80 (m, 8H), 5.95 (s, 2H), 4.47 (t, *J*=7.4 Hz, 2H), 3.09 (t, *J*=7.4 Hz, 2H); LC-MS $[M+H]^+$ 393.0.

[00773] Example 225



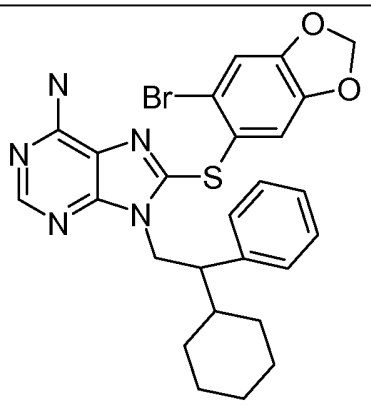
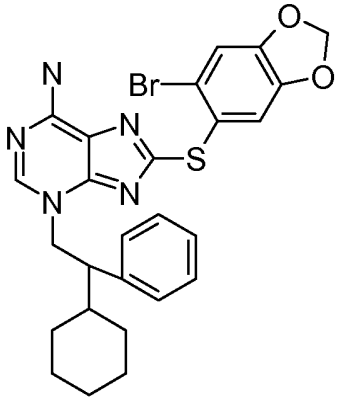
[00774] 8-(6-Bromo-benzo[1,3]dioxol-5-ylsulfanyl)-9-phenethyl-1,9-dihydro-purin-6-one

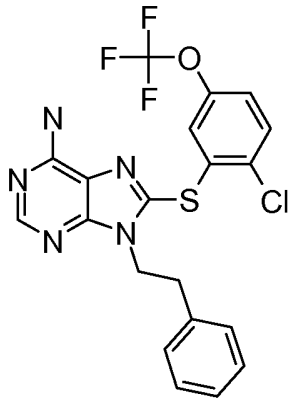
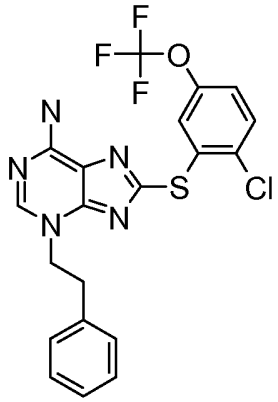
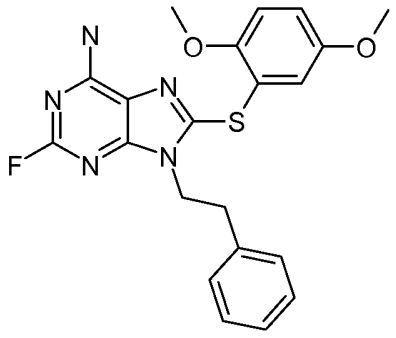
[00775] To a solution of the purine from step 4 (0.088 g, 0.266 mmol) from above reaction in AcOH (0.2 M) was added bromine (0.02 mL, 0.319 mmol). The resulting reaction mixture was covered with aluminum foil and allowed to mix at rt until HPLC shows consumption of starting material. The resulting solution is diluted with 150 mL of toluene and concentrated. This process was repeated two more times and the resulting solid was purified by preparative HPLC to provide the desired product as a white solid (0.059 g, 46% yield). ^1H NMR (DMSO-d_6) δ 12.42 (s, 1H), 8.09 (m, 1H), 7.39 (s, 1H), 7.25-7.17 (m, 3H), 7.10-7.04 (m, 2H), 6.81 (s, 1H), 6.05 (s, 2H), 4.39 (t, *J*=7.1 Hz, 2H), 3.03 (t, *J*=7.1 Hz, 2H); LC-MS $[M+H]^+$ 472.3.

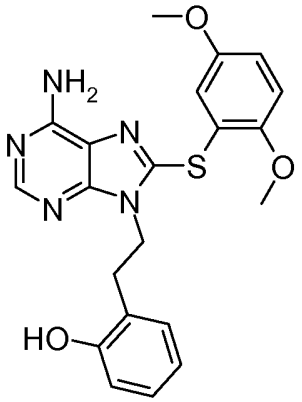
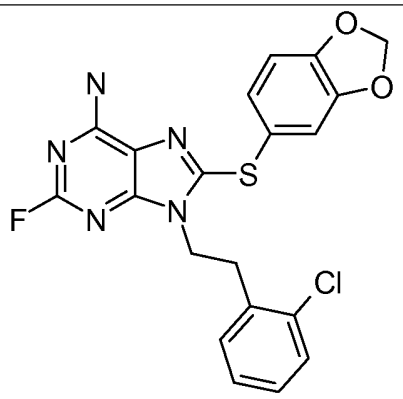
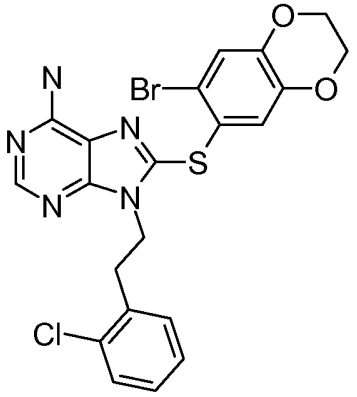
[00776] Examples 226-336

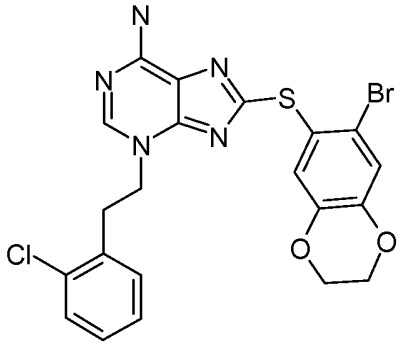
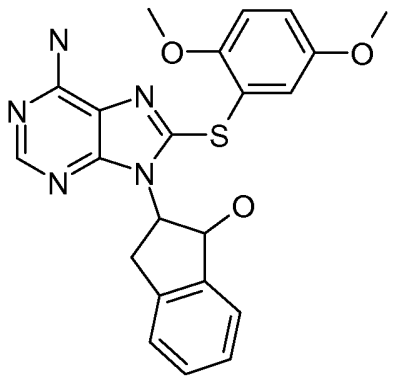
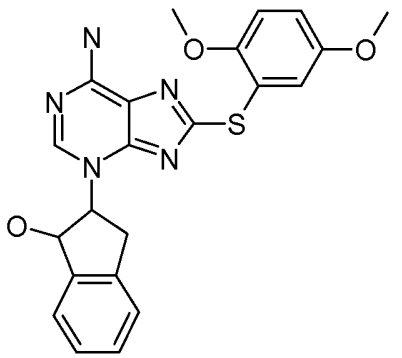
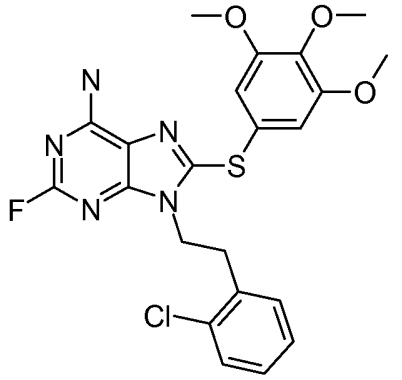
[00777] Examples 226 -336 were prepared according to the procedure described for examples 1 and 2, using appropriate starting materials and their names and analytical data is summarized in table 3. All compounds are isolated as trifluoroacetate salts. The skilled artisan readily recognizes that the pendant -N on the purine ring systems is an amino group ($-NH_2$) and the pendant –O on the indane ring is a hydroxyl.

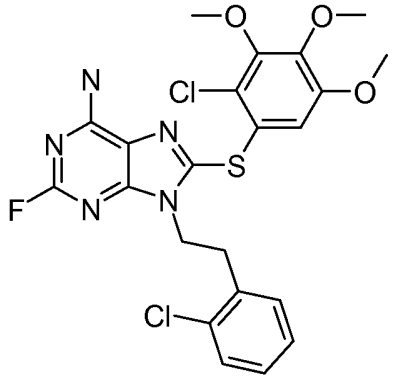
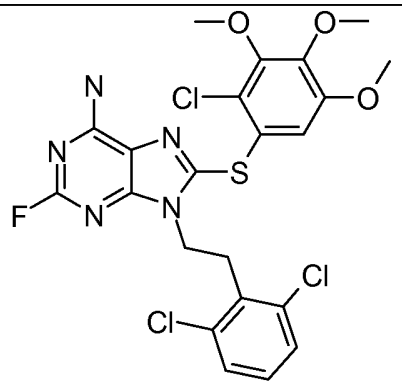
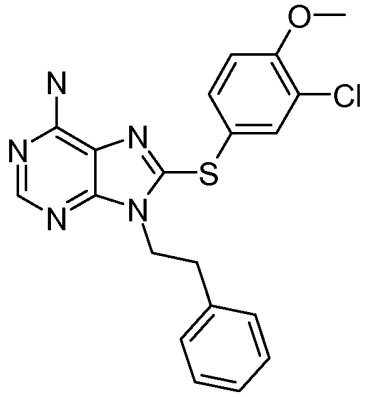
[00778] Table 3

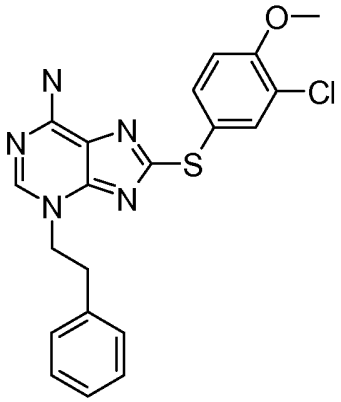
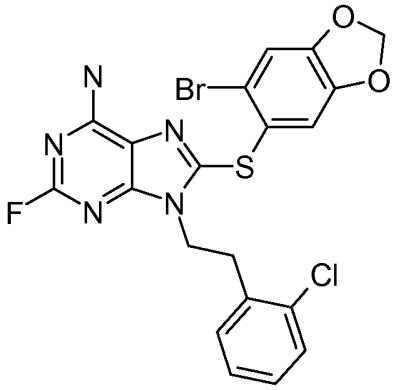
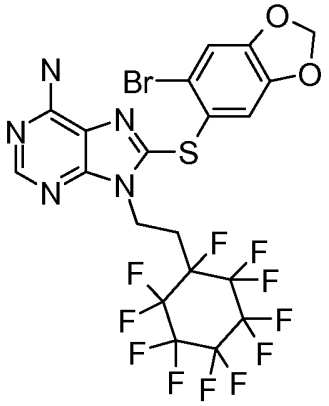
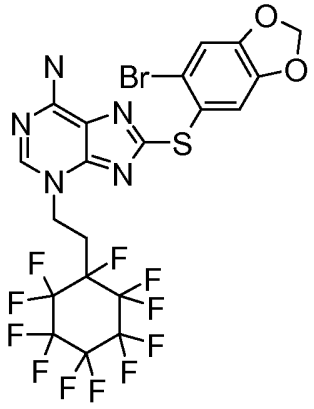
No.	Structure	Name and analytical data
226		8-[(6-Bromo-1,3-benzodioxol-5-yl)thio]-9-(2-cyclohexyl-2-phenylethyl)-9H-purin-6-amine. ^{1}H NMR (Acetone d_6) δ 8.19 (s, 1H), 7.20 (s, 1H), 7.15-7.07 (m, 5H), 6.63 (s, 1H), 6.08 (s, 2H), 4.60-4.50 (m, 3H), 2.50-1.0 (m, 11H); LC-MS $[M+H]^+$ 552.1
227		8-[(6-Bromo-1,3-benzodioxol-5-yl)thio]-3-(2-cyclohexyl-2-phenylethyl)-3H-purin-6-amine. ^{1}H NMR (Acetone d_6) δ 7.82 (s, 1H), 7.45 (s,1H), 7.36 (s, 1H), 7.23-7.17 (m, 3H), 7.09-7.07 (m, 2H), 6.20 (s, 2H), 4.95-4.91 (m, 1H), 4.45-4.43 (m, 1H), 3.30-3.20 (m, 2H), 2.60-2.50 (m, 3H), 2.40-1.00 (m, 7H); LC-MS $[M+H]^+$ 552.1

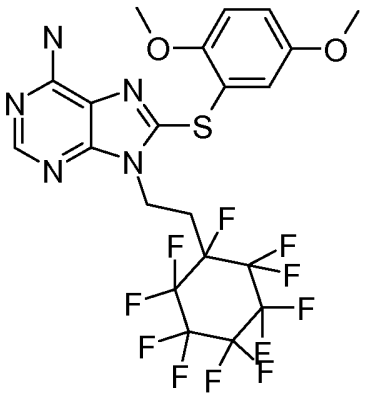
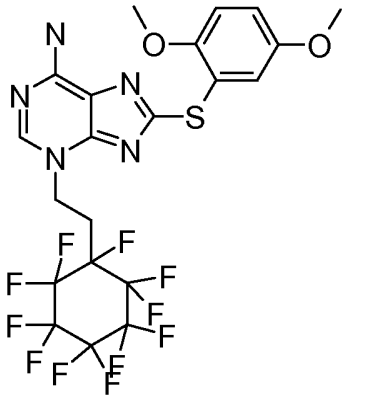
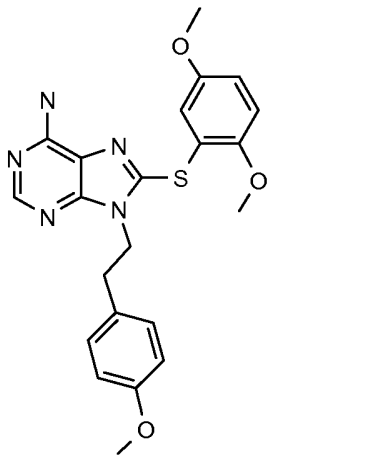
228		8-{[2-Chloro-5-(trifluoromethoxy)phenyl]thio}-9-(2-phenylethyl)-9H-purin-6-amine. ^{1}H NMR ($CDCl_3$) δ 8.31 (s, 1H), 7.65 (d, J = 8.8 Hz, 1H), 7.36-7.30 (m, 2H), 7.22-7.16 (m, 3H), 7.08-7.04 (m, 2H), 4.59 (t, J = 6.8 Hz, 2H), 3.17 (t, J = 6.8 Hz, 2H); LC-MS $[M+H]^+$ 466.0
229		8-{[2-Chloro-5-(trifluoromethoxy)phenyl]thio}-3-(2-phenylethyl)-3H-purin-6-amine. ^{1}H NMR ($CDCl_3$) δ 8.08 (s, 1H), 7.74 (d, J = 8.8 Hz, 1H), 7.71-7.70 (m, 1H), 7.47-7.44 (m, 1H), 7.26-7.20 (m, 3H), 7.07-7.03 (m, 2H), 4.56 (t, J = 6.8 Hz, 2H), 3.18 (t, J = 6.8 Hz, 2H); LC-MS $[M+H]^+$ 466.0
230		8-[(2,5-Dimethoxyphenyl)thio]-2-fluoro-9-(2-phenylethyl)-9H-purin-6-amine. ^{1}H NMR (DMSO-d_6) δ 7.24-7.18 (m, 3H), 7.05-7.00 (m, 3H), 6.88-6.84 (m, 1H), 6.49-6.47 (m, 1H), 4.32 (t, J = 6.8 Hz, 2H), 3.74 (s, 3H), 3.60 (s, 3H), 2.95 (t, J = 6.8 Hz, 2H); TOF-MS $[M+H]^+$ 426.2

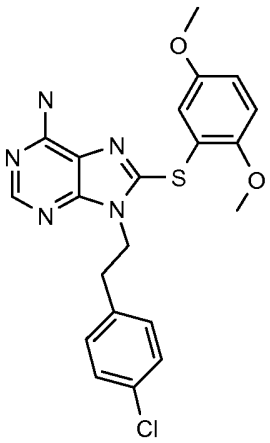
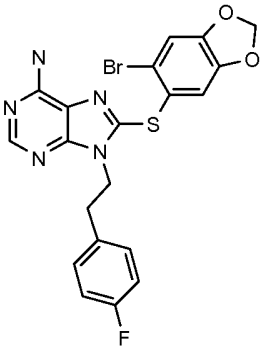
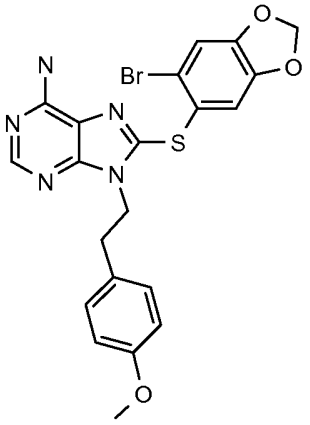
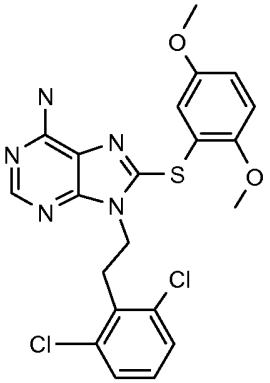
231		2-(2-{6-Amino-8-[(2,5-dimethoxyphenyl)thio]-9H-purin-9-yl}ethyl)phenol. ^{1}H NMR (CD_3OD) δ 7.92 (s, 1H), 7.30 (s, 1H), 7.20-7.18 (m, 2H), 7.07-7.02 (m, 1H), 6.87-6.84 (m, 1H), 6.72-6.67 (m, 2H), 4.62 (t, J = 6.2 Hz, 2H), 3.82 (s, 3H), 3.80 (s, 3H), 3.19 (t, J = 6.2 Hz, 2H); TOF-MS $[M+H]^+$ 424.1
232		8-(1,3-Benzodioxol-5-ylthio)-9-[2-(2-chlorophenyl)ethyl]-2-fluoro-9H-purin-6-amine. ^{1}H NMR (DMSO-d_6) δ 7.39 (d, J = 8.0 Hz, 1H), 7.27-7.16 (m, 2H), 7.03-7.00 (m, 1H), 6.91 (d, J = 8.0 Hz, 1H), 6.90-6.83 (m, 2H), 6.04 (s, 2H), 4.37 (t, J = 6.8 Hz, 2H), 3.13 (t, J = 6.8 Hz, 2H); LC-MS $[M+Na]^+$ 469.2
233		8-[(7-Bromo-2,3-dihydro-1,4-benzodioxin-6-yl)thio]-9-[2-(2-chlorophenyl)ethyl]-9H-purin-6-amine. ^{1}H NMR (CD_3OD) δ 8.14 (s, 1H), 7.38-7.34 (m, 1H), 7.23-7.14 (m, 3H), 7.04-7.00 (m, 1H), 6.92 (s, 1H), 4.90-4.80 (m, 2H), 4.60-4.50 (m, 4H), 4.28-4.22 (m, 2H);TOF-MS $[M+H]^+$ 518.0

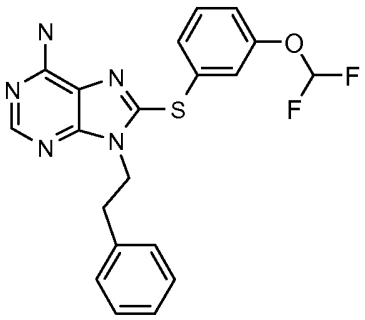
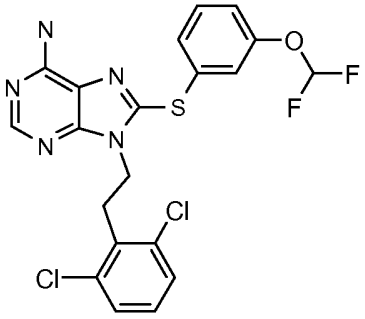
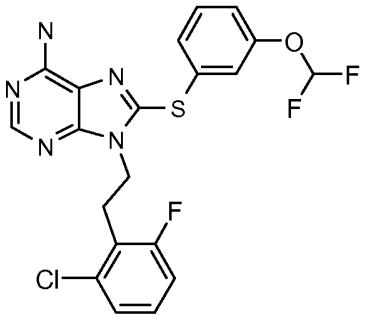
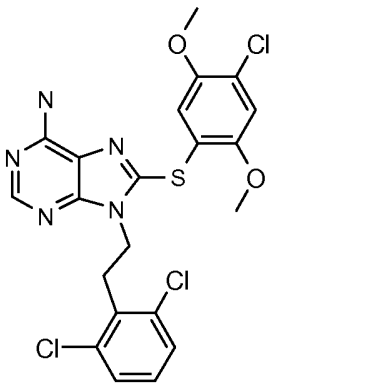
234		8-[(7-Bromo-2,3-dihydro-1,4-benzodioxin-6-yl)thio]-3-[2-(2-chlorophenyl)ethyl]-3H-purin-6-amine. ^{1}H NMR (CD_3OD) δ 8.47 (s, 1H), 7.40-7.30 (m, 1H), 7.23-7.05 (m, 3H) 7.19 (s, 1H), 7.12 (s, 1H), 4.90-4.80 (m, 4H), 4.28-4.26 (m, 2H), 1.80-1.60 (m, 2H); TOF-MS $[M+H]^+$ 518.0
235		2-{6-Amino-8-[(2,5-dimethoxyphenyl)thio]-9H-purin-9-yl}indan-1-ol. ^{1}H NMR (DMSO-d_6) δ 8.14 (s, 1H), 7.29-7.21 (m, 2H), 7.10-7.05 (m, 1H), 7.00-6.98 (m, 1H), 6.90-6.87 (m, 1H), 6.75-6.74 (m, 1H), 6.03-6.02 (m, 1H), 5.28-5.25 (m, 1H), 3.65 (s, 3H), 3.54 (s, 3H), 3.40-3.33 (m, 1H), 2.90-2.80 (m, 2H); TOF-MS $[M+H]^+$ 436.1
236		2-{6-Amino-8-[(2,5-dimethoxyphenyl)thio]-3H-purin-3-yl}indan-1-ol. ^{1}H NMR (DMSO -d_6) δ 8.27 (s, 1H), 7.32-7.30 (m, 2H), 7.20-7.10 (m, 3H), 7.02-6.99 (m, 2H), 5.97-5.95 (m, 1H), 3.72 (s, 3H), 3.69 (s, 3H), 3.70-3.30 (m, 1H), 2.90-2.80 (m, 2H); TOF-MS [M+H]+ 436.1
237		9-[2-(2-Chlorophenyl)ethyl]-2-fluoro-8-[(3,4,5-trimethoxyphenyl)thio]-9H-purin-6-amine. ^{1}H NMR (CD_3OD) δ 7.34 (dd, J = 8.0, 1.6 Hz. 1H), 7.21 (dt, J = 8.0, 1.6 Hz. 1H), 7.14 (dt, J = 8.0, 1.6 Hz, 1H), 6.98 (dd, J = 8.0, 1.6 Hz, 1H), 6.70 (s, 2H), 4.46 (t, J = 6.8 Hz, 2H), 3.78 (s, 6H), 3.48 (s, 3H), 3.25

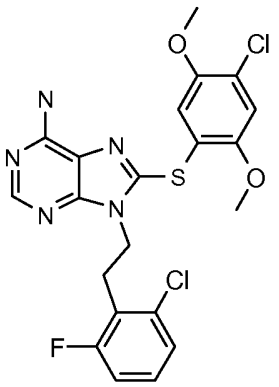
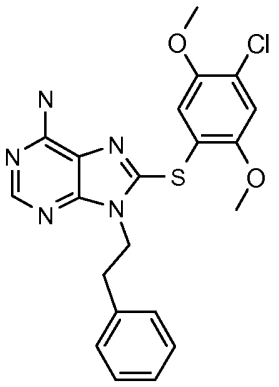
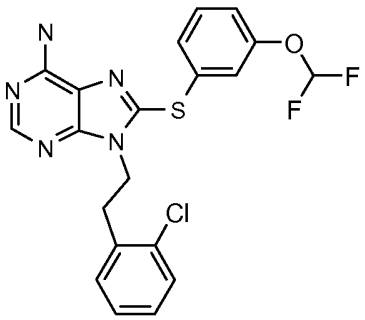
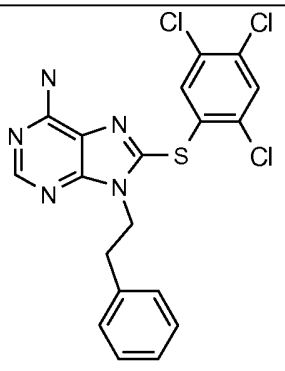
		(t, J = 6.8 Hz, 2H); LC-MS $[M+H]^+$ 490.3
238		9-[2-(2-Chlorophenyl)ethyl]-8-[(2-chloro-3,4,5-trimethoxyphenyl)thio]-2-fluoro-9H-purin-6-amine. TOF-MS $[M+H]^+$ 522.0
239		8-[(2-Chloro-3,4,5-trimethoxyphenyl)thio]-9-[2-(2,6-dichlorophenyl)ethyl]-2-fluoro-9H-purin-6-amine. TOF-MS $[M+H]^+$ 558.0
240		8-[(3-Chloro-4-methoxyphenyl)thio]-9-(2-phenylethyl)-9H-purin-6-amine. ^1H NMR (CD_3OD) δ 7.87-7.84 (m, 1H), 7.79-7.72 (m, 1H), 7.65-7.61 (m, 1H), 7.58-7.43 (m, 2H), 7.32-7.26 (m, 1H), 7.08-6.97 (m, 2H), 6.15-6.11 (m, 1H), 4.67-4.50 (m, 2H), 1.60 (s, 3H), 1.40-1.20 (m, 2H); TOF-MS $[M+H]^-$ 410.4

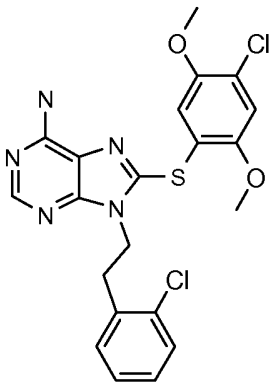
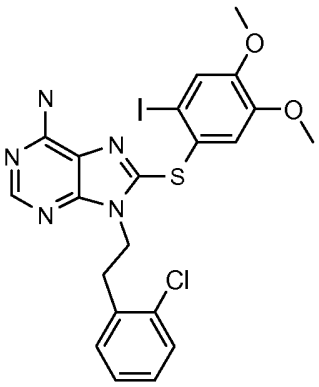
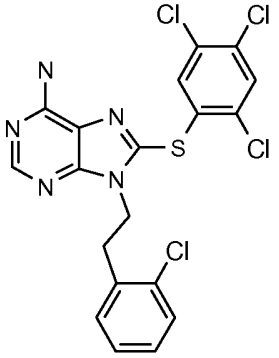
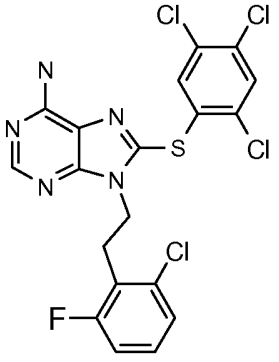
241		8-[(3-Chloro-4-methoxyphenyl)thio]-3-(2-phenylethyl)-3H-purin-6-amine. TOF-MS $[M+H]^+$ 412.3
242		8-[(6-Bromo-1,3-benzodioxol-5-yl)thio]-9-[2-(2-chlorophenyl)ethyl]-2-fluoro-9H-purin-6-amine. ^{1}H NMR (DMSO-d_6) δ 7.38-7.34 (m, 1H), 7.31 (s, 1H), 7.24-7.16 (m, 2H), 7.06-7.0 (m, 1H), 6.59 (s, 1H), 6.07 (s, 2H), 4.40-4.36 (m, 2H), 3.20-3.10 (m, 2H); TOF-MS $[M+H]^+$ 522.9
243		8-[(6-Bromo-1,3-benzodioxol-5-yl)thio]-9-[2-(undecafluorocyclohexyl)ethyl]-9H-purin-6-amine. TOF-MS $[M+H]^+$ 673.8
244		8-[(6-Bromo-1,3-benzodioxol-5-yl)thio]-3-[2-(undecafluorocyclohexyl)ethyl]-3H-purin-6-amine. TOF-MS $[M+H]^+$ 673.8

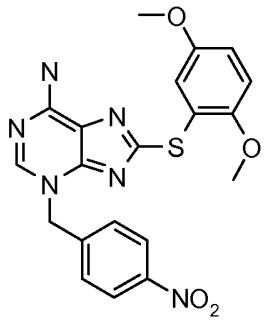
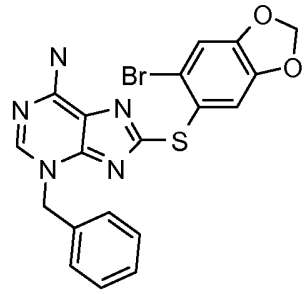
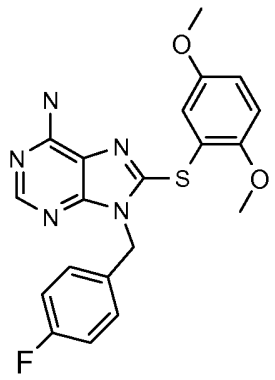
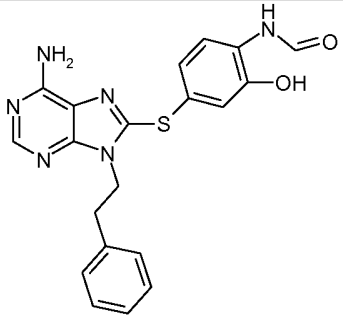
245		8-[(2,5-Dimethoxyphenyl)thio]-9-[2-(undecafluorocyclohexyl)ethyl]-9H-purin-6-amine. ^{1}H NMR (Acetone -d_6) δ 8.65 (s, 1H), 7.27 (s,1H), 7.07-7.02 (m, 2H), 4.82-4.77 (m, 2H), 3.81-3.70 (m, 2H) 3.78 (s, 3H), 3.75 (s, 3H); TOF-MS $[M+H]^+$ 612.0
246		8-[(2,5-Dimethoxyphenyl)thio]-3-[2-(undecafluorocyclohexyl)ethyl]-3H-purin-6-amine. ^{1}H NMR (Acetone -d_6) δ 8.38 (s, 1H), 7.08-7.05 (m,1H), 6.98-6.94 (m, 1H), 6.87-6.86 (m, 1H), 4.72 (t, J = 8.4 Hz, 2H), 3.80 (s, 3H), 3.71 (s, 3H), 2.95 (d, J = 8.4 Hz, 2H); TOF-MS $[M+H]^+$ 612.0
247		8-[(2,5-Dimethoxyphenyl)thio]-9-[2-(4-methoxyphenyl)ethyl]-9H-purin-6-amine.^{1}H NMR (DMSO-d_6) δ 8.22 (s, 1H), 7.62 (s, 1H), 7.02 (d, J = 8.8 Hz, 1H), 6.94 (d, J = 7.2 Hz, 2H), 6.86 (d, J = 8.8 Hz, 2H), 6.79 (d, J = 7.6 Hz, 1H), 4.35 (t, J = 7.2 Hz, 2H), 3.75 (s, 3H), 3.69 (s, 3H), 3.60 (s, 3H), 2.92 (t, J = 7.2 Hz, 2H); LC-MS $[M+H]^+$ 438.1

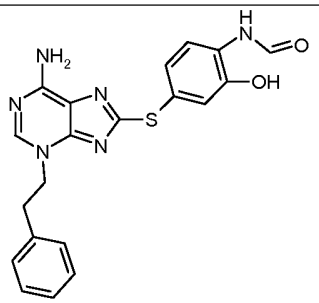
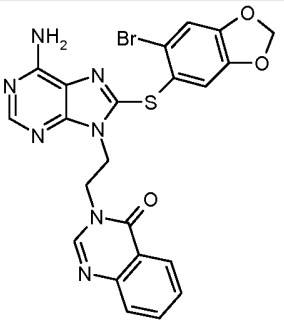
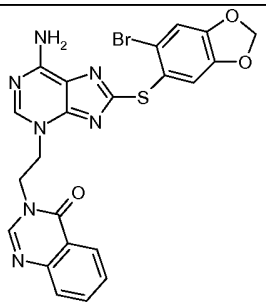
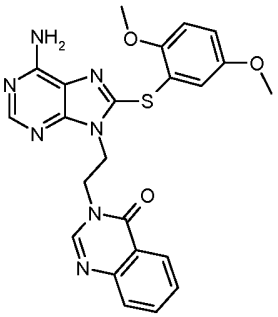
248		9-[2-(4-Chlorophenyl)ethyl]-8-[(2,5-dimethoxyphenyl)thio]-9H-purin-6-amine.^{1}H NMR (DMSO- d_6) δ 8.25 (s, 1H), 7.27 (d, J = 7.6 Hz, 2H), 7.05-7.01 (m, 2H), 6.87 (d, J = 9.2 Hz, 2H), 6.52 (s, 1H), 4.42 (t, J = 7.2 Hz, 2H), 3.74 (s, 3H), 3.62 (s, 3H), 3.02 (t, J = 7.2 Hz, 2H); LC-MS $[M+H]^+$ 442.1
249		8-[(6-Bromo-1,3-benzodioxol-5-yl)thio]-9-[2-(4-fluorophenyl)ethyl]-9H-purin-6-amine.LC-MS $[M+H]^+$ 488.0
250		8-[(6-Bromo-1,3-benzodioxol-5-yl)thio]-9-[2-(4-methoxyphenyl)ethyl]-9H-purin-6-amine. LC-MS $[M+H]^+$ 500.0
251		9-[2-(2,6-Dichlorophenyl)ethyl]-8-[(2,5-dimethoxyphenyl)thio]-9H-purin-6-amine.LC-MS $[M+H]^+$ 476.1

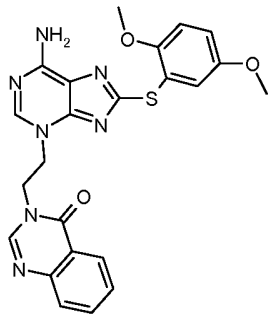
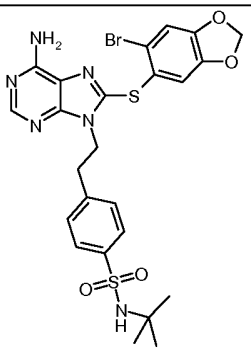
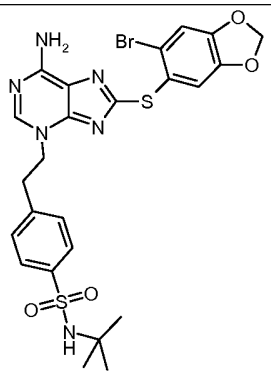
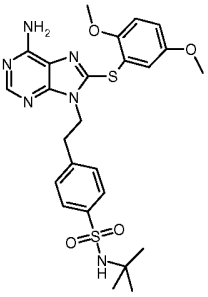
252		8-{[3-(Difluoromethoxy)phenyl]thio}-9-(2-phenylethyl)-9H-purin-6-amine ^{1}H NMR (DMSO- d_6) δ 8.30 (s, 1H), 7.40 (s, 1H), 7.30-7.10 (m, 8H), 4.50 (t, J =7.2 Hz, 2H), 3.10 (t, J =7.2 Hz, 2H), 1.30 (s, 1H); LC-MS $[M+H]^+$ 414.4
253		9-[2-(2,6-Dichlorophenyl)ethyl]-8-{[3-(difluoromethoxy)phenyl]thio}-9H-purin-6-amine. LC-MS $[M+H]^+$ 482.0
254		9-[2-(2-Chloro-6-fluorophenyl)ethyl]-8-{[3-(difluoromethoxy)phenyl]thio}-9H-purin-6-amine. LC-MS $[M+H]^+$ 466.1
255		8-[(4-Chloro-2,5-dimethoxyphenyl)thio]-9-[2-(2,6-dichlorophenyl)ethyl]-9H-purin-6-amine. LC-MS $[M+H]^+$ 512.0

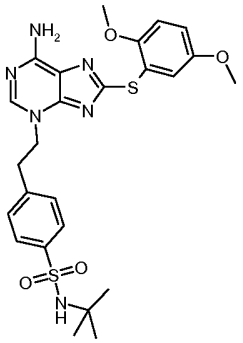
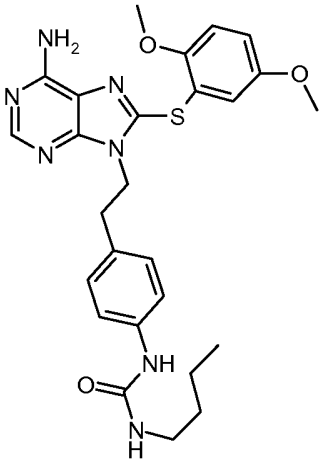
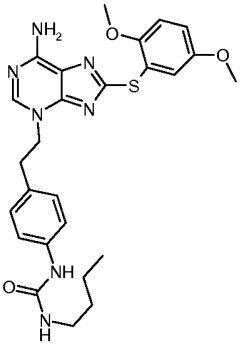
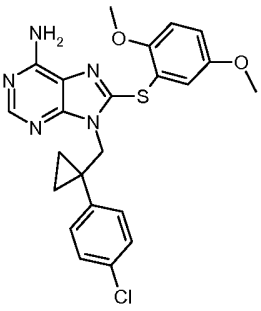
256		8-[(4-Chloro-2,5-dimethoxyphenyl)thio]-9-[2-(2-chloro-6-fluorophenyl)ethyl]-9H-purin-6-amine ^{1}H NMR (DMSO- d_6) δ 8.15 (s, 1H), 7.25-7.20 (m, 5H), 4.50 (t, J = 6.0 Hz, 2H) 3.73 (s, 3H), 3.67 (s, 3H), 3.25-3.20 (m, 2H); LC-MS $[M+H]^+$ 494.0
257		8-[(4-Chloro-2,5-dimethoxyphenyl)thio]-9-(2-phenylethyl)-9H-purin-6-amine. ^{1}H NMR (DMSO-d_6) δ 8.25 (s, 1H), 7.30-7.20 (m, 4H), 7.10-7.00 (m, 3H), 4.50 (t, J = 6.8 Hz, 2H), 3.73 (s, 3H), 3.70 (s, 3H), 3.00 (t, J = 6.8 Hz, 2H); LC-MS $[M+H]^+$ 442.1
258		9-[2-(2-Chlorophenyl)ethyl]-8-{[3-(difluoromethoxy)phenyl]thio}-9H-purin-6-amine. LC-MS $[M+H]^+$ 448.0
259		9-(2-Phenylethyl)-8-[(2,4,5-trichlorophenyl)thio]-9H-purin-6-amine ^{1}H NMR (DMSO- d_6) δ 8.30 (s, 1H), 7.97 (s, 1H), 7.22 (s, 1H), 7.17-7.00 (m, 3H), 7.00-6.98 (m, 2H), 4.50 (t, J = 6.8 Hz, 2H), 3.00 (t, J = 6.8 Hz, 2H); LC-MS $[M+H]^+$ 450.4

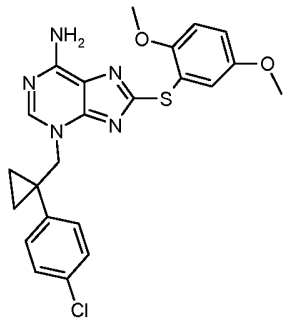
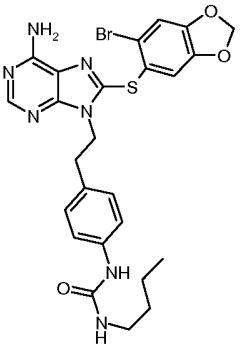
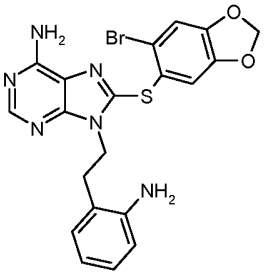
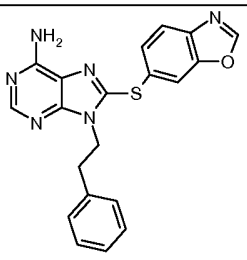
260		8-[(4-Chloro-2,5-dimethoxyphenyl)thio]-9-[2-(2-chlorophenyl)ethyl]-9H-purin-6-amine ^{1}H NMR (Acetone -d_6) δ 8.20 (s, 1H), 7.36-7.29 (m, 1H), 7.23-7.13 (m, 2H), 7.13 (s, 1H), 7.07-7.04 (m, 1H), 6.98 (s, 1H), 4.57 (t, J = 7.2 Hz, 2H), 3.83 (s, 3H), 3.72 (s, 3H), 3.28 (t, J = 7.2 Hz, 2H); LC-MS $[M+H]^+$ 476.0
261		9-[2-(2-Chlorophenyl)ethyl]-8-[(2-iodo-4,5-dimethoxyphenyl)thio]-9H-purin-6-amine. ^{1}H NMR (DMSO- d_6) δ 8.23 (s, 1H), 7.40 - 7.37 (m, 2H), 7.26-7.17 (m, 2H), 7.10-7.06 (m, 1H), 6.89 (s, 1H), 4.50 (t, J = 6.8 Hz, 2H), 3.77 (s, 3H), 3.61 (s, 3H), 3.20 (t, J = 6.8 Hz, 2H); LC-MS $[M+H]^+$ 568.3
262		9-[2-(2-Chlorophenyl)ethyl]-8-[(2,4,5-trichlorophenyl)thio]-9H-purin-6-amine. LC-MS $[M+H]^+$ 484.2
263		9-[2-(2-Chloro-6-fluorophenyl)ethyl]-8-[(2,4,5-trichlorophenyl)thio]-9H-purin-6-amine. LC-MS $[M+H]^+$ 502.9

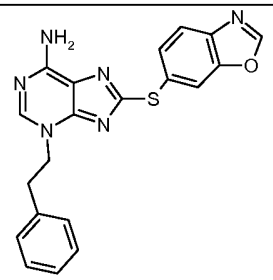
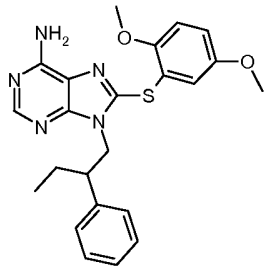
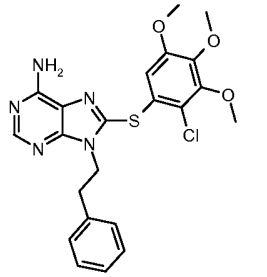
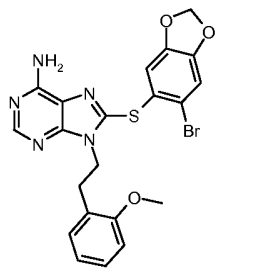
264		8-[(2,5-Dimethoxyphenyl)thio]-3-(4-nitrobenzyl)-3H-purin-6-amine. ^{1}H NMR (DMSO- d_6) δ 8.60 (s, 1H), 8.21-8.18 (m, 2H), 7.65-7.62 (m, 2H), 6.94-6.92 (m, 1H), 6.91-6.89 (m, 1H), 6.76-6.73 (m, 1H), 5.60 (s, 2H), 3.70 (s, 3H), 3.60 (s, 3H); LC-MS $[M+H]^+$ 439.1
265		3-Benzyl-8-[(6-bromo-1,3-benzodioxol-5-yl)thio]-3H-purin-6-amine. ^{1}H NMR (DMSO- d_6) δ 8.80 (s, 1H), 7.50-7.45 (m, 3H), 7.40-7.30 (m, 4H), 6.20 (s, 2H), 5.50 (s, 2H); LC-MS $[M+H]^+$ 457.9
266		8-[(2,5-Dimethoxyphenyl)thio]-9-(4-fluorobenzyl)-9H-purin-6-amine. ^{1}H NMR (DMSO- d_6) δ 8.20 (s, 1H), 7.23-7.20 (m, 2H), 6.97-6.95 (m, 2H), 6.82-6.70 (m, 2H), 6.33 (d, J = 2.8 Hz, 1H), 5.40 (s, 2H), 3.70 (s, 3H), 3.60 (s, 3H); LC-MS $[M+H]^+$ 412.1
267		N-(4-{[6-Amino-9-(2-phenylethyl)-9H-purin-8-yl]thio}-2-hydroxyphenyl)formamide. ^{1}H-NMR (DMSO- d_6) δ 10.52 (s, 1H), 9.72 (s, 1H), 8.38 (d, J = 11.7, 1.9 Hz, 2H), 7.58-7.48 (broad s, 1H), 7.30-7.19 (m, 3H), 7.10-7.05 (m, 2H), 4.35 (t, J = 7.2 Hz, 2H), 2.93 (t, J = 7.2 Hz, 2H); TOF-MS $[M+H]^+$ 407.1

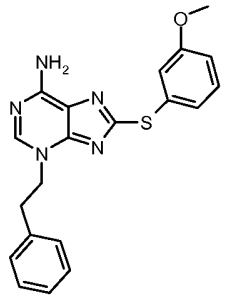
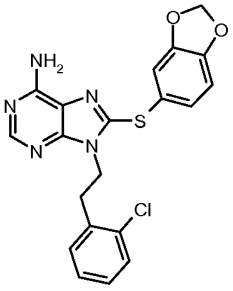
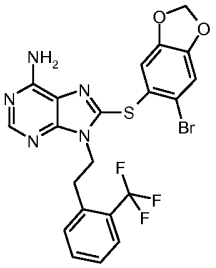
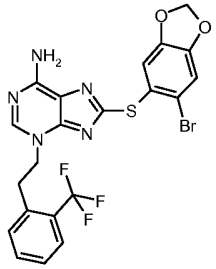
268		N-(4-{[6-Amino-3-(2-phenylethyl)-3H-purin-8-yl]thio}-2-hydroxyphenyl)formamide.TOF-MS $[M+H]^+$ 407.1
269		3-(2-{6-Amino-8-[(6-bromo-1,3-benzodioxol-5-yl)thio]-9H-purin-9-yl}ethyl)quinazolin-4(3H)-one ^{1}H-NMR (DMSO-d_6) δ 8.06-8.00 (m, 2H), 7.98 (s, 1H), 7.79 (dt, J = 7.1, 1.5 Hz, 1H), 7.67 (d, H = 7.6 Hz, 1H), 7.53-7.47 (m, 1H), 7.20 (s, 1H), 6.51 (s, 1H), 6.60 (s, 2H), 4.65-4.60 (m, 2H), 4.44-4.39 (m, 2H); LC-MS $[M-H]^+$ 538.3
270		3-(2-{6-Amino-8-[(6-bromo-1,3-benzodioxol-5-yl)thio]-3H-purin-3-yl}ethyl)quinazolin-4(3H)-one LC-MS $[M+H]^+$ 538.3
271		3-(2-{6-Amino-8-[(2,5-dimethoxyphenyl)thio]-9H-purin-9-yl}ethyl)quinazolin-4(3H)-one ^{1}H-NMR (DMSO- d_6) δ 8.07-8.01 (m, 2H), 7.94 (s, 1H), 7.82-7.77 (m, 1H), 7.59 (d, J = 8.2 Hz, 1H), 7.54-7.48 (m, 1H), 6.95 (d, J = 9.1 Hz, 1 H), 6.80 (dd, J = 9.0, 2.9 Hz, 1H), 6.53 (d, J = 2.9 Hz, 1H), 4.66-4.60 (m, 2H), 4.42-4.36 (m, 2H), 3.69 (s, 3H), 3.61 (s, 3H); LC-MS $[M+H]^+$ 476.4

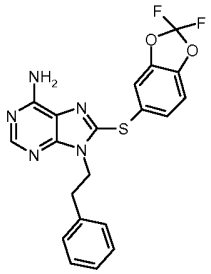
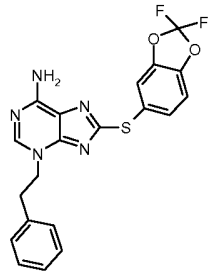
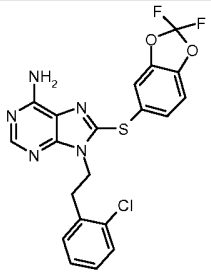
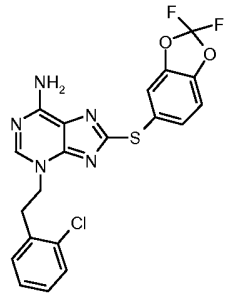
272		3-(2-{6-Amino-8-[(2,5-dimethoxyphenyl)thio]-3H-purin-3-yl}ethyl)quinazolin-4(3H)-one LC-MS $[M+H]^+$ 476.4
273		4-(2-{6-Amino-8-[(6-bromo-1,3-benzodioxol-5-yl)thio]-9H-purin-9-yl}ethyl)-N-(tert-butyl)benzenesulfonamide. ^{1}H-NMR (DMSO- d_6) δ 8.27 (s, 1H), 7.68 (d, J = 8.4 Hz, 2H), 7.38 (s, 1H), 7.24 (d, J = 8.4 Hz, 2H), 7.00 (s, 2H), 6.85 (s, 1H), 4.49 (t, J = 6.8 Hz, 2H), 3.16 (t, J = 6.8 Hz, 2H), 1.04 (s, 9H); LC-MS $[M+H]^+$ 605.4
274		4-(2-{6-Amino-8-[(6-bromo-1,3-benzodioxol-5-yl)thio]-3H-purin-3-yl}ethyl)-N-(tert-butyl)benzenesulfonamide. LC-MS $[M+H]^+$ 605.4
275		4-(2-{6-Amino-8-[(2,5-dimethoxyphenyl)thio]-9H-purin-9-yl}ethyl)-N-(tert-butyl)benzenesulfonamide. ^{1}H NMR (DMSO-d_6) δ 8.24 (s, 1H), 7.66 (d, J = 8.2 Hz, 2H), 7.20 (d, J = 8.2 Hz, 2H), 7.03 (d, J = 9.0 Hz, 1H), 6.90 (dd, J = 9.0, 3.1 Hz, 1H), 6.58 (d, J = 2.9 Hz, 1H), 4.50-4.42 (m, 2H), 3.73 (s, 3H), 3.63 (s, 3H), 3.20-3.08 (m, 2H), 1.05 (s, 9H); LC-MS $[M+H]^+$ 543.5

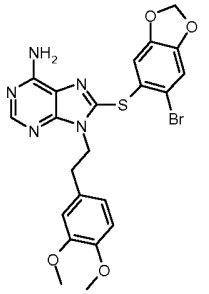
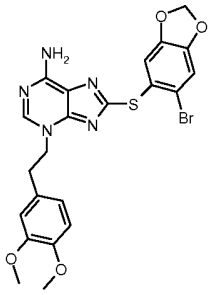
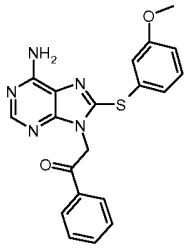
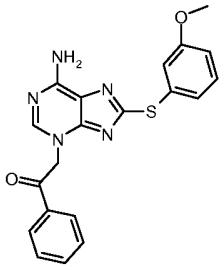
276		4-(2-{6-Amino-8-[(2,5-dimethoxyphenyl)thio]-3H-purin-3-yl}ethyl)-N-(tert-butyl)benzenesulfonamide. LC-MS $[M+H]^+$ 543.5
277		N-[4-(2-{6-Amino-8-[(2,5-dimethoxyphenyl)thio]-9H-purin-9-yl}ethyl)phenyl]-N'-butylurea. ^{1}H-NMR (DMSO- d_6) δ 8.35 (s, 1H), 8.31 (s, 1H), 7.25 (d, J = 8.6 Hz, 2H), 7.03 (d, J = 9.0 Hz, 1H), 6.91-6.84 (m, 2H), 6.59 (d, J = 2.9 Hz, 1H), 6.12 -6.08 (m, 1H), 4.37 (t, J = 8.0 Hz, 2H), 3.75 (s, 3H), 3.12 (s, 3H), 3.05 (q, J = 6.5 Hz, 2H), 2.90 (t, J = 8.0 Hz, 2H), 1.42-1.25 (m, 4H), 0.89 (t, J = 7.23 Hz, 3H); LC-MS $[M+H]^+$ 522.5
278		N-[4-(2-{6-Amino-8-[(2,5-dimethoxyphenyl)thio]-3H-purin-3-yl}ethyl)phenyl]-N'-butylurea. LC-MS $[M+H]^+$ 522.5
279		9-{[1-(4-Chlorophenyl)cyclopropyl]methyl}-8-[(2,5-dimethoxyphenyl)thio]-9H-purin-6-amine. ^{1}H NMR (DMSO- d_6) δ 8.15 (s, 1H), 7.21 (d, J = 8.4 Hz, 2H), 7.05 (d, J = 8.4 Hz, 2H), 6.94 (d, J = 9.0 Hz, 1H), 6.81 (dd, J = 9.0, 3.1 Hz, 1H), 6.42 (d, J = 2.9 Hz, 1H), 4.40 (s, 2H), 3.69 (s, 3H), 3.60 (s, 3H), 1.30-

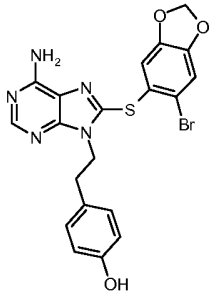
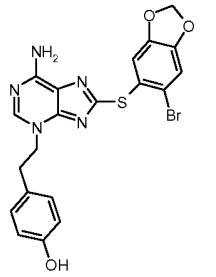
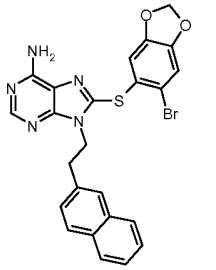
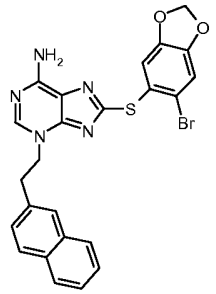
		1.25 (m, 2H), 0.80-0.75 (m, 2H); TOF-MS $[M+H]^+$ 468.1
280		3-{[1-(4-Chlorophenyl)cyclopropyl]methyl}-8-[(2,5-dimethoxyphenyl)thio]-3H-purin-6-amine.TOF-MS $[M+H]^+$ 468.1
281		N-[4-(2-{6-Amino-8-[(6-bromo-1,3-benzodioxol-5-yl)thio]-9H-purin-9-yl}ethyl)phenyl]-N'-butylurea. ^1H NMR (DMSO-d_6) δ 8.24 (s, 1H), 7.35 (s, 1H), 7.24 (d, J = 8.4 Hz, 2H), 6.90 (d, J = 8.40 Hz, 2H), 6.71 (s, 1H), 6.18 (s, 2H), 4.35 (t, J = 7.4 Hz, 2H), 3.05 (q, J = 6.6 Hz, 2H), 2.93 (t, J = 7.2 Hz, 2H), 1.42-1.25 (m, 4H), 0.89 (t, J = 7.2 Hz, 3H); LC-MS $[M+H]^+$ 584.5
282		9-[2-(2-Aminophenyl)ethyl]-8-[(6-bromo-1,3-benzodioxol-5-yl)thio]-9H-purin-6-amine.^1H NMR (DMSO- d_6) δ 8.30 (s, 1H), 7.38 (s, 1H), 7.19-7.13 (m, 1H), 6.84-6.70 (m, 4H), 6.10 (s, 2H), 4.39 (t, J = 7.6 Hz, 2H), 2.99 (t, J = 7.6 Hz, 2H); TOF-MS $[M+H]^+$ 485.04
283		8-(1,3-Benzoxazol-6-ylthio)-9-(2-phenylethyl)-9H-purin-6-amine. ^1H-NMR (DMSO- d_6) δ 8.82 (s, 1H), 8.18 (s, 1H), 7.83 (d, J = 1.7 Hz, 1H), 7.79 (d, J = 8.6 Hz, 1H), 7.42-7.15 (m, 3H), 7.26-7.16 (m, 3H), 4.42 (t, J = 7.6 Hz, 2H), 3.00 (t, J = 7.0

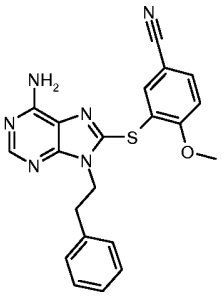
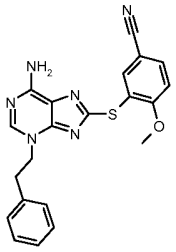
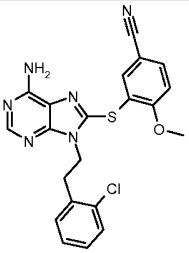
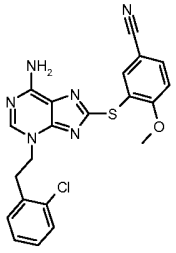
		Hz, 2H); TOF-MS $[M+H]^+$ 389.1
284		8-(1,3-Benzoxazol-6-ylthio)-3-(2-phenylethyl)-3H-purin-6-amine. TOF-MS $[M+H]^+$ 389.12
285		8-[(2,5-Dimethoxyphenyl)thio]-9-(2-phenylbutyl)-9H-purin-6-amine. ^{1}H NMR (DMSO- d_6) δ 8.28 (s, 1H), 7.25-7.14 (m, 3H), 7.08-7.01 (m, 3H), 6.87 (dd, J = 9.0, 3.1 Hz, 1H), 6.51 (d, J = 2.9 Hz, 1H), 4.45-4.30 (m, 2H), 3.75 (s, 3H), 3.60 (s, 3H), 3.15-3.05 (m, 1H), 1.70-1.55 (m, 2H), 0.65 (t, J = 7.4 Hz, 3H); TOF-MS $[M+H]^+$ 436.1
286		8-[(2-Chloro-3,4,5-trimethoxyphenyl)thio]-9-(2-phenylethyl)-9H-purin-6-amine. ^{1}H NMR (CD_3OD) δ 8.19 (s, 1H), 7.90-7.26 (m, 3H), 7.10-7.07 (m, 2H), 6.94 (s, 1H), 4.52 (t, J = 6.8 Hz, 2H), 3.87 (s, 6H), 3.78 (s, 3H), 3.13 (t, J = 6.8 Hz, 2H); LC-MS $[M+H]^+$ 472.4
287		8-[(6-Bromo-1,3-benzodioxol-5-yl)thio]-9-[2-(2-methoxyphenyl)ethyl]-9H-purin-6-amine.^{1}H NMR (CD_3OD) δ 8.23 (s, 1H), 7.23-7.17 (m, 2H), 6.97 (s, 1H), 6.90-6.85 (m, 2H), 6.76 (dd, J = 7.6, 0.8 Hz, 1H), 6.06 (s, 2H), 4.55 (t, J = 6.8 Hz, 2H), 3.72 (s, 3H), 3.19 (t, J = 6.8 Hz, 2H); TOF-MS $[M+H]^+$ 500.03

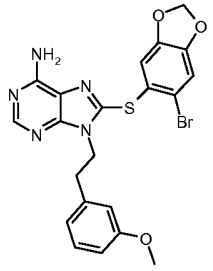
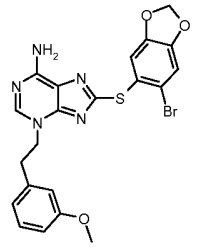
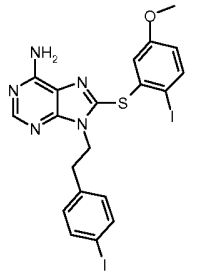
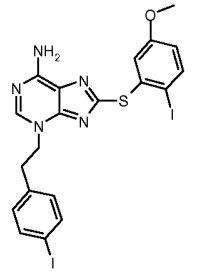
288		8-[(3-Methoxyphenyl)thio]-3-(2-phenylethyl)-3H-purin-6-amine. ^{1}H NMR (CD_3OD) δ 7.74 (s, 1H), 7.32-7.17 (m, 4H), 7.13-7.05 (m, 4H), 6.91 (m, 1H), 4.53 (t, J = 6.8 Hz, 2H), 3.78 (s, 3H), 3.20 (t, J = 6.8 Hz, 2H); TOF-MS $[M+H]^+$ 378.18
289		8-(1,3-Benzodioxol-5-ylthio)-9-[2-(2-chlorophenyl)ethyl]-9H-purin-6-amine. ^{1}H NMR (CD_3OD) δ 8.11 (s, 1H), 7.39-7.32 (m, 2H), 7.26-7.19 (m, 1H), 7.16-7.11 (m, 1H), 6.99-6.94 (m, 1H), 6.87-6.80 (m, 2H), 6.00 (s, 2H), 4.50 (t, J = 6.4 Hz, 2H), 3.33-3.25 (m, 2H); LC-MS $[M+H]^+$ 426.1
290		8-[(6-Bromo-1,3-benzodioxol-5-yl)thio]-9-{2-[2-(trifluoromethyl)phenyl]ethyl}-9H-purin-6-amine. ^{1}H NMR (CD_3OD) δ 8.26 (s, 1H), 7.70 (d, J = 7.2 Hz, 1H), 7.50-7.40 (m, 2H), 7.23 (s, 1H), 7.16 (d, J = 7.2 Hz, 1H), 7.04 (s, 1H), 6.07 (s, 2H), 4.59 (t, J = 6.8 Hz, 2H), 3.38 (t, J = 6.8 Hz, 2H); TOF-MS $[M+H]^+$ 538.01
291		8-[(6-Bromo-1,3-benzodioxol-5-yl)thio]-3-{2-[2-(trifluoromethyl)phenyl]ethyl}-3H-purin-6-amine. ^{1}H NMR (CD_3OD) δ 8.24 (s, 1H), 7.68 (d, J = 7.6 Hz, 1H), 7.53 (t, J = 7.2 Hz, 1H), 7.44 (t, J = 7.6 Hz, 1H), 7.36 (s, 1H), 7.34 (s, 1H), 7.3 (d, J = 7.6 Hz, 1H), 6.15 (s, 2H), 4.62 (t, J = 6.8 Hz, 2H), 3.41 (t, J = 6.8 Hz, 2H); TOF-MS $[M+H]^+$ 538.01

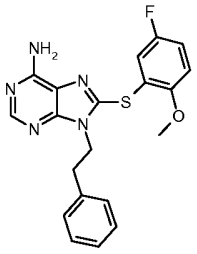
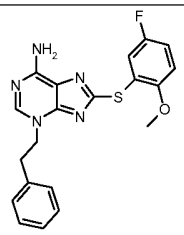
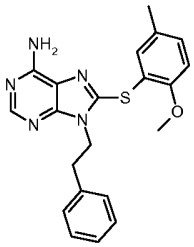
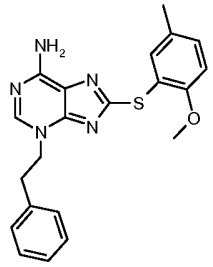
292		8-[(2,2-Difluoro-1,3-benzodioxol-5-yl)thio]-9-(2-phenylethyl)-9H-purin-6-amine. ^{1}H NMR (CD_3OD) δ 8.27 (s, 1H), 7.40-7.20 (m, 6H), 7.10-7.04 (m, 2H), 4.54 (t, J = 6.8 Hz, 2H), 3.18 (t, J = 6.8 Hz, 2H); TOF-MS $[M+H]^+$ 428.1
293		8-[(2,2-Difluoro-1,3-benzodioxol-5-yl)thio]-3-(2-phenylethyl)-3H-purin-6-amine. ^{1}H NMR (CD_3OD) δ 8.11 (s, 1H), 7.70 (d, J = 2.0 Hz, 1H), 7.61 (dd, J = 8.4, 1.6 Hz, 1H), 7.42 (d, J = 8.4 Hz, 1H), 7.29-7.22 (m, 3H), 7.11-7.07 (m, 2H), 4.58 (t, J = 7.2 Hz, 2H), 3.20 (t, J = 7.2 Hz, 2H); TOF-MS $[M+H]^+$ 428.1
294		9-[2-(2-Chlorophenyl)ethyl]-8-[(2,2-difluoro-1,3-benzodioxol-5-yl)thio]-9H-purin-6-amine. ^{1}H NMR (CD_3OD) δ 8.11 (s, 1H), 7.40-7.27 (m, 4H), 7.23 (dt, J = 7.6, 1.6 Hz, 1H), 7.16 (dt, J = 7.6, 1.6 Hz, 1H), 7.04 (dd, J = 7.6, 1.6 Hz, 1H), 4.60 (t, J = 6.8 Hz, 2H), 3.34 (t, J = 6.8 Hz, 2H); TOF-MS $[M+H]^+$ 462.0
295		3-[2-(2-Chlorophenyl)ethyl]-8-[(2,2-difluoro-1,3-benzodioxol-5-yl)thio]-3H-purin-6-amine. ^{1}H NMR (CD_3OD) δ 8.93 (s, 1H), 8.55 (d, J = 2.0 Hz, 1H), 8.28-8.19 (m, 3H), 8.1-7.97 (m, 3H), 5.31 (t, J = 6.8 Hz, 2H), 4.11 (t, J = 6.8 Hz, 2H); TOF-MS $[M+H]^+$ 462.0

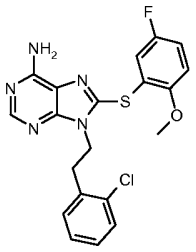
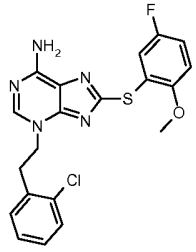
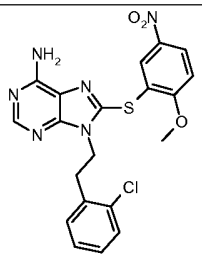
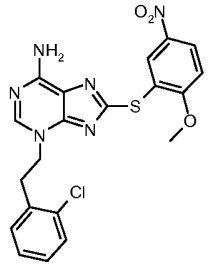
296		8-[(6-Bromo-1,3-benzodioxol-5-yl)thio]-9-[2-(3,4-dimethoxyphenyl)ethyl]-9H-purin-6-amine. ^{1}H NMR (CD_3OD) δ 8.27 (s, 1H), 7.22 (s, 1H), 6.97 (s, 1H), 6.78 (d, J = 8.0 Hz, 1H), 6.62 (d, J = 2.0 Hz, 1H), 6.57 (dd, J = 8.0, 2.0 Hz, 1H), 6.06 (s, 2H), 4.53 (t, J = 6.8 Hz, 2H), 3.76 (s, 3H), 3.71 (s, 3H), 3.12 (t, J = 6.8 Hz, 2H); TOF-MS $[M+H]^+$ 530.0
297		8-[(6-Bromo-1,3-benzodioxol-5-yl)thio]-3-[2-(3,4-dimethoxyphenyl)ethyl]-3H-purin-6-amine. ^{1}H NMR (CD_3OD) δ 8.16 (s, 1H), 7.4 (d, J = 4.0 Hz, 2H), 6.84 (d, J = 8.4 Hz, 1H), 6.71 (d, J = 2.0 Hz, 1H), 6.62 (dd, J = 8.4, 2.0 Hz, 1H), 6.19 (s, 2H), 4.62 (t, J = 6.8 Hz, 2H), 3.81 (s, 3H), 3.78 (s, 3H), 3.18 (t, J = 6.8 Hz, 2H); TOF-MS $[M+H]^+$ 530.0
298		2-{6-Amino-8-[(3-methoxyphenyl)thio]-9H-purin-9-yl}-1-phenylethanone. ^{1}H NMR (CD_3OD) δ 8.24 (s, 1H), 8.05 (dd, J = 8.4, 1.2 Hz, 2H), 7.72 (t, J = 7.2 Hz, 1H), 7.58 (t, J = 7.2 Hz, 2H), 7.23 (t, J = 8.0 Hz, 1H), 7.06-7.02 (m, 2H), 6.91-6.86 (m, 1H), 5.89 (s, 2H), 3.70 (s, 3H); TOF-MS $[M+H]^+$ 392.1
299		2-{6-Amino-8-[(3-methoxyphenyl)thio]-3H-purin-3-yl}-1-phenylethanone. ^{1}H NMR (CD_3OD) δ 8.45 (s, 1H), 8.13-8.09 (m, 2H), 7.75 (dt, J = 8.0, 1.2 Hz, 1H), 7.61 (t, J = 7.6 Hz, 2H), 7.43 (dt, J = 8.4, 1.6 Hz, 1H), 7.28-7.24 (m, 2H), 7.14-7.1 (m, 1H), 6.03 (s, 2H), 3.80 (s, 3H); TOF-MS $[M+H]^+$ 392.1

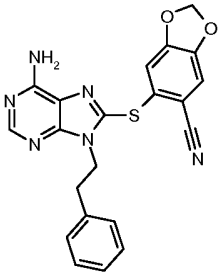
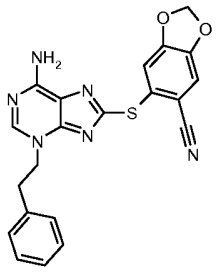
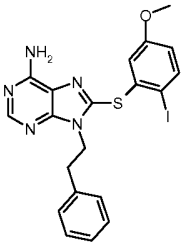
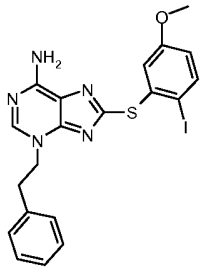
300		4-(2-{6-Amino-8-[(6-bromo-1,3-benzodioxol-5-yl)thio]-9H-purin-9-yl}ethyl)phenol. ^{1}H NMR (CD_3OD) δ 8.27 (s, 1H), 7.24 (s, 1H), 7.05 (d, J = 7.6 Hz, 2H), 7.00-6.95 (m, 3H), 6.07 (s, 2H), 4.52 (t, J = 6.8 Hz, 2H), 3.14 (t, J = 6.8 Hz, 2H); TOF-MS $[M+H]^+$ 486.0
301		4-(2-{6-Amino-8-[(6-bromo-1,3-benzodioxol-5-yl)thio]-3H-purin-3-yl}ethyl)phenol. ^{1}H NMR (CD_3OD) δ 8.09 (s, 1H), 7.37 (s, 1H), 7.36 (s, 1H), 7.07 (d, J = 8.0 Hz, 2H), 6.96 (d, J = 8.0 Hz, 2H), 6.15 (s, 2H), 4.57 (t, J = 6.8 Hz, 2H), 3.16 (t, J = 6.8 Hz, 2H); TOF-MS $[M+H]^+$ 486.0
302		8-[(6-Bromo-1,3-benzodioxol-5-yl)thio]-9-[2-(2-naphthyl)ethyl]-9H-purin-6-amine. ^{1}H NMR (CD_3OD) δ 8.17 (s, 1H), 7.8-7.77 (m, 1H), 7.74 (d, J = 8.4 Hz, 1H), 7.71-7.67 (m, 1H), 7.46 (s, 1H), 7.45-7.40 (m, 2H), 7.25 (dd, J = 8.8, 2.0 Hz, 1H), 7.12 (s, 1H), 6.67 (s, 1H), 5.99 (s, 2H), 4.58 (t, J = 6.8 Hz, 2H), 3.34-3.28 (m, 2H); TOF-MS $[M+H]^+$ 520.0
303		8-[(6-Bromo-1,3-benzodioxol-5-yl)thio]-3-[2-(2-naphthyl)ethyl]-3H-purin-6-amine. ^{1}H NMR (CD_3OD) δ 8.17 (s, 1H), 7.85-7.75 (m, 2H), 7.73-7.67 (m, 1H), 7.51 (s, 1H), 7.70-7.44 (m, 2H), 7.39 (s, 1H), 7.35 (s, 1H), 7.29 (dd, J = 8.4, 1.6 Hz, 1H), 6.15 (s, 2H), 4.70 (t, J = 6.8 Hz, 2H), 3.39 (t, J = 6.8 Hz, 2H); TOF-MS $[M+H]^+$ 520.0

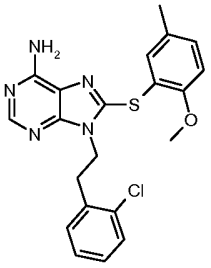
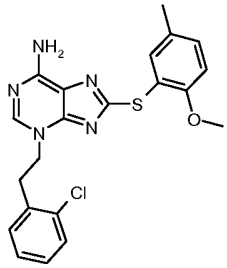
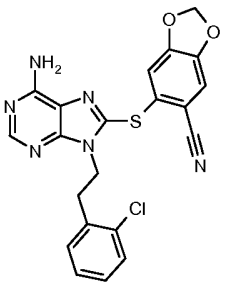
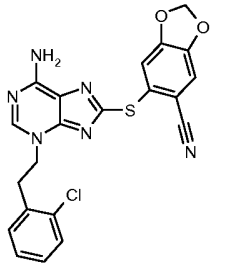
304		3-{[6-Amino-9-(2-phenylethyl)-9H-purin-8-yl]thio}-4-methoxybenzonitrile. ^{1}H NMR (CD_3OD) δ 8.22 (s, 1H), 7.77 (dd, J = 10.8, 2.4 Hz, 1H), 7.61 (d, J = 2.0 Hz, 1H), 7.27-7.20 (m, 4H), 7.07-7.14 (m, 2H), 4.57 (t, J = 6.8 Hz, 2H), 3.91 (s, 3H), 3.18 (t, J = 6.8 Hz, 2H); TOF-MS $[M+H]^+$ 403.1
305		3-{[6-Amino-3-(2-phenylethyl)-3H-purin-8-yl]thio}-4-methoxybenzonitrile. ^{1}H NMR (CD_3OD) δ 9.38 (d, J = 2.0 Hz, 1H), 9.27 (s, 1H), 9.22 (dd, J = 8.8, 2.4 Hz, 1H), 8.65-8.57 (m, 4H), 8.46-8.39 (m, 2H), 5.81 (t, J = 6.8 Hz, 2H), 5.25 (s, 3H), 4.48 (t, J = 6.8 Hz, 2H); TOF-MS $[M+H]^+$ 403.1
306		3-({6-Amino-9-[2-(2-chlorophenyl)ethyl]-9H-purin-8-yl}thio)-4-methoxybenzonitrile. ^{1}H NMR (CD_3OD) δ 8.25 (s, 1H), 7.65 (dd, J = 8.4, 2.0 Hz, 1H), 7.32 (d, J = 2.0 Hz, 1H), 7.29 (dd, J = 8.0, 1.2 Hz, 1H), 7.15 (dt, J = 7.6, 2.0 Hz, 1H), 7.13-7.07 (m, 2H), 6.93 (dd, J = 7.6, 2.0 Hz, 1H), 4.53 (t, J = 6.8 Hz, 2H), 3.91 (s, 3H), 3.27 (t, J = 6.8 Hz, 2H); TOF-MS $[M+H]^+$ 437.1
307		3-({6-Amino-3-[2-(2-chlorophenyl)ethyl]-3H-purin-8-yl}thio)-4-methoxybenzonitrile. ^{1}H NMR (CD_3OD) δ 8.14 (s, 1H), 8.08 (d, J = 2.0 Hz, 1H), 7.95 (dd, J = 8.8, 2.0 Hz, 1H), 7.37-7.33 (m, 2H), 7.22 (dq, J = 7.6, 2.0 Hz, 2H), 7.15-7.12 (m, 1H), 4.61 (t, J = 6.8 Hz, 2H), 3.94 (s, 3H), 3.35 (t, J = 6.8 Hz, 2H); TOF-MS $[M+H]^+$ 437.1

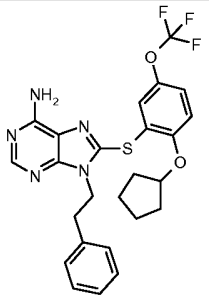
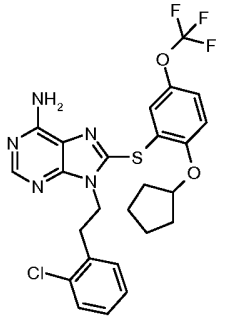
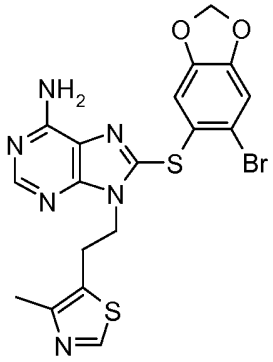
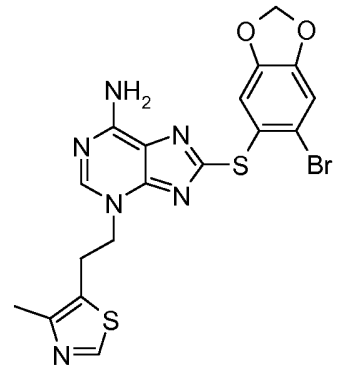
308		8-[(6-Bromo-1,3-benzodioxol-5-yl)thio]-9-[2-(3-methoxyphenyl)ethyl]-9H-purin-6-amine. ^{1}H NMR (CD_3OD) δ 8.25 (s, 1H), 7.22 (s, 1H), 7.12 (t, J = 7.6 Hz, 1H), 7.00 (s, 1H), 6.74 (ddd, J = 8.4, 2.8, 1.2 Hz, 1H), 6.67-6.6 (m, 2H), 6.06 (s, 2H), 4.53 (t, J = 6.8 Hz, 2H), 3.70 (s, 3H), 3.14 (t, J = 6.8 Hz, 2H); TOF-MS $[M+H]^+$ 500.0
309		8-[(6-Bromo-1,3-benzodioxol-5-yl)thio]-3-[2-(3-methoxyphenyl)ethyl]-3H-purin-6-amine. ^{1}H NMR (CD_3OD) δ 7.97 (s, 1H), 7.29 (s, 1H), 7.24 (s, 1H), 7.15 (t, J = 7.6 Hz, 1H), 6.79-6.75 (m, 1H), 6.66-6.61 (m, 2H), 6.10 (s, 2H), 4.56 (t, J = 6.8 Hz, 2H), 3.70 (s, 3H), 3.17 (t, J = 6.8 Hz, 2H); LC-MS $[M+H]^+$ 500.3
310		8-[(2-Iodo-5-methoxyphenyl)thio]-9-[2-(4-iodophenyl)ethyl]-9H-purin-6-amine. ^{1}H NMR ($CDCl_3$) δ 8.37 (s, 1H), 8.16 (s, 1H), 7.25-7.18 (m, 3H), 7.13-7.09 (m, 2H), 6.69 (s, 1H), 4.48 (t, J = 6.8 Hz, 2H), 3.48 (s, 3H), 3.12 (t, J = 6.8 Hz, 2H); TOF-MS $[M+H]^+$ 629.9
311		8-[(2-Iodo-5-methoxyphenyl)thio]-3-[2-(4-iodophenyl)ethyl]-3H-purin-6-amine. ^{1}H NMR ($CDCl_3$) δ 8.35 (s, 1H), 7.57 (s, 1H), 7.34-7.25 (m, 4H), 6.94 (dd, J =7.6, 2.0 Hz, 2H), 4.46 (t, J = 6.8 Hz, 2H), 3.9 (s, 3H), 3.18 (t, J = 6.8 Hz, 2H); TOF-MS $[M+H]^+$ 629.9

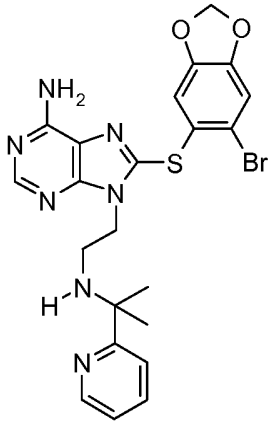
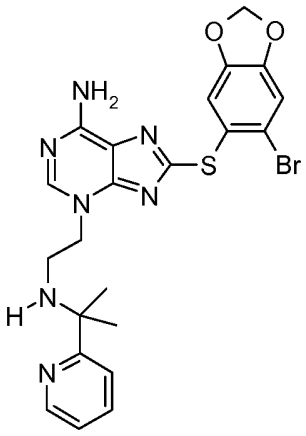
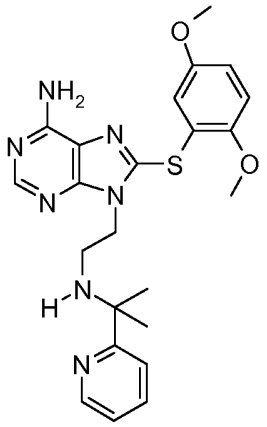
312		8-[(5-Fluoro-2-methoxyphenyl)thio]-9-(2-phenylethyl)-9H-purin-6-amine. ^{1}H NMR ($CDCl_3$) δ 8.50- 8.40 (broad s, 1H), 7.29-7.19 (m, 3H), 7.15-7.11 (m, 2H), 7.02-6.95 (m, 1H), 6.91 (dd, J = 8.0, 2.8 Hz, 1H), 6.84 (dd, J = 9.2, 4.4 Hz, 1H), 4.49 (t, J = 6.8 Hz, 2H), 3.81 (s, 3H), 3.10 (t, J = 6.8 Hz, 2H); LC-MS $[M+H]^+$ 396.3
313		8-[(5-Fluoro-2-methoxyphenyl)thio]-3-(2-phenylethyl)-3H-purin-6-amine. ^{1}H NMR ($CDCl_3$) δ 7.55-7.52 (m, 1H), 7.41 (dd, J = 7.6, 2.8 Hz, 1H), 7.33-7.26 (m, 3H), 7.23-7.16 (m, 1H), 6.99-6.93 (m, 3H), 4.50 (t, J = 6.8 Hz, 2H), 3.83 (s, 3H), 3.19 (t, J = 6.8 Hz, 2H); LC-MS $[M+H]^+$ 396.4
314		8-[(2-Methoxy-5-methylphenyl)thio]-9-(2-phenylethyl)-9H-purin-6-amine LC-MS $[M+H]^+$ 392.4
315		8-[(2-Methoxy-5-methylphenyl)thio]-3-(2-phenylethyl)-3H-purin-6-amine. ^{1}H NMR ($CDCl_3$) δ 7.51-7.43 (m, 2H), 7.33-7.25 (m, 4H), 6.98-6.94 (m, 2H), 6.91 (d, J = 8.4 Hz, 1H), 4.49 (t, J = 6.8 Hz, 2H), 3.81 (s, 3H), 3.19 (t, J = 6.8 Hz, 2H), 2.35 (s, 3H); LC-MS $[M+H]^+$ 392.4

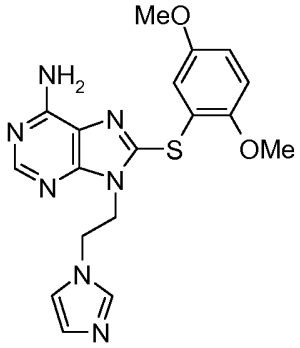
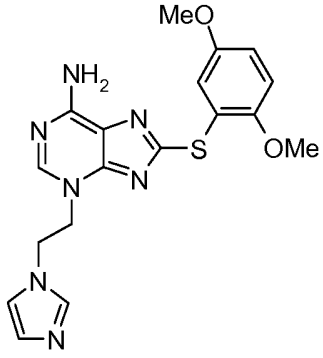
316		9-[2-(2-Chlorophenyl)ethyl]-8-[(5-fluoro-2-methoxyphenyl)thio]-9H-purin-6-amine. ^{1}H NMR ($CDCl_3$) δ 8.21 (s, 1H), 7.33 (dd, J = 7.6, 1.2 Hz, 1H), 7.18 (dt, J = 7.6, 1.6 Hz, 1H), 7.1 (dt, J = 7.6, 1.6 Hz, 1H), 7.07-6.94 (m, 3H), 6.86 (dd, J = 9.2, 4.4 Hz, 1H), 4.57 (t, J = 7.2 Hz, 2H), 3.79 (s, 3H), 3.28 (t, J = 7.2 Hz, 2H); LC-MS $[M+H]^+$ 430.3
317		3-[2-(2-Chlorophenyl)ethyl]-8-[(5-fluoro-2-methoxyphenyl)thio]-3H-purin-6-amine. ^{1}H NMR ($CDCl_3$) δ 7.61-7.57 (broad s, 1H), 7.43-7.37 (m, 2H), 7.25-7.12 (m, 3H), 6.95 (dd, J = 8.8, 4.0 Hz, 1H), 6.84 (dd, J = 7.6, 1.6 Hz, 1H), 4.56 (t, J = 6.8 Hz, 2H), 3.83 (s, 3H), 3.34 (t, J = 6.8 Hz, 2H); LC-MS $[M+H]^+$ 430.3
318		9-[2-(2-Chlorophenyl)ethyl]-8-[(2-methoxy-5-nitrophenyl)thio]-9H-purin-6-amine. ^{1}H NMR ($CDCl_3$) δ 8.28 (s, 1H), 8.22 (dd, J = 9.2, 2.8 Hz, 1H), 8.15 (d, J = 2.4 Hz, 1H), 7.31 (dd, J = 7.6, 1.6 Hz, 1H), 7.15 (dt, J = 7.6, 1.6 Hz, 1H), 7.09 (dt, J = 7.6, 1.2 Hz, 1H), 6.98 (d, J = 9.2 Hz, 1H), 6.94 (dd, J = 7.2, 1.6 Hz, 1H), 4.59 (t, J = 6.8 Hz, 2H), 3.94 (s, 3H), 3.31 (t, J = 6.8 Hz, 2H); LC-MS $[M+H]^+$ 457.3
319		3-[2-(2-Chlorophenyl)ethyl]-8-[(2-methoxy-5-nitrophenyl)thio]-3H-purin-6-amine. ^{1}H NMR ($CDCl_3$) δ 8.59 (s, 1H), 8.23-8.21 (m, 1H), 7.52 (s, 1H), 7.38 (dd, J = 8.0, 1.2 Hz, 1H), 7.22 (dt, J = 7.6, 1.6 Hz, 1H), 7.11 (dt,

		J = 7.6, 1.2 Hz, 1H), 7.01 (d, J = 8.8 Hz, 1H), 6.85 (dd, J = 7.6, 1.6 Hz, 1H), 4.61 (t, J = 6.8 Hz, 2H), 4.01 (s, 3H), 3.41 (t, J = 6.8 Hz, 2H); LC-MS $[M+H]^+$ 457.3
320		6-{[6-Amino-9-(2-phenylethyl)-9H-purin-8-yl]thio}-1,3-benzodioxole-5-carbonitrile. ^1H NMR (CD_3OD) δ 8.23 (s, 1H), 7.32 (s, 1H), 7.28-7.20 (m, 3H), 7.13-7.08 (m, 3H), 6.17 (s, 2H), 4.56 (t, J = 6.8 Hz, 2H), 3.19 (t, J = 6.8 Hz, 2H); TOF-MS $[M+H]^+$ 417.1
321		6-{[6-Amino-3-(2-phenylethyl)-3H-purin-8-yl]thio}-1,3-benzodioxole-5-carbonitrile. ^1H NMR (CD_3OD) δ 8.08 (s, 1H), 7.44 (s, 1H), 7.41 (s, 1H), 7.30-7.20 (m, 3H), 7.10-7.06 (m, 2H), 6.24 (s, 2H), 4.57 (t, J = 6.8 Hz, 2H), 3.20 (t, J = 6.8 Hz, 2H); TOF-MS $[M+H]^+$ 417.1
322		8-[(2-Iodo-5-methoxyphenyl)thio]-9-(2-phenylethyl)-9H-purin-6-amine. ^1H NMR ($CDCl_3$) δ 8.18 (s, 1H), 7.78 (d, J = 8.4 Hz, 1H), 7.32-7.24 (m, 3H), 7.40-7.10 (m, 2H), 6.98 (d, J = 2.8 Hz, 1H), 6.68 (dd, J = 8.4, 2.8 Hz, 1H), 4.5 (t, J = 6.8 Hz, 2H), 3.75 (s, 3H), 3.12 (t, J = 6.8 Hz, 2H); LC-MS $[M+H]^+$ 504.3
323		8-[(2-Iodo-5-methoxyphenyl)thio]-3-(2-phenylethyl)-3H-purin-6-amine. ^1H NMR ($CDCl_3$) δ 7.85 (d, J = 8.4 Hz, 1H), 7.52 (s, 1H), 7.42 (d, J = 4.4 Hz, 1H), 7.30-7.25 (m, 3H), 6.98-6.94 (m, 2H), 6.76 (dd, J = 8.8, 3.2 Hz, 1H), 4.47 (t, J = 6.8 Hz, 2H),

		3.82 (s, 3H), 3.19 (t, J = 6.8 Hz, 2H); LC-MS $[M+H]^+$ 504.3
324		9-[2-(2-Chlorophenyl)ethyl]-8-[(2-methoxy-5-methylphenyl)thio]-9H-purin-6-amine. LC-MS $[M+H]^+$ 426.3
325		3-[2-(2-Chlorophenyl)ethyl]-8-[(2-methoxy-5-methylphenyl)thio]-3H-purin-6-amine. ^1H NMR ($CDCl_3$) δ 7.54 (s, 1H), 7.48-7.46 (m, 1H), 7.39 (dd, J = 8.0, 1.2 Hz, 1H), 7.32-7.28 (m, 1H), 7.25-7.21 (m, 1H), 7.15 (dt, J = 7.6, 1.2 Hz, 1H), 6.91 (d, J = 8.4 Hz, 1H), 6.82 (dd, J = 7.6, 1.6 Hz, 1H), 4.55 (t, J = 6.8 Hz, 2H), 3.81 (s, 3H), 3.34 (t, J = 6.8 Hz, 2H), 2.33 (s, 3H); LC-MS $[M+H]^+$ 426.3
326		6-({6-Amino-9-[2-(2-chlorophenyl)ethyl]-9H-purin-8-yl}thio)-1,3-benzodioxole-5-carbonitrile. ^1H NMR (CD_3OD) δ 8.26 (s, 1H),7.36 (dd, J = 8.0, 1.6 Hz, 1H), 7.33 (s, 1H), 7.23 (dt, J = 7.6, 2.0 Hz, 1H), 7.18-7.14 (m, 2H), 7.09 (dd, J = 7.6, 1.6 Hz, 1H), 6.18 (s, 2H), 4.65 (t, J = 6.8 Hz, 2H), 3.37 (t, J = 6.8 Hz, 2H); TOF-MS $[M+H]^+$ 451.0
327		6-({6-Amino-3-[2-(2-chlorophenyl)ethyl]-3H-purin-8-yl}thio)-1,3-benzodioxole-5-carbonitrile. ^1H NMR (CD_3OD) δ 8.16 (s, 1H), 7.43 (s, 1H), 7.39 (s, 1H), 7.34 (dd, J = 7.6, 1.2 Hz, 1H), 7.23 (dt, J = 7.2, 1.6 Hz, 1H), 7.17 (dt, J = 7.6, 1.6 Hz, 1H), 7.01 (dd,

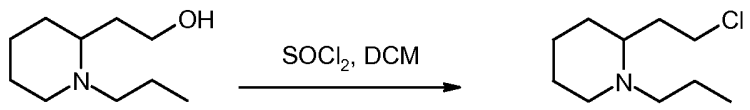
		J = 7.6, 1.6 Hz, 1H), 6.25 (s, 2H), 4.61 (t, J = 6.8 Hz, 2H), 3.34 (t, J = 6.8 Hz, 2H); TOF-MS $[M+H]^+$ 451.0
328		8-{[2-(Cyclopentyloxy)-5-(trifluoromethoxy)phenyl]thio}-9-(2-phenylethyl)-9H-purin-6-amine. TOF-MS [M+H]+ 516.1
329		9-[2-(2-Chlorophenyl)ethyl]-8-{[2-(cyclopentyloxy)-5-(trifluoromethoxy)phenyl]thio}-9H-purin-6-amine. TOF-MS [M+H]+ 550.1
330		8-[(6-Bromo-1,3-benzodioxol-5-yl)thio]-9-[2-(4-methyl-1,3-thiazol-5-yl)ethyl]-9H-purin-6-amine. ^{1}H NMR (CD_3OD) δ 8.75 (s, 1H), 8.19 (s, 1H), 7.23 (s, 1H), 6.97 (s, 1H), 6.07 (s, 2H), 4.50 (t, J = 6.8 Hz, 2H), 3.41 (t, J = 6.8 Hz, 2H), 2.13 (s, 3H); LC-MS $[M+H]^+$ 491.1
331		8-[(6-Bromo-1,3-benzodioxol-5-yl)thio]-3-[2-(4-methyl-1,3-thiazol-5-yl)ethyl]-3H-purin-6-amine. ^{1}H NMR (CD_3OD) δ 8.80 (s, 1H), 8.35 (s, 1H), 7.40 (s, 1H), 7.39 (s, 1H), 6.17 (s, 2H), 4.58 (t, J = 6.8 Hz, 2H), 3.47 (t, J = 6.8 Hz, 2H), 2.18 (s, 3H); LC-MS $[M+H]^+$ 491.3

332		8-[(6-Bromo-1,3-benzodioxol-5-yl)thio]-3-{2-[(1-methyl-1-pyridin-2-ylethyl)amino]ethyl}-3H-purin-6-amine. ^{1}H NMR (CD_3OD) δ 8.45 (ddd, J = 4.8, 2.0, 0.8 Hz, 1H), 8.28 (s, 1H), 7.90 (td, J = 8.4, 2.0 Hz, 1H), 7.57 (dt, J = 8.4, 0.8 Hz, 1H), 7.38 (ddd, J = 8.4, 4.8, 0.8 Hz, 1H), 7.23 (s, 1H), 7.05 (s, 1H), 6.06 (s, 2H), 4.68 (t, J = 6.8 Hz, 2H), 3.33 (t, J = 6.8 Hz, 2H), 1.75 (s, 6H); TOF-MS $[M+H]^+$ 528.08
333		8-[(6-Bromo-1,3-benzodioxol-5-yl)thio]-3-{2-[(1-methyl-1-pyridin-2-ylethyl)amino]ethyl}-3H-purin-6-amine.^{1}H NMR (CD_3OD) δ 8.42-8.39 (m, 2H), 7.91 (td, J = 7.6, 2.0 Hz, 1H), 7.58 (d, J = 8.4 Hz, 1H), 7.39 (ddd, J = 6.0, 5.2, 1.2 Hz, 1H), 7.31 (s, 1H), 7.21 (s, 1H), 6.12 (s, 2H), 4.71 (t, J = 6.4 Hz, 2H), 3.52 (t, J = 6.4 Hz, 2H), 1.73 (s, 6H); TOF-MS $[M+H]^+$528.08
334		8-[(2,5-Dimethoxyphenyl)thio]-9-{2-[(1-methyl-1-pyridin-2-ylethyl)amino]ethyl}-9H-purin-6-amine. ^{1}H NMR (CD_3OD) δ 8.43 (ddd, J = 4.8, 1.6, 0.8 Hz, 1H), 8.28 (s, 1H), 7.89 (td, J = 8.0, 2.0 Hz, 1H), 7.57 (td, J = 8.0, 1.2 Hz, 1H), 7.36 (ddd, J = 8.0, 4.8, 1.2 Hz, 1H), 6.99 (dd, J = 9.2, 0.8 Hz, 1H), 6.96 (d, J = 9.2 Hz, 1H), 6.92 (dd, J = 2.8, 0.8 Hz, 1H), 4.70 (t, J = 6.4 Hz, 2H), 3.72 (s, 3H), 3.66 (s, 3H), 3.32 (t, J = 6.4 Hz, 2H), 1.74 (s, 6H); TOF-MS $[M+H]^+$ 466.2

335		8-[(2,5-Dimethoxyphenyl)thio]-9-[2-(1H-imidazol-1-yl)ethyl]-9H-purin-6-amine. ^{1}H NMR (CD_3CN) δ 8.33 (t, J = 1.2 Hz, 1H), 8.18 (s, 1H), 7.28 (t, J = 1.6 Hz, 1H), 7.13 (t, J = 1.6 Hz, 1H), 7.01 (d, J = 9.2 Hz, 1H), 6.95 (dd, J = 9.2, 2.8 Hz, 1H), 6.83 (d, J = 3.2 Hz, 1H), 4.69 (m, 2H), 4.61 (m, 2H), 3.88 (s, 3H), 3.72 (s, 3H); TOF-MS $[M+H]^+$ 398.1
336		8-[(2,5-Dimethoxyphenyl)thio]-3-[2-(1H-imidazol-1-yl)ethyl]-3H-purin-6-amine.^{1}H NMR (CD_3CN) δ 8.26 (s, 1H), 8.04 (s, 1H), 7.29 (brt, J = 1.6 Hz, 1H), 7.21 (dd, J = 2.0, 0.8 Hz, 1H), 7.10 (brt, J = 1.6 Hz, 1H), 7.07-7.06 (m, 2H), 4.67-4.63 (m, 2H), 4.61-4.58 (m, 2H), 3.78 (s, 3H), 3.77 (s, 3H); TOF-MS $[M+H]^+$ 398.14

[00779] Intermediate 43

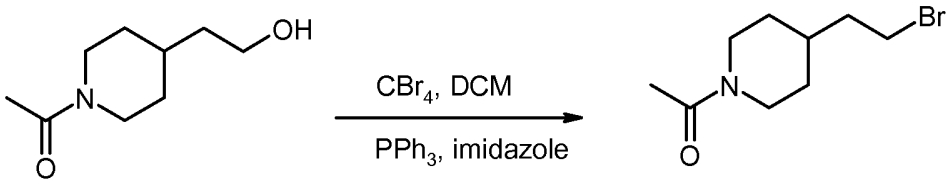
[00780] Synthesis of 2-(2-chloro-ethyl)-1-propyl-piperidine



[00781] To a solution of 2-(1-propyl-piperidin-2-yl)-ethanol (0.150 g, 0.875 mmol) in dichloromethane (5 mL) was added thionyl chloride (1.0 mL, 13.70 mmol) at room temperature and the reaction mixture was refluxed for 3h. The solvent and excess thionyl chloride was removed under reduced pressure. The product was dissolved in dichloromethane and evaporated to dryness. The product was used for the next step without further purifications. GC-MS *m/z* 189.00

[00782] Intermediate 44

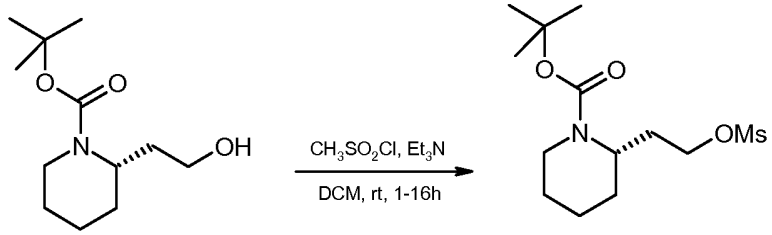
[00783] Synthesis of 1-[4-(2-bromo-ethyl)-piperidin-1-yl]-ethanone



[00784] To a solution of 1-[4-(2-hydroxy-ethyl)-piperidin-1-yl]-ethanone (0.500 g, 2.92 mmol) in dichloromethane (15 mL) was added carbon tetrabromide 1.45 g, 4.38 mmol), triphenyl phosphine (0.728 g, 2.77 mmol) and imidazole (0.398 g, 5.84 mmol) at 0°C. The temperature of the reaction mixture was slowly raised to room temperature and stirring continued at rt for 18 h. The reaction was diluted with dichloromethane and washed with water. The organic layer was dried (Na_2SO_4), filtered, and the solvent was evaporated. The product was chromatographed over silica gel using gradient of 0-10% methanol in dichloromethane. GC-MS *m/z* 235

[00785] Intermediate 45

[00786] Synthesis of (S)-2-(2-Methanesulfonyloxy-ethyl)-piperidine-1-carboxylic acid tert-butyl ester.



[00787] To a solution of (*S*)-2-(2-hydroxy-ethyl)-piperidine-1-carboxylic acid tert-butyl ester (0.300 g, 1.30mmol) in dichloromethane (5 mL) was added methane sulfonylchloride 0.304 mL, 3.9 mmol) and triethylamine (0.547 mL, 3.9 mmol) at rt for 1-16 h. The reaction mixture was diluted with dichloromethane and

washed with $NaHCO_3$ (10%, W/V), followed by water. The dichloromethane layer was dried (Na_2SO_4), filtered and the solvent was evaporated to dryness. The product was sufficiently pure for the next step and was used without any further purification. LC-MS [M+Na] 329.9

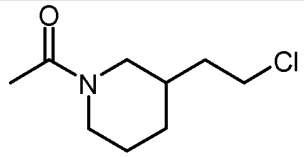
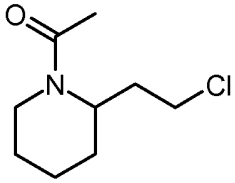
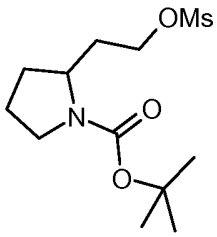
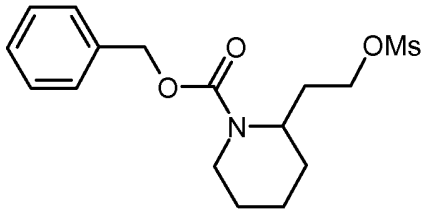
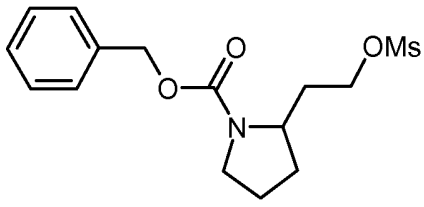
[00788] Intermediate 46

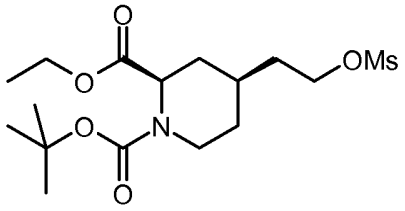
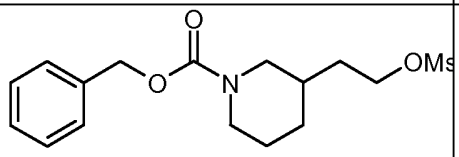
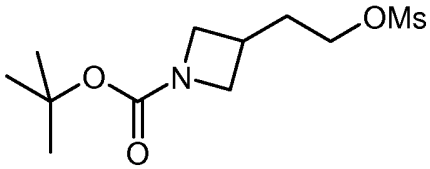
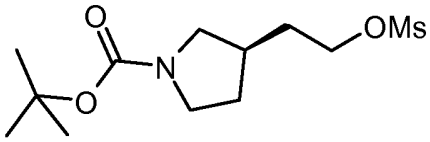
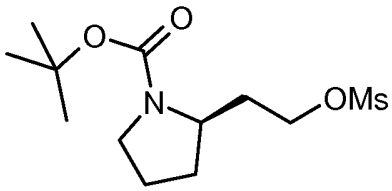
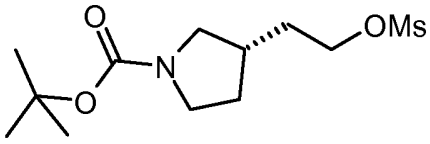
[00789] Synthesis of toluene-4-sulfonic acid 2-(1-benzyl-1, 2, 3, 6-tetrahydro-pyridin-4-yl)-ethyl ester

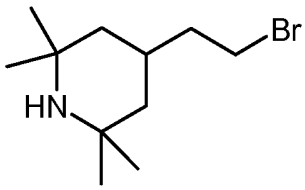
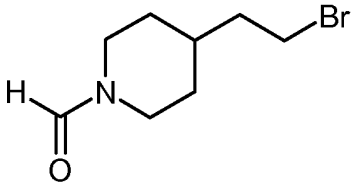
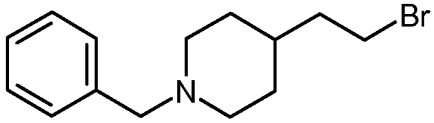
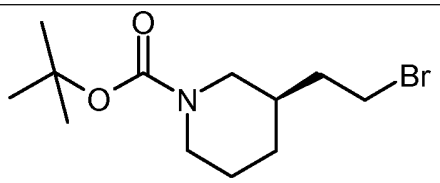
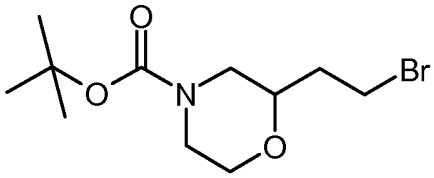
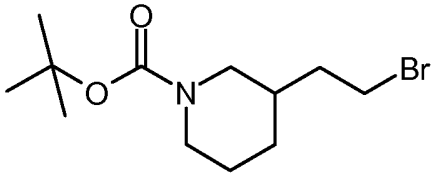
[00790] To a solution of 2-(1-benzyl-1,2,3,6-tetrahydro-pyridin-4-yl)ethanol (0.822 g, 4.09 mmol)(*J. Med. Chem.* **1990**, 33, 3133) in dichloromethane was added p-toluene sulfonyl chloride (1.71 g, 9.00 mmol) and triethyl amine (2.3 mL, 16.4 mmol) and DMAP(0.050 g, 0.41 mmol) at room temperature and stirring continued at rt for 3h. The reaction mixture was diluted with dichloromethane and washed with aq $NaHCO_3$ (10% W/V) solution, followed by saturated NaCl solution. The organic layer was dried (Na_2SO_4), filtered and solvent was evaporated to dryness. The product was flash chromatographed over silica gel using gradient of 0-10% methanol in dichloromethane. ^1H NMR ($CDCl_3$) δ 7.77 (d, 8.4 Hz, 2H), 7.34-7.30 (m, 5H), 7.26 (m, 1H), 5.36 (m, 1H), 4.09 (t, J = 6.8 Hz, 2H), 3.54 (s, 2H), 2.92-2.88 (m, 2H), 2.50 (t, J = 5.6 Hz, 2H), 2.44 (s, 3H), 2.31 (brt, J = 6.8 Hz, 2H), 2.20-1.84 (m, 2H).

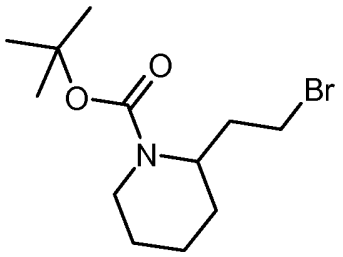
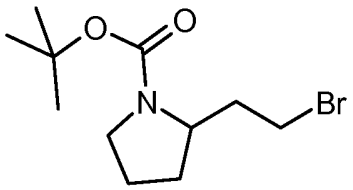
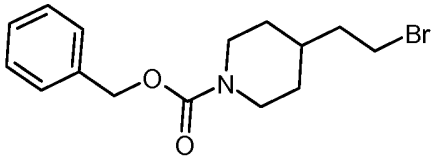
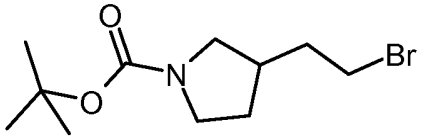
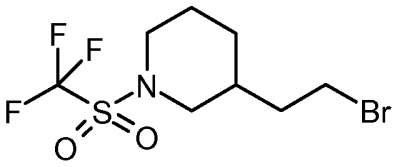
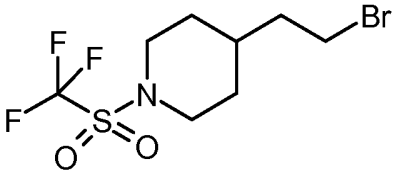
[00791] Intermediates 47 – 86 were prepared analogously to the procedure described for intermediates 43- 46 using the appropriate starting materials and are listed in table 4

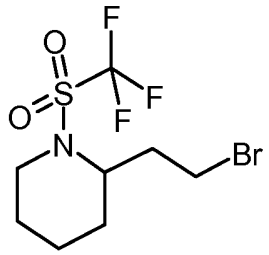
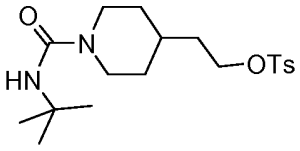
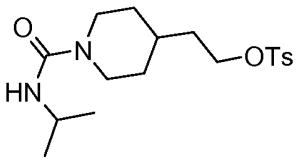
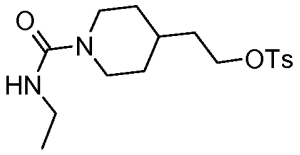
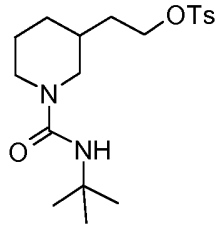
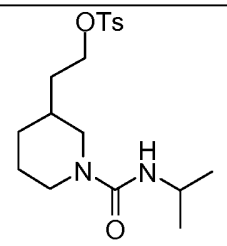
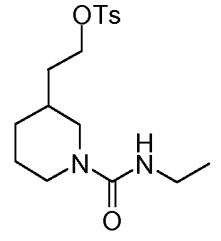
[00792] Table 4

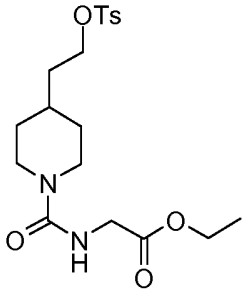
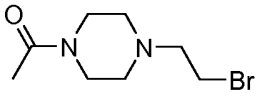
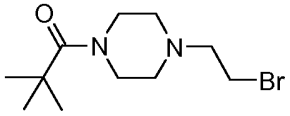
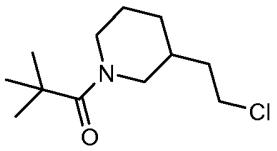
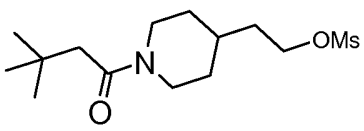
Intermediate	Structure	Name and Analytical data
47		1-[3-(2-Chloro-ethyl)-piperidn-1-yl]-ethanone, GC-MS *m/z* 189.0
48		1-[2-Chloro-ethyl)piperidin-1-yl]-ethanone. GC-MS *m/z* 189.0
49		2-(2-Methanesulfonyloxy-ethyl)-pyrrolidine-1-carboxylic acid tert-butyl ester. LC-MS $[M+H]^+$ 294.3
50		2-(2-Methanesulfonyloxy-ethyl)-piperidine-1-carboxylic acid benzyl ester. LC-MS $[M-H]^+$ 340.8
51		2-(2-Methanesulfonyloxy-ethyl)-pyrrolidine-1-carboxylic acid benzyl ester. LC-MS $[M+H]^+$ 328.0
52		(2*R*,4*S*)-4-(2-Methanesulfonyloxy-ethyl)-piperidine-1,2-dicarboxylic

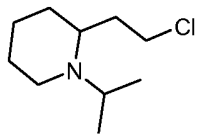
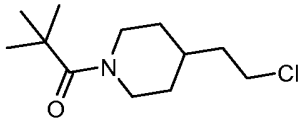
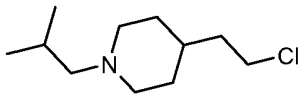
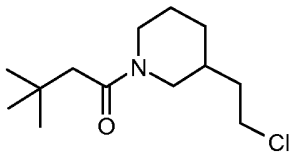
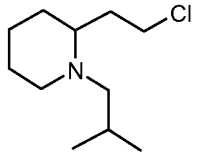
		acid 1-*tert*-butylester 2-ethyl ester. LC-MS $[M-H]^+$ 378.0
53		3-(2-Methanesulfonyloxy-ethyl)-piperidine-1-carboxylic acid benzyl ester. LC-MS $[M-H]^+$ 340.1
54		3-(2-Methanesulfonyloxy-ethyl)-azetidine-1-carboxylic acid tert-butyl ester. LC-MS $[M+H]^+$ 279.9
55		(*R*)-3-(2-Methanesulfonyloxy-ethyl)-pyrrolidine-1-carboxylic acid tert-butyl ester. LC-MS $[M+H]^+$ 294.1
56		(*R*)-2-(2-Methanesylfonyloxy-ethyl)-pyrrolidine-1-carboxylic acid tert-butyl ester. LC-MS $[M+H]^+$ 294.6
57		(*S*)-3-(2-Methanesulfonyloxy-ethyl)-pyrrolidine-1-carboxylic acid tert-butyl ester. LC-MS $[M+H]^+$ 294.3

58		4-(2-bromo-ethyl)-2, 2, 6, 6-tetramethyl-piperidine. GC-MS *m/z* 248.11
59		4-(2-Bromo-ethyl)-piperidine-1-carbaldehyde. GC-MS *m/z* 219
60		1-Benzyl-4-(2-bromo-ethyl)-piperidine. LC-MS $[M+H]^+$ 282.2
61		(*R*)-3-(2-(Bromo-ethylpiperidine-1-carboxylic acid tert-butyl ester. GC-MS *m/z* 291
62		2-(2-Bromo-ethyl)morpholine-4-carboxylic acid tert-butyl ester.GC-MS *m/z* 293
63		3-(2-Bromo-ethyl)-piperidine-1-carboxylic acid tert-butyl ester. GC-MS *m/z* 291
64		2-(2-Bromo-ethyl)-piperidine-1-carboxylic acid *tert*-Butyl ester.GC-MS *m/z*

		291
65		2-(2-Bromo-ethyl)-pyrrolidine-1-carboxylic acid tert-butyl ester. GC-MS *m/z* 277
66		4-(2-(Bromo-ethyl)-piperidine-1-carboxylic acid benzyl ester. GC-MS *m/z* 325
67		3-(2-Bromo-ethyl)-pyrrolydine-1-carboxylic acid tert-butyl ester. GC-MS *m/z* 277
68		3-(2-Bromo-ethyl)-1-trifluoromethanesulfonyl-piperidine. GC-MS *m/z* 323.0
69		4-(2-Bromo-ethyl)-1-trifluoromethanesulfonyl-piperidine. GC-MS *m/z* 323.00

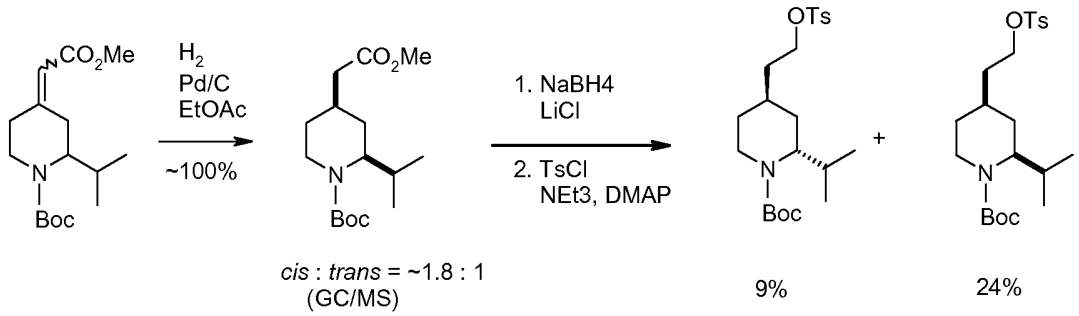
70		2-(2-Bromo-ethyl)-1-trifluoromethanesulfonyl-piperidine. GC-MS *m/z* 216 [M-C_2H_4Br]
71		Toluene-4-sulfonic acid 2-(1-tert-butylcarbamoyl-piperidin-4-yl)-ethyl ester. LC-MS $[M+H]^+$ 383.2
72		Toluene-4-sulfonic acid 2-(1-isopropylcarbamoyl-piperidin-4-yl)-ethyl ester.LC-MS $[M+H]^+$ 369.2
73		Toluene-4-sulfonic acid 2-(1-ethylcarbamoyl-piperidin-4-yl)-ethyl ester. LC-MS $[M+H]^+$ 355.2
74		Toluene-4-sulfonic acid 2-(1-tert-butylcarbamoyl-piperidin-3-yl)-ethyl ester. LC-MS $[M+H]^+$ 383.3
75		Toluene-4-sulfonic acid 2-(1-isopropylcarbamoyl-piperidin-3-yl)-ethyl ester. LC-MS $[M+H]^+$ 369.2
76		Toluene-4-sulfonic acid 2-(1-ethylcarbamoyl-piperidin-3-yl)-ethyl ester. LC-MS $[M+H]^+$ 355.2

77		({4-[2-(Toluene-4-sulfonyloxy)-ethyl]-piperidine-1-carbonyl}-amino)-acetic acid ethyl ester. LC-MS $[M+H]^+$ 413.5
78		1-[4-(2-Bromo-ethyl)-piperazin-1-yl]-ethanone. ^1H NMR ($CDCl_3$) δ 3.65-3.62 (m, 2H), 3.50-3.47 (m, 2H), 3.43 (t, J = 7.2 Hz, 2H), 2.81 (t, J = 7.2 Hz, 2H), 2.53-2.51 (m, 2H), 2.49-2.47 (m, 2H), 2.10 (s, 3H).
79		1-[4-(2-Bromo-ethyl)-piperazin-1-yl]-2,2-dimethyl-propan-1-one. ^1H NMR ($CDCl_3$): 3.68-3.65 (m, 2H), 3.43 (t, J = 7.2 Hz, 2H), 2.80 (t, J = 7.2 Hz, 2H), 2.51-2.48 (m, 2H), 1.28 (s, 9H)
80		1-[3-(2-Chloro-ethyl)-piperidin-1-yl]-2.2-dimethyl-propan-1-one. LC-MS $[M+H]^+$ 232
81		Methanesulfonic acid 2-[1-(3,3-dimethyl-butyryl)-piperidin-4-yl]-ethyl ester. LC-MS $[M+H]^+$ 305

82		2-(2-Chloro-ethyl)-1-isopropyl-piperidine. GC-MS m/z 189.0
83		1-[4-(2-Chloro-ethyl)-piperidin-1-yl]-2,2-dimethyl-propan-1-one. LC-MS $[M+H]^+$ 232
84		4-(2-Chloro-ethyl)-1-isobutyl-piperidine. GC-MS m/z 203.0
85		1-[3[(2-Chloro-ethyl)-piperidin-1-yl]-3, 3-dimethyl-butan-1-one. GC-MS m/z 245.0
86		2-(2-Chloro-ethyl)-1-isobutyl-piperidine. GC-MS m/z 203.0

[00793] Intermediates 87 and 88

[00794] Synthesis of *trans*-2-Isopropyl-4-[2-(toluene-4-sulfonyloxy)-ethyl]-piperidine-1-carboxylic acid *tert*-butyl ester and *cis*-2-isopropyl-4-[2-(toluene-4-sulfonyloxy)-ethyl]-piperidine-1-carboxylic acid *tert*-butyl ester.

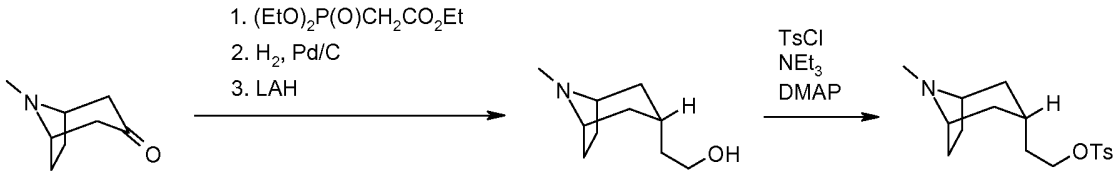


[00795] 2-isopropyl-4-methoxycarbonylmethyl-piperidine-1-carboxylic acid tert-butyl ester was prepared as a mixture of cis and trans-isomer according to the known literature procedure (*Org. Lett.* **2000**, *2*, 3679). Subsequent treatment of ester with with $NaBH_4$/LiCl, followed by addition of TsCl in the presence of NEt_3 and catalytic quantity of DMAP, provided *cis*-2-isopropyl-4-[2-(toluene-4-sulfonyloxy)-ethyl]-piperidine-1-carboxylic acid *tert*-butyl ester and *cis*-2-isopropyl-4-[2-(toluene-4-sulfonyloxy)-ethyl]-piperidine-1-carboxylic acid tert-butyl ester, which were separated by ISCO flash chromatograph. *cis*-2-Isopropyl-4-[2-(toluene-4-sulfonyloxy)-ethyl]-piperidine-1-carboxylic acid *tert*-butyl ester, ^{1}H NMR ($CDCl_3$) δ 7.79 (dt, J = 8.4, 2.0 Hz, 2H), 7.35 (d, J = 8.4 Hz, 2H), 4.04 (m, 2H), 3.78 (ddd, J = 14.0, 8.0, 2.0 Hz, 1H), 3.52 (q, 8.4 Hz, 1H), 2.83 (ddd, J = 14.5, 10.8, 6.8 Hz, 1H), 2.46 (s, 3H), 1.86-1.76 (m, 2H), 1.69-1.59 (m, 3H), 1.52 (m, 1H), 1.45 (m, 9H), 1.06 (m, 1H), 1.00 (m, 1H), 0.85 (d, J = 6.4 Hz, 6H).

[00796] *cis*-2-Isopropyl-4-[2-(toluene-4-sulfonyloxy)-ethyl]-piperidine-1-carboxylic acid tert-butyl ester,^{1}H NMR ($CDCl_3$) δ 7.79 (dt, J = 8.8, 2.2 Hz, 2H), 7.35 (d, J = 8.8 Hz, 2H), 4.10-4.02 (m, 2H), 3.89 (m, 1H), 3.67 (m, 1H), 2.68 and 2.59 (two t, J = 14.4 and 13.6 Hz, 1H), 2.46 (s, 3H), 1.93 (m, 1H), 1.75 (brd, J =14.0 Hz, 1H), 1.68 (m, 1H), 1.55-1.47 (m, 3H), 1.43 (s, 9H), 1.07 (dt, J = 12.8, 5.2 Hz, 1H), 0.97 (m, 1H)

[00797] Intermediate 89

[00798] Synthesis of toluene-4-sulfonic acid 2-(8-methyl-8-aza-bicyclo[3.2.1]oct-3-yl)-ethyl ester

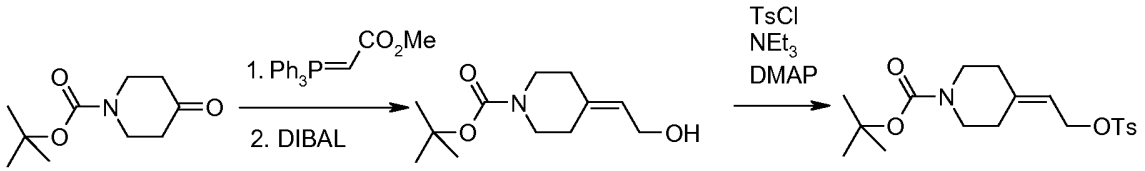


[00799] 2-(8-Methyl-8-aza-bicyclo[3.2.1]oct-3-yl)ethanol was prepared from commercially available 3-tropinone according to the literature procedure (*J. Med. Chem.* **2001**, *44*, 3937). It was converted to corresponding tosylate according

to the procedure described for intermediates 46 and it was used for the next without further purification.

[00800] Intermediate 90

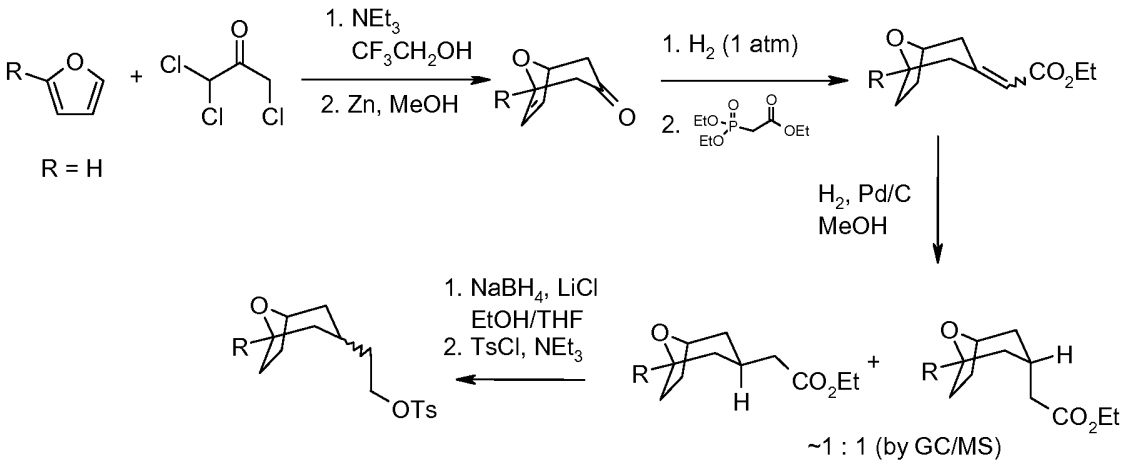
[00801] Synthesis of 4[2-(Toluene-4-sulfonyloxy)-ethylidene]-piperidine-1-carboxylic acid tert-butyl ester.



[00802] The title product was prepared in three steps sequence starting from N-Boc 4-piperidone, by standard Wittig reaction, followed by DIBAL reduction to afford 4-(2-hydroxy-ethylidene)-piperidine-1-carboxylic acid tert-butyl ester. The alcohol was treated according to the procedure described for intermediate 46 to afford the corresponding tosylate. ^{1}H NMR ($CDCl_3$) δ 7.77 (dt, J = 8.4, 2.0 Hz, 2H), 7.35 (d, J = 2H), 5.37 (m, 1H), 4.09 (t, J = 6.4 Hz, 2H), 3.97-3.78 (m, 2H), 3.42 (t, J = 6.4 Hz, 2H), 2.46 (s, 3H), 2.34 (brt, J = 7.2 Hz, 2H), 1.98-1.92 (m, 2H), 1.47 (s, 9H).

[00803] Intermediate 91

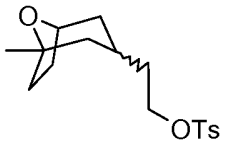
[00804] Synthesis of toluene-4-sulfonic acid 2-(8-oxa-bicyclo[3.2.1]oct-3-yl)ethyl ester



[00805] 8-Oxa-bicyclo[3.2.1]oct-6-en-3-one was synthesized by the known [4+3] cycloaddtion of the commercially available furan and the oxyally generated from 1,1,3-trichloroacetone, followed by reduction with zinc (*J. Org. Chem.* **1999**,*64*, 3398 and *J. Am. Chem. Soc.* **2001**, *123*, 5590). Internal double bond of the cycloadduct was reduced using Pd/C in MeOH to give 8-oxa-bicyclo[3.2.1]octan-3-one. The resulting ketone was subjected to Eadsworth-Horner-Emmons condition to yield the α,β-unsatured ester. Catalytic hydrogenation of the conjugated ester gave rise to an inseparable mixture (~1:1) of diasteromers with no diastereoselectivity. The mixture of diastereomers carried forward to the next two steps. These steps include reduction of esters with $NaBH_4$/LiCl followed by treatement with TsCl in the presence of NEt_3 to furnish the oxabicyclo[3.2.1]octaneethylmethylbenzensolfonate. ^{1}H NMR ($CDCl_3$): δ 7.81-7.78 (m, 2H), 7.37-7.34 (m, 2H), 4.35-4.28 (m, 2H), 4.07-4.02 (m, 2H), 2.46 (s, 3H), 2.07 (m, 1H), 1.95-1.87 (m, 2H), 1.82-1.76 (m, 1H), 1.68-1.63 (m, 2H), 1.55-1.50 (m, 2H), 1.43-1.28 (m, 2H), 1.10 (m, 1H).

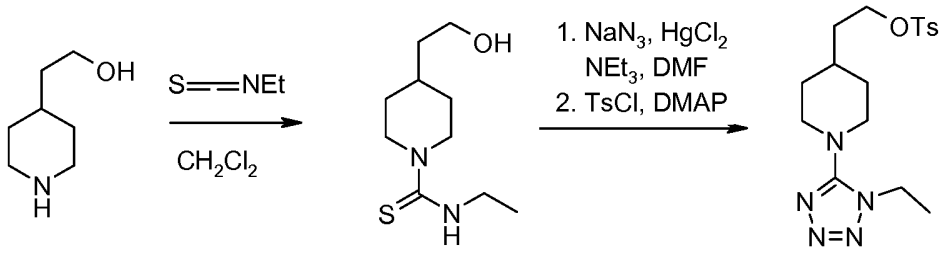
[00806] Intermediate 92

[00807] Synthesis of toluene-4-sulfonic acid 2-(1-methyl-8-oxa-bicyclo[3.2.1]oct-3-yl)-ethyl ester.



[00808] The title product was synthesized according to the procedure described for intermediate 91 starting from 2-methyl furan. ^{1}H NMR ($CDCl_3$): δ 7.81-7.78 (m, 2H), 7.37-7.35 (m, 2H), 4.37-4.29 (m, 1H), 4.07-4.02 (m, 2H), 2.46 (s, 3H), 2.10-1.96 (m, 2H), 1.89-1.50 (m, 6H), 1.39 (m, 1H), 1.27 (s, 1.5H), 1.26 (s, 1.5H), 1.25 (m, 1H), 1.10 (m, 1H).

[00809] Intermediate 93



[00810] 2-{1-(1-Ethyl-1H-tetrazol-5-yl)piperidin-4-yl)ethyl-4-ethylbenzenesulfonate

[00811] Intermediate 93 was prepared in three sequential steps

[00812] *Step 1:* N-Ethyl-4-(2-hydroxyethyl)piperidine-1-carbothioamide.

[00813] To a solution of 2-(piperidin-4-yl)ethanol (509 mg, 3.94 mmol) in CH_2Cl_2 (13 mL) was added isothiocyanatoethane (343 μL, 3.94 mmol). After stirring for 10 h at rt, the mixture was concentrated in vacuo to provide the titled compound (716 mg, 84%): ^{1}H NMR ($CDCl_3$) δ 5.38 (brs, 1H), 4.59 (d, J = 13.6 Hz, 1H), 3.74-3.67 (m, 3H), 3.15 (d, J = 12.8 Hz, 1H), 3.00 (t, J = 13.2 Hz, 2H), 2.65 (t, J = 12.4 Hz, 1H), 1.81-1.72 (m, 3H), 1.55-1.52 (m, 3H), 1.28-1.22 (m, 4H)

[00814] *Step 2:* 2-{1-(1-Ethyl-1H-tetrazol-5-yl)piperidin-4-yl}ethanol.

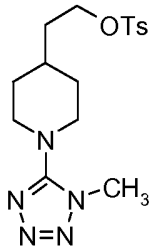
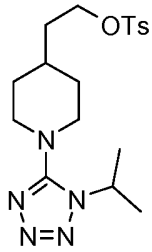
[00815] To a mixture of N-Ethyl-4-(2-hydroxyethyl)piperidine-1-carbothioamide (200 mg, 0.93 mmol), $HgCl_2$ (277 mg, 1.02 mmol), and NaN_3 (181 mg, 2.78 mmol) in DMF (2.5 mL) was added NEt_3 (388 μL, 2.78 mmol) at rt. After stirring for 10 h, the reaction mixture was filtered, and the filter cake was washed with CH_2Cl_2. The combined filtrates and washings were washed with brine, dried (Na_2SO_4), filtered and concentrated in vacuo, and the residue was purified by SiO_2 chromatograph (60% EtOAc/hexane) to afford the titled compound (85 mg, 41%): ^{1}H NMR ($CDCl_3$) δ 4.18 (q, J = 7.2 Hz, 2H), 3.75 (td, J = 6.8, 5.2 Hz, 2H), 3.51 (brd, J = 12.4, 2H), 3.03 (td, J = 12.4, 2.8 Hz, 2H), 1.84 (brd, J = 14.4 Hz, 2H), 1.71 (m, 1H), 1.59 (q, J = 6.8 Hz, 2H), 1.56 (t, J = 7.2 Hz, 3H), 1.48-1.38 (m, 2H)

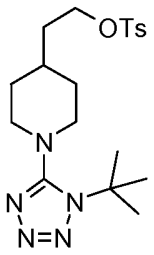
[00816] *Step 3:* 2-{1-(1-Ethyl-1H-tetrazol-5-yl)piperidin-4-yl)ethyl-4-ethylbenzenesulfonate.

[00817] The titled compound (79 mg, 55%) was obtained from 2-{1-(1-ethyl-1H-tetrazol-5-yl)piperidin-4-yl}ethanol (85 mg, 0.38 mmol) according to the procedure described for intermediate 46. ^{1}H NMR ($CDCl_3$) δ 7.80 (brd, J = 8.0 Hz, 2H), 7.37 (brd, J = 8.0 Hz, 2H), 4.15 (q, J = 7.6 Hz, 2H), 4.10 (t, J = 6.0 Hz, 2H), 3.46 (brd, J = 12.4, 2H), 2.97 (td, J = 12.4, 2.0 Hz, 2H), 2.46 (s, 3H), 1.71 (brd, J = 12.8 Hz, 2H), 1.67-1.63 (m, 3H), 1.54 (t, J = 7.6 Hz, 3H), 1.41-1.31 (m, 2H)

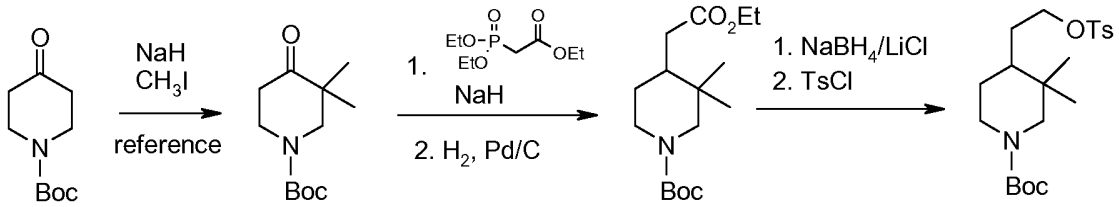
[00818] The following compounds are prepared according to the procedure described for intermediate 46 using appropriate starting materials and summarized in table 5.

[00819] Table 5

Intermediate No.	Structure	Name and analytical Data
94		2-{1-(1-methyl-1H-tetrazol-5-yl)piperidine-4-yl}ethyl-4-methylbenzenesulfonate. LC-MS $[M+Na]^+$ 365.5
95		2-{1-(1-isopropyl-1H-tetrazol-5-yl)piperidine-4-yl}ethyl-4-methylbenzenesulfonate. 1H NMR ($CDCl_3$) δ 7.80 (brd, J = 7.2 Hz, 2H), 7.37 (brd, J = 7.2 Hz, 2H), 4.41 (sep, J = 6.4 Hz, 1H), 4.10 (t, J = 5.2 Hz, 2H), 3.36 (d, J = 12.0 Hz, 2H), 2.96 (t, J = 12.8 Hz, 2H), 2.46 (s, 3H), 1.72-1.60 (m, 5H), 1.56 (d, J = 6.4 Hz, 6H), 1.42-1.33 (m, 2H)

96		2-{1-(1-tert-butyl-1H-tetrazol-5-yl)piperidine-4-yl}ethyl-4-methylbenzenesulfonate. 1H NMR ($CDCl_3$) δ 7.81 (d, J = 7.2 Hz, 2H), 7.37 (d, J = 7.2 Hz, 2H), 4.41 (brt, J = 5.0 Hz, 2H), 3.00-2.93 (m, 4H), 2.47 (s, 3H), 1.71 (s, 9H), 1.66-1.58 (m, 5H), 1.39-1.29 (m, 2H)

[00820] Intermediate 97



2-{1-(*tert*-Butoxycarbonyl)-3,3-dimethylpiperidine-4-yl}ethyl-4-ethyhylbenzenesulfonate.

[00821] The title compound was prepared in four sequential steps.

[00822] *Step 1:* (*E*)-*tert*-Butyl 4-{(ethoxycarbonyl)methylene}-3,3-dimethylpiperidine-1-carboxylate.

[00823] To a suspension of NaH (0.212 g, 5.29 mmol) in THF (2 mL) was added a solution of triethyl 2-phosphonopropionate (1.05 mL, 5.29 mmol) in THF (2 mL) at 0 °C. After the mixture was stirred for 1h at rt, a solution of tert-butyl-3,3-dimethyl-4-oxopiperidine-1-carboxylate (*J. Org. Chem,.* **2001,** 66, 2487) (0.600 g, 2.64 mmol) in THF was then added and stirred for 10 h. The resulting mixture was quenched with water and the product portion was extracted with Et_2O. The combined extracts were washed with brine, dried (Na_2SO_4), filtered and concentrated in vacuo. The residue was purified by SiO_2 chromatography (gradient: 5% EtOAc/hexane to 40% EtOAc/hexane) to afford the titled compound (784 mg, ~100%); ^1H NMR ($CDCl_3$) δ 5.73 (s, 1H), 4.15 (q, J = 6.8 Hz, 2H), 3.52-3.42 (m,

2H), 3.25-3.18 (m, 2H), 3.05 (t, J = 5.6 Hz, 2H), 1.47 (s, 9H), 1.29 (t, J = 6.8 Hz, 3H), 1.12 (s, 6H)

[00824] *Step 2: tert*-Butyl 4-{(ethoxycarbonyl)methyl}-3,3-dimethylpiperidine-1-carboxylate.

[00825] A solution of (*E*)-*tert*-butyl 4-{(ethoxycarbonyl)methylene}-3,3-dimethylpiperidine-1-carboxylate (784 mg, 2.64 mmol) in MeOH (10 mL) containing Pd/C (131 mg) was hydrogenated at 1 atm. After 10 h, the mixture was filtered, and the filter cake was washed with MeOH. The combined filtrates were concentrated to afford the titled compound (540 mg, 68%): ^{1}H NMR ($CDCl_3$) δ 4.13 (q, J = 6.8 Hz, 2H), 4.05 (m, 1H), 3.57 (m, 1H), 2.57 (m, 1H), 2.46 (dd, J = 15.2, 3.2 Hz, 1H), 1.93 (dd, J = 15.2, 10.4 Hz, 1H), 1.76 (m, 1H), 1.59-1.50 (m, 2H), 1.45 (s, 9H)1.34 (m, 1H), 1.26 (t, J = 6.8 Hz, 3H), 0.91 (s, 3H), 0.79 (s, 3H).

[00826] *Step 3: tert*-Butyl 4-(2-hydroxyethyl)-3,3-dimethylpiperidine-1-carboxylate.

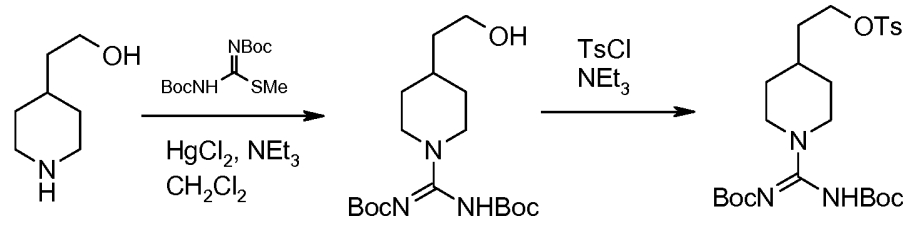
[00827] To a slurry of $NaBH_4$ (204 mg, 5.40 mmol) and LiCl (229 mg, 5.40 mmol) in EtOH (8 mL) was added a solution of *tert*-butyl 4-{(ethoxycarbonyl)methyl}-3,3-dimethylpiperidine-1-carboxylate (538 mg, 1.80 mmol) in THF (10 mL) at 0 °C. After stirring for 10 h at rt, the resulting mixture was quenched with water and the product portion was extracted with Et_2O. The combined extracts were dried (Na_2SO_4), filtered, and concentrated in vacuo. The residue was purified by SiO_2 chromatography (gradient: 40% EtOAc/hexane to 90% EtOAc/hexane) to provide the titled compound (275 mg, 59%).

[00828] *Step 4:* 2-{1-(*tert*-Butoxycarbonyl)-3,3-dimethylpiperidine-4-yl}ethyl-4-ethyhylbenzenesulfonate.

[00829] The titled compound (350 mg, 55%) was obtained from *tert*-butyl 4-(2-hydroxyethyl)-3,3-dimethylpiperidine-1-carboxylate (275 mg, 1.07 mmol) according to the procedure described for intermediate 46. ^{1}H NMR ($CDCl_3$) δ 7.79 (brd, J = 8.0 Hz, 2H), 7.36 (brd, J = 8.0 Hz, 2H), 4.15-3.96 (m, 4H), 3.60 (m, 1H),

2.46 (s, 3H), 2.61-2.23 (m, 2H), 1.89 (m, 1H), 1.44 (s, 9H), 1.26 (m, 3H), 0.84 (s, 3H), 0.74 (s, 3H)

[00830] Intermediate 98



2-(1-{(*Z*)-[(*tert*-Butoxycarbonyl)amino][(tert-butoxycarbonyl)imino]methyl}piperidin-4-yl)ethyl 4-methyl benzenesulfonate

[00817] *Step 1:* di-*tert*-Butyl{(Z)-[4-(2-hydroxyethyl)piperidin-1-yl]methylidene}biscarbamate.

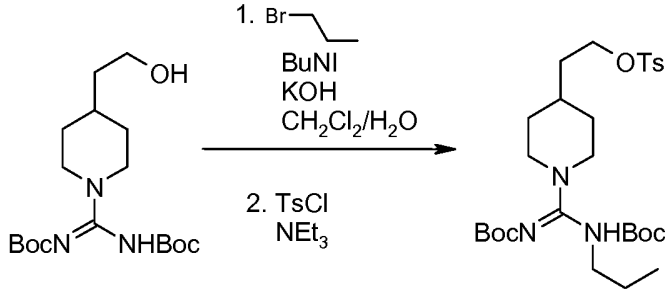
[00818] To a solution of 2-(piperidin-4-yl)ethanol (400 mg, 3.10 mmol) and NEt_3 (864 μL, 6.20 mmol) in CH_2Cl_2 (8 mL) was added 1,3-bis(tert-butoxycarbonyl)-2-methyl-2-thiopsudourea (899 mg, 3.10 mmol) and $HgCl_2$ (842 mg, 3.10 mmol). After stirring at rt for 10 h, the reaction mixture was extracted with CH_2Cl_2. The combined extracts were dried (Na_2SO_4), filtered, and concentrated in vacuo. The residue was purified by SiO_2 chromatography (gradient: 50% EtOAc/hexane to 90% EtOAc/hexane) to provide the titled compound (969 mg, 84%): ^{1}H NMR ($CDCl_3$) δ 10.16 (brs, 1H), 4.25-4.20 (m, 2H), 3.75-3.65 (m, 2H), 2.94 (t, J = 12.8 Hz, 2H), 1.78-1.72 (m, 3H), 1.54 (q, J = 6.4 Hz, 2H), 1.49 (s, 18 H), 1.38-1.29 (m, 2H).

[00819] *Step 2:* 2-(1-{(*Z*)-[(tert-butoxycarbonyl)amino][(tert-butoxycarbonyl)imino]methyl}piperidin-4-yl)ethyl 4-methyl benzenesulfonate.

[00820] The titled compound (446 mg, 65%) was obtained from di-*tert*-Butyl{(*Z*)-[4-(2-hydroxyethyl)piperidin-1-yl]methylidene}biscarbamate (484 mg, 1.307 mmol) according to the procedure described for intermediate 46. ^{1}H NMR

($CDCl_3$) δ 10.16 (brs, 1H), 7.79 (d, J = 8.4 Hz, 2H), 7.36 (d, J = 8.4 Hz, 2H), 4.07 (t, J = 6.0 Hz, 2H),4.20-3.91 (m, 2H), 2.85 (t, J = 12.8 Hz, 2H), 2.46 (s, 3H), 1.61-1.59 (m, 5H), 1.48 (s, 9H), 1.28-1.18 (m, 2H).

[00821] Intermediate 99



[00822] 2-(1-{(*E*)-[(tert-butoxycarbonyl)imino][(tert-butoxycarbonyl)(propyl)amino]methyl}piperidin-4-yl)ethyl 4-methyl benzenesulfonate

[00823] The title compound was prepared in two sequential steps

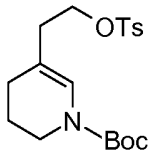
[00824] *Step 1:* 2-(1-{(*E*)-[(tert-butoxycarbonyl)imino][(tert-butoxycarbonyl)(propyl)amino]methyl}piperidin-4-yl)ethanol

[00825] To a mixture of di-*tert*-Butyl{(*Z*)-[4-(2-hydroxyethyl)piperidin-1-yl]methylidene}biscarbamate (200 mg, 0.538 mmol), Bu_4NI (40 mg, 0.11 mmol), and KOH (70 mg, 1.3 mmol) in CH_2Cl_2 (2.5 mL) and H_2O (2.5 mL) was added iodopropane (63 μL, 0.65 mmol) and refluxed for 3 h. After cooling to rt, the product portion was extracted with CH_2Cl_2, washed with brine, dried (Na_2SO_4), filtered, and concentrated in vacuo. The residue was purified by SiO_2 chromatography (gradient: 40% EtOAc/hexane to 100% EtOAc) to afford the titled compound (192 mg, 86%); LC-MS $[M+H]^+$ 442.5

[00826] *Step 2:* 2-(1-{(*E*)-[(tert-butoxycarbonyl)imino][(tert-butoxycarbonyl)(propyl)amino]methyl}piperidin-4-yl)ethyl 4-methyl benzenesulfonate

[00827] The titled compound (189 mg, 72%) was obtained from 2-(1-{(E)-[(tert-butoxycarbonyl)imino][(tert-butoxycarbonyl)(propyl)amino]methyl}piperidin-4-yl)ethanol (190 mg, 0.460 mmol) analogously to the procedure described for intermediates 46. ^{1}H NMR ($CDCl_3$) δ 7.79 (d, J = 7.2 Hz, 2H), 7.36 (d, J = 7.2 Hz, 2H), 4.49 (brs, 1H), 4.12-4.02 (m, 2H), 2.46 (s, 3H), 1.74-1.52 (m, 7H), 1.31-1.05 (m, 2H), 0.87 (t, J = 7.2 Hz, 3H)

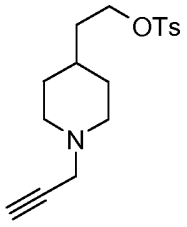
[00828] Intermediate 100



[00829] *tert*-Butyl 5-(2-{[4-methylphenyl)sulfonyl]oxy}ethyl)-3,4-dihydropyridine-1-(2H)-carboxylate.

[00830] The title compound was prepared analogously to the procedure described for intermediate 46 using appropriate starting materials. ^{1}H NMR ($CDCl_3$) δ 7.79 (d, J = 8.4 Hz, 2H), 7.34 (d, J = 8.4 Hz, 2H), 6.66 and 6.56 (s, 1H), 4.06 (q, J = 6.8 Hz, 2H), 3.46-3.41 (m, 2H), 2.45 (s, 3H), 2.31 (t, J = 7.2 Hz, 2H), 1.91 (m, 1H), 1.85 (m, 1H), 1.78-1.70 (m, 2H), 1.48 (s, 9H)

[00831] Intermediate 101

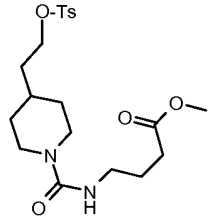
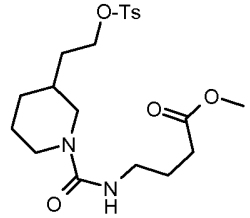
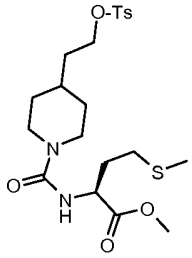
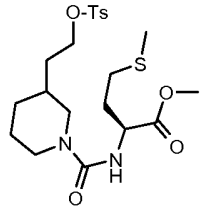


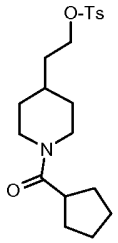
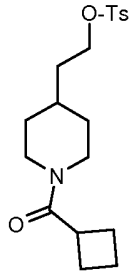
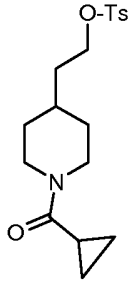
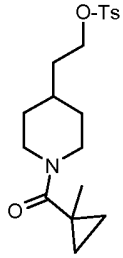
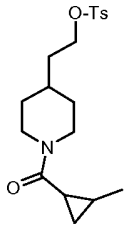
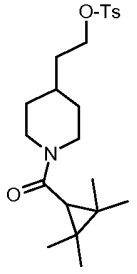
[00832] 1-(1-Prop-2-yn-1-yl)piperidine-4-yl)ethyl 4-methyl benzenesulfonate

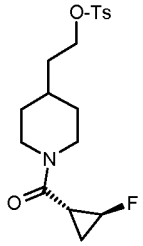
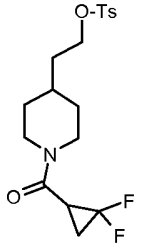
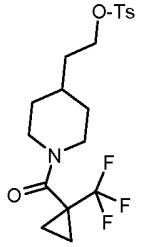
[00833] The title compound was prepared according to the procedure described for intermediate 46 using appropriate starting materials. LC-MS $[M+H]^+$ 322.1.

[00834] Intermediates 102 –114 were prepared according the procedure described for intermediate 46 using appropriate starting materials and are summarized in table 6.

[00835] Table 6

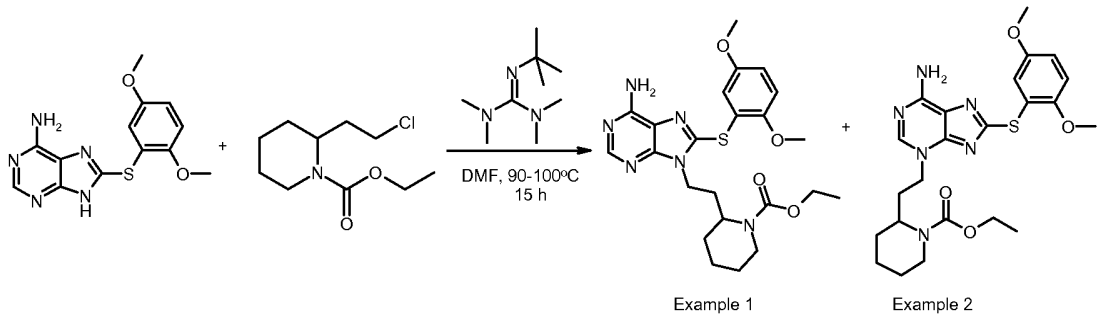
Intermediate No.	Structure	Name and analytical data
102		4-({4-[2-(Toluene-4-sulfonyloxy)-ethyl]-piperidine-1-carbonyl}-amino)-butyric acid methyl ester; LC-MS $[M+H]^+$ 413.2
103		4-({3-[2-(Toluene-4-sulfonyloxy)-ethyl]-piperidine-1-carbonyl}-amino)-butyric acid methyl ester; LC-MS $[M+H]^+$ 413.2
104		(*S*)-4-Methylsulfanyl-2-({4-[2-(toluene-4-sulfonyloxy)-ethyl]-piperidine-1-carbonyl}-amino)-butyric acid methyl ester; LC-MS $[M+H]^+$ 473.1
105		(*S*)-4-Methylsulfanyl-2-({3-[2-(toluene-4-sulfonyloxy)-ethyl]-piperidine-1-carbonyl}-amino)-butyric acid methyl ester; LC-MS $[M+23]^+$ 495.1

106		Toluene-4-sulfonic acid 2-(1-cyclopentanecarbonyl-piperidin-4-yl)-ethyl ester; LC-MS $[M+H]^+$ 380.3
107		Toluene-4-sulfonic acid 2-(1-cyclobutanecarbonyl-piperidin-4-yl)-ethyl ester; LC-MS $[M+H]^+$ 366.1
108		Toluene-4-sulfonic acid 2-(1-cyclopropanecarbonyl-piperidin-4-yl)-ethyl ester; LC-MS $[M+H]^+$ 352.1
109		Toluene-4-sulfonic acid 2-[1-(1-methyl-cyclopropanecarbonyl)-piperidin-4-yl]-ethyl ester; LC-MS $[M+H]^+$ 366.2
110		Toluene-4-sulfonic acid 2-[1-(2-methyl-cyclopropanecarbonyl)-piperidin-4-yl]-ethyl ester; LC-MS $[M+H]^+$ 366.2
111		Toluene-4-sulfonic acid 2-[1-(2,2,3,3-tetramethyl-cyclopropanecarbonyl)-piperidin-4-yl]-ethyl ester; LC-MS $[M+H]^+$ 408.4

112		Toluene-4-sulfonic acid 2-[1-((1*R*,2*S*)-2-fluoro-cyclopropanecarbonyl)-piperidin-4-yl]-ethyl ester; LC-MS $[M+H]^+$ 370.2
113		Toluene-4-sulfonic acid 2-[1-(2,2-difluoro-cyclopropanecarbonyl)-piperidin-4-yl]-ethyl ester; LC-MS $[M+H]^+$ 388.1
114		Toluene-4-sulfonic acid 2-[1-(1-trifluoromethyl-cyclopropanecarbonyl)-piperidin-4-yl]-ethyl ester; LC-MS $[M+H]^+$ 420.1

[00836] Examples 337 and 338

[00837] 2-{2-[6-Amino-8-(2, 5-dimethoxy-phenylsulfanyl)-purin-9-yl]-ethyl}-piperidine-1-carboxylic acid ethyl ester and 2-{2-[6-amino-8-(2, 5-dimethoxy-phenylsulfanyl)-purin-3-yl]-ethyl}-piperidine-1-carboxylic acid ethyl ester.

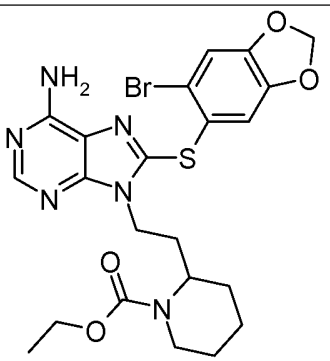
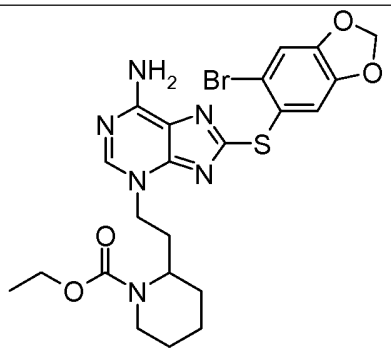


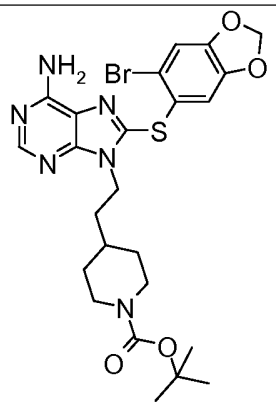
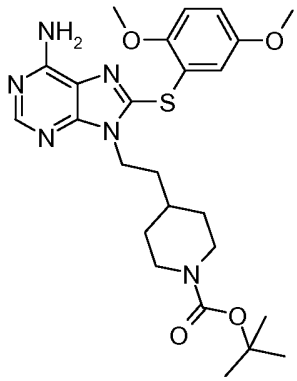
[00838] A mixture of 8- (2, 5-dimethoxy-phenylsulfanyl)-9H-purin-6-ylamine (0.29 g, 0.66 mmol), (2-chloro-ethyl)-piperidine-1-carboxylic acid ethyl ester (0.174 g, 0.79 mmol), and Barton's base (0.163 mL, 0.79 mmol) in DMF (3

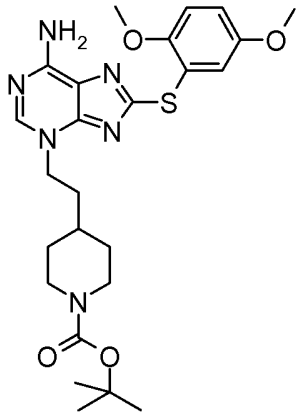
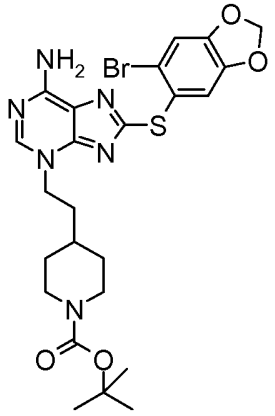
mL) was heated at 90-100 °C for 15 h. The reaction mixture was then allowed to reach ambient temperature. After removal of solvent under reduced pressure, the residue was purified by preparative HPLC [X-Terra prep-RP18 10 um, 19x250 mm(waters), Mobile phase: solvent A: Water HPLC grade containing 0.01% TFA, and solvent B: acetonitrile containing 0.01% TFA, general eluting gradient - solvent B 15% to 80% over 15 to 25 minutes run time]. After lyophilization of HPLC fractions N-9 and N-3 isomers were isolated as trifluoroacetate salts. 2-{2-[6-Amino-8-(2, 5-dimethoxy-phenylsulfanyl)-purin-9-yl]-ethyl}-piperidine-1-carboxylic acid ethyl ester. ^{1}H NMR δ (CD_3OD) 8.29 (s, 1H), 7.05-6.97 (m, 3H), 4.39-4.30 (m, 2H), 4.21-4.15 (m, 1H), 4.09-3.9 (m, 3H), 3.70 (d, 5.2 Hz, 2H), 3.75 (s, 3H), 3.73 (s, 3H), 2.98-2.88 (m, 1H), 2.34-2.28 (m, 1H), 2.02-1.98 (m, 1H), 1.78-1.70 (m, 1H), 1.66-1.58 (m, 2H), 1.34-1.24 (m, 4H); LC-MS TOF $[M+H]^+$ 487.2. 2-{2-[6-Amino-8-(2, 5-dimethoxy-phenylsulfanyl)-purin-3-yl]-ethyl}-piperidine-1-carboxylic acid ethyl ester. ^{1}H NMR δ (CD_3OD) 8.41 (s, 1H), 7.2 (s, 1H), 7.12 (m, 2H), 4.32-4.30 (m, 2H), 4.08 (m, 1H), 3.79 (s, 3H), 3.78 (s, 3H), 3.48-4.41 (m, 1H), 3.36-3.35 (m, 3H), 3.2-3.17(m, 1H), 3.13-3.12 (m, 2H), 1.7-1.6 (m, 5H), 1.28-1.22 (m, 3H); LC-MS TOF $[M+H]^+$ 487.2.

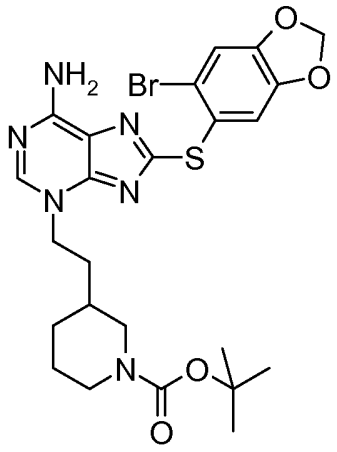
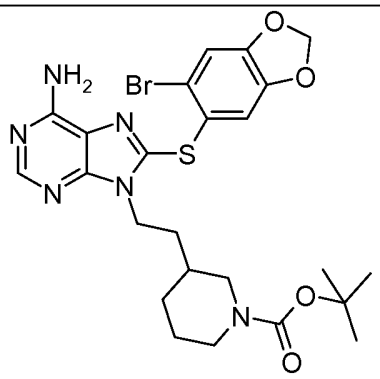
[00839] Examples 339 – 464 were prepared analogously to the procedure described for examples 337 and 338 and are are summarized in table 7. All compunds were isolated as a trifluoroacetate salts.

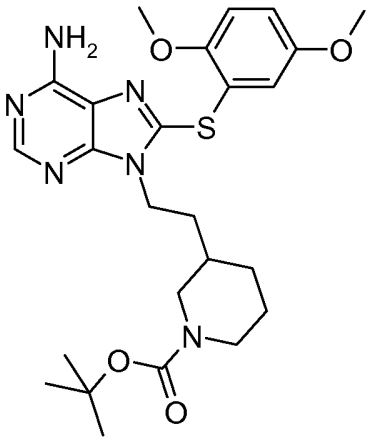
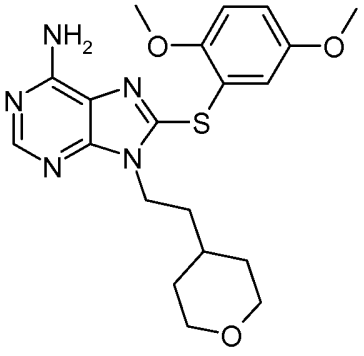
Example No.	Structure	Name and analytical data

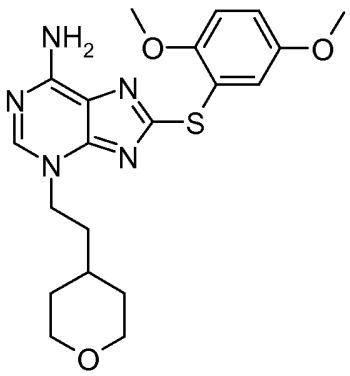
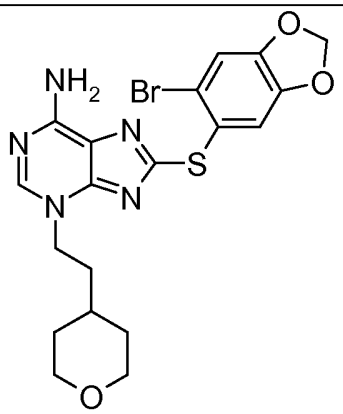
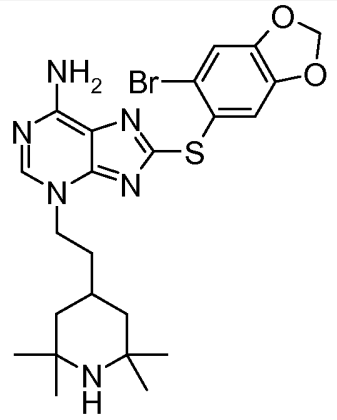
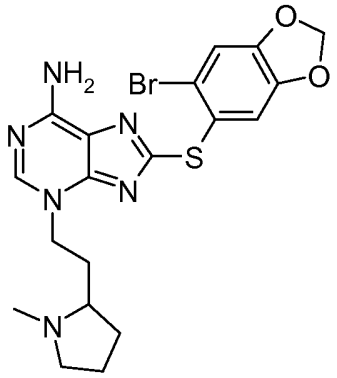
339		Ethyl 2-(2-{6-amino-8-[(6-bromo-1,3-benzodioxol-5-yl)thio]-9H-purin-9-yl}ethyl)piperidine-1-carboxylate. ^{1}H NMR (CD_3OD) δ 8.29 (s, 1H), 7.26 (s, 1H), 7.14 (s, 1H), 6.08 (s, 2H), 4.38-4.3 (m, 2H), 4.23-4.18 (m, 1H), 4.09-4.0 (m, 3H), 3.0-2.94 (m, 1H), 2.36-2.26 (m, 2H), 2.11-2.01 (m, 2H), 1.91-1.82 (m , 2H), 1.7-1.6 (m, 2H), 0.99-0.96 (m, 3H); LC-MS $[M+H]^+$ 549.3.
340		Ethyl 2-(2-{6-amino-8-[(6-bromo-1,3-benzodioxol-5-yl)thio]-3H-purin-3-yl}ethyl)piperidine-1-carboxylate. ^{1}H NMR (CD_3OD) δ 8.49 (s, 1H), 7.36 (s, 1H), 7.35 (s, 1H), 6.15 (s, 2H), 4.34-4.29 (m, 3H), 4.11-4.05 (m, 3H), 3.97-3.9 (m, 1H), 2.9-2.8 (m, 1H), 2.58-2.49 (m, 1H), 2.03-2.01 (m, 1H), 1.91-1.82 (m , 1H), 1.79-1.7 (m, 2H), 1.66-1.58 (m, 2H), 0.99-0.96 (m, 3H); LC-MS $[M+H]^+$ 549.3.

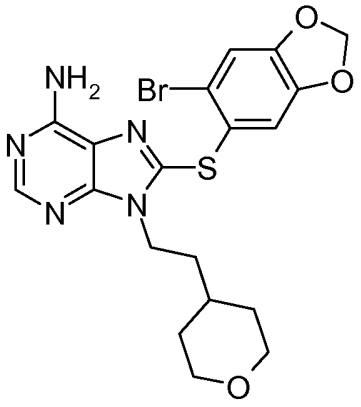
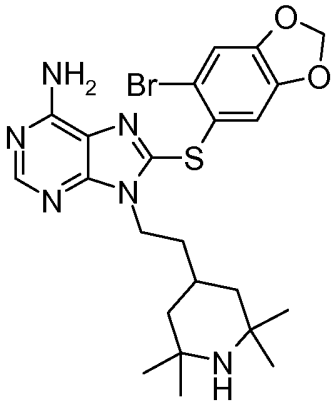
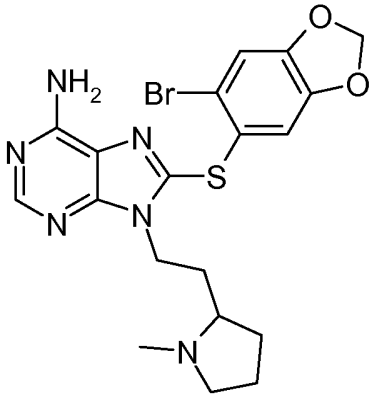
341		*tert*-Butyl 4-(2-{6-amino-8-[(6-bromo-1,3-benzodioxol-5-yl)thio]-9H-purin-9-yl}ethyl)piperidine-1-carboxylate. ^{1}H NMR(Acetone-d_6) δ 8.28 (s, 1H), 7.26 (s, 1H), 6.92 (s, 1H), 6.11 (s, 2H), 4.34 (t, J= 7.2 Hz, 2H), 4.1-4.0 (m, 2H), 2.07-2.05 (m, 4H), 1.8-1.71 (m, 5H), 1.46 (s, 9H); LC-MS $[M+H]^+$ 577.4.
342		*tert*-Butyl 4-(2-{6-amino-8-[(2,5-dimethoxyphenyl)thio]-9H-purin-9-yl}ethyl)piperidine-1-carboxylate. ^{1}H NMR (Acetone-d_6) δ 8.24 (s, 1H), 7.07 (d, J=9.2 Hz, 1H), 6.96 (dd, J=9.2, 2.8 Hz, 1H), 6.86 (d, J=2.8 Hz, 1H), 4.40 (t, J= 7.6 Hz, 2H), 4.40-3.9 (m, 2H), 3.8 (s, 3H), 3.7 (s, 3H), 2.06-2.0 (m, 3H), 1.78-1.73 (m, 4H), 1.42 (s, 9H), 1.12-1.0 (m, 2H); LC-MS $[M+H]^+$ 515.5.

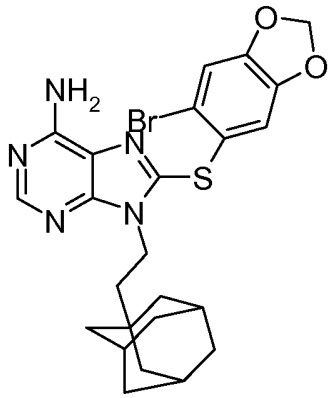
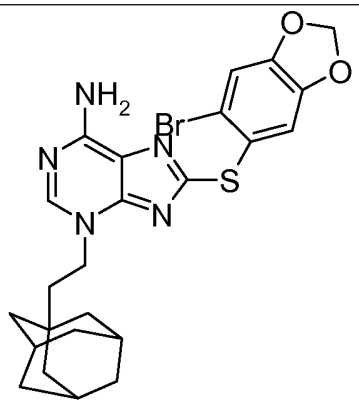
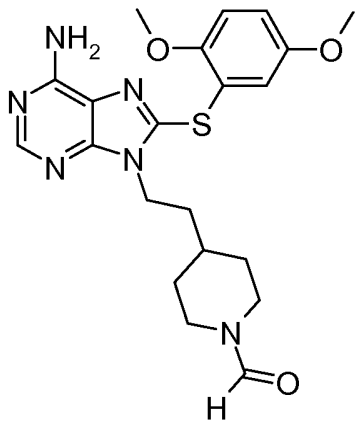
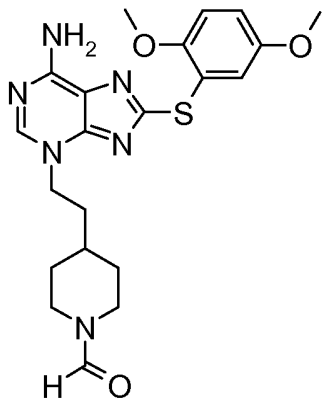
343		*tert*-Butyl 4-(2-{6-amino-8-[(2,5-dimethoxyphenyl)thio]-3H-purin-3-yl}ethyl)piperidine-1-carboxylate. ^{1}H NMR (Acetone-d_6) δ 8.58 (s, 1H), 7.29 (d, J=2.8 Hz, 1H), 7.09 (d, J=8.8 Hz, 1H), 7.03 (dd, J=8.8, 2.8 Hz, 1H), 4.46 (t, J= 7.6 Hz, 2H), 4.41-3.9 (m, 2H), 3.80 (s, 3H), 3.78 (s, 3H), 1.93-1.87 (m, 2H), 1.68-1.60 (m, 2H), 1.52-1.39 (m, 3H), 1.42 (s, 9H), 1.1-1.0 (m, 2H); LC-MS $[M+H]^+$ 515.5.
344		*tert*-Butyl 4-(2-{6-amino-8-[(6-bromo-1,3-benzodioxol-5-yl)thio]-3H-purin-3-yl}ethyl)piperidine-1-carboxylate. ^{1}H NMR (Acetone-d_6) δ 8.55 (s, 1H), 7.36 (s, 1H), 7.29 (s, 1H), 6.18 (s, 2H), 4.46 (t, J= 7.2 Hz, 2H), 2.22-2.20 (m, 1H), 2.04-2.01 (m, 2H), 1.93-1.89 (m, 3H), 1.74-1.71 (m, 2H), 1.52-1.49 (m, 1H), 1.44 (s, 9H), 1.1-1.0 (m, 2H); LC-MS $[M+H]^+$ 577.4.

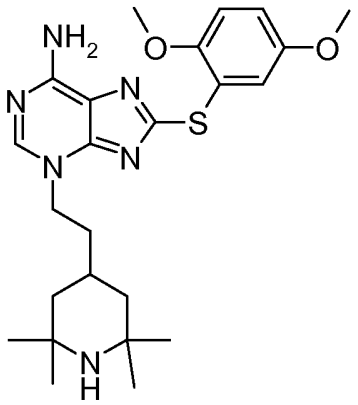
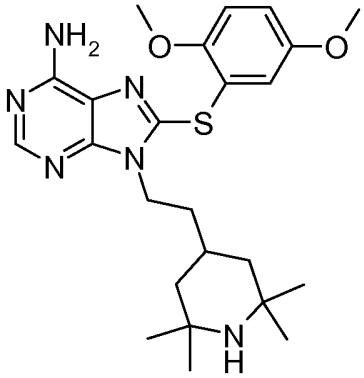
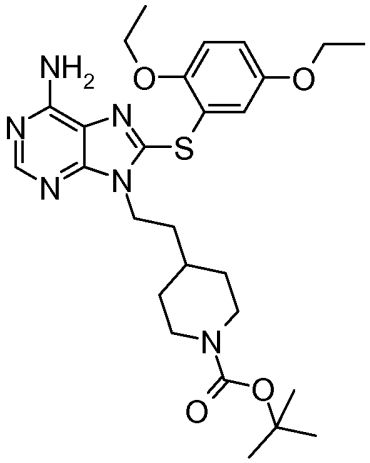
345		*tert*-Butyl 3-(2-{6-amino-8-[(6-bromo-1,3-benzodioxol-5-yl)thio]-3H-purin-3-yl}ethyl)piperidine-1-carboxylate. ^{1}H NMR (DMSO-d_6) δ 8.6 (s, 1H), 7.5 (s, 1H), 7.4 (s, 1H), 6.15 (s, 2H), 4.4-4.3 (m, 2H), 3.8-3.4 (m, 5H), 2.90-2.70 (m, 1H), 2.52-2.49 (m, 2H), 1.90-1.50 (m, 3H), 1.4 (s, 9H); TOF LC-MS $[M+H]^+$ 577.1
346		*tert*-Butyl 3-(2-{6-amino-8-[(6-bromo-1,3-benzodioxol-5-yl)thio]-9H-purin-9-yl}ethyl)piperidine-1-carboxylate. ^{1}H NMR (Acetone-d_6) δ 8.43 (s, 1H), 7.29 (s, 1H), 7.08 (s, 1H), 6.15 (s, 2H), 4.42 (t, J= 7.2 Hz, 2H), 3.86-3.76 (m, 2H), 2.91-2.85 (m, 2H), 1.77-1.69 (m, 2H), 1.65-1.49 (m, 5H), 1.48 (s, 9H); TOF LC-MS $[M+H]^+$ 577.1

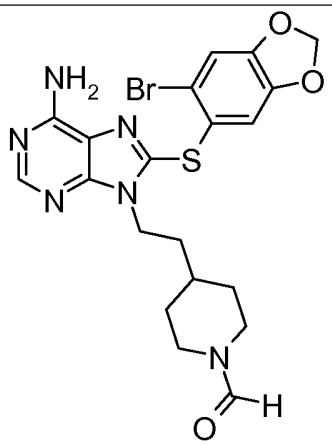
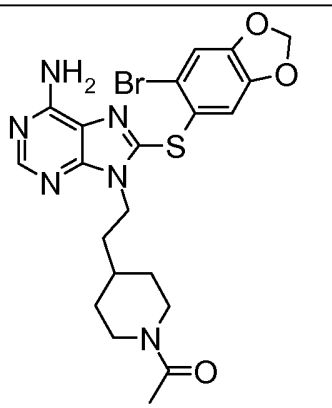
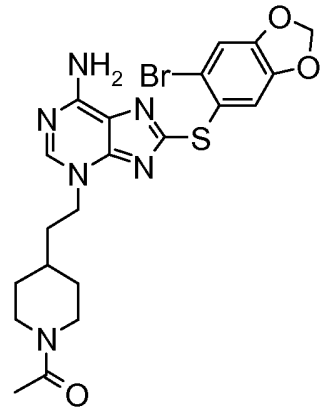
347		*tert*-Butyl 3-(2-{6-amino-8-[(2,5-dimethoxyphenyl)thio]-9H-purin-9-yl}ethyl)piperidine-1-carboxylate. ^{1}H NMR (DMSO-d_6) δ 8.27 (s, 1H), 7.05 (d, J=8.8 Hz, 1H), 6.90 (dd, J=8.8, 2.8 Hz, 1H), 6.59 (d, J=2.8 Hz, 1H), 4.22 (t, J= 7.2 Hz, 2H), 3.75 (s, 3H), 3.62 (s, 3H), 2.75-2.68 (m, 1H), 2.52-2.49 (m, 6H), 1.8-1.7 (m, 1H), 1.58-1.50 (m, 2H), 1.36 (s, 9H), 1.1-1.0 (m, 1H); TOF LC-MS $[M+H]^+$ 515.2
348		8-[(2,5-Dimethoxyphenyl)thio]-9-[2-(tetrahydro-2H-pyran-4-yl)ethyl]-9H-purin-6-amine. ^{1}H NMR (DMSO-d_6) δ 8.24 (s, 1H), 7.05 (d, J=9.2 Hz, 1H), 6.88 (dd, J=9.2, 2.8 Hz, 1H), 6.52 (d, J=2.8 Hz, 1H), 4.22 (t, J= 5.6 Hz, 2H), 3.76 (s, 3H), 3.75-3.73 (m, 3H), 3.61 (s, 3H), 3.16-3.10 (m, 2H), 1.59-1.51 (m, 4H), 1.12-1.04 (m, 2H); TOF LC-MS $[M+H]^+$ 416.2

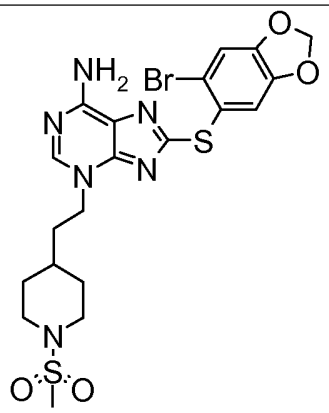
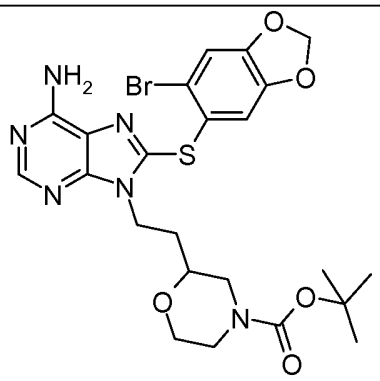
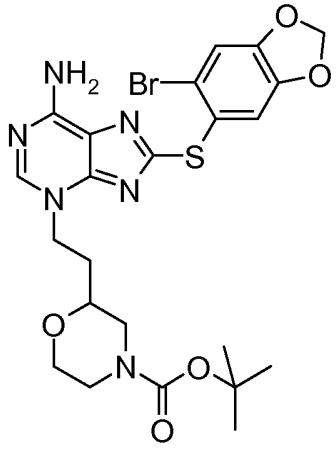
349		8-[(2,5-Dimethoxyphenyl)thio]-3-[2-(tetrahydro-2H-pyran-4-yl)ethyl]-3H-purin-6-amine. TOF LC-MS $[M+H]^+$ 416.2
350		8-[(6-Bromo-1,3-benzodioxol-5-yl)thio]-3-[2-(tetrahydro-2H-pyran-4-yl)ethyl]-3H-purin-6-amine. TOF LC-MS $[M+H]^+$ 478.1
351		8-[(6-Bromo-1,3-benzodioxol-5-yl)thio]-3-[2-(2,2,6,6-tetramethylpiperidin-4-yl)ethyl]-3H-purin-6-amine. ^1H NMR (DMSO-d_6) δ 7.56-7.52 (m, 3H), 6.11 (s, 2H), 4.34-4.33 (m, 2H), 1.87-1.80 (m, 5H), 1.32 (s, 6H), 1.29 (s, 6H), 1.14-1.12 (m, 2H); TOF LC-MS $[M+H]^+$ 533.1
352		8-[(6-Bromo-1,3-benzodioxol-5-yl)thio]-3-[2-(1-methylpyrrolidin-2-yl)ethyl]-3H-purin-6-amine. LC-MS $[M-H]^+$ 475.4.

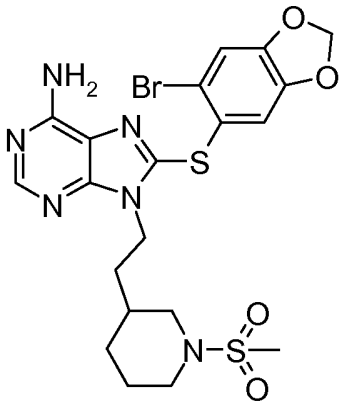
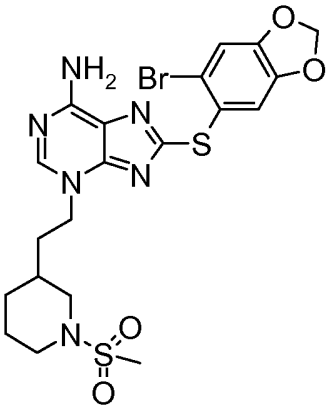
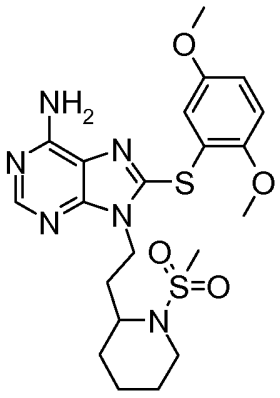
353		8-[(6-Bromo-1,3-benzodioxol-5-yl)thio]-9-[2-(tetrahydro-2H-pyran-4-yl)ethyl]-9H-purin-6-amine. ^{1}H NMR (DMSO-d_6) δ8.19 (s, 1H), 7.39 (s, 1H), 6.83 (s, 1H), 6.09 (s, 2H), 4.18 (t, J= 8.0 Hz, 2H), 3.78 (d, J=8.0, 2H), 3.20-3.14 (m, 3H), 1.62-1.56 (m, 4H), 1.16-1.14 (m, 2H); TOF LC-MS $[M+H]^+$ 478.1
354		8-[(6-Bromo-1,3-benzodioxol-5-yl)thio]-9-[2-(2,2,6,6-tetramethylpiperidin-4-yl)ethyl]-9H-purin-6-amine. ^{1}H NMR (DMSO-d_6) δ 8.19 (s, 1H), 7.40 (s, 1H), 6.82 (s, 1H), 6.09 (s, 2H), 4.20 (t, J= 7.6 Hz, 2H), 1.81-1.78 (m, 3H), 1.62-1.60 (m, 2H), 1.31 (s, 6H), 1.26 (s, 6H), 1.10 (d, J= 7.6Hz, 2H); TOF LC-MS $[M+H]^+$ 533.1
355		8-[(6-Bromo-1,3-benzodioxol-5-yl)thio]-9-[2-(1-methylpyrrolidin-2-yl)ethyl]-9H-purin-6-amine.^{1}H NMR (DMSO-d_6) δ 8.42 (s, 1H), 6.60-6.50 (m, 2H), 6.10 (s, 2H), 4.40-4.20 (m, 2H), 3.07-2.99 (m, 2H), 2.77-1.78 (m, 5H), 2.52-2.48 (m, 5H); LC-MS $[M+H]^+$ 477.3.

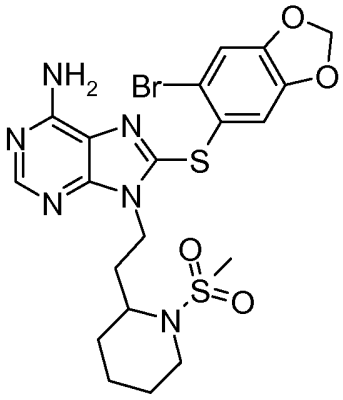
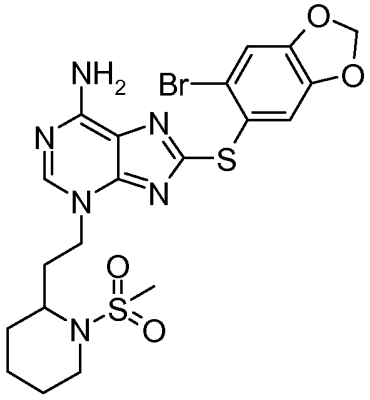
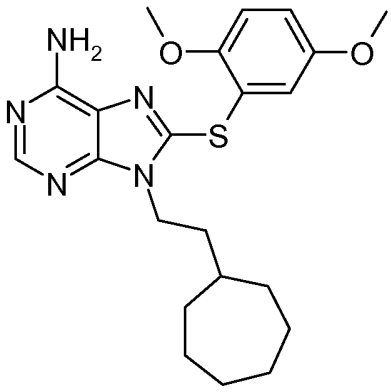
356		9-[2-(1-Adamantyl)ethyl]-8-[(6-bromo-1,3-benzodioxol-5-yl)thio]-9H-purin-6-amine. LC-MS $[M+H]^+$ 528.4
357		3-[2-(1-Adamantyl)ethyl]-8-[(6-bromo-1,3-benzodioxol-5-yl)thio]-3H-purin-6-amine.LC-MS $[M+H]^+$ 528.4
358		4-(2-{6-Amino-8-[(2,5-dimethoxyphenyl)thio]-9H-purin-9-yl}ethyl)piperidine-1-carbaldehyde. LC-MS $[M+H]^+$ 443.5.
359		4-(2-{6-Amino-8-[(2,5-dimethoxyphenyl)thio]-3H-purin-3-yl}ethyl)piperidine-1-carbaldehyde. LC-MS $[M+H]^+$ 443.5

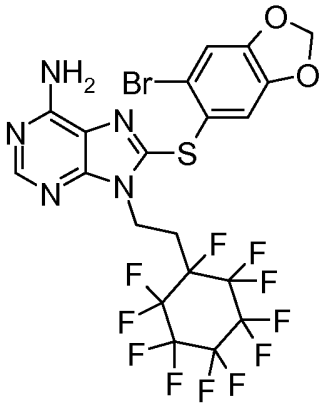
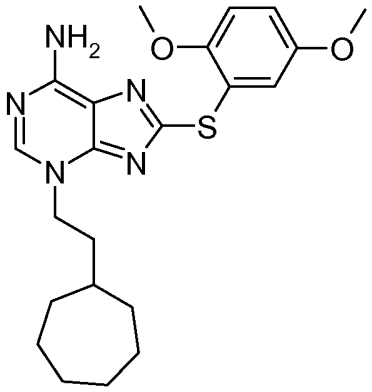
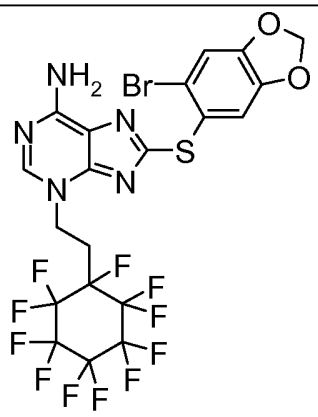
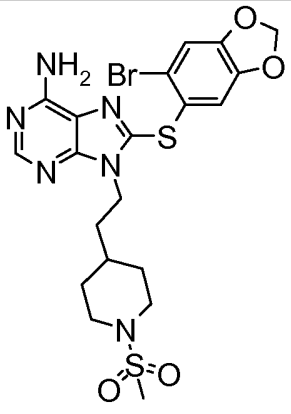
360		8-[(2,5-Dimethoxyphenyl)thio]-3-[2-(2,2,6,6-tetramethylpiperidin-4-yl)ethyl]-3H-purin-6-amine. TOF LC-MS $[M+H]^+$ 471.2
361		8-[(2,5-Dimethoxyphenyl)thio]-9-[2-(2,2,6,6-tetramethylpiperidin-4-yl)ethyl]-9H-purin-6-amine. ^{1}H NMR δ (DMSO-d_6) 8.19 (s, 1H), 7.05 (d, J=8.8 Hz, 1H), 6.80 (dd, J=8.8, 3.2Hz, 1H), 6.46 (d, J=3.2Hz, 1H), 4.22-4.20 (m, 2H), 3.77 (s, 3H), 3.62 (s, 3H), 2.46-2.45 (m, 2H), 1.76-1.73 (m, 2H), 1.59-1.57 (m, 2H), 1.29 (s, 6H), 1.23 (s, 6H), 1.10-1.00 (m, 1H); TOF LC-MS $[M+H]^+$ 471.3
362		*tert*-Butyl 4-(2-{6-amino-8-[(2,5-diethoxyphenyl)thio]-9H-purin-9-yl}ethyl)piperidine-1-carboxylate.^{1}H NMR (DMSO-d_6) δ 8.16 (s, 1H), 6.99 (d, J=9.2 Hz, 1H), 6.82 (dd, J=9.2, 2.8 Hz, 1H), 6.45 (d, J=2.8 Hz, 1H), 4.2-4.16 (m, 4H), 4.0-3.97 (m, 3H), 3.87-3.84 (m, 6H), 2.52-2.49 (m, 4H), 1.37 (s, 9H) 1.23-1.17 (m, 6H); LC-MS $[M+H]^+$ 543.2.

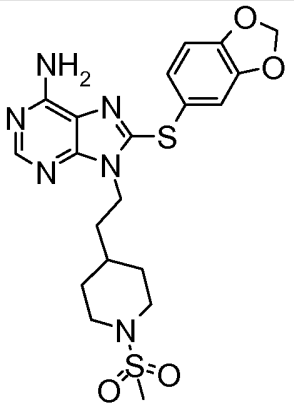
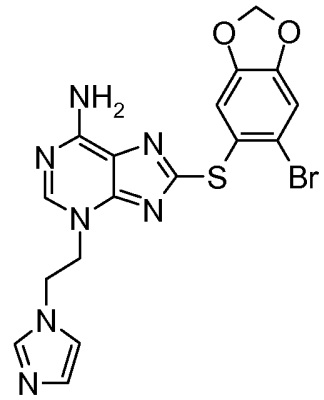
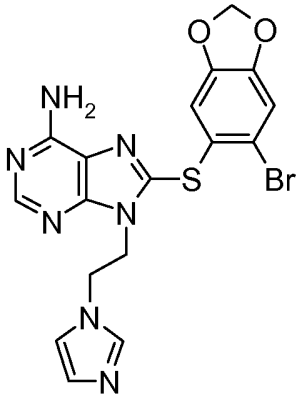
363		4-(2-{6-Amino-8-[(6-bromo-1,3-benzodioxol-5-yl)thio]-9H-purin-9-yl}ethyl)piperidine-1-carbaldehyde.^{1}H NMR (DMSO-d_6) δ 8.21 (s, 1H), 7.94 (s, 1H), 7.40 (s, 1H), 6.85 (s, 1H), 6.09 (s, 2H), 4.34 (t, J= 6.8 Hz, 2H), 4.12-4.00 (m, 1H), 3.70-3.60 (m, 4H), 2.95-2.90 (m, 2H), 1.75-1.70 (m, 4H); LC/MS TOF $[M+H]^+$ 505.1
364		9-[2-(1-Acetylpiperidin-4-yl)ethyl]-8-[(6-bromo-1,3-benzodioxol-5-yl)thio]-9H-purin-6-amine. LC-MS $[M+H]^+$ 519.0
365		3-[2-(1-Acetylpiperidin-4-yl)ethyl]-8-[(6-bromo-1,3-benzodioxol-5-yl)thio]-3H-purin-6-amine.LC-MS $[M+H]^+$ 519.0

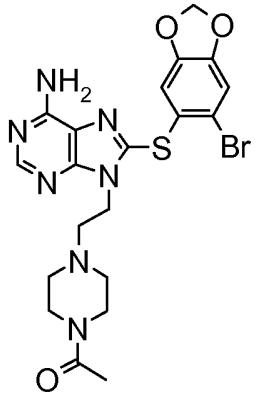
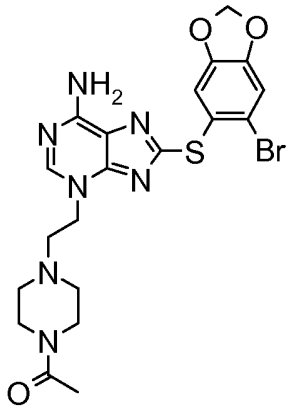
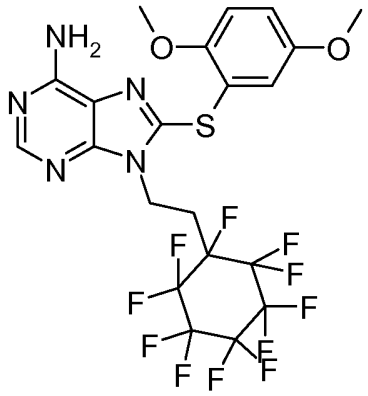
366		8-[(6-Bromo-1,3-benzodioxol-5-yl)thio]-3-{2-[1-(methylsulfonyl)piperidin-4-yl]ethyl}-3H-purin-6-amine. LC-MS $[M+H]^+$ 557.0
367		*tert*-Butyl 2-(2-{6-amino-8-[(6-bromo-1,3-benzodioxol-5-yl)thio]-9H-purin-9-yl}ethyl)morpholine-4-carboxylate. ^{1}H NMR (Acetone-d_6) δ 8.36 (s, 1H), 7.26 (s, 1H), 7.05 (s, 1H), 6.14 (s, 2H), 4.47 (t, J=6.4 Hz, 2H), 3.85-3.80 (m, 4H), 3.41 (t, J=6.4 Hz, 2H), 3.20-2.70 (m, 3H), 1.41 (s, 9H); TOF LC-MS $[M+H]^+$ 579.1
368		*tert*-Butyl 2-(2-{6-amino-8-[(6-bromo-1,3-benzodioxol-5-yl)thio]-3H-purin-3-yl}ethyl)morpholine-4-carboxylate. ^{1}H NMR (Acetone-d_6) δ 8.55 (s, 1H), 7.34 (s, 1H), 7.28 (s, 1H), 6.17 (s, 2H), 4.54 (t, J=6.0 Hz, 2H), 3.79-3.76 (m, 4H), 3.42-3.33 (m, 2H), 3.10-2.80 (m, 3H), 1.42 (s, 9H); TOF LC-MS $[M+H]^+$ 579.1

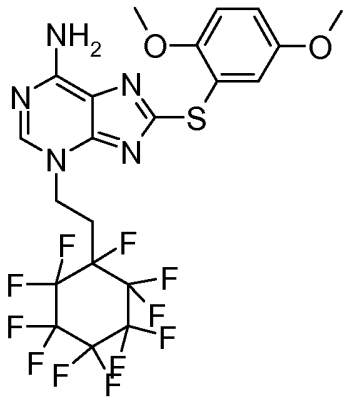
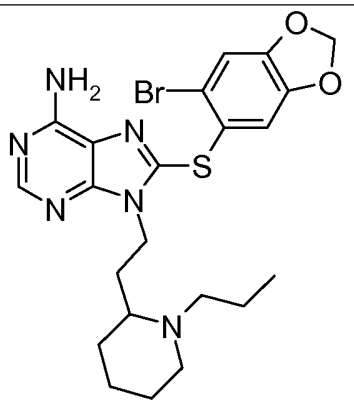
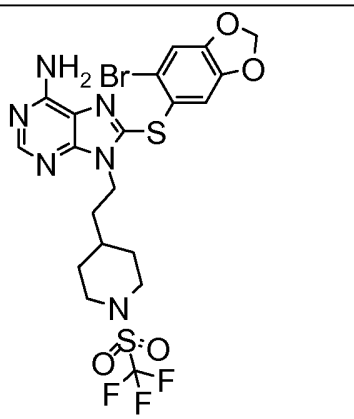
369		8-[(6-Bromo-1,3-benzodioxol-5-yl)thio]-9-{2-[1-(methylsulfonyl)piperidin-3-yl]ethyl}-9H-purin-6-amine. ^{1}H NMR (CD_3OD) δ 8.20 (s, 1H), 7.3 (s, 1H), 7.10 (s, 1H), 6.08 (s, 2H), 4.33 (t, J= 6 Hz, 2H), 3.61-3.60 (m, 2H), 3.14-3.12 (m, 2H), 2.80 (s, 3H), 1.90-1.89 (m, 1H), 1.81-1.75 (m, 4H), 1.75-1.62 (m, 2H);LC-MS $[M+H]^+$ 555.1
370		8-[(6-Bromo-1,3-benzodioxol-5-yl)thio]-3-{2-[1-(methylsulfonyl)piperidin-3-yl]ethyl}-3H-purin-6-amine. ^{1}H NMR (CD_3OD) δ 8.53 (s, 1H), 8.28 (s, 1H), 7.40 (s, 1H), 6.05 (s, 2H), 4.47 (t, J= 6 Hz, 2H), 3.52-3.40 (m, 2H), 3.14-3.12 (m, 2H), 2.80 (s, 3H), 1.96-1.84 (m, 1H), 1.82-1.80 (m, 4H), 1.70-1.54 (m, 2H); LC-MS $[M+H]^+$ 555.1
371		8-[(2,5-Dimethoxyphenyl)thio]-9-{2-[1-(methylsulfonyl)piperidin-2-yl]ethyl}-9H-purin-6-amine. LC-MS $[M+H]^+$ 493.2

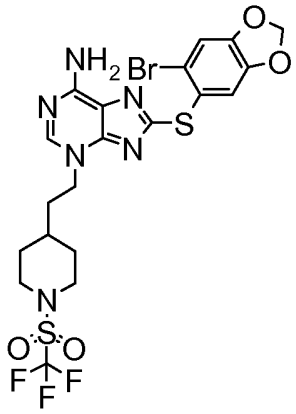
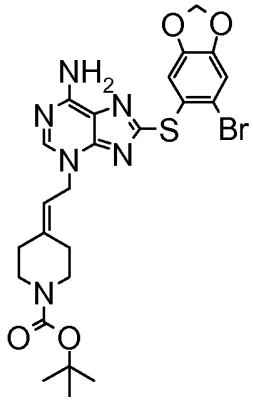
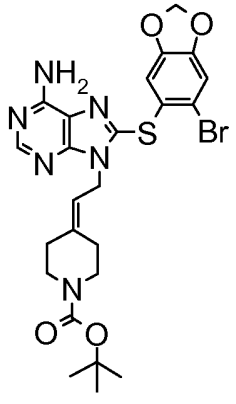
372		8-[(6-Bromo-1,3-benzodioxol-5-yl)thio]-9-{2-[1-(methylsulfonyl)piperidin-2-yl]ethyl}-9H-purin-6-amine. ^{1}H NMR (CD_3OD) δ 8.31 (s, 1H), 7.27 (s, 1H), 7.20 (s, 1H), 6.09 (s, 2H), 4.35 (t, J= 8.4 Hz, 2H), 3.30-3.20 (m, 2H), 3.00 (s, 3H), 2.48-2.30 (m, 2H), 2.03-2.00 (m, 2H), 1.70-1.62 (m, 5H); LC-MS $[M+H]^+$ 555.1
373		8-[(6-Bromo-1,3-benzodioxol-5-yl)thio]-3-{2-[1-(methylsulfonyl)piperidin-2-yl]ethyl}-3H-purin-6-amine. LC-MS $[M+H]^+$ 555.1
374		9-(2-Cycloheptylethyl)-8-[(2,5-dimethoxyphenyl)thio]-9H-purin-6-amine.^{1}H NMR (DMSO-d_6) δ 8.23 (s, 1H), 7.30 (d, J= 9.2 Hz, 1H), 6.87 (dd, J=9.2, 3.2 Hz, 1H), 6.50 (d, J= 3.2 Hz, 1H), 4.15 (t, J=6.8 Hz, 2H), 3.76 (s, 3H), 3.75-3.71 (m, 2H), 3.60 (s, 3H), 1.63-1.42 (m, 13H); TOF LC-MS $[M+H]^+$ 427.3

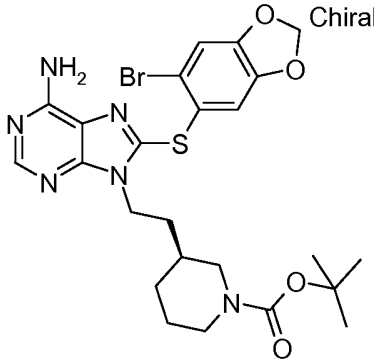
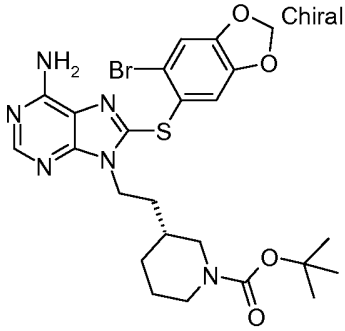
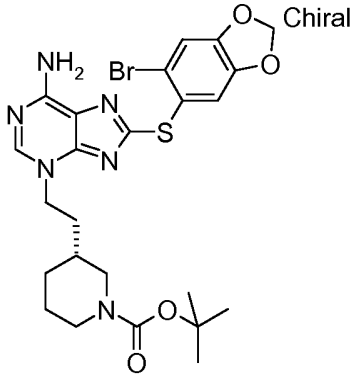
375		8-[(6-Bromo-1,3-benzodioxol-5-yl)thio]-9-[2-(undecafluorocyclohexyl)ethyl]-9H-purin-6-amine. TOF LC-MS $[M+H]^+$ 674.0
376		3-(2-Cycloheptylethyl)-8-[(2,5-dimethoxyphenyl)thio]-3H-purin-6-amine.TOF LC-MS $[M+H]^+$ 427.3
377		8-[(6-Bromo-1,3-benzodioxol-5-yl)thio]-3-[2-(undecafluorocyclohexyl)ethyl]-3H-purin-6-amine. TOF LC-MS $[M+H]^+$ 674.0.
378		8-[(6-Bromo-1,3-benzodioxol-5-yl)thio]-9-{2-[1-(methylsulfonyl)piperidin-4-yl]ethyl}-9H-purin-6-amine. ^1H NMR (CD_3OD) δ 8.20 (s, 1H), 7.30 (s, 1H), 7.10 (s, 1H), 6.08 (s, 2H), 4.32 (t, J= 7.2 Hz, 2H), 3.70-3.69 (m, 2H), 3.25-3.12 (m, 2H), 2.81 (s,

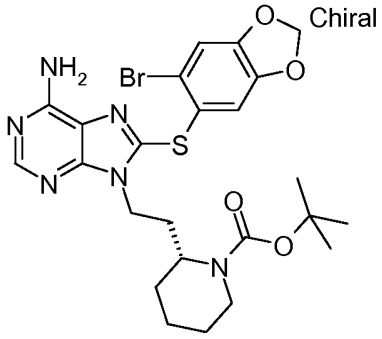
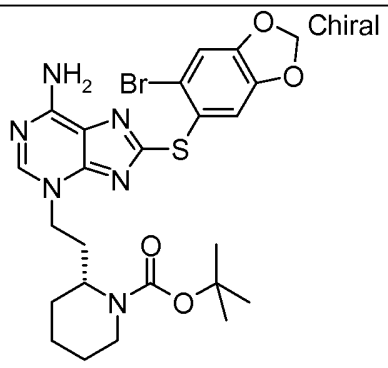
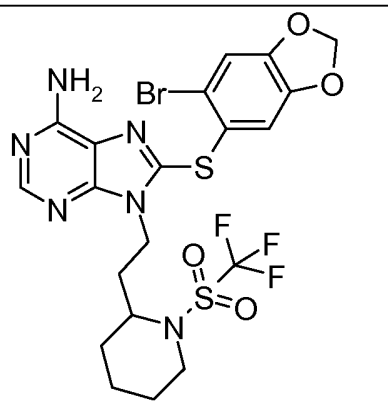
		3H), 1.93-1.91 (m, 2H), 1.82-1.76 (m, 2H), 1.44-1.30 (m, 3H); LC-MS $[M+H]^+$ 555.3
379		8-(1,3-Benzodioxol-5-ylthio)-9-{2-[1-(methylsulfonyl)piperidin-4-yl]ethyl}-9H-purin-6-amine. LC-MS $[M+H]^+$ 555.0
380		8-[(6-Bromo-1,3-benzodioxol-5-yl)thio]-3-[2-(1H-imidazol-1-yl)ethyl]-3H-purin-6-amine. ^{1}H NMR (CD_3OD) δ 8.90 (s, 1H), 8.39 (s, 1H), 7.54 (br s, 2H), 7.36 (s, 1H), 7.30 (s, 1H), 6.15 (s, 2H), 4.90-4.80 (m, 4H); TOF LC-MS $M+H]^+$ 460.1
381		8-[(6-Bromo-1,3-benzodioxol-5-yl)thio]-9-[2-(1H-imidazol-1-yl)ethyl]-9H-purin-6-amine.^{1}H NMR (CD_3OD) δ 8.92 (t, J = 1.2 Hz, 1H), 8.24 (s, 1H), 7.56-7.53 (m, 2H), 7.26 (s, 1H), 7.13 (s, 1H), 6.09 (s, 2H), 4.80 (s, 4H); TOF LC-MS $[M+H]^+$ 460.5

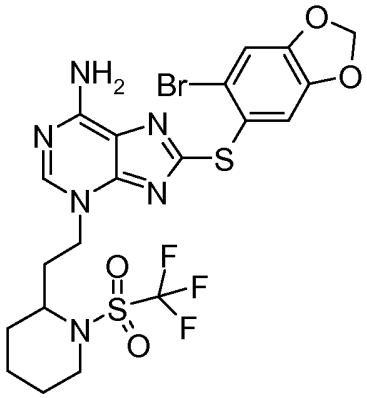
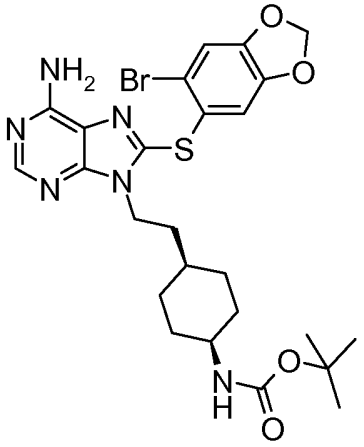
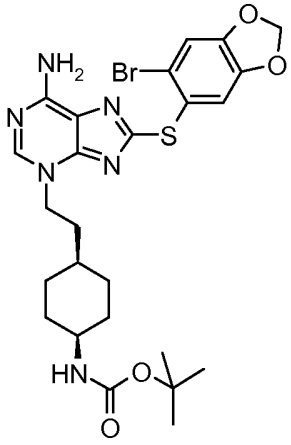
382		9-[2-(4-Acetylpiperazin-1-yl)ethyl]-8-[(6-bromo-1,3-benzodioxol-5-yl)thio]-9H-purin-6-amine. ^{1}H NMR (CD_3OD) δ 8.33 (s, 1H), 7.27 (s, 1H), 7.22 (s, 1H), 6.08 (s, 2H), 4.66 (t, J = 5.6 Hz, 2H), 3.79-3.66 (m, 3H), 3.36 (m, 1H), 3.17-3.11 (m, 4H), 3.30 (br t, J = 5.6 Hz, 2H), 2.12 (s, 3H); TOF LC-MS $[M+H]^+$ 520.1
383		3-[2-(4-Acetylpiperazin-1-yl)ethyl]-8-[(6-bromo-1,3-benzodioxol-5-yl)thio]-3H-purin-6-amine. ^{1}H NMR (CD_3OD) δ 8.53 (s, 1H), 7.38 (s, 1H), 7.37 (s, 1H), 6.16 (s, 2H), 4.67 (t, J = 4.8 Hz, 2H), 3.70-3.61 (m, 4H), 3.30 (t, J = 4.8 Hz, 2H), 3.00-2.94 (m, 4H), 2.12 (s, 3H); TOF LC-MS $[M+H]^+$ 520.1
384		8-[(2,5-Dimethoxyphenyl)thio]-9-[2-(undecafluorocyclohexyl)ethyl]-9H-purin-6-amine. ^{1}H NMR (Acetone-d_6) δ 8.65 (s, 1H), 7.27 (d, J= 3.2 Hz, 1H), 7.07-7.02 (m, 2H), 4.80 (t, J= 8.0 Hz, 2H), 3.78 (s, 3H), 3.75 (s, 3H), 2.15 (t, J= 8.0 Hz, 2H); TOF LC-MS $[M+H]^+$ 612.1

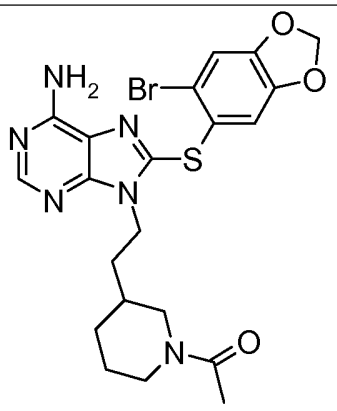
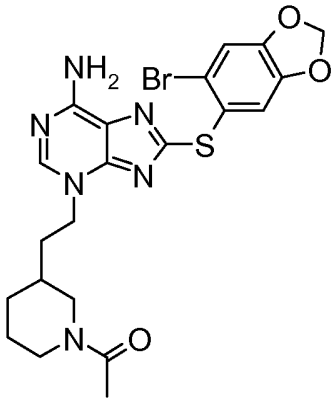
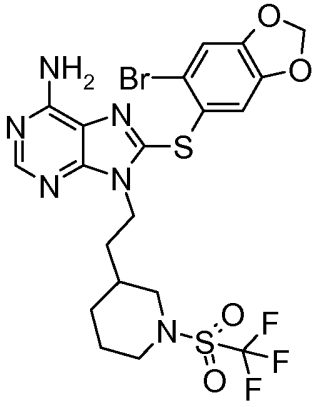
385		8-[(2,5-Dimethoxyphenyl)thio]-3-[2-(undecafluorocyclohexyl)ethyl]-3H-purin-6-amine. ^{1}H NMR (Acetone-d_6) δ 8.38 (s, 1H), 7.06 (d, J= 8.8 Hz, 1H), 6.95 (dd, J=8.8, 2.8 Hz, 1H), 6.86 (d, J=2.8 Hz, 1H), 4.70 (t, J= 8.4 Hz, 2H), 3.80 (s, 3H), 3.71 (s, 3H), 2.94 (d, J= 8.4 Hz, 2H); TOF LC-MS $[M+H]^+$ 612.1
386		8-[(6-Bromo-1,3-benzodioxol-5-yl)thio]-9-[2-(1-propylpiperidin-2-yl)ethyl]-9H-purin-6-amine. ^{1}H NMR (CD_3OD) δ 8.34 (s, 1H), 7.30 (s, 1H), 7.22 (s, 1H), 6.10 (s, 2H), 4.46-4.14 (m, 2H), 2.57-2.50 (m, 2H), 2.35-2.26 (m, 3H), 2.20-2.14 (m, 2H), 2.01-1.84 (m, 3H), 1.80-1.60 (m, 5H), 1.01 (t, J= 7.7 Hz, 3H); LC-MS $[M+H]^+$ 519.0
387		8-[(6-Bromo-1,3-benzodioxol-5-yl)thio]-9-(2-{1-[(trifluoromethyl)sulfonyl]piperidin-4-yl}ethyl)-9H-purin-6-amine. LC-MS $[M+H]^+$ 609.3

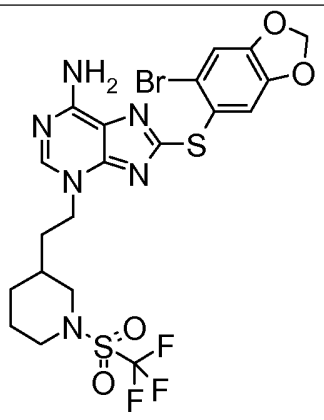
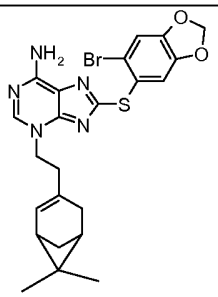
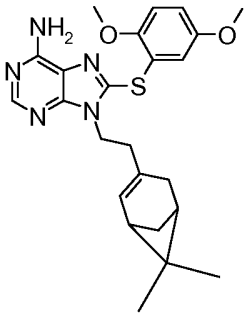
388		8-[(6-Bromo-1,3-benzodioxol-5-yl)thio]-3-(2-{1-[(trifluoromethyl)sulfonyl]piperidin-4-yl}ethyl)-3H-purin-6-amine. LC-MS $[M+H]^+$ 609.0
389		*tert*-Butyl 4-(2-{6-amino-8-[(6-bromo-1,3-benzodioxol-5-yl)thio]-3H-purin-3-yl}ethylidene)piperidine-1-carboxylate. ^1H NMR (CD_3OD) δ 8.45 (s, 1H), 7.38 (s, 1H), 7.37 (s, 1H), 6.16 (s, 2H), 5.23 (s, 1H), 4.48(t, J = 6.8 Hz, 2H), 3.69 (brs, 2H), 3.49-3.44 (m, 2H), 2.62(t, J = 6.8 Hz, 2H), 2.18-2.13 (m, 2H), 1.46 (s, 9H); LC-MS $[M+H]^+$ 575.5
390		*tert*-Butyl 4-(2-{6-amino-8-[(6-bromo-1,3-benzodioxol-5-yl)thio]-9H-purin-9-yl}ethylidene)piperidine-1-carboxylate. ^1H NMR (CD_3OD) δ 8.18 (s, 1H), 7.24 (s, 1H), 7.01 (s, 1H), 6.07 (s, 2H), 5.17 (s, 1H), 4.36 (t, J = 6.4 Hz, 2H), 3.69 (s, 2H), 3.52-3.44 (m, 2H), 2.53 (t, J = 6.4 Hz, 2H), 2.24-2.18(m, 2H), 1.44 (s,

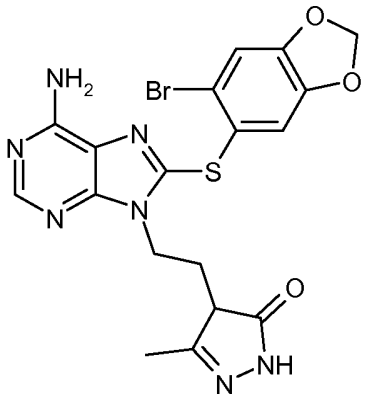
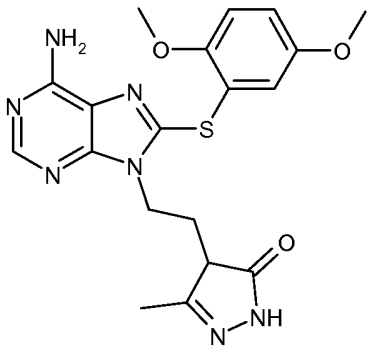
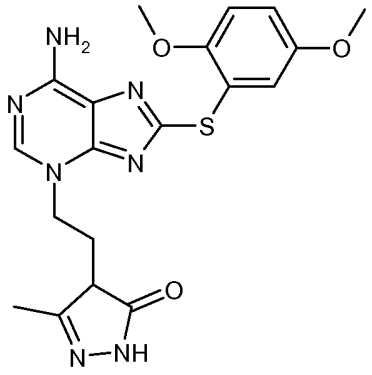
		9H); LC-MS $[M+H]^+$ 575.0
391		*tert*-Butyl (3*S*)-3-(2-{6-amino-8-[(6-bromo-1,3-benzodioxol-5-yl)thio]-9H-purin-9-yl}ethyl)piperidine-1-carboxylate. LC-MS $[M+H]^+$ 577.3
392		*tert*-Butyl (3*R*)-3-(2-{6-amino-8-[(6-bromo-1,3-benzodioxol-5-yl)thio]-9H-purin-9-yl}ethyl)piperidine-1-carboxylate. ^{1}H NMR (Acetone-d_6) δ 8.32 (s, 1H), 7.26 (s, 1H), 6.98 (s, 1H), 6.12 (s, 2H), 4.36 (t, J=7.2 Hz, 2H), 3.85-3.80 (m, 2H), 2.86 (t, J=6.4 Hz, 2H), 2.00-1.60 (m, 4H), 1.50-1.20 (m, 3H), 1.41 (s, 9H); TOF LC-MS $[M+H]^+$ 577.3
393		*tert*-Butyl (3*R*)-3-(2-{6-amino-8-[(6-bromo-1,3-benzodioxol-5-yl)thio]-3H-purin-3-yl}ethyl)piperidine-1-carboxylate.^{1}H NMR (Acetone-d_6) δ 8.61 (s, 1H), 7.36 (s, 1H), 7.30 (s, 1H), 6.17 (s, 2H), 4.48 (t, J=6.4 Hz, 2H), 3.83-3.76 (m, 3H), 3.62-3.59 (m, 1H), 2.90-2.79 (m, 3H), 1.91-1.84 (m, 4H), 1.45 (s, 9H); TOF LC-MS $[M+H]^+$ 577.3.

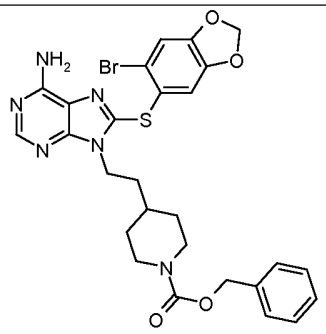
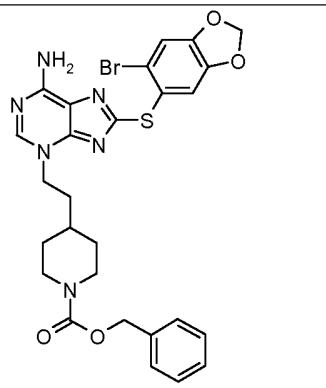
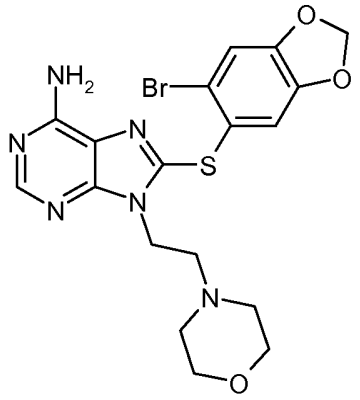
394		*tert*-Butyl (2*R*)-2-(2-{6-amino-8-[(6-bromo-1,3-benzodioxol-5-yl)thio]-9H-purin-9-yl}ethyl)piperidine-1-carboxylate. ^{1}H NMR (Acetone-d_6) δ 8.30 (s, 1H), 7.25 (s, 1H), 6.87 (s, 1H), 6.10 (s, 2H), 4.40-4.00 (m, 2H), 3.70-3.60 (m, 2H), 2.10-1.80 (m, 5H), 1.70-1.50 (m, 6H), 1.90-1.50 (m, 9H), 1.40 (s, 9H); TOF LC-MS $[M+H]^+$ 577.4
395		*tert*-Butyl (2*R*)-2-(2-{6-amino-8-[(6-bromo-1,3-benzodioxol-5-yl)thio]-3H-purin-3-yl}ethyl)piperidine-1-carboxylate.^{1}H NMR (Acetone-d_6) δ 8.45 (s, 1H), 7.36 (s, 1H), 7.30 (s, 1H), 6.19 (s, 2H), 4.42 (d, J= 7.6 Hz, 2H), 2.75-2.6 (m, 6H), 2.42-2.40 (m, 2H), 2.20-2.00 (m, 3H), 1.35 (s, 9H); TOF LC-MS $[M+H]^+$ 579.4.
396		8-[(6-Bromo-1,3-benzodioxol-5-yl)thio]-9-(2-{1-[(trifluoromethyl)sulfonyl]piperidin-2-yl}ethyl)-9H-purin-6-amine. LC-MS $[M+H]^+$ 609.1

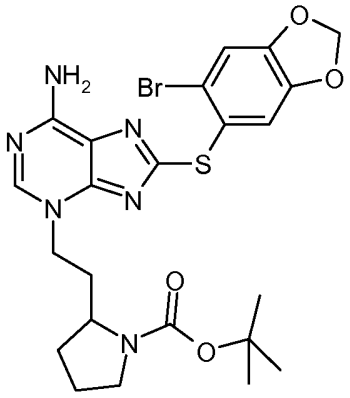
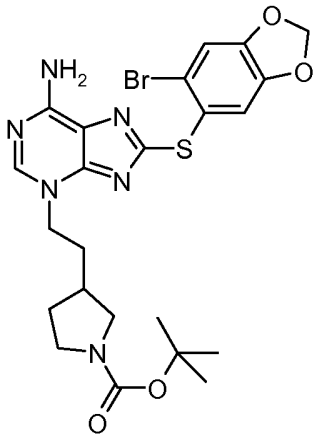
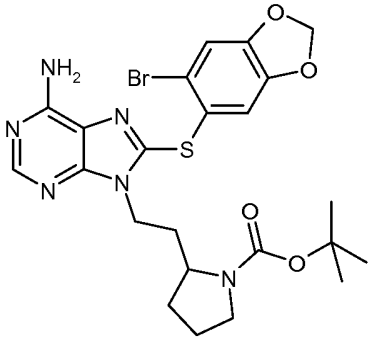
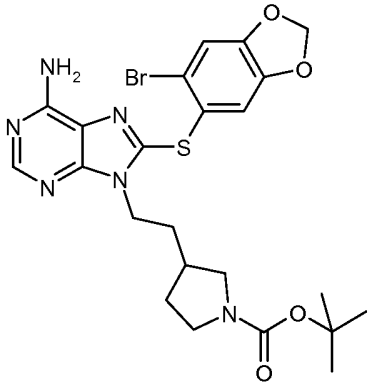
397		8-[(6-Bromo-1,3-benzodioxol-5-yl)thio]-3-(2-{1-[(trifluoromethyl)sulfonyl]piperidin-2-yl}ethyl)-3H-purin-6-amine. LC-MS $[M+H]^+$ 609.1
398		*tert*-Butyl [*cis*-4-(2-{6-amino-8-[(6-bromo-1,3-benzodioxol-5-yl)thio]-9H-purin-9-yl}ethyl)cyclohexyl]carbamate. ^{1}H NMR (Acetone-d_6) δ 8.3 (s, 1H), 7.25 (s, 1H), 6.94 (s, 1H), 6.12 (s, 2H), 4.31 (t, J = 7.2 Hz, 2H), 1.80-1.50 (m, 12H), 1.39 (s, 9H); LC-MS $[M+H]^+$ 591.5
399		*tert*-Butyl [*cis*-4-(2-{6-amino-8-[(6-bromo-1,3-benzodioxol-5-yl)thio]-3H-purin-3-yl}ethyl)cyclohexyl]carbamate. ^{1}H NMR (Acetone-d_6) δ 8.29 (s, 1H), 7.25 (s, 1H), 6.93 (s, 1H), 6.11 (s, 2H), 4.31 (t, J = 7.2 Hz, 2H), 1.76-1.50 (m, 12H), 1.39 (s, 9H); LC-MS $[M+H]^+$ 591.5

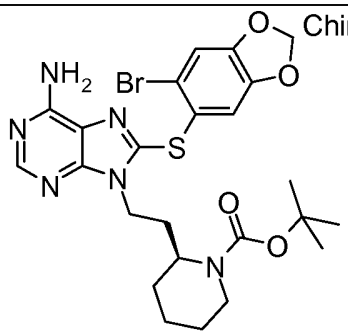
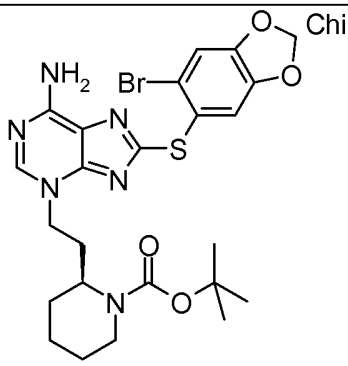
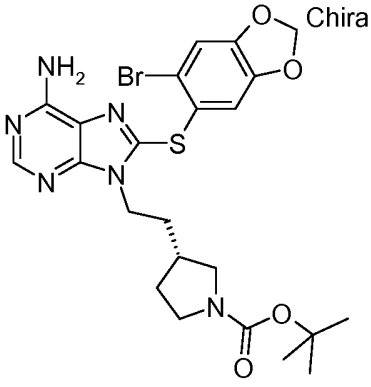
400		9-[2-(1-Acetylpiperidin-3-yl)ethyl]-8-[(6-bromo-1,3-benzodioxol-5-yl)thio]-9H-purin-6-amine. ^{1}H NMR (CD_3OD) δ 8.16 (d, J= 2.8 Hz, 1H), 7.26 (d, J=2.0 Hz, 1H), 7.07 (d, J=6.8 Hz, 1H), 6.08 (s, 2H), 4.38-3.90 (m, 2H), 3.47-3.36 (m, 2H), 3.15-3.11 (m, 3H), 2.70 (s, 3H), 2.09-2.07 (m, 2H), 1.78-1.69 (m, 2H), 1.35 (s, 2H); LC-MS $[M+H]^+$ 519.0
401		3-[2-(1-Acetylpiperidin-3-yl)ethyl]-8-[(6-bromo-1,3-benzodioxol-5-yl)thio]-3H-purin-6-amine. LC-MS $[M+H]^+$ 519.0
402		8-[(6-Bromo-1,3-benzodioxol-5-yl)thio]-9-(2-{1-[(trifluoromethyl)sulfonyl]piperidin-3-yl}ethyl)-9H-purin-6-amine. 1H NMR δ (CD3OD), 8.17 (s, 1H), 7.25 (s, 1H), 7.06 (s, 1H), 6.07 (s, 2H), 4.33-4.29 (m, 2H), 3.83-3.70 (m, 2H), 3.50-3.48 (m, 2H), 3.14-3.12 (m, 2H), 1.99-1.93 (m, 1H), 1.79-1.78 (m, 2H), 1.61-1.59 (m, 2H); LC-MS $[M+H]^+$ 609.1

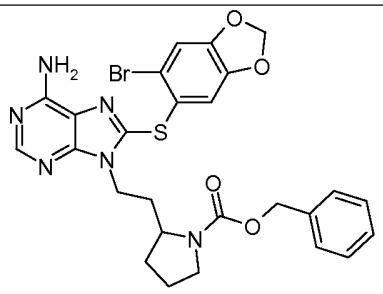
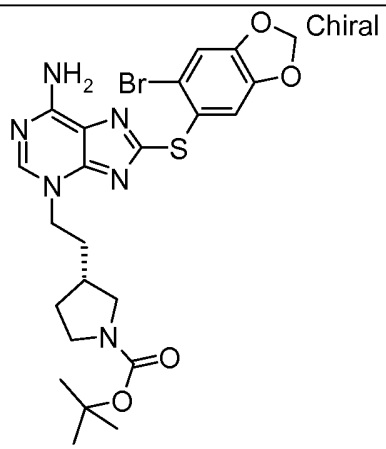
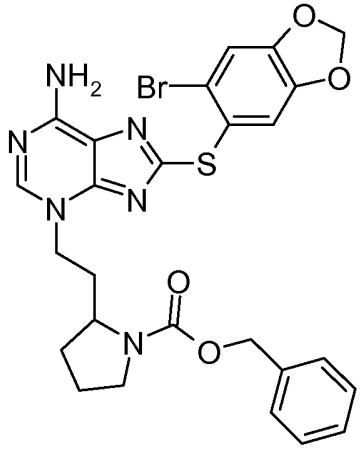
403		8-[(6-Bromo-1, 3-benzodioxol-5-yl)thio]-3-(2-{1-[(trifluoromethyl)sulfonyl]piperidin-3-yl}ethyl)-3H-purin-6-amine. LC-MS $[M+H]^+$ 609.0
404		8-[(6-Bromo1, 3-benzodioxal-5-yl)thio]-3-[2-(6,6-dimethylbicyclo[3.1.1]hept-2-en-3-yl)ethyl]-3H-purin-6-amine. TOF LC-MS $[M+H]^+$ 514.1
405		8-[(2, 5-Dimethoxyphenyl)thio]-9-[2-(6,6-dimethylbicyclo[3.1.1]hept-2-en-3-yl)ethyl]-9H-purin-6-amine. ^1H NMR (DMSO-d_6) δ 8.20 (s, 1H), 7.05 (d, J= 9.2Hz, 1H), 6.80 (dd, J=9.2, 2.8 Hz, 1H), 6.50 (d, J= 2.8Hz, 1H), 5.20 (s, 1H), 4.12-4.10 (m, 2H), 3.77 (s, 3H), 3.60 (s, 3H), 2.32-1.98 (m, 6H), 1.24 (s, 3H), 0.96-0.94 (m, 2H), 0.86 (s, 3H); LC-MS $[M+H]^+$ 452.5

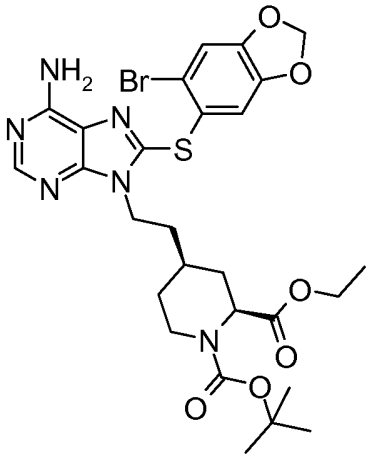
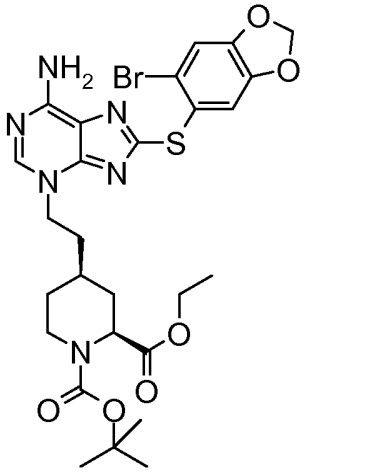
406		4-(2-{6-Amino-8-[(6-bromo-1,3-benzodioxol-5-yl)thio]-9H-purin-9-yl}ethyl)-5-methyl-2,4-dihydro-3H-pyrazol-3-one. ^{1}H NMR (Acetone-d_6) δ 8.35 (s, 1H), 7.36 (s, 1H), 7.29 (s, 1H), 6.18 (s, 2H), 4.52-4.48 (m, 2H), 2.96-2.92 (m, 2H), 2.03 (m, 1H), 1.33 (s, 3H); LC-MS $[M+H]^+$ 490.2
407		4-(2-{6-Amino-8-[(2,5-dimethoxyphenyl)thio]-9H-purin-9-yl}ethyl)-5-methyl-2,4-dihydro-3H-pyrazol-3-one. ^{1}H NMR (DMSO-d_6) δ 8.31 (s, 1H), 7.25 (d, J= 3.2Hz, 1H), 7.19 (d, J= 9.2 Hz, 1H), 7.12 (dd, J= 9.2, 3.2 Hz, 1H), 4.40-4.30 (m, 2H), 3.74 (s, 3H), 3.72 (s, 3H), 2.78-2.70 (m, 2H), 1.87 (s, 3H), 0.95-0.87 (m, 1H); LC-MS $[M+H]^+$ 428.2
408		4-(2-{6-Amino-8-[(2,5-dimethoxyphenyl)thio]-3H-purin-3-yl}ethyl)-5-methyl-2,4-dihydro-3H-pyrazol-3-one.LC-MS $[M+H]^+$ 428.2

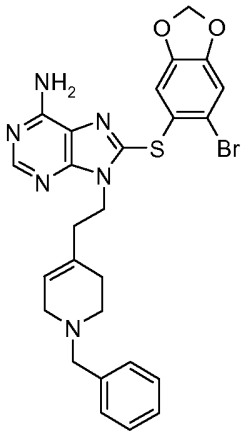
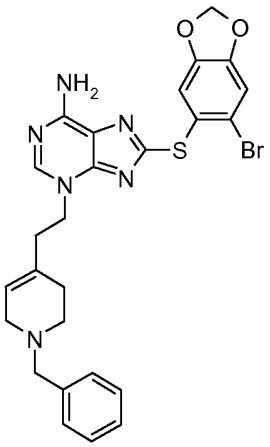
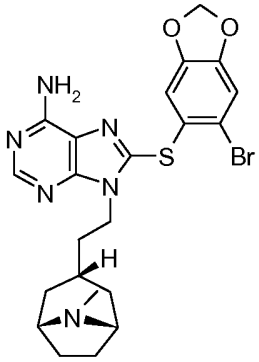
409		Benzyl 4-(2-{6-amino-8-[(6-bromo-1,3-benzodioxol-5-yl)thio]-9H-purin-9-yl}ethyl)piperidine-1-carboxylate. ^{1}H NMR (DMSO-d_6) δ 8.18 (s, 1H), 7.39-7.31 (m, 6H), 6.82 (s, 1H), 6.08 (s, 2H), 5.05 (s, 2H), 4.18 (m, J=7.2 Hz, 2H), 3.97-3.93 (m, 2H), 1.70-1.20 (m, 9H); LC-MS $[M+H]^+$ 611.1
410		Benzyl 4-(2-{6-amino-8-[(6-bromo-1,3-benzodioxol-5-yl)thio]-3H-purin-3-yl}ethyl)piperidine-1-carboxylate. ^{1}H NMR (DMSO-d_6) δ 8.63 (s, 1H), 7.47 (s, 1H), 7.39-7.25 (m, 6H), 6.14 (s, 2H), 5.06 (s, 2H), 4.31 (m, J=7.2 Hz, 2H), 3.97-3.93 (m, 2H), 1.70-1.20 (m, 9H); LC-MS $[M+H]^+$ 611.1
411		8-[(6-Bromo-1,3-benzodioxol-5-yl)thio]-9-(2-morpholin-4-ylethyl)-9H-purin-6-amine. ^{1}H NMR (DMSO-d_6) δ 8.30(s, 1H), 7.39 (s, 1H), 6.90 (s, 1H), 6.10 (s, 2H), 4.58 (t, J = 6.0 Hz, 2H), 3.60-3.50 (m, 4H), 3.40-3.30 (m, 4H), 2.55-2.50 (m, 2H); LC-MS $[M+H]^+$ 479.3.

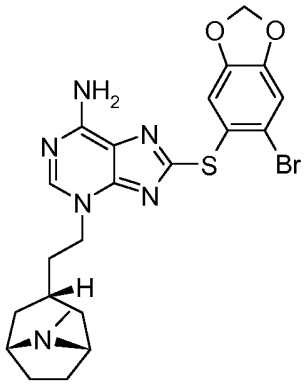
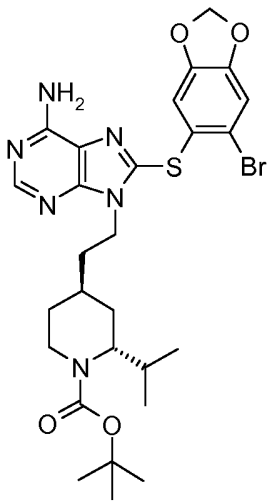
412		*tert*-Butyl 2-(2-{6-amino-8-[(6-bromo-1,3-benzodioxol-5-yl)thio]-3H-purin-3-yl}ethyl)pyrrolidine-1-carboxylate. ^{1}H NMR (DMSO-d_6) δ 8.63 (s, 1H), 7.48 (s, 1H), 7.34 (s, 1H), 6.16 (s, 2H), 4.30-4.20 (m, 2H), 3.30-3.20 (m, 2H), 1.89-1.50 (m, 7H), 1.24 (s, 9H); TOF LC-MS $[M+H]^+$ 563.0
413		*tert*-Butyl 3-(2-{6-amino-8-[(6-bromo-1,3-benzodioxol-5-yl)thio]-3H-purin-3-yl}ethyl)pyrrolidine-1-carboxylate. LC-MS TOF $[M+H]^+$ 563.0
414		*tert*-Butyl 2-(2-{6-amino-8-[(6-bromo-1,3-benzodioxol-5-yl)thio]-9H-purin-9-yl}ethyl)pyrrolidine-1-carboxylate. TOF LC-MS $[M+H]^+$ 563.0
415		*tert*-Butyl 3-(2-{6-amino-8-[(6-bromo-1,3-benzodioxol-5-yl)thio]-9H-purin-9-yl}ethyl)pyrrolidine-1-carboxylate. ^{1}H NMR (DMSO-d_6) δ 8.22 (s, 1H), 7.39 (s, 1H), 6.88 (s, 1H), 6.09 (s, 2H), 4.20-4.10 (m, 2H), 3.30-3.20 (m, 2H), 2.70-1.80

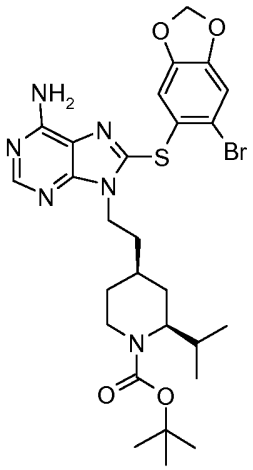
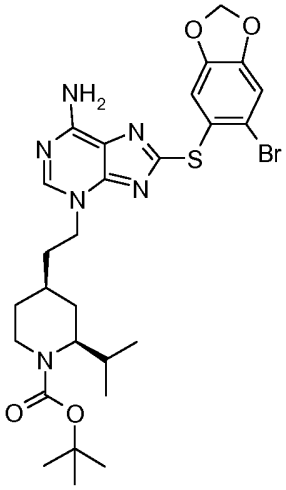
		(m, 7H), 1.37 (s, 9H); TOF LC-MS $[M+H]^+$ 563.0
416		*tert*-Butyl (2*S*)-2-(2-{6-amino-8-[(6-bromo-1,3-benzodioxol-5-yl)thio]-9H-purin-9-yl}ethyl)piperidine-1-carboxylate. ^{1}H NMR (DMSO-d_6) δ 8.21 (s, 1H), 7.38 (s, 1H), 6.73 (s, 1H), 6.08 (s, 2H), 4.20-3.80 (m, 2H), 2.51-2.45 (m, 2H), 1.60-1.20 (m, 9H), 1.30 (s, 9H); LC-MS $[M+H]^+$ 577.1
417		*tert*-Butyl (2*S*)-2-(2-{6-amino-8-[(6-bromo-1,3-benzodioxol-5-yl)thio]-3H-purin-3-yl}ethyl)piperidine-1-carboxylate. ^{1}H NMR (DMSO-d_6) δ 8.49 (s, 1H), 7.41 (s, 1H), 7.29 (s, 1H), 6.11 (s, 2H), 4.25-4.15 (m, 2H), 3.27-3.15 (m, 2H), 1.60-1.20 (m, 9H), 1.32 (s, 9H); LC-MS $[M+H]^+$ 577.1
418		*tert*-Butyl (3*R*)-3-(2-{6-amino-8-[(6-bromo-1,3-benzodioxol-5-yl)thio]-9H-purin-9-yl}ethyl)pyrrolidine-1-carboxylate. ^{1}H NMR (DMSO-d_6) δ 8.24 (s, 1H), 7.37 (s, 1H), 6.89 (s, 1H), 6.08 (s, 2H), 4.20-4.14 (m, 2H), 3.33-3.28 (m, 3H), 2.00-1.70 (m, 6H), 1.35 (s, 9H); LC-MS $[M+H]^+$ 564.8

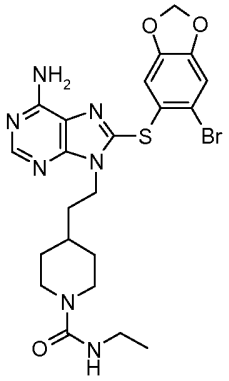
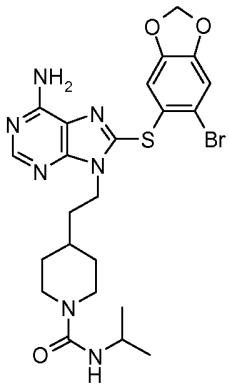
419		Benzyl 2-(2-{6-amino-8-[(6-bromo-1,3-benzodioxol-5-yl)thio]-9H-purin-9-yl}ethyl)pyrrolidine-1-carboxylate. ^{1}H NMR (DMSO-d_6) δ 8.24 (s, 1H), 7.36 (s, 1H), 7.32 (s, 1H), 7.30-7.18 (m, 3H), 6.88-6.82 (m, 2H), 6.07 (s, 2H), 5.00 (s, 2H), 4.20-4.10 (m, 2H), 3.33-3.28 (m, 3H), 2.20-1.70 (m, 6H); LC-MS $[M+Na]^+$ 599.1
420		*tert*-Butyl (3*S*)-3-(2-{6-amino-8-[(6-bromo-1,3-benzodioxol-5-yl)thio]-3H-purin-3-yl}ethyl)pyrrolidine-1-carboxylate. ^{1}H NMR (DMSO-d_6) δ 8.60 (s, 1H), 7.45 (s, 1H), 7.12 (s, 1H), 6.14 (s, 2H), 4.28 (t, J=7.2Hz, 2H), 3.40-3.30 (m, 3H), 2.00-1.80 (m, 6H), 1.36 (s, 9H); LC-MS $[M+H]^+$ 563.1.
421		Benzyl 2-(2-{6-amino-8-[(6-bromo-1,3-benzodioxol-5-yl)thio]-3H-purin-3-yl}ethyl)pyrrolidine-1-carboxylate. ^{1}H NMR (DMSO-d_6) δ 8.67 (s, 1H), 7.47 (s, 1H), 7.32 (s, 1H), 7.40-7.18 (m, 5H), 6.14 (s, 2H), 5.00 (s, 2H), 4.29-4.27 (m, 2H), 3.78-3.28 (m, 3H), 2.20-1.70 (m, 6H); LC-MS $[M+Na]^+$ 599.1

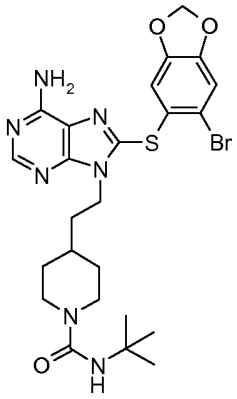
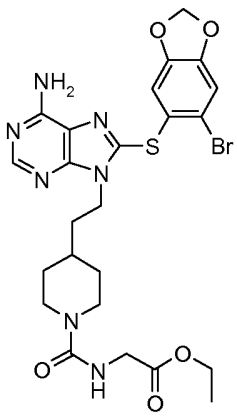
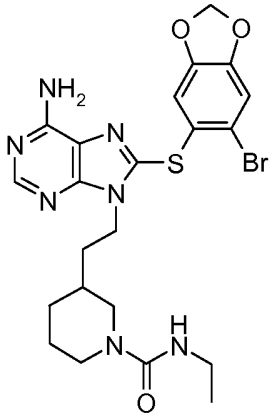
422		1-*tert*-Butyl 2-ethyl *cis*-4-(2-{6-amino-8-[(6-bromo-1,3-benzodioxol-5-yl)thio]-9H-purin-9-yl}ethyl)piperidine-1,2-dicarboxylate. ^{1}H NMR (CD_3OD) δ 8.31 (s, 1H), 7.28 (s, 1H), 7.17 (s, 1H), 6.09 (s, 2H), 4.35-4.32 (m, 3H), 4.17 (t, J=7.2Hz, 2H), 3.68-3.60 (m, 1H), 2.10-2.05 (m, 1H), 1.92-1.80 (m, 4H), 1.75-1.65 (m, 1H), 1.42 (s, 9H), 1.30-1.28 (m, 2H), 1.23 (t, J=7.2Hz, 3H); LC-MS $[M+H]^+$ 649.1
423		1-*tert*-Butyl 2-ethyl *cis*-4-(2-{6-amino-8-[(6-bromo-1,3-benzodioxol-5-yl)thio]-3H-purin-3-yl}ethyl)piperidine-1,2-dicarboxylate. ^{1}H NMR (CD_3OD) δ 8.48 (s, 1H), 7.37 (s, 1H), 7.34 (s, 1H), 6.15 (s, 2H), 4.40-4.35 (m, 3H), 4.18 (q, J=7.2Hz, 2H), 3.68-3.60 (m, 1H), 3.27-3.25 (m, 2H), 2.20-1.70 (m, 6H), 1.44 (s, 9H), 1.26 (t, J=7.2Hz, 3H); LC-MS $[M+H]^+$ 649.1

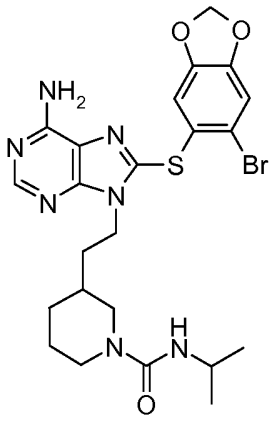
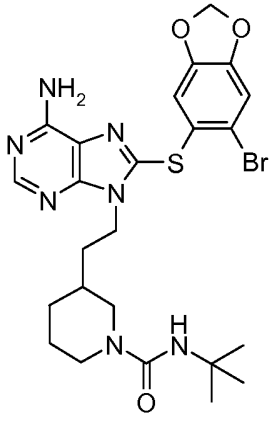
424		9-[2-(1-Benzyl-1,2,3,6-tetrahydropyridin-4-yl)ethyl]-8-[(6-bromo-1,3-benzodioxol-5-yl)thio]-9H-purin-6-amine. ^{1}HNMR (CD_3OD) δ 8.23 (s, 1H), 7.52-7.45 (m, 5H), 7.27 (s, 1H), 7.16 (s, 1H), 6.01 (s, 2H), 5.26 (s, 1H), 4.60-4.30 (m, 4H), 3.67-3.56 (m, 3H), 3.50 (m, 1H), 2.72-2.52 (m, 4H); LC-MS $[M+H]^+$ 565.8
425		3-[2-(1-Benzyl-1,2,3,6-tetrahydropyridin-4-yl)ethyl]-8-[(6-bromo-1,3-benzodioxol-5-yl)thio]-3H-purin-6-amine.^{1}H NMR(CD_3OD) δ 8.49 (s, 1H), 7.51-7.49 (m, 5H), 7.36 (s, 1H), 7.32 (s, 1H), 6.13 (s, 2H), 5.42 (s, 1H), 4.50 (brt, J = 6.4 Hz, 2H), 4.39-4.43 (m, 2H), 3.64-3.56 (m, 3H), 3.21(m, 1H), 2.72 (brt, J = 6.4 Hz, 2H), 2.57-2.52 (m, 2H); LC-MS $[M+H]^+$ 565.3
426		8-[(6-Bromo-1,3-benzodioxol-5-yl)thio]-9-{2-[(3-endo)-8-methyl-8-azabicyclo[3.2.1] oct-3-yl]ethyl}-9H-purin-6-amine.^{1}H NMR (CD_3OD) δ 8.26 (s, 1H), 7.28 (s, 1H), 7.15 (s, 1H), 6.09 (s, 2H), 4.34 (t, J = 7.6 Hz, 2H), 3.88-3.84 (m, 2H), 2.77 (s, 3H), 2.37-2.29 (m, 4H), 2.22-2.29 (m, 4H), 1.97-1.88(m, 3H); LC-MS

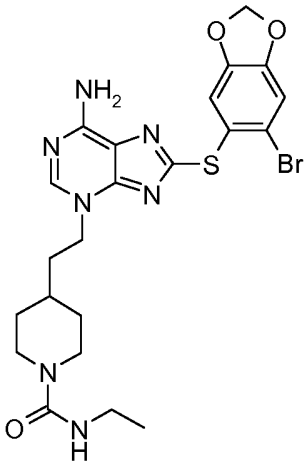
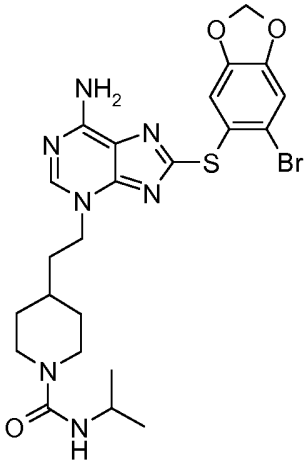
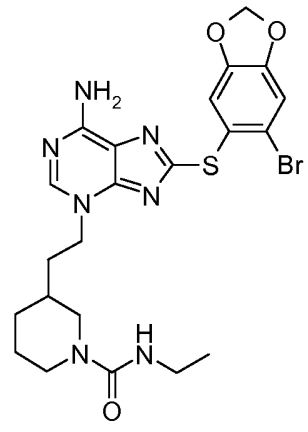
		$[M+H]^+$ 517.1.
427		8-[(6-Bromo-1,3-benzodioxol-5-yl)thio]-3-{2-[(3-endo)-8-methyl-8-azabicyclo[3.2.1] oct-3-yl]ethyl}-3H-purin-6-amine. ^{1}H NMR (CD_3OD) δ 8.52 (s, 1H), 7.39 (s, 1H), 7.36 (s, 1H), 6.16 (s, 2H), 4.40 (m, 2H), 3.89-3.85 (m, 2H), 2.78 (s, 3H), 2.37-2.30 (m, 4H), 2.25 (q, J = 7.6 Hz, 2 H), 2.15-2.13 (m, 2H), 1.94(brd, J =14.8 Hz, 2H), 1.90 (m, 1H); LC-MS $[M+H]^+$ 517.1
428		*tert*-Butyl *trans*-4-(2-{6-amino-8-[(6-bromo-1,3-benzodioxol-5-yl)thio]-9H-purin-9-yl}ethyl)-2-isopropylpiperidine-1-carboxylate. ^{1}H NMR (CD_3OD) δ 8.18 (s, 1H), 7.25 (s, 1H), 7.06 (s, 1H), 6.07 (s, 2H), 4.29 (td, J = 7.6, 2.8 Hz, 2H), 3.75 (dd, J = 13.6, 7.6 Hz, 1H), 3.52 (q, J = 8.8 Hz, 1H), 2.91 (ddd, J = 13.6, 11.2, 6.8 Hz, 1H), 1.96 (m, 1H), 1.89-1.76 (m, 4H), 1.40 (s, 9H), 1.32 (m, 1H), 1.23-1.14 (m, 2H), 0.91 (d, J = 6.8 Hz, 3H), 0.86 (d, J = 6.8 Hz, 3H); LC-MS $[M+H]^+$ 619.1

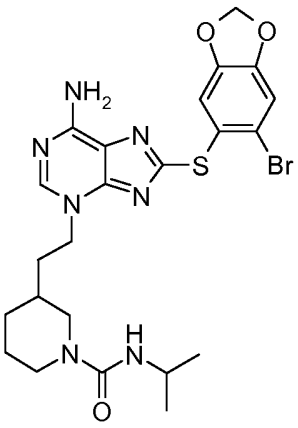
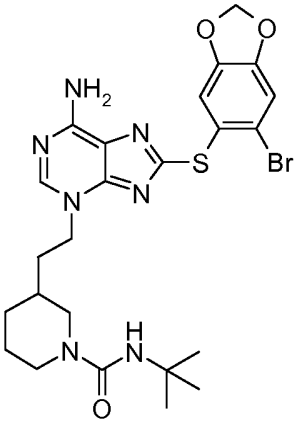
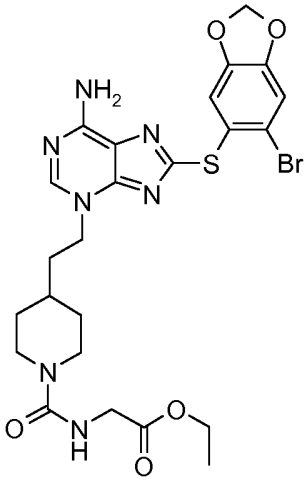
429		*tert*-Butyl *cis*-4-(2-{6-amino-8-[(6-bromo-1,3-benzodioxol-5-yl)thio]-9H-purin-9-yl}ethyl)-2-isopropylpiperidine-1-carboxylate. ^{1}H NMR (CD_3OD) δ 8.17 (s, 1H), 7.25 (s, 1H), 7.06 (s, 1H), 6.07 (s, 2H), 4.33-4.25 (m, 2H), 3.99 (brt, J = 13.6Hz, 1H), 3.76 (m, 1H), 2.75 and 2.67 (two brt, J = 14 and 13.6 Hz, 1H), 1.96-1.89 (m, 2H), 1.79-1.61 (m, 4H), 1.44 (s, 9H), 1.19-1.02 (m, 2H), 0.92-0.88 (m, 3H), 0.81 and 0.78 (two d, J = 6.4 and 6.8 Hz, 3H); LC-MS $[M+H]^+$ 619.1
430		*tert*-Butyl *cis*-4-(2-{6-amino-8-[(6-bromo-1,3-benzodioxol-5-yl)thio]-3H-purin-3-yl}ethyl)-2-isopropylpiperidine-1-carboxylate. ^{1}H NMR (CD_3OD) δ 8.52 (s, 1H), 7.36 (s, 1H), 7.35 (s, 1H), 6.15 (s, 2H), 4.41 (t, J = 7.6 Hz, 2H), 4.05 (brt, J = 12.8Hz, 1H), 3.78 (m, 1H), 2.81 and 2.72 (two brt, J = 12.8 and 12.4 Hz, 1H), 2.03 (m, 1H), 1.93 (brd, J = 12.4 Hz, 1H), 1.83-1.72 (m, 4H), 1.46 (s, 9H), 1.22-1.04 (m, 2H), 0.95-0.92 (m, 3H), 0.84 and 0.81 (two d, J = 6.8 and 6.8 Hz, 3H); LC-MS $[M+H]^+$ 619.1

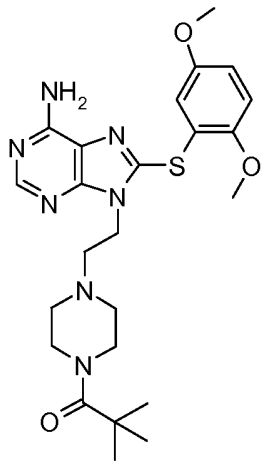
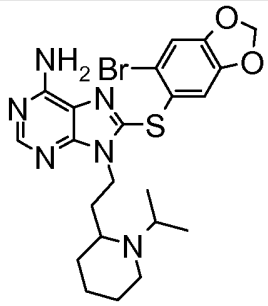
431		4-(2-{6-Amino-8-[(6-bromo-1,3-benzodioxol-5-yl)thio]-9H-purin-9-yl}ethyl)-N-ethylpiperidine-1-carboxamide. ^{1}H NMR (CD_3OD) δ 8.29 (s, 1H), 7.28 (s, 1H), 7.18 (s, 1H), 6.08 (s, 2H), 4.36 (t, J = 7.4 Hz, 2H) 3.97 (br d, J = 13.2 Hz, 2H), 3.16 (q, J = 7.0 Hz, 2H), 2.69 (t, J = 10.5 Hz, 2H), 1.85-1.76 (m, 4H), 1.58-1.46 (m, 1H), 1.22-1.13 (m, 2H), 1.09 (t, 7.03 Hz, 3H); TOF LC-MS $[M+H]^+$ 548.1
432		4-(2-{6-Amino-8-[(6-bromo-1,3-benzodioxol-5-yl)thio]-9H-purin-9-yl}ethyl)-N-isopropylpiperidine-1-carboxamide. ^{1}H NMR (CD_3OD) δ 8.31 (s, 1H), 7.28 (s, 1H), 7.2 (s, 1H), 6.09 (s, 2H), 4.36 (t, J = 7.4 Hz, 2H), 4.01 (br d, J = 13.2 Hz, 2H), 3.87 (q, J = 6.2 Hz, 1H), 2.70 (t, J = 10.9 Hz, 2H), 1.84-1.76 (m, 4H), 1.68-1.46 (m, 1H), 1.20-1.00 (m, 8H); TOF LC-MS $[M+H]^+$ 562.1

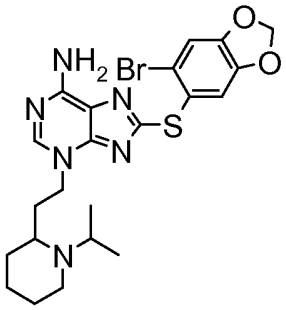
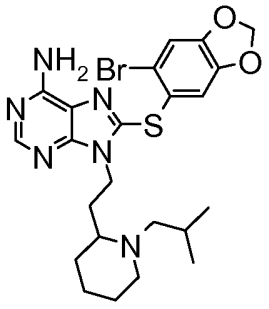
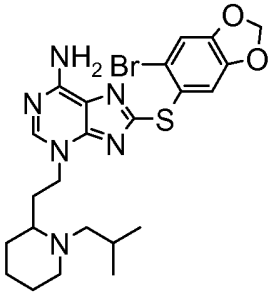
433		4-(2-{6-Amino-8-[(6-bromo-1,3-benzodioxol-5-yl)thio]-9H-purin-9-yl}ethyl)-N-(*tert*-butyl)piperidine-1-carboxamide. ^{1}H NMR (CD_3OD) δ 8.30 (s, 1H), 7.28 (s, 1H), 7.19 (s, 1H), 6.08 (s, 2H), 4.36 (t, J = 7.4 Hz, 2H), 3.95 (broad d, J = 13.6 Hz, 2H), 2.67 (dt, J = 2.3, 12.8 Hz, 2H),1.85-1.75 (m, 4H), 1.59-1.43 (m, 1H), 1.31 (s, 9H), 1.22-1.05 (m, 2H); TOF LC-MS $[M+H]^+$ 576.1
434		Ethyl N-{[4-(2-{6-amino-8-[(6-bromo-1,3-benzodioxol-5-yl)thio]-9H-purin-9-yl}ethyl)piperidin-1-yl]carbonyl}glycinate. ^{1}H NMR (CD_3OD) δ 8.33 (s, 1H), 7.28 (s, 1H), 7.21 (s, 1H), 6.09 (s, 2H), 4.37 (t, J = 7.0 Hz, 2H), 4.16 (q, J = 7.0 Hz, 2H), 4.01 (broad d, J = 13.2 Hz, 2H), 3.83 (s, 2H), 2.78 (t, J = 12.1 Hz, 2H), 1.86-1.79 (m, 4H), 1.61-1.48 (m, 1H), 1.33-1.18 (m, 5H); TOF LC-MS $[M+H]^+$ 606.1
435		3-(2-{6-Amino-8-[(6-bromo-1,3-benzodioxol-5-yl)thio]-9H-purin-9-yl}ethyl)-N-ethylpiperidine-1-carboxamide. ^{1}H NMR (CD_3OD) δ 8.31 (s, 1H),7.27(s, 1H), 7.22 (s, 1H), 6.09 (s, 2H), 4.38 (t, J = 7.4 Hz, 2H), 3.97-3.89 (m, 1H), 3.78 (d, J = 7.0 Hz, 1H), 3.16 (q, J = 7.0 Hz,

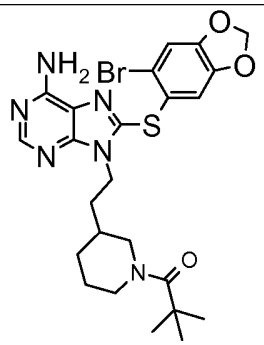
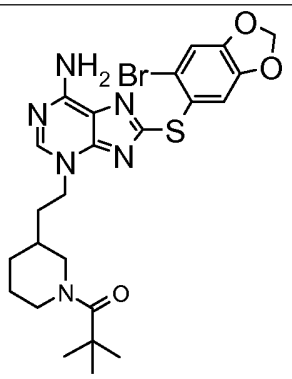
		2H), 2.85 (dt, J = 11.3, 2.7 Hz, 1H), 2.61 (dd, J = 13.2, 10.1 Hz, 1H), 2.05-1.96 (m, 1H), 1.86 (sext, J = 7.4 Hz, 1H), 1.78-1.62 (m, 2H), 1.60-1.20 (m, 3H), 1.08 (t, J = 7.0 Hz, 3H); TOF LC-MS $[M+H]^+$ 548.1
436		3-(2-{6-Amino-8-[(6-bromo-1,3-benzodioxol-5-yl)thio]-9H-purin-9-yl}ethyl)-N-isopropylpiperidine-1-carboxamide. ^{1}H NMR (CD_3OD) δ 8.30 (s, 1H), 7.28 (s, 1H), 7.22 (s, 1H), 6.09 (s, 2H), 4.38 (t, J = 7.4 Hz, 2H), 3.97-3.77 (m, 3H), 2.84 (dd, J = 11.3, 3.1 Hz, 1H), 2.60 (dd, J = 13.2, 10.1 Hz, 1H), 2.04-1.97 (m, 1H), 1.92-1.82 (m, 1H), 1.78-1.63 (m, 3H), 1.59-1.40 (m, 2H), 1.12 (dd, J = 6.6, 2.7 Hz, 6H); TOF LC-MS $[M+H]^+$ 562.1
437		3-(2-{6-Amino-8-[(6-bromo-1,3-benzodioxol-5-yl)thio]-9H-purin-9-yl}ethyl)-N-(tert-butyl)piperidine-1-carboxamide. ^{1}H NMR (CD_3OD) δ 8.30 (s, 1H), 7.28 (s, 1H), 7.22(s, 1H), 6.09 (s, 2H), 4.38 (t, J = 7.0 Hz, 2H), 3.92-3.86 (m, 1H), 3.79-3.72 (m, 1H), 2.81 (dt, J = 14.0, 3.1 Hz, 1H), 2.55 (dd, J = 13.2, 10.1 Hz, 1H), 2.04-1.95 (m, 1H), 1.85 (p, J = 5.8 Hz, 1H), 1.75-1.64 (m, 2H), 1.54-1.40 (m, 2H), 1.31-1.18 (m, 10

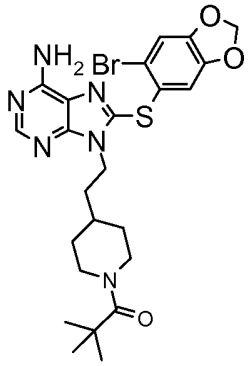
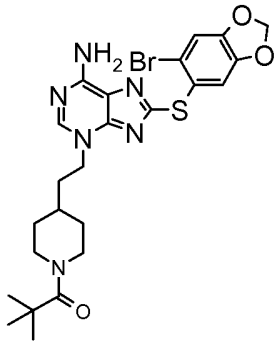
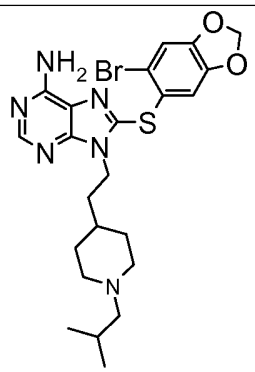
		H); TOF LC-MS $[M+H]^+$ 576.1
438		4-(2-{6-Amino-8-[(6-bromo-1,3-benzodioxol-5-yl)thio]-3H-purin-3-yl}ethyl)-N-ethylpiperidine-1-carboxamide. TOF LC-MS $[M+H]^+$ 548.1
439		4-(2-{6-Amino-8-[(6-bromo-1,3-benzodioxol-5-yl)thio]-3H-purin-3-yl}ethyl)-N-isopropylpiperidine-1-carboxamide. ^1H NMR (CD_3OD) δ 8.52 (s, 1H), 7.37 (s, 1H), 7.35 (s, 1H), 6.15 (s, 2H), 4.42 (t, J = 7.03 Hz, 2H), 4.01 (d, J = 12.8 Hz, 2H), 3.92-3.84 (m, 1H), 2.72 (t, J = 13.2 Hz, 2H), 1.92-1.83 (m, 2H), 1.80-1.70 (m, 2H), 1.68-1.48 (m, 3H), 1.43 (d, J = 6.6 Hz, 3H), 0.97 (d, J = 6.6 Hz, 3H); TOF LC-MS $[M+H]^+$ 562.1
440		3-(2-{6-Amino-8-[(6-bromo-1,3-benzodioxol-5-yl)thio]-3H-purin-3-yl}ethyl)-N-ethylpiperidine-1-carboxamide. TOF LC-MS $[M+H]^+$ 548.1

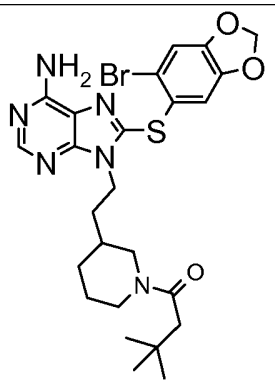
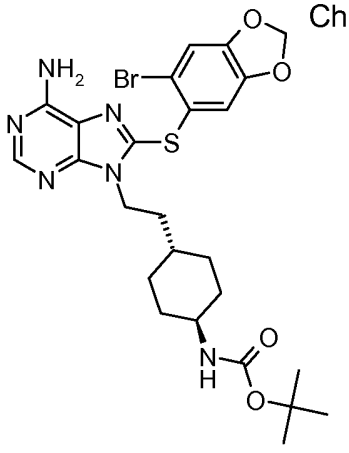
441		3-(2-{6-Amino-8-[(6-bromo-1,3-benzodioxol-5-yl)thio]-3H-purin-3-yl}ethyl)-N-isopropylpiperidine-1-carboxamide.TOF LC-MS $[M+H]^+$ 562.1
442		3-(2-{6-Amino-8-[(6-bromo-1,3-benzodioxol-5-yl)thio]-3H-purin-3-yl}ethyl)-N-(*tert*-butyl)piperidine-1-carboxamide. ^{1}H NMR (CD_3OD) δ 8.53 (s, 1H), 7.37 (s, 1H), 7.36 (s, 1H), 6.14 (s, 2H), 4.43 (t, J = 7.8 Hz, 2H), 3.90-3.85 (m, 1H), 3.79-3.72 (m, 1H), 2.83 (tt, J = 10.9, 3.1 Hz, 1H), 2.54 (dd, J = 13.2, 10.1 Hz, 1H), 1.97-1.78 (m, 3H), 1.71-1.63 (m, 1H), 1.50-1.38 (m, 2H), 1.33-1.16 (m, 10 H); TOF LC-MS $[M+H]^+$ 576.1
443		Ethyl N-{[4-(2-{6-amino-8-[(6-bromo-1,3-benzodioxol-5-yl)thio]-3H-purin-3-yl}ethyl)piperidin-1-yl]carbonyl}glycinate. ^{1}H NMR (CD_3OD) δ 8.54 (s, 1H), 7.36 (s, 1H), 6.15 (s, 2H), 4.42 (t, J = 7.81 Hz, 2H), 4.16 (q, J = 7.0 Hz, 2H), 3.99 (broad d, J = 13.2 Hz, 2H), 3.84 (s, 2H), 2.79 (t, J = 11.3 Hz, 2H), 1.88 (q, J = 7.4 Hz, 2H),

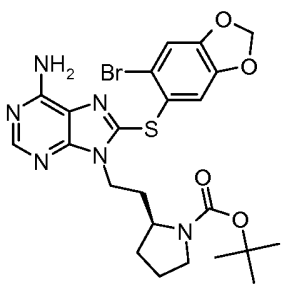
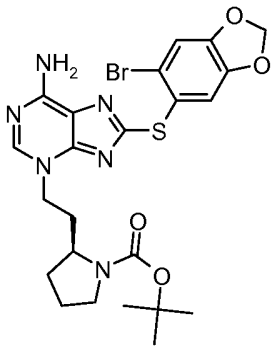
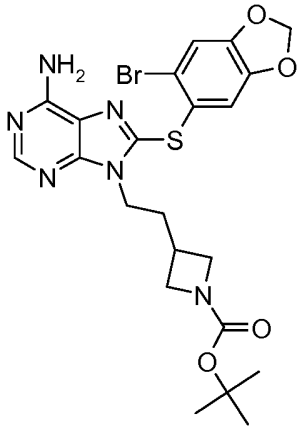
		1.76 (d, J = 12.5 Hz, 2H), 1.62-1.50 (m, 1H), 1.35-1.16 (m, 5H); TOF LC-MS $[M+H]^+$ 606.1
444		8-[(2,5-Dimethoxyphenyl)thio]-9-{2-[4-(2,2-dimethylpropanoyl)piperazin-1-yl]ethyl}-9H-purin-6-amine. ^1H NMR (CD_3OD) δ 8.32 (s, 1H), 7.07 (d, J = 2.8 Hz, 1H), 7.04 (s, 1H), 7.01 (dd, J = 14.4, 2.8 Hz, 1H), 4.70 (t, J = 6.0 Hz, 2H), 3.91-3.80 (m, 4H), 3.75 (s, 6H), 3.42 (t, J = 6.0 Hz, 2H), 3.24-3.180 (m, 4H), 1.29 (s, 9H); TOF LC-MS $[M+H]^+$ 500.3
445		8-[(6-Bromo-1,3-benzodioxol-5-yl)thio]-9-[2-(1-isopropylpiperidin-2-yl)ethyl]-9H-purin-6-amine ^1H NMR (CD_3OD) δ 8.23 (s, 1H), 7.30 (s, 1H), 7.14 (s, 1H), 6.09 (s, 2H), 4.42-4.20 (m, 2H), 4.20-4.00 (m, 1H), 2.97-2.94 (m, 2H), 2.50-2.30 (m, 2H), 2.10-1.90 (m, 4H), 1.75-1.70 (m, 2H), 1.65-1.59 (m, 1H), 1.38 (d, J= 6.8 Hz, 3H). 1.21 (d, J=6.8 Hz, 3H); LC-MS $[M+H]^+$ 519.1

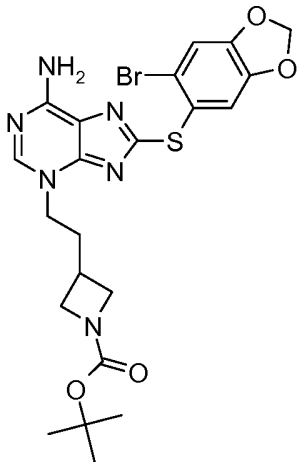
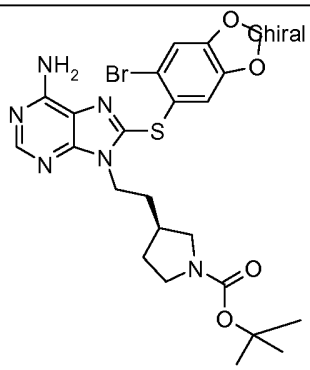
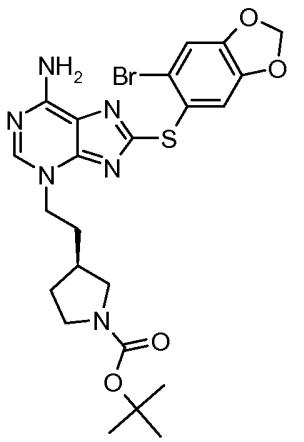
446		8-[(6-Bromo-1,3-benzodioxol-5-yl)thio]-3-[2-(1-isopropylpiperidin-2-yl)ethyl]-3H-purin-6-amine ^{1}H NMR (CD_3OD) δ 8.51 (s, 1H), 7.40 (s, 1H), 7.31 (s, 1H), 6.09 (s, 2H), 4.52-4.45 (m, 2H), 4.10-4.00 (m, 1H), 3.60-3.50 (m, 2H), 2.97-2.92 (m, 2H), 2.24-2.20 (m, 2H), 2.00-1.90 (m, 2H), 1.76-1.71 (m, 2H), 1.62-1.60 (m, 1H), 1.40 (d, J= 6.4 Hz, 3H). 1.24 (d, J=6.8 Hz, 3H); LC-MS $[M+H]^+$ 519.1
447		8-[(6-Bromo-1,3-benzodioxol-5-yl)thio]-9-[2-(1-isobutylpiperidin-2-yl)ethyl]-9H-purin-6-amine ^{1}H NMR (CD_3OD) δ 8.28 (s, 1H), 7.30 (s, 1H), 7.20 (s, 1H), 6.10 (s, 2H), 4.80-4.30 (m, 2H), 3.65-3.62 (m, 1H), 3.12-3.11 (m, 2H), 2.93-2.87 (m, 2H), 2.32-2.10 (m, 2H), 2.10-1.90 (m, 4H), 1.81-1.72 (m, 2H), 1.67-1.61 (m, 1H). 1.07-1.02 (m, 6H); LC-MS $[M+H]^+$ 533.3
448		8-[(6-Bromo-1,3-benzodioxol-5-yl)thio]-3-[2-(1-isobutylpiperidin-2-yl)ethyl]-3H-purin-6-amine ^{1}H NMR (CD_3OD) δ 8.52 (s, 1H), 7.40 (s, 1H), 7.30 (s, 1H), 6.20 (s, 2H), 4.47-4.45 (m, 2H), 3.48-3.43 (m, 1H), 3.30-3.10 (m, 2H), 3.00-2.90 (m, 2H), 2.65 (m, 1H), 2.32-2.30

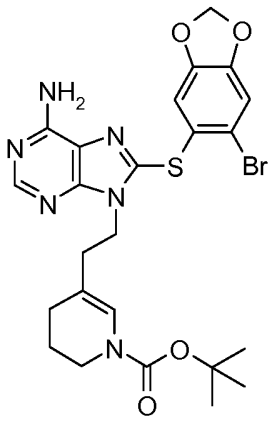
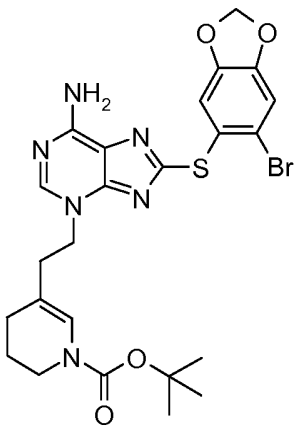
		(m, 2H), 2.20-2.10 (m, 2H), 1.90-1.80 (m, 2H), 1.62-1.60 (m, 2H). 1.11-1.10 (m, 6H); LC-MS $[M+H]^+$ 533.3
449		8-[(6-Bromo-1,3-benzodioxol-5-yl)thio]-9-{2-[1-(2,2-dimethylpropanoyl)piperidin-3-yl]ethyl}-9H-purin-6-amine ^1H NMR (CD_3OD) δ 8.30 (s, 1H), 7.30 (s, 1H), 7.20 (s, 1H), 6.10 (s, 2H), 4.40 (t, J= 7.2 Hz, 2H), 4.20-4.10 (m, 2H), 3.10-3.00 (m, 1H), 2.80-2.70 (m, 2H), 2.10-1.90 (m, 2H), 1.80-1.70 (m, 2H), 1.53-1.50 (m, 2H), 1.24 (m, 9H); LC-MS $[M+H]^+$ 561.1
450		8-[(6-Bromo-1,3-benzodioxol-5-yl)thio]-3-{2-[1-(2,2-dimethylpropanoyl)piperidin-3-yl]ethyl}-3H-purin-6-amine ^1H NMR (CD_3OD) δ 8.53 (s, 1H), 7.38 (s, 1H), 7.36 (s, 1H), 6.20 (s, 2H), 4.50 (t, J= 7.2 Hz, 2H), 4.20-4.10 (m, 2H), 3.14-3.12 (m, 2H), 2.80-2.70 (m, 2H), 2.00-1.93 (m, 1H), 1.93-1.90 (m, 2H), 1.50-1.49 (m, 2H), 1.30 (m, 9H); LC-MS $[MH]^+$ 561.1

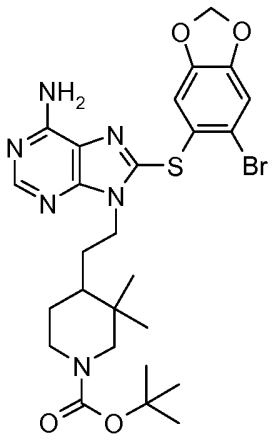
451		8-[(6-Bromo-1,3-benzodioxol-5-yl)thio]-9-{2-[1-(2,2-dimethylpropanoyl)piperidin-4-yl]ethyl}-9H-purin-6-amine ^{1}H NMR (CD_3OD) δ 8.20 (s, 1H), 7.30 (s, 1H), 7.10 (s, 1H), 6.10 (s, 2H), 4.40 (d, J = 14 Hz, 2H), 4.30 (t, J= 7.6 Hz, 2H), 2.80 (s, 2H), 1.90-1.84 (m, 2H), 1.80-1.70 (m, 2H), 1.64-1.60 (m, 1H), 1.30 (s, 9H), 1.20-1.10 (m, 2H); LC-MS $[M+H]^+$ 561.1
452		8-[(6-Bromo-1,3-benzodioxol-5-yl)thio]-3-{2-[1-(2,2-dimethylpropanoyl)piperidin-4-yl]ethyl}-3H-purin-6-amine ^{1}H NMR (CD_3OD) δ 8.52 (s, 1H), 7.40 (s, 1H), 7.30 (s, 1H), 6.10 (s, 2H), 4.44-4.40 (m, 2H), 2.90-2.80 (m, 2H), 1.90-1.88 (m, 2H), 1.80-1.70 (m, 2H), 1.70-1.60 (m, 2H), 1.60-1.50 (m, 1H), 1.30 (s, 9H), 1.20-1.10 (m, 2H); LC-MS $[M+H]^+$ 561.1
453		8-[(6-Bromo-1,3-benzodioxol-5-yl)thio]-9-[2-(1-isobutylpiperidin-4-yl)ethyl]-9H-purin-6-amine ^{1}H NMR (CD_3OD) δ 8.22 (s, 1H), 7.30 (s, 1H), 7.10 (s, 1H), 6.10 (s, 2H), 4.40 (t, J= 7.2 Hz, 2H), 3.60-3.58 (m, 2H), 3.00-2.90 (m, 2H),

		2.15-2.10 (m, 2H), 2.00-1.90 (m, 2H), 1.90-1.80 (m, 2H), 1.60-1.50 (m, 2H), 1.30-1.20 (m, 2H), 1.10-1.00 (m, 6H); LC-MS $[M+H]^+$ 533.1
454		8-[(6-Bromo-1,3-benzodioxol-5-yl)thio]-9-{2-[1-(3,3-dimethylbutanoyl)piperidin-3-yl]ethyl}-9H-purin-6-amine ^{1}H NMR (CD_3OD) δ 8.30 (s, 1H), 7.30 (s, 1H), 7.20 (s, 1H), 6.10 (s, 2H), 4.40-4.36 (m, 2H), 4.30-4.27 (m, 1H), 4.00-3.90 (m, 1H), 2.70-2.60 (m, 1H), 2.40-2.20 (m, 2H), 2.00-1.90 (m, 2H), 1.80-1.70 (m, 2H), 1.50-1.40 (m, 2H), 1.40-1.30 (m, 2H), 1.00-0.90 (m, 9H); LC-MS $[M+H]^+$ 575.1
455	 Chiral	*tert*-Butyl [*trans*-4-(2-{6-amino-8-[(6-bromo-1,3-benzodioxol-5-yl)thio]-9H-purin-9-yl}ethyl)cyclohexyl]carbamate. ^{1}H NMR (CD_3OD) δ 8.26 (s, 1H), 7.28 (s, 1H), 7.15 (s, 1H), 6.08 (s, 2H), 4.31 (t, J = 8.4 Hz, 2H), 3.35-3.25 (m, 2H), 1.91-0.83 (m, 19H). TOF-MS $[M+H]^+$ 591.1

456	Chiral 	*tert*-Butyl (2*S*)-2-(2-{6-amino-8-[(6-bromo-1,3-benzodioxol-5-yl)thio]-3H-purin-3-yl}ethyl)pyrrolidine-1-carboxylate. ^{1}H NMR (CD_3OD) δ 8.24 (s, 1H), 7.27 (s, 1H), 7.11 (s, 1H), 6.08 (s, 2H), 4.36-4.28 (m, 2H), 4.00-3.86 (m, 2H), 3.36-3.25 (m, 3H), 2.00-0.80 (m, 13H). TOF-MS [M+H]$^+$ 563.0
457	Chiral 	*tert*-Butyl (2*S*)-2-(2-{6-amino-8-[(6-bromo-1,3-benzodioxol-5-yl)thio]-9H-purin-9-yl}ethyl)pyrrolidine-1-carboxylate.^{1}H NMR (CD_3OD) δ 8.59 (s, 1H), 7.37 (s, 1H), 7.36 (s, 1H), 6.15 (s, 2H), 4.42-4.38 (m, 2H), 3.86-3.78 (m, 2H), 3.36-3.25 (m, 3H), 1.90-0.80 (m, 13H). TOF-MS [M+H]$^+$ 563.0
458		*tert*-Butyl 3-(2-{6-amino-8-[(6-bromo-1,3-benzodioxol-5-yl)thio]-9H-purin-9-yl}ethyl)azetidine-1-carboxylate. ^{1}H NMR (DMSO-d_6) δ 8.23 (s, 1H), 7.37 (s, 1H), 6.90 (s, 1H), 6.08 (s, 2H), 4.12 (t, J = 6.4 Hz, 2H), 3.80-3.60 (m, 2H), 3.55-3.46 (m, 1H), 2.50-2.45 (m, 2H), 2.00-1.96 (m, 2H), 1.33 (s, 9H); LC-MS [M+H]$^+$ 549.2

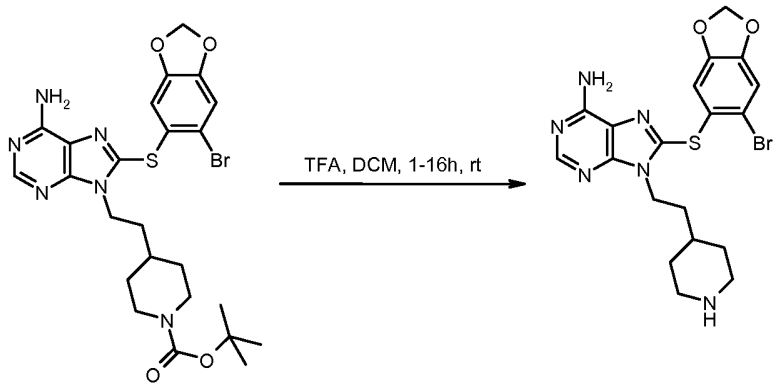
459		*tert*-Butyl 3-(2-{6-amino-8-[(6-bromo-1,3-benzodioxol-5-yl)thio]-3H-purin-3-yl}ethyl)azetidine-1-carboxylate. ^{1}H NMR (DMSO-d_6) δ 8.57 (s, 1H), 7.48 (s, 1H), 7.38 (s, 1H), 6.15 (s, 2H), 4.23 (t, J = 6.8 Hz, 2H), 3.90-3.80 (m, 2H), 3.66-3.60 (m, 1H), 2.50-2.45 (m, 2H), 2.11-2.00 (m, 2H), 1.34 (s, 9H). LC-MS $[M+H]^+$ 549.2
460		*tert*-Butyl (3*S*)-3-(2-{6-amino-8-[(6-bromo-1,3-benzodioxol-5-yl)thio]-9H-purin-9-yl}ethyl)pyrrolidine-1-carboxylate. ^{1}H NMR (DMSO-d_6) δ 8.23 (s, 1H), 7.37 (s, 1H), 6.86 (s, 1H), 6.08 (s, 2H), 4.20-4.10 (m, 2H), 3.20-3.00 (m, 2H), 2.50-2.00 (m, 4H), 2.00-1.70 (m, 3H), 1.35 (s, 9H). LC-MS $[M+H]^+$ 564.2
461		*tert*-Butyl (3*R*)-3-(2-{6-amino-8-[(6-bromo-1,3-benzodioxol-5-yl)thio]-3H-purin-3-yl}ethyl)pyrrolidine-1-carboxylate. ^{1}H NMR (DMSO-d_6) δ 8.62 (s, 1H), 7.47 (s, 1H), 7.35 (s, 1H), 6.15 (s, 2H), 4.35-4.20 (m, 2H), 3.20-3.00 (m, 2H), 2.80-2.70 (m, 2H), 2.00-0.80 (m, 14H). LC-MS $[M+H]^+$ 564.2

462		*tert*-Butyl 5-(2-{6-amino-8-[(6-bromo-1,3-benzodioxol-5-yl)thio]-9H-purin-9-yl}ethyl)-3,4-dihydropyridine-1(2H)-carboxylate.^{1}H NMR (CD_3OD) δ 8.29 (s, 1H), 7.28 (s, 1H), 7.18 (s, 1H), 6.09 (s, 2H), 6.34 and 6.05 (s, 1H), 4.38 (m, 2H), 3.45-3.35 (m, 2H), 2.59-2.51 (m, 2H), 2.20-2.17 (m, 2H), 1.84-1.77 (m, 2H), 1.43 and 1.36 (s, 9H); LC-MS $[M+H]^+$ 575.6.
463		*tert*-Butyl 5-(2-{6-amino-8-[(6-bromo-1,3-benzodioxol-5-yl)thio]-3H-purin-3-yl}ethyl)-3,4-dihydropyridine-1(2H)-carboxylate.^{1}H NMR (CD_3OD) δ 8.46 (s, 1H), 7.39 (s, 1H), 7.37 (s, 1H), 6.30 and 6.06 (s, 1H), 6.16 (s, 2H), 4.47 (t, J = 6.8 Hz, 2H), 3.45-3.36 (m, 2H), 2.62-2.52 (m, 2H), 2.16-2.09 (m, 2H), 1.80 (t, J = 6.8 Hz, 2H), 1.37 (s, 9H); LC-MS $[M+H]^+$ 575.0

464		*tert*-Butyl 4-(2-{6-amino-8-[(6-bromo-1,3-benzodioxol-5-yl)thio]-9H-purin-9-yl}ethyl)-3,3-dimethylpiperidine-1-carboxylate. ^{1}H NMR ($CDCl_3$) δ 8.26 (s, 1H), 7.14 (s, 1H), 6.99 (s, 1H), 6.05 (s, 2H), 4.30-4.19 (m, 3H), 3.61 (m, 1H), 2.63 (m, 1H), 2.40 (m, 1H), 2.07 (m, 1H), 1.78 (m, 1H), 1.45 (s, 9H), 1.40-1.32 (m, 2H), 1.14 (m, 1H), 0.79 (s, 3H), 0.76 (s, 3H),; TOF-MS $[M+H]^+$ 605.15

[00840] Example 465

[00841] Synthesis of 8-[(6-bromo-1,3-benzodioxol-5-yl)thio]-9-(2-piperidin-4-ylethyl)-9H-purin-6-amine

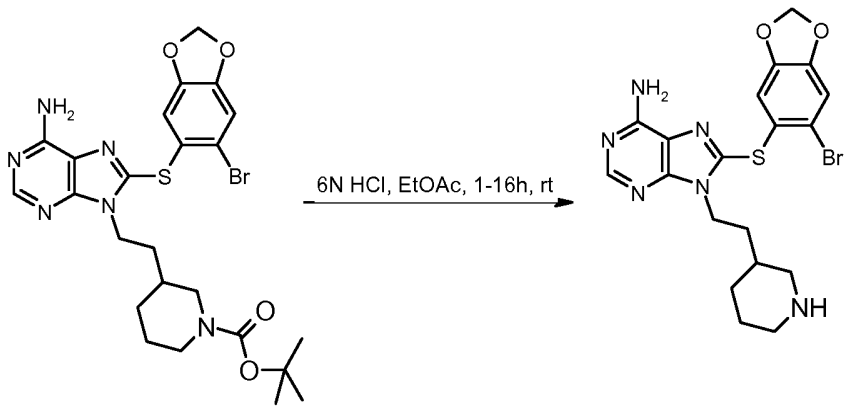


[00842] To a solution of *tert*-Butyl 4-(2-{6-amino-8-[(6-bromo-1,3-benzodioxol-5-yl)thio]-9H-purin-9-yl}ethyl)piperidine-1-carboxylate (0.030 g) in DCM (10 mL) was added trifluoroacetic acid (5 mL) at room temperature and stirring was continued at rt for 1-16 h. The solvent and the excess trifluoroacetic acid was evaporated to dryness. The oily residue was co-evaporated with toluene

(3x 5 mL) to afford title product as a trifluoroacetate salt. ^{1}H NMR (DMSO-d_6) δ 8.21 (s, 1H), 7.40 (s, 1H), 6.85 (s, 1H), 6.10 (s, 2H), 4.19 (t, J= 7.6 Hz, 2H), 3.25-3.20 (m, 2H), 2.80-2.75 (m, 2H), 1.88-1.85 (m, 2H), 1.68-1.62 (m, 2H), 1.50-1.42 (M, 1H), 1.30-1.24 (m, 2H); LC-MS $[M+H]^+$ 477.1

[00843] Example 466

[00844] Synthesis of 8-[(6-Bromo-1,3-benzodioxol-5-yl)thio]-9-(2-piperidin-3-ylethyl)-9H-purin-6-amine.

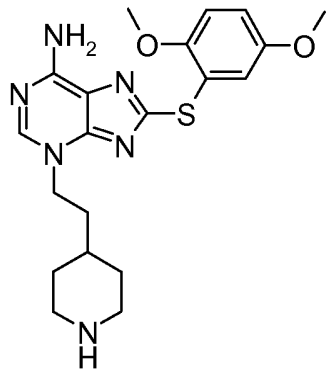
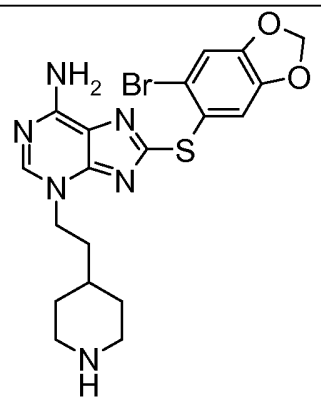


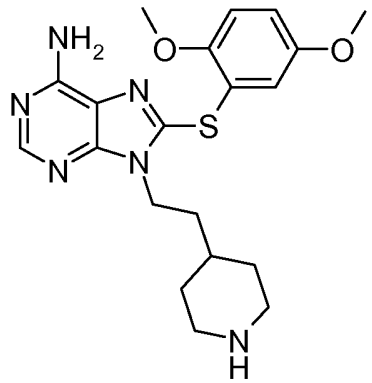
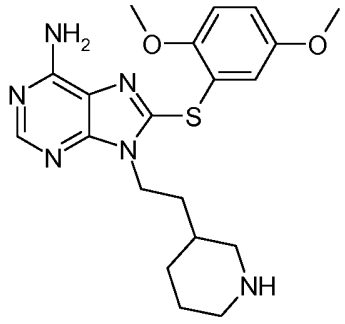
[00845] To a suspension of *tert*-Butyl 3-(2-{6-amino-8-[(6-bromo-1,3-benzodioxol-5-yl)thio]-9H-purin-9-yl}ethyl)piperidine-1-carboxylate (0.03 g) in ethyl acetate (10 mL) was added 6N HCl (5 mL) at room temperature and stirring was continued at rt for 1-16 h. The solvent and the excess hydrochloric acid was evaporated to dryness. The oily residue was co-evaporated with toluene (3x 5 mL) to afford title product as hydrochloride salt. ^{1}H NMR (CD_3OD) δ 8.38 (s, 1H), 7.29 (s, 1H), 7.26 (s, 1H), 6.10 (s, 2H), 4.43-4.41 (m, 2H), 3.49-3.46 (m, 1H), 2.95-2.92 (m, 1H), 2.80-2.65 (m, 2H), 1.92-1.76 (m, 4H), 1.39-1.23 (m, 4H); TOF LC-MS $[M+H]^+$] 477.1

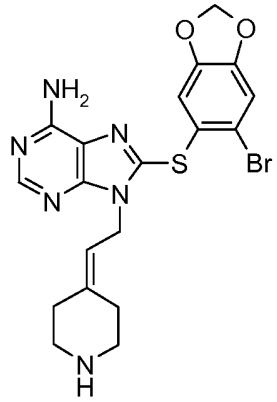
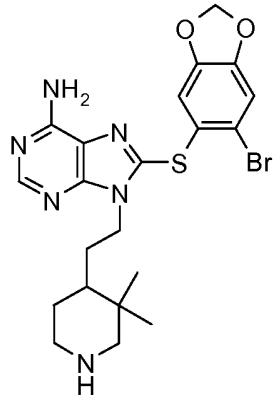
[00846] Examples 467-472 and examples 479 and 480 were synthesized analogously to the procedure described for example 465 using appropriate starting materials from table 7 and isolated as a trifluoroacetate salts and their analytical data summarized in Table 8. Examples 473 - 478 and examples 481-484 were

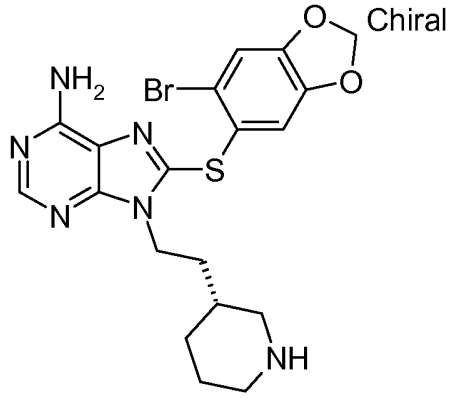
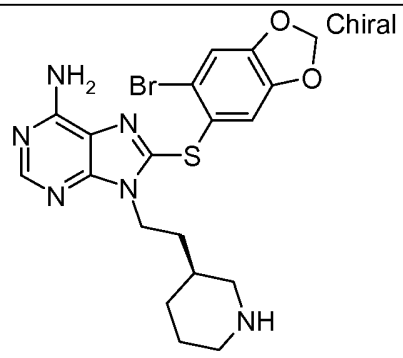
synthesized analogously to the procedure described for example 466 and isolated as HCl salts, and their analytical data summarized in table 8.

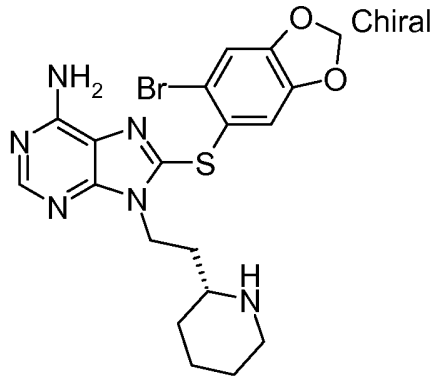
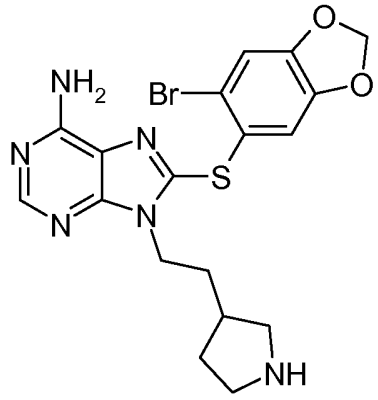
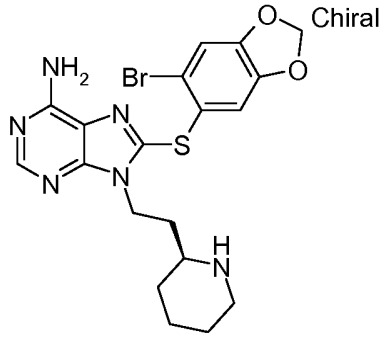
[00847] Table 8

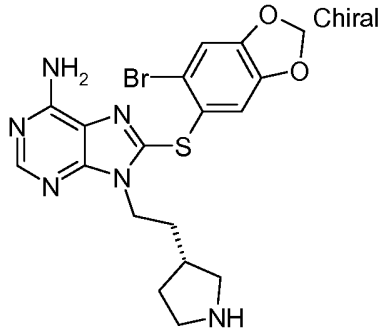
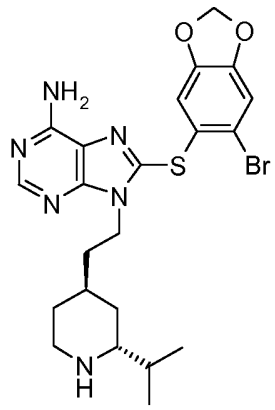
Example No.	Structure	Name and Analytical Data
467		8-[(2,5-Dimethoxyphenyl)thio]-3-(2-piperidin-4-ylethyl)-3H-purin-6-amine. ^{1}H NMR (DMSO-d_6) δ 8.60 (s, 1H), 8.40 (m, 1H), 8.20-8.10 (m, 2H), 4.34-4.32 (m, 2H), 3.76 (s, 3H), 3.71 (s, 3H), 3.60-3.30 (m, 4H), 3.27-3.23 (m, 3H), 1.90-1.80(m, 2H), 1.31-1.25 (m, 2H); LC-MS $[M+H]^+$ 415.1
468		8-[(6-Bromo-1,3-benzodioxol-5-yl)thio]-3-(2-piperidin-4-ylethyl)-3H-purin-6-amine. ^{1}H NMR (DMSO-d_6) δ 8.55 (s, 1H), 7.46 (s, 1H), 7.30 (s, 1H), 6.15 (s, 2H), 4.31 (t, J= 7.2 Hz, 2H), 3.26-3.23 (m, 2H), 2.90-2.80 (m, 2H), 1.88-1.81 (m, 4H), 1.30-1.20

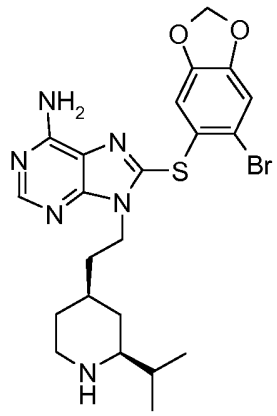
		(m, 3H); LC-MS $[M+H]^+$ 477.1
469		8-[(2,5-Dimethoxyphenyl)thio]-9-(2-piperidin-4-ylethyl)-9H-purin-6-amine. ^{1}H NMR (DMSO-d_6) δ 8.23 (s, 1H), 7.04 (d, J=9.2 Hz, 1H), 6.88 (dd, J = 9.2, 2.8Hz, 1H), 6.48 (d, J = 2.8 Hz, 1H), 4.20 (t, J = 7.2Hz, 2H), 3.77 (s, 3H), 3.62 (s, 3H), 3.23-3.20 (m, 4H), 2.70-2.58 (m, 1H), 1.85-1.78 (m, 2H), 1.65-1.60 (m, 2H), 1.28-1.20 (m, 2H); LC-MS $[M+H]^+$ 415.1
470		8-[(2,5-Dimethoxyphenyl)thio]-9-(2-piperidin-3-ylethyl)-9H-purin-6-amine. ^{1}H NMR (DMSO-d_6) δ 8.21 (s, 1H), 7.05 (d, J=8.8 Hz, 1H), 6.80 (dd, J = 8.8, 2.4Hz, 1H), 6.46 (d, J = 2.4Hz, 1H), 4.22-4.20 (m, 2H), 3.77 (s, 3H), 3.61 (s, 3H), 2.52-2.45 (m, 7H), 1.70-1.30 (m,

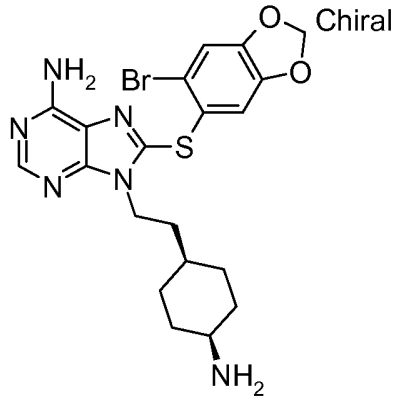
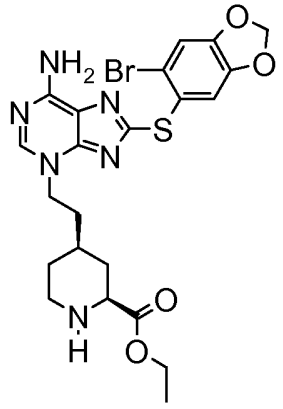
		4H); LC-MS $[M+H]^+$ 415.1
471		8-[(6-Bromo-1,3-benzodioxol-5-yl)thio]-9-(2-piperidin-4-ylideneethyl)-9H-purin-6-amine. ^{1}H NMR (CD_3OD) δ 8.35 (s, 1H), 7.29 (s, 1H), 7.25 (s, 1H), 6.10 (s, 2H), 5.39 (s, 1H), 4.47 (t, J = 7.2 Hz, 2H), 3.52 (brs, 2H), 3.35-3.30 (m, 2H), 2.66 (t, J = 7.2 Hz, 2H), 2.55-2.49 (m, 2H), 1.44 (s, 9H); LC-MS $[M+H]^+$ 475.0
472		8-[(6-Bromo-1,3-benzodioxol-5-yl)thio]-9-[2-(3,3-dimethylpiperidin-4-yl)ethyl]-9H-purin-6-amine ^{1}H NMR ($CDCl_3$) δ 8.29 (s, 1H), 7.29 (s, 1H), 7.17 (s, 1H), 6.09 (s, 2H), 4.38-4.32 (m, 2H), 3.78 (m, 1H), 3.01 (d, J = 12.4 Hz, 1H), 2.91 (brt, J = 13.2 Hz, 1H), 2.74 (d, J = 12.4 Hz, 1H), 2.20

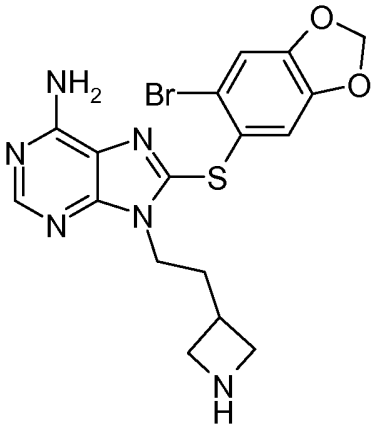
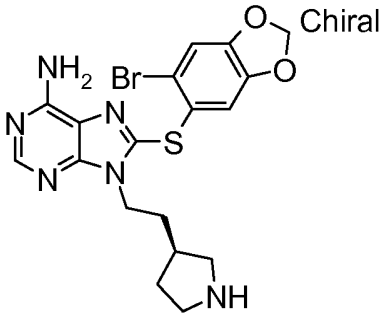
		(m, 2H), 1.63 (m, 1H), 1.54-1.38 (m, 2H), 0.97 (s, 3H), 0.93 (s, 3H); TOF-MS $[M+H]^+$ 505.15
473		8-[(6-Bromo-1,3-benzodioxol-5-yl)thio]-9-{2-[(3*R*)-piperidin-3-yl]ethyl}-9H-purin-6-amine. LC-MS $[M+H]^+$ 477.1
474		8-[(6-Bromo-1,3-benzodioxol-5-yl)thio]-9-{2-[(3*S*)-piperidin-3-yl]ethyl}-9H-purin-6-amine. ^{1}H NMR (Acetone-d_6) δ 8.37 (s, 1H), 7.27 (s, 1H), 7.01 (s, 1H), 6.13 (s, 2H), 4.45-4.40 (m, 2H), 3.70-3.60 (m, 2H), 1.90-1.50 (m, 9H); TOF LC-MS $[M+H]^+$ 477.4

475		8-[(6-Bromo-1,3-benzodioxol-5-yl)thio]-9-{2-[(2*R*)-piperidin-2-yl]ethyl}-9H-purin-6-amine. TOF LC-MS $[M+H]^+$ 477.1
476		8-[(6-Bromo-1,3-benzodioxol-5-yl)thio]-9-(2-pyrrolidin-3-ylethyl)-9H-purin-6-amine.^{1}H NMR (DMSO-d_6) δ 8.33 (s, 1H), 7.42 (s, 1H), 6.97 (s, 1H), 6.12 (s, 2H), 4.22 (t, J = 7.6 Hz, 2H), 3.18-3.14 (m, 2H), 1.56-1.23 (m, 7H).
477		8-[(6-Bromo-1,3-benzodioxol-5-yl)thio]-9-{2-[(2*S*)-piperidin-2-yl]ethyl}-9H-purin-6-amine.^{1}H NMR (CD_3OD) δ 8.40 (s, 1H), 7.29 (s, 1H), 7.27 (s, 1H), 6.10 (s, 2H), 4.55-4.44 (m, 2H), 3.10-2.90 (m, 2H), 2.30-1.50 (m, 8H); LC-MS $[M+H]^+$ 477.1

478		8-[(6-Bromo-1,3-benzodioxol-5-yl)thio]-9-{2-[(3*R*)-pyrrolidin-3-yl]ethyl}-9H-purin-6-amine. ^{1}H NMR (CD_3OD) δ 8.37 (s, 1H), 7.30 (s, 1H), 7.27 (s, 1H), 6.10 (s, 2H), 4.41 (t, J= 6.8Hz, 2H), 3.58-3.48 (m, 2H), 3.33-3.28 (m, 1H), 2.95-2.90 (m, 2H), 2.35-2.30 (m, 2H), 2.13-2.01 (m, 2H), 1.74-1.72 (m, 2H); LC-MS $[M+Na]^+$ 480.0
479		8-[(6-bromo-1,3-benzodioxol-5-yl)thio]-9-{2-[*trans*-2-isopropylpiperidin-4-yl]ethyl}-9H-purin-6-amine. ^{1}H NMR (CD_3OD) δ 8.32 (s, 1H), 7.29 (s, 1H), 7.21 (s, 1H), 6.10 (s, 2H), 4.29 (td, J = 7.6, 3.2 Hz, 2H), 3.41 (ddd, J = 13.2, 4.0, 2.0 Hz, 1H), 2.99 (td, J = 13.2, 3.2 Hz, 1H), 2.90 (ddd, J = 12.0, 5.6, 2.8, 2H), 2.18 (br d, J = 14.0 Hz, 1H), 2.08 (br d, J =

		14.4 Hz, 1H), 1.97-1.83 (m, 3H), 1.63 (m, 1H), 1.41 (qd, J = 13.2, 4.4 1H), 1.16 (q, J = 12.4 Hz, 1H), 1.05 (d, J = 6.8 Hz, 3H), 1.03 (d, J = 6.8 Hz, 3H); LC-MS $[M+H]^+$ 519.3
480		8-[(6-bromo-1,3-benzodioxol-5-yl)thio]-9-{2-[*cis*-2-isopropylpiperidin-4-yl]ethyl}-9H-purin-6-amine. ^1H NMR (CD_3OD) δ 8.29(s, 1H), 7.29 (s, 1H), 7.18 (s, 1H), 6.09 (s, 2H), 4.36 (m, 2H), 3.23-3.19 (m, 2H), 3.10 (m, 1H), 2.02-1.91 (m, 5H), 1.83-1.74 (m, 3H), 1.04 (d, J = 6.8 Hz, 3H), 1.01 (d, J = 6.4 Hz, 3H); LC-MS $[M+H]^+$ 519.3

481		9-[2-(*cis*-4-Aminocyclohexyl)ethyl]-8-[(6-bromo-1,3-benzodioxol-5-yl)thio]-9H-purin-6-amine. ^{1}H NMR (DMSO-d_6) δ 8.17 (s, 1H), 7.37 (s, 1H), 6.83 (s, 1H), 6.08 (s, 2H), 4.15 (t, J = 7.2 Hz, 2H), 3.20-3.10 (m, 2H), 2.50-2.40 (m, 2H), 1.70-1.35 (m, 10H). TOF-MS $[M+H]^+$ 491.0
482		Ethyl *cis*-4-(2-{6-amino-8-[(6-bromo-1,3-benzodioxol-5-yl)thio]-3H-purin-3-yl}ethyl)piperidine-2-carboxylate. ^{1}H NMR (CD_3OD) δ 8.56 (s, 1H), 7.39 (s, 1H), 7.37 (s, 1H), 6.16 (s, 2H), 4.48 (t, J = 6.8 Hz, 2H), 4.33 (q, J = 7.2 Hz, 2H), 4.05-4.00 (m, 1H), 3.55-3.46 (m, 1H), 3.12-3.00 (m, 1H), 2.55-2.44 (m, 1H), 2.14-1.70 (m, 4H), 1.50-1.30 (m, 2H), 1.34 (t, J = 7.2 Hz, 3H). LC-MS $[M+H]^+$ 549.1

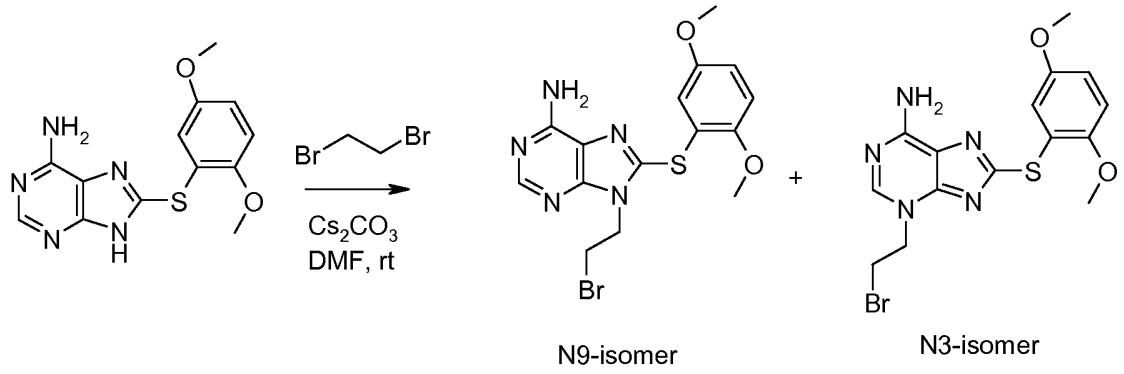
483		9-(2-Azetidin-3-ylethyl)-8-[(6-bromo-1,3-benzodioxol-5-yl)thio]-9H-purin-6-amine. ^{1}H NMR (CD3OD) δ 9.19 (s, 1H), 8.21 (s, 1H), 7.82 (s, 1H), 6.02 (s, 2H), 4.96 (t, J = 7.2 Hz, 2H), 4.70-4.60 (m, 2H), 3.55-3.46 (m, 1H), 3.35-3.25 (m, 2H), 2.92-2.87 (m, 2H). LC-MS $[M+H]^+$ 449.3
484		8-[(6-Bromo-1,3-benzodioxol-5-yl)thio]-9-{2-[(3*S*)-pyrrolidin-3-yl]ethyl}-9H-purin-6-amine. ^{1}H NMR (DMSO-d_6) δ 8.29 (s, 1H), 7.39 (s, 1H), 6.93 (s, 1H), 6.10 (s, 2H), 4.19 (t, J = 8.4 Hz, 2H), 3.60-3.00 (m, 6H), 2.50-2.00 (m, 3H). LC-MS $[M+H]^+$ 464.92

[00848] Examples 485 and 486

[00849] 1-(2-{6-Amino-8-[(2,5-dimethoxyphenyl)thio]-9H-purin-9-yl}ethyl)piperidine-2,6-dione and 8-(2,5-dimethoxy-phenylsulfonyl)-9-vinyl-9H-purin-6-ylamine.

[00850] Title compounds were prepared in two steps reaction sequence as described below:

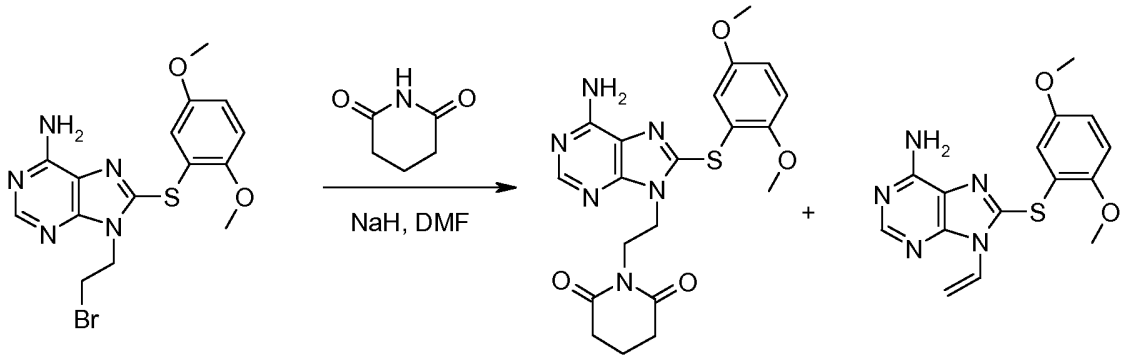
[00851] *Step 1*: Synthesis of 9-(bromo-ethyl)-8-(2, 5-dimethoxy-phenylsulfanyl)-9H-purin-6-ylamine:



N9-isomer N3-isomer

[00852] A mixture of 8-(2,5-dimethoxyphenylthio)-9*H*-purin-6-amine (1.00 g, 3.30 mmol), 1,3-dibromoethane (1.42 mL, 16.48 mmol), and Cs_2CO_3 (1.29 g, 3.96 mmol) in DMF (11 mL) was stirred for 1-2 days at room temperature. The reaction mixture was then diluted with CH_2Cl_2, washed with brine, dried (Na_2SO_4), filtered, and concentrated in vacuo. After standing for 10 h, the mixture was treated with CH_2Cl_2. The resulting solid was filtered, washed with EtOAc, and air-dried to afford the product (274 mg, 20%). The combined filtrates were concentrated and purified by column chromatography (CH_2Cl_2/EtOAc/MeOH = 1/1/0.1 to 1/1/0.5) to give additional product (200 mg, 15%): ^{1}H NMR (DMSO) δ 8.18 (s, 1H), 7.95 (brs, 2H), 7.02 (d, J = 8.8 Hz, 1H), 6.87 (dd, J = 8.8, 3.2 Hz, 1H), 6.57 (d, J = 3.2 Hz, 1H), 4.61 (t, J = 6.0 Hz, 2H), 3.86 (t, J = 6.0 Hz, 2H), 3.76 (s, 3H), 3.62 (s, 3H); TOF LC-MS $[M+H]^+$ 410.0. When the reaction was carried out at high temperature 85-90 °C otherwise identical reaction conditions gave a 1:1 mixture of N9 and N3 isomers.

[00853] *Step 2:* Coupling of Step 1 product with gultaimide



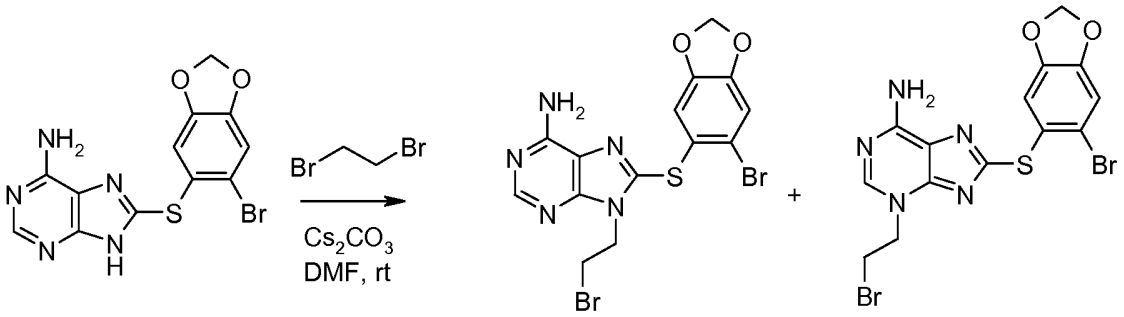
[00854] A solution of glutaimide (10 mg, 0.091 mmol) in DMF (0.5 mL) was treated with NaH (4.3 mg, 0.11 mmol) at room temperature. After stirring for 15 min, a solution of step1 intermediate (N-9) (34 mg, 0.083 mmol) in DMF (1 mL) was added dropwise to the solution of gultaimide anion. The resulting mixture was heated at 60 °C for 10 h, cooled to room temperature and quenched with AcOH (10 μL). The reaction mixture was extracted with EtOAc, washed with brine, dried (Na_2SO_4), filtered, and concentrated in vacuo. The crude material was purified by preparative HPLC to afford the desired compound (8 mg) along with the elimination product 8-(2,5-dimethoxy-phenylsulfonyl)-9-vinyl-9H-purin-6ylamine (10 mg). 1-(2-{6-Amino-8-[(2,5-dimethoxyphenyl)thio]-9H-purin-9-yl}ethyl)piperidine-2,6-dione. ^{1}H NMR (CD_3OD) δ 8.30 (s, 1H), 7.10 (d, J = 2.8 Hz, 1H), 7.06 (d, J = 8.8 Hz, 1H), 7.02 (dd, J = 8.8, 2.8 Hz, 12H), 4.54-4.50 (m, 2H), 4.24-4.22 (m, 2H), 3.78 (s, 3H), 3.75 (s, 3H), 2.57 (t, J = 6.8 Hz, 4H), 1.89 (quintet, J = 6.8 Hz, 2H); TOF-MS $[M+H]^+$ 443.1. 8-(2,5-dimethoxy-phenylsulfonyl)-9-vinyl-9H-purin-6-ylamine. ^{1}H NMR (DMSO-d_6) δ 8.24 (s, 1H), 7.57 (dd, J = 15.6, 8.8 Hz, 1H), 7.03 (d, J = 9.2 Hz, 1H), 6.87 (dd, J = 9.2, 3.2 Hz, 1H), 6.43 (d, J = 3.2 Hz, 1H), 6.39 (d, J = 15.6 Hz, 1H), 5.24 (d, J = 8.8 Hz, 1H), 3.76 (s, 3H), 3.61 (s, 3H).

[00855] Examples 487 and 488

[00856] 8-[(6-Bromo-1,3-benzodioxol-5-yl)thio]-9-[2-(4-isopropylpiperazin-1-yl)ethyl]-9H-purin-6-amine and 8-[(6-Bromo-1,3-benzodioxol-5-yl)thio]-3-[2-(4-isopropylpiperazin-1-yl)ethyl]-3H-purin-6-amine.

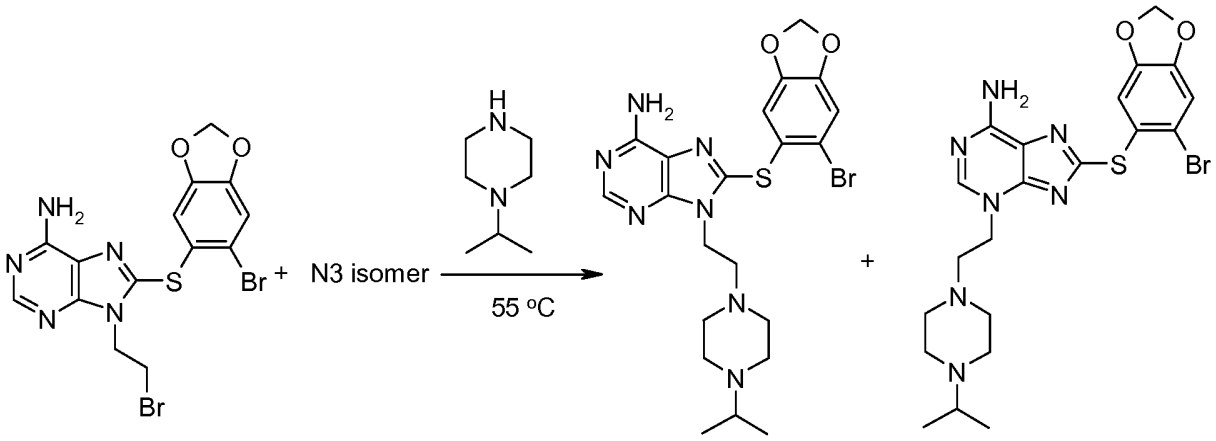
[00857] Title compounds were prepared in two steps reaction sequence as described below:

[00858] *Step 1:* Synthesis 8-(6-bromo-benzo[1,3]dioxol-5-ylsulfonyl)-9-(2-bromo-ethyl)-9H-purin-6-ylamine and 8-(6-bromo-benzo[1,3]dioxol-5-ylsulfonyl)-3-(2-bromo-ethyl)-3H-purin-6-ylamine



[00859] The title compounds 8-(6-bromo-benzo[1,3]dioxol-5-ylsulfonyl)-9-(2-bromo-ethyl)-9H-purin-6-ylamine and 8-(6-bromo-benzo[1,3]dioxol-5-ylsulfonyl)-3-(2-bromo-ethyl)-3H-purin-6-ylamine(112 mg, 43%) were obtained as an inseparable 2:1 mixture of N9 and N3 isomers according to the procedure described for examples 485 and 486 step 1, using 8-(6-bromo-benzo[1,3]dioxol-5-ylsulfonyl)-9H-purin-6-ylamine (200 mg, 0.546 mmol). ^{1}H NMR (DMSO) δ 8.17 (s, 1H), 7.48 (brs, 2H), 7.36 (s, 1H), 6.87 (s, 1H), 6.09 (s, 2H), 4.61 (t, J = 6.0 Hz, 2H), 3.89 (t, J = 6.0 Hz, 2H; TOF LC-MS $[M+H]^+$ 473.9

[00860] *Step 2:* Coupling of Step 1 product with 1-isopropyl piperazine

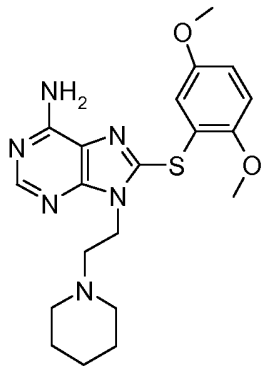
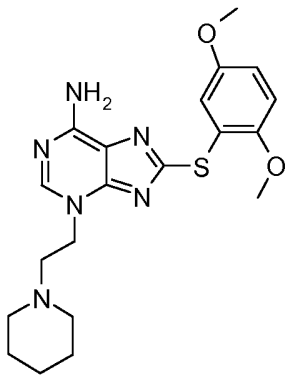
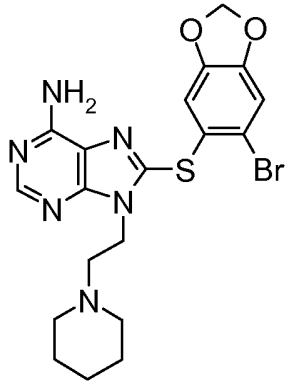


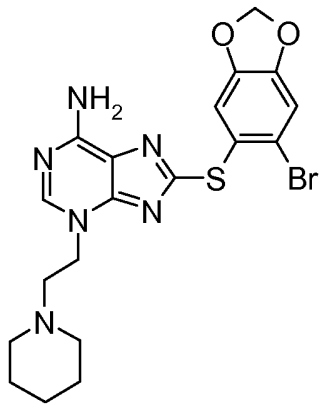
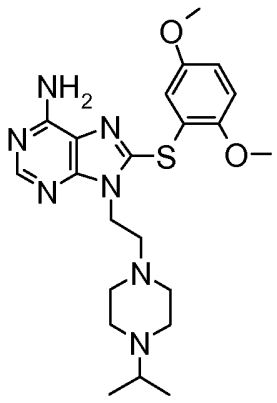
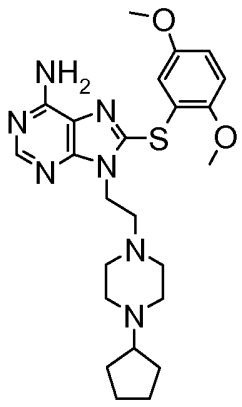
[00861] A mixture above Step 1 product (50 mg, 0.11 mmol) and 1-isopropyl piperazine (378 mg, 2.64 mmol) was heated at 55 °C for 10 h and purified by preparative HPLC to afford the N9-isomer (8 mg) and N3-isomer (17 mg). 8-[(6-Bromo-1,3-benzodioxol-5-yl)thio]-9-[2-(4-isopropylpiperazin-1-yl)ethyl]-9H-purin-6-amine. ^{1}H NMR (CD_3OD) δ 8.32 (s, 1H), 7.27 (s, 1H), 7.22 (s, 1H), 6.09 (s, 2H), 4.48 (t, J = 5.6 Hz, 2H), 3.51-3.40 (m, 3H), 3.24-3.18 (m, 2H), 3.41-2.98 (br t, J = 10.8 Hz, 2H), 2.91 (t, J = 5.6 Hz, 2H), 2.58-2.49 (m, 2H), 1.32 (d, J = 6.4 Hz, 6H); TOF-MS $[M+H]^+$ 520.1. 8-[(6-Bromo-1,3-benzodioxol-5-yl)thio]-3-[2-(4-isopropylpiperazin-1-yl)ethyl]-3H-purin-6-amine.^{1}H NMR (CD_3OD) δ 8.51 (s, 1H), 7.39 (s, 1H), 7.36 (s, 1H), 6.16 (s, 2H), 4.51 (t, J = 5.6 Hz, 2H), 3.48 (septet, J = 6.4 Hz, 1H), 3.45-3.40 (m, 2H), 3.19-3.14 (m, 2H), 3.00 (br d, J = 10.0 Hz, 2H), 2.95 (t, J = 5.6 Hz, 2H), 2.49 (br t, J = 11.2 Hz, 2H), 1.35 (d, J = 6.4 Hz, 6H); TOF LC-MS $[M+H]^+$ 520.1

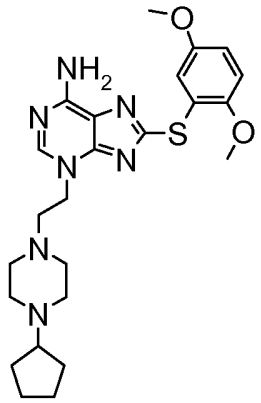
[00862] Examples 489- 495 were synthesized analogously to the procedure described for examples 487 and 488 using appropriate starting materials and were isolated as a trifluoroacetate salts after preparative HPLC purification. Their analytical data is summarized in table 9.

[00863] Table 9

Example No.	Structure	Name and analytical data

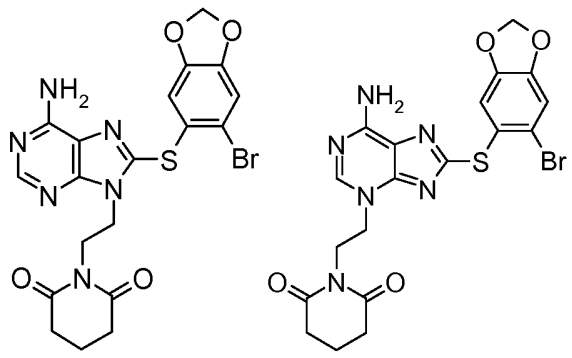
489		8-[(2,5-Dimethoxyphenyl)thio]-9-(2-piperidin-1-ylethyl)-9H-purin-6-amine. ^{1}H NMR (CD_3OD) δ 8.34 (s, 1H), 7.11 (d, J = 2.4 Hz, 1H), 7.05 (d, J = 8.8 Hz, 1H), 7.02 (dd, J = 8.8, 2.4 Hz, 1H), 4.78 (t, J = 6.0 Hz, 2H), 3.85-3.78 (m, 2H), 3.75 (2s, 6H), 3.63 (t, J = 6.0 Hz, 2H), 3.11-2.99 (m, 2H), 2.05-1.72 (m, 5H), 1.55 (m, 1H); TOF LC-MS $[M+H]^+$ 415.2
490		8-[(2,5-Dimethoxyphenyl)thio]-3-(2-piperidin-1-ylethyl)-3H-purin-6-amine.^{1}H NMR (CD_3OD) δ 8.51 (s, 1H), 7.27 (t, J = 1.2 Hz, 1H), 7.17 (d, J = 1.2 Hz, 2H), 4.82 (t, J = 5.6 Hz, 2H), 3.80 (s, 3H), 3.798 (s, 3H), 3.70 (t, J = 5.6 Hz, 2H), 3.15-2.88 (m, 4H), 2.01-1.60 (m, 6H); TOF LC-MS $[M+H]^+$ 415.2
491		8-[(6-Bromo-1,3-benzodioxol-5-yl)thio]-9-(2-piperidin-1-ylethyl)-9H-purin-6-amine ^{1}H NMR (CD_3OD) δ 8.33 (s, 1H), 7.27 (s, 1H), 7.22 (s, 1H), 6.09 (s, 2H), 4.75 (t, J = 6.4 Hz, 2H), 3.88-3.78 (m, 2H), 3.65 (t, J = 6.4 Hz, 2H), 3.12-3.00 (m, 2H), 2.40-1.72 (m, 5H), 1.58 (m, 1H); TOF-MS $[M+H]^+$ 477.1

492		8-[(6-Bromo-1,3-benzodioxol-5-yl)thio]-3-(2-piperidin-1-ylethyl)-3H-purin-6-amine. ^{1}H NMR (CD_3OD) δ 8.47 (s, 1H), 7.35 (s, 1H), 7.30 (s, 1H), 6.13 (s, 2H), 4.81 (t, J = 6.0 Hz, 2H), 3.80-3.65 (m, 2H), 3.68 (t, J = 6.0 Hz, 2H), 3.14-2.94 (m, 2H), 2.10-1.51 (m, 6H); TOF LC-MS $[M+H]^+$ 477.1
493		8-[(2,5-Dimethoxyphenyl)thio]-9-[2-(4-isopropylpiperazin-1-yl)ethyl]-9H-purin-6-amine.^{1}H NMR (CD_3OD) δ 8.29 (s, 1H), 7.04 (dt, J = 10.0 Hz, 2.0 Hz, 1H), 7.00 (s, 1H), 6.99 (dd, J =10.0, 2.4 Hz, 1H), 4.48 (t, J = 5.2 Hz, 2H), 3.75 (s, 3H), 3.73 (s, 3H), 3.55 (s, 1H), 3.48-3.42 (m, 2H), 3.20-3.13 (m, 2H), 2.95 (br t, J = 11.6 Hz, 2H), 2.48 (br t, J = 11.6 Hz, 2 H), 1.31 (d, J = 6.4 Hz, 6H); TOF LC-MS $[M+H]^+$ 458.2
494		9-[2-(4-Cyclopentylpiperazin-1-yl)ethyl]-8-[(2,5-dimethoxyphenyl)thio]-9H-purin-6-amine. ^{1}H NMR (CD_3OD) δ 8.29 (s, 1H), 7.03 (dt, J = 10.0, 1.6 Hz, 1H), 7.01 (s, 1H), 7.00 (dd, J = 10.0, 3.2 Hz, 1H), 4.49 (t, J = 5.2 Hz, 2H), 3.75 (2s, 6H), 3.55-3.50 (m, 2H), 3.47 (m, 1H), 3.19-3.14 (m, 2H), 2.97-2.93 (m,

		2H), 2.88 (t, J = 5.2 Hz, 2H), 2.44 (br t, J =12.8 Hz, 2H), 2.18-2.10 (m, 2H), 1.88-1.78 (m, 2H), 1.72-1.60 (m, 4H); TOF LC-MS $[M+H]^+$ 484.3
495		3-[2-(4-Cyclopentylpiperazin-1-yl)ethyl]-8-[(2,5-dimethoxyphenyl)thio]-3H-purin-6-amine. ^{1}H NMR (CD_3OD) δ 8.52 (s, 1H), 7.22-7.10 (m, 2H), 4.52 (t, J = 5.6 Hz, 2H), 3.80 (2s, 6H), 3.58-3.44 (m, 3H), 3.18-3.10 (m, 2H), 3.10-2.96 (m, 2H), 2.94 (t, J = 5.6 Hz, 2H), 2.57-2.44 (m, 2H), 2.19-2.08 (m, 2H), 1.88-1.78 (m, 2H), 1.72-1.64 (m, 4H); TOF LC-MS $[M+H]^+$ 484.2

[00864] Examples 496 and 497

[00865] Synthesis of 1-(2-{6-Amino-8-[(6-bromo-1,3-benzodioxol-5-yl)thio]-9H-purin-9-yl}ethyl)piperidine-2,6-dione and 1-(2-{6-amino-8-[(6-bromo-1,3-benzodioxol-5-yl)thio]-3H-purin-3-yl}ethyl)piperidine-2,6-dione.



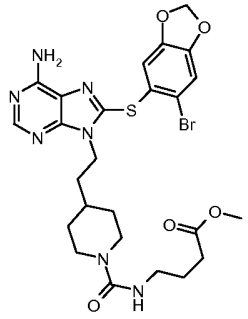
[00866] Title examples were prepared from Step 1 products of example 487 and 488 using glutaimide according to the procedure described for examples 485 and

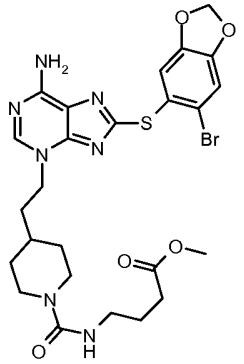
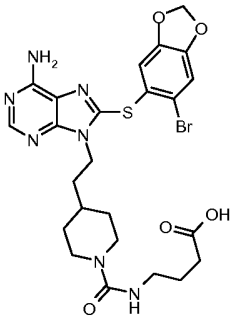
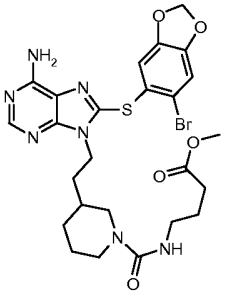
486 1-(2-{6-Amino-8-[(6-bromo-1,3-benzodioxol-5-yl)thio]-9H-purin-9-yl}ethyl)piperidine-2,6-dione ^{1}H NMR (CD_3OD) δ 8.30 (s, 1H), 7.26 (s, 1H), 7.23 (s, 1H), 6.08 (s, 2H), 4.53-4.49 (m, 2H), 4.26-4.23 (m, 2H), 2.55 (t, J = 6.8 Hz, 4H), 1.86 (quintet, J = 6.8 Hz, 2H); TOF LC-MS $[M+H]^+$ 505.0. 1-(2-{6-Amino-8-[(6-bromo-1,3-benzodioxol-5-yl)thio]-3H-purin-3-yl}ethyl)piperidine-2,6-dione. TOF LC-MS $[M+H]^+$ 505.0.

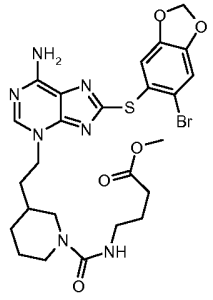
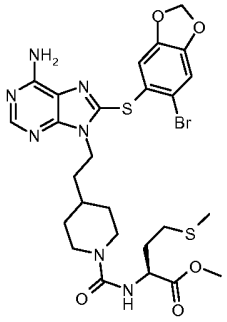
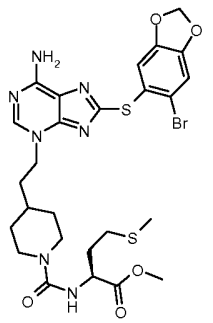
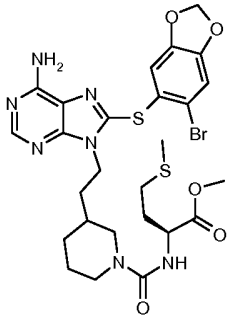
[00867] Along with the desired products corresponding elimination products were also isolated. 8-(6-bromo-benzo[1,3]dioxol-5-ylsulfanyl)-9-vinyl-9H-6-ylamine (**Example 498**) ^{1}H NMR (CD_3OD) δ 8.26 (s, 1H), 7.27 (s, 1H), 7.21 (dd, J = 15.6, 9.6 Hz, 1H), 7.16 (s, 1H), 6.27 (dd, J = 15.6, 1.2 Hz, 1H), 6.09 (s, 2H), 5.47 (dd, J = 9.6, 1.2 Hz, 1H); LC-MS $[M+H]^+$ 392.0. 8-(6-bromo-benzo[1,3]dioxol-5-ylsulfanyl)-3-vinyl-3H-6-ylamine (**Example 499**). ^{1}H NMR (CD_3OD) δ 8.68 (s, 1H), 7.363 (s, 1H), 7.362 (dd, J = 15.6, 9.2 Hz, 1H), 7.35 (s, 1H), 6.27 (dd, J = 15.6, 2.0 Hz, 1H), 6.15 (s, 2H), 5.51 (dd, J = 9.2, 2.0 Hz, 1H); LC-MS $[M+H]^+$ 392.1

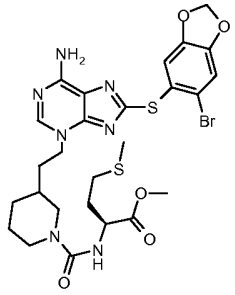
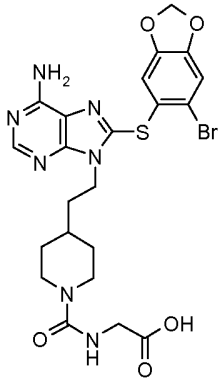
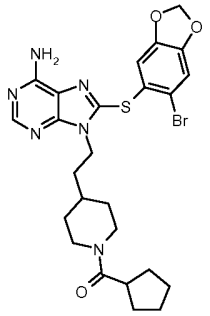
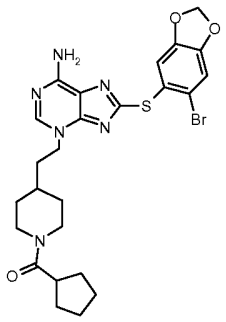
[00868] Examples 500 - 645 were prepared according to the procedure described for examples 337 and 338 and isolated as a trifluoroacetate salts after preparative HPLC purification and summarized in table 10

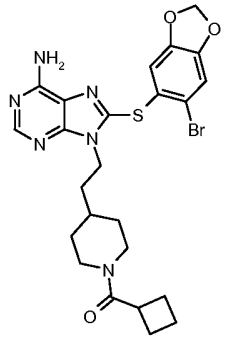
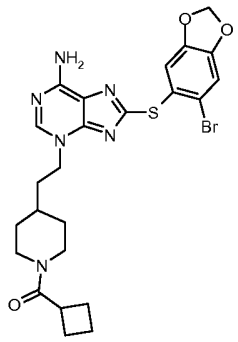
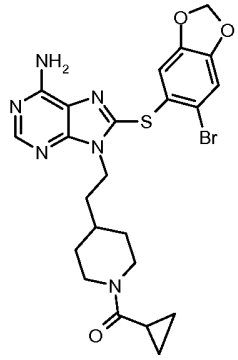
[00869] Table 10

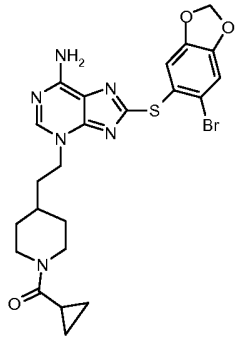
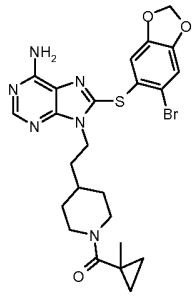
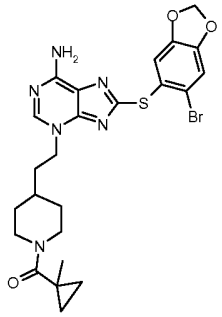
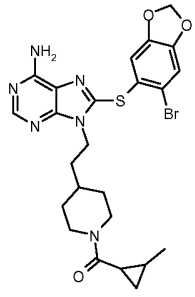
Example	Structure	Name and analytical data
500		Methyl 4-({[4-(2-{6-amino-8-[(6-bromo-1,3-benzodioxol-5-yl)thio]-9H-purin-9-yl}ethyl)piperidin-1-yl]carbonyl}amino)butanoate. ^{1}H NMR (DMSO-d_6) δ 8.26 (s, 1H), 7.40 (s, 1H), 6.88 (s, 1H), 6.45-6.40 (m, 1H), 6.10 (s, 2H), 4.20 (t, J = 7.8 Hz, 2H), 3.87 (d, J = 14.0 Hz, 2H), 3.57 (s, 3H), 2.99 (q, J = 6.2 Hz, 2H), 2.60-2.40 (m, 2H), 2.27 (t, J = 7.4 Hz, 2H), 1.70-1.55 (m, 6H), 1.40 -1.25(m, 1H), 1.05-0.90(m, 2H); TOF-MS

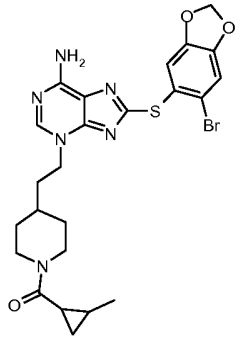
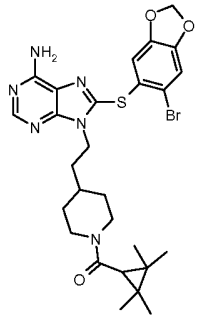
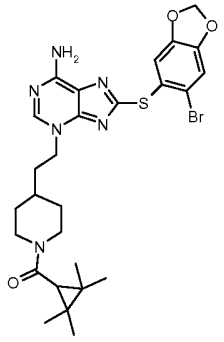
		$[M+H]^+$ 620.12
501		Methyl 4-({[4-(2-{6-amino-8-[(6-bromo-1,3-benzodioxol-5-yl)thio]-3H-purin-3-yl}ethyl)piperidin-1-yl]carbonyl}amino)butanoate. TOF-MS $[M+H]^+$ 620.12
502		4-({[4-(2-{6-Amino-8-[(6-bromo-1,3-benzodioxol-5-yl)thio]-9H-purin-9-yl}ethyl)piperidin-1-yl]carbonyl}amino)butanoic acid. ^{1}H NMR (DMSO-D_6) δ 12.03 (s, 1H), 8.16 (s, 1H), 7.55-7.42 (broad s, 2H), 7.39 (s, 1H), 6.8 (s, 1H), 6.45-6.40 (m, 1H), 6.09 (s, 2H), 4.17 (t, J = 7.8 Hz, 2H), 3.88 (d, J = 13.2 Hz, 2H), 2.99 (q, J = 5.8 Hz, 2H), 2.60-2.40 (m, 2H), 2.18 (t, J = 7.4 Hz, 2H), 1.65-1.55(m, 6H), 1.40-1.20 (m, 1H), 1.00-0.90 (m, 2H); TOF-MS $[M+H]^+$ 606.10
503		Methyl 4-({[3-(2-{6-amino-8-[(6-bromo-1,3-benzodioxol-5-yl)thio]-9H-purin-9-yl}ethyl)piperidin-1-yl]carbonyl}amino)butanoate. ^{1}H NMR (CD_3OD) δ 8.25 (s, 1H), 7.26 (s, 1H), 7.17 (s, 1H), 6.08 (s, 2H), 4.35 (t, J = 7.4 Hz, 2H), 3.95 - 3.75(m, 2H), 3.68 (s, 3H), 3.50-3.10 (m, 2H), 2.90-2.80 (m, 1H), 2.63 (dd, J = 13.6, 10.5 Hz, 1H), 2.37 (t, J = 7.4 Hz, 2H), 2.04-1.92(m, 1H), 1.88-1.66 (m, 5H), 1.56-1.36 (m, 2H), 1.30-1.20 (m, 1H); TOF-MS $[M+H]^+$ 620.12

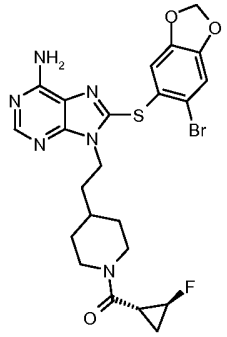
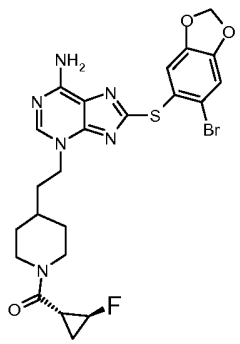
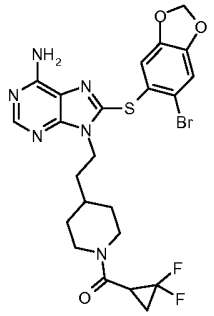
504		Methyl 4-({[3-(2-{6-amino-8-[(6-bromo-1,3-benzodioxol-5-yl)thio]-3H-purin-3-yl}ethyl)piperidin-1-yl]carbonyl}amino)butanoate. TOF-MS $[M+H]^+$ 620.12
505		Methyl N-{[4-(2-{6-amino-8-[(6-bromo-1,3-benzodioxol-5-yl)thio]-9H-purin-9-yl}ethyl)piperidin-1-yl]carbonyl}-*L*-methioninate. ^{1}H NMR (DMSO-D_6) δ 8.30 (s, 1H), 7.38 (s, 1H), 6.90 (s, 1H), 6.65 (d, J = 7.8 Hz, 1H), 6.08 (s,2H), 4.26-4.10 (m, 4H), 3.95-3.85 (m, 3H), 3.57 (s, 3H), 2.60-2.38 (m, 2H), 2.00 (s, 3H), 1.86 (q, J = 7.8 Hz, 2H), 1.66-1.55 (m, 4H), 1.40-1.28 (m, 1H), 1.02-0.88 (m, 2H); TOF-MS $[M+H]^+$ 666.10
506		Methyl N-{[4-(2-{6-amino-8-[(6-bromo-1,3-benzodioxol-5-yl)thio]-3H-purin-3-yl}ethyl)piperidin-1-yl]carbonyl}-*L*-methioninate. LC-MS $[M+H]^+$ 666.1
507		Methyl N-{[3-(2-{6-amino-8-[(6-bromo-1,3-benzodioxol-5-yl)thio]-9H-purin-9-yl}ethyl)piperidin-1-yl]carbonyl}-*L*-methioninate. ^{1}H NMR (DMSO-D_6) δ 8.30 (s, 1H), 7.40 (s, 1H), 6.95 (s, 1H), 6.74-6.65(m, 1H), 6.11 (s, 2H), 4.30-4.10 (m, 3H), 3.88-3.70 (m, 2H), 3.59 (s, 3H), 2.80-2.60 (m, 1H), 2.62-2.40 (m, 1H), 2.30-2.20 (m, 1H), 2.02 (s, 3H),

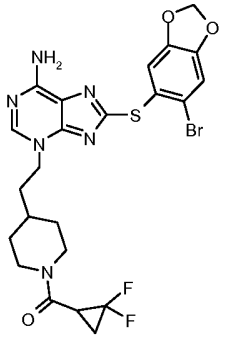
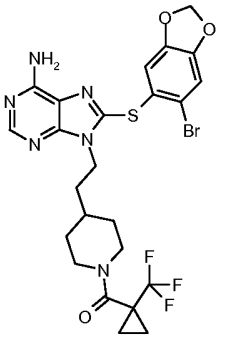
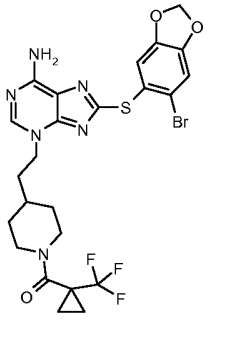
		95-1.80 (m, 3H), 1.73-1.50 (m, 3H), 1.40-1.05 (m, 4H); TOF-MS $[M+H]^+$ 666.12
508		Methyl N-{[3-(2-{6-amino-8-[(6-bromo-1,3-benzodioxol-5-yl)thio]-3H-purin-3-yl}ethyl)piperidin-1-yl]carbonyl}-*L*-methioninate.LC-MS $[M+H]^+$ 666.1
509		N-{[4-(2-{6-Amino-8-[(6-bromo-1,3-benzodioxol-5-yl)thio]-9H-purin-9-yl}ethyl)piperidin-1-yl]carbonyl}glycine. LC-MS $[M+H]^+$ 578.0
510		8-[(6-Bromo-1,3-benzodioxol-5-yl)thio]-9-{2-[1-(cyclopentylcarbonyl)piperidin-4-yl]ethyl}-9H-purin-6-amine. ^{1}H NMR (DMSO-D_6) δ 8.16 (s, 1H), 7.49 (s, 1H), 7.05 (s, 1H), 6.06 (s, 2H), 4.5 (d, J = 13.2 Hz, 1H), 4.29 (t, J = 7.2 Hz, 2H), 4.07 (d, J = 14.0 Hz, 1H), 3.07-2.98 (m, 2H), 2.57 (dd, J = 12.89, 3.1 Hz, 1H), 1.92-1.50 (m, 9H), 1.38 -1.25(m, 4H), 1.22-1.00 (m, 2H); TOF-MS $[M+H]^+$ 573.11
511		8-[(6-Bromo-1,3-benzodioxol-5-yl)thio]-3-{2-[1-(cyclopentylcarbonyl)piperidin-4-yl]ethyl}-3H-purin-6-amine. LC-MS $[M+H]^+$ 573.2

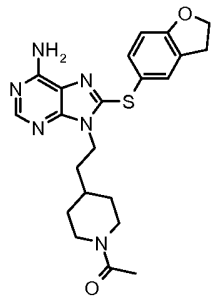
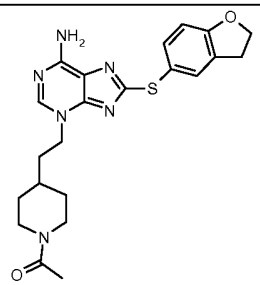
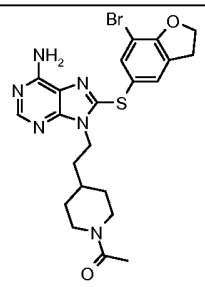
512		8-[(6-Bromo-1,3-benzodioxol-5-yl)thio]-9-{2-[1-(cyclobutylcarbonyl)piperidin-4-yl]ethyl}-9H-purin-6-amine. ^{1}H NMR ($CDCl_3$) δ 8.19 (s, 1H), 7.16 (s, 1H), 7.09 (s, 1H), 6.08 (s, 2H), 4.62 (d, J = 13.6 Hz, 1H), 4.29 (t, J = 8.2 Hz, 2H), 3.72 (d, J = 14.8 Hz, 1H), 3.60-3.40 (m, 1H), 2.9 (t, J = 12.5 Hz, 1H), 2.52 (t, J = 12.5 Hz, 1H), 2.40-2.28 (m, 2H), 2.18-2.14 (m, 2H), 1.9-2.0 (m, 1H), 1.9-1.75 (m, 5H), 1.6-1.5 (m, 1H), 1.1-1.28 (m, 2H); TOF-MS $[M+H]^+$ 559.11
513		8-[(6-Bromo-1,3-benzodioxol-5-yl)thio]-3-{2-[1-(cyclobutylcarbonyl)piperidin-4-yl]ethyl}-3H-purin-6-amine. TOF-MS $[M+H]^+$ 559.11
514		8-[(6-Bromo-1,3-benzodioxol-5-yl)thio]-9-{2-[1-(cyclopropylcarbonyl)piperidin-4-yl]ethyl}-9H-purin-6-amine. ^{1}H NMR ($CDCl_3$) δ 8.32 (s, 1H), 7.09 (s, 1H), 6.84 (s, 1H), 6.00 (s, 2H), 6.00-5.85 (broad s, 2H), 4.58 (d, J = 13.6 Hz, 1H), 4.27 (t, J = 7.4 Hz, 2H), 4.21 (d, J = 13.6 Hz, 1H), 3.03 (t, J = 12.1 Hz, 1H), 2.53 (t, J = 10.5 Hz, 1H), 1.93 -1.70(m, 5H), 1.60-1.48 (m, 1H), 1.30-1.10 (m, 2H), 0.99 -0.96(m, 2H), 0.73 (dd, J = 8.2, 2.7 Hz, 2H); TOF-MS $[M+H]^+$ 545.09

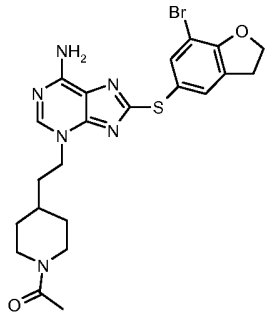
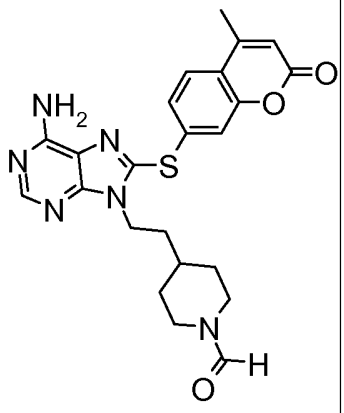
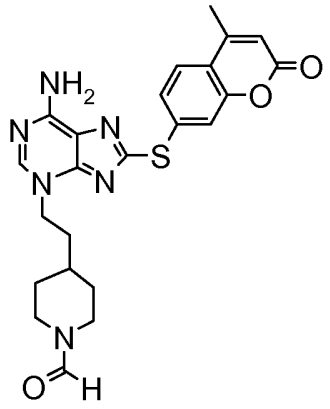
515		8-[(6-Bromo-1,3-benzodioxol-5-yl)thio]-3-{2-[1-(cyclopropylcarbonyl)piperidin-4-yl]ethyl}-3H-purin-6-amine. TOF-MS $[M+H]^+$ 545.09
516		8-[(6-Bromo-1,3-benzodioxol-5-yl)thio]-9-(2-{1-[(1-methylcyclopropyl)carbonyl]piperidin-4-yl}ethyl)-9H-purin-6-amine. ^{1}H NMR (CD_3OD) δ 8.32 (s, 1H), 7.28 (s, 1H), 7.21 (s, 1H), 6.09 (s, 2H), 4.45-4.34 (m, 4H), 3.00-2.50 (broad hump, 2H), 1.95 -1.85(m, 4H), 1.68-1.56 (m, 1H), 1.28 (s, 3H), 1.26 -1.10(m, 2H), 0.90-0.84 (m, 2H), 0.64 -0.60(m, 2H); TOF-MS $[M+H]^+$ 559.01
517		8-[(6-Bromo-1,3-benzodioxol-5-yl)thio]-3-(2-{1-[(1-methylcyclopropyl)carbonyl]piperidin-4-yl}ethyl)-3H-purin-6-amine. LC-MS $[M+H]^+$ 559.01
518		8-[(6-Bromo-1,3-benzodioxol-5-yl)thio]-9-(2-{1-[(2-methylcyclopropyl)carbonyl]piperidin-4-yl}ethyl)-9H-purin-6-amine. ^{1}H NMR (CD_3OD) δ 8.26 (s, 1H), 7.27 (s, 1H), 7.16 (s, 1H), 6.08 (s, 2H), 4.5-4.4 (m, 1H), 4.35 (t, J = 7.0 Hz, 2H), 4.33-4.25 (m, 1H), 3.15-3.03 (m, 1H), 2.65-2.55 (m, 1H), 2.00-1.75 (m, 4H), 1.70-1.58

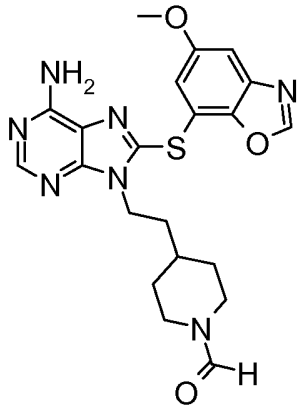
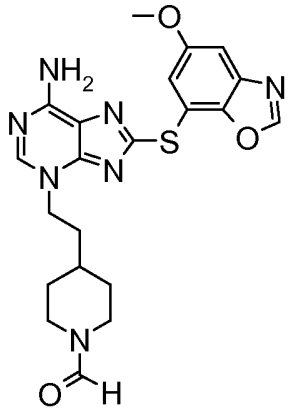
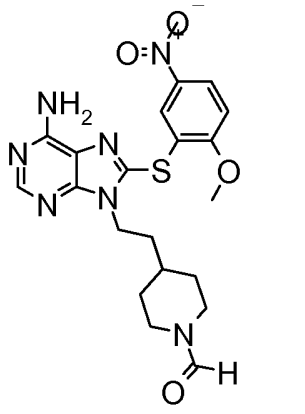
		(m, 2H), 1.30-1.19 (m, 2H), 1.18-1.02 (m, 5H), 0.66-0.58 (m, 1H); TOF-MS $[M+H]^+$ 559.10
519		8-[(6-Bromo-1,3-benzodioxol-5-yl)thio]-3-(2-{1-[(2-methylcyclopropyl)carbonyl]piperidin-4-yl}ethyl)-3H-purin-6-amine. LC-MS $[M+H]^+$ 559.1
520		8-[(6-Bromo-1,3-benzodioxol-5-yl)thio]-9-(2-{1-[(2,2,3,3-tetramethylcyclopropyl)carbonyl]piperidin-4-yl}ethyl)-9H-purin-6-amine. ^{1}H NMR (CD_3OD) δ 8.19 (s, 1H), 7.25 (s, 1H), 7.08 (s, 1H), 6.07 (s, 2H), 4.45 (d, J = 13.6 Hz, 1H), 4.31 (t, J = 7.8 Hz, 2H), 4.04 (d, J = 13.6 Hz, 1H), 3.03 (t, J = 12.1 Hz, 1H), 2.56 (t, J = 12.8 Hz, 1H), 1.96-1.70 (m, 5H), 1.68-1.50 (m, 1H), 1.25-1.00 (m, 14H); TOF-MS $[M+H]^+$ 601.14
521		8-[(6-Bromo-1,3-benzodioxol-5-yl)thio]-3-(2-{1-[(2,2,3,3-tetramethylcyclopropyl)carbonyl]piperidin-4-yl}ethyl)-3H-purin-6-amine. LC-MS $[M+H]^+$ 601.1

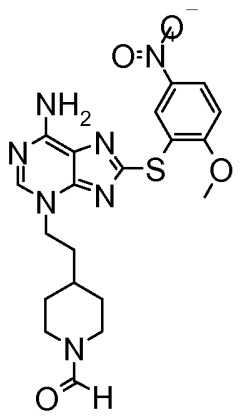
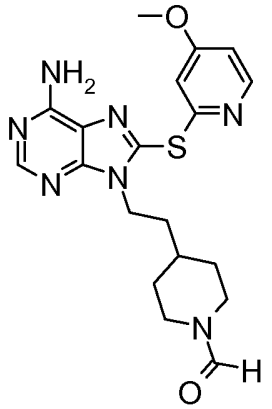
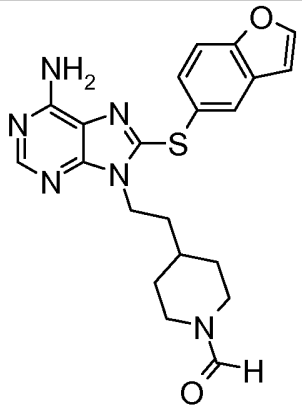
522		8-[(6-Bromo-1,3-benzodioxol-5-yl)thio]-9-[2-(1-{[(2*S*)-2-fluorocyclopropyl]carbonyl}piperidin-4-yl)ethyl]-9H-purin-6-amine. ^{1}H NMR (CD_3OD) δ 8.25 (s, 1H), 7.9 (s, 2H), 7.27 (s, 1H), 7.15 (s, 1H), 6.08 (s, 2H), 4.44 (d, J = 12.5 Hz, 1H), 4.35 (t, J = 8.2 Hz, 2H), 4.28 (d, J = 12.15 Hz, 1H), 3.20-3.05 (m, 1H), 2.65-2.40(m, 2H), 2.00-1.75(m, 4H), 1.70-1.55 (m, 1H), 1.50-1.20 (m, 5H); TOF-MS $[M+H]^+$ 563.07
523		8-[(6-Bromo-1,3-benzodioxol-5-yl)thio]-3-[2-(1-{[(2*S*)-2-fluorocyclopropyl]carbonyl}piperidin-4-yl)ethyl]-3H-purin-6-amine. LC-MS $[M+H]^+$ 563.1
524		8-[(6-Bromo-1,3-benzodioxol-5-yl)thio]-9-(2-{1-[(2,2-difluorocyclopropyl)carbonyl]piperidin-4-yl}ethyl)-9H-purin-6-amine. ^{1}H NMR ($CDCl_3$) δ 8.28 (s, 1H), 7.1 (s, 1H), 6.90 (s, 1H), 6.00(s, 2H), 4.57 (dd, J = 25.7, 13.2 Hz, 1H), 4.27 (t, J = 7.4 Hz, 2H), 4.03 (d, J = 13.2 Hz, 1H), 3.08 (t, J = 12.5 Hz, 1H), 2.70-2.47 (m, 2H), 2.18-2.08 (m, 1H), 2.00-1.48 (m, 6H), 1.30-1.10 (m, 2H); TOF-MS $[M+H]^+$ 581.08

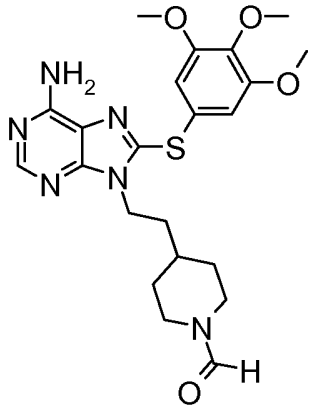
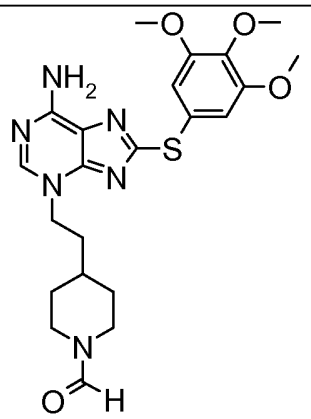
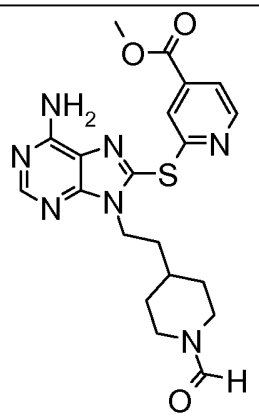
525		8-[(6-Bromo-1,3-benzodioxol-5-yl)thio]-3-(2-{1-[(2,2-difluorocyclopropyl)carbonyl]piperidin-4-yl}ethyl)-3H-purin-6-amine. ^{1}H NMR ($CDCl_3$) δ 10.59 (s, 1H), 8.06 (s, 1H), 7.21 (s, 1H), 7.17 (s, 1H), 6.09 (s, 2H), 4.56 (dd, J = 33.5, 15.2 Hz, 1H), 4.40-4.30(m, 2H), 4.04 (d, J = 14.4 Hz, 1H), 3.16-3.05 (m, 1H), 2.74-2.48 (m, 3H), 2.20-2.08 (m, 1H), 1.98-1.48 (m, 4H), 1.30-1.10 (m, 3H); TOF-MS $[M+H]^+$ 581.08
526		8-[(6-Bromo-1,3-benzodioxol-5-yl)thio]-9-[2-(1-{[1-(trifluoromethyl)cyclopropyl]carbonyl}piperidin-4-yl)ethyl]-9H-purin-6-amine. ^{1}H NMR ($CDCl_3$) δ 8.3 (s, 1H), 7.08 (s, 1H), 6.86 (s, 1H), 5.99 (s, 2H), 4.65-4.27 (m, 4H), 2.50-3.10 (2 broad peaks, 2H), 1.86 (d, J = 13.6 Hz, 2H), 1.74 (q, J = 7.0 Hz, 2H), 1.57-1.48 (m, 1H), 1.20-1.35 (m, 4H), 1.20-1.10 (m, 2H); TOF-MS $[M+H]^+$ 613.07
527		8-[(6-Bromo-1,3-benzodioxol-5-yl)thio]-3-[2-(1-{[1-(trifluoromethyl)cyclopropyl]carbonyl}piperidin-4-yl)ethyl]-3H-purin-6-amine. ^{1}H NMR ($CDCl_3$) δ 8.06 (s, 1H), 7.21 (s, 1H), 7.17 (s, 1H), 6.10 (s, 2H), 4.70-4.20 (m, 4H), 2.5-3.1 (2 broad peaks, 2H), 1.9 (q, J = 7.0 Hz, 1H), 1.82 (d, J = 11.3 Hz, 1H), 1.48-1.58 (m, 1H), 1.12-1.38 (m, 6H); TOF-MS $[M+H]^+$ 613.07

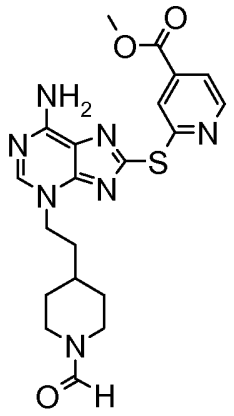
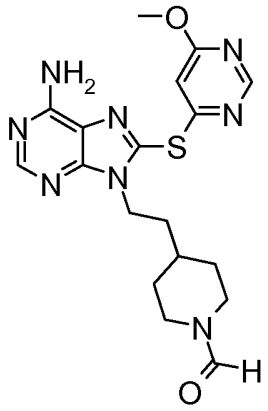
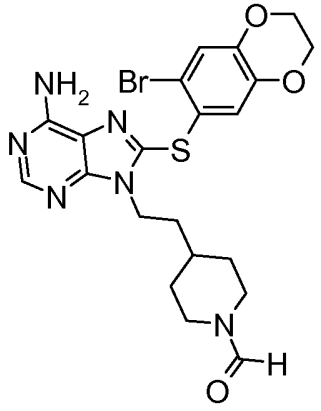
528		9-[2-(1-Acetylpiperidin-4-yl)ethyl]-8-(2,3-dihydro-1-benzofuran-5-ylthio)-9H-purin-6-amine. ^{1}H NMR (CD_3OD) δ 8.28 (d, J = 3.1 Hz, 1H), 7.49 (s, 1H), 7.40 (dd, J = 3.1, 8.2 Hz, 1H), 6.84 (d, J = 8.2 Hz, 1H), 4.62 (t, J = 8.9 Hz, 2H), 4.50 (d, J = 13.2 Hz, 1H), 4.34 (t, J = 7.0 Hz, 2H), 3.91 (d, J = 13.6 Hz, 1H), 3.25 (t, J = 8.9 Hz, 2H), 3.07 (t, J = 12.5 Hz, 1H), 2.59 (t, J = 10.5 Hz, 1H), 2.08 (s, 3H), 1.93-1.70 (m, 4H), 1.68-1.50 (m, 1H), 1.30-1.08 (m, 2H); TOF-MS $[M+H]^+$ 439.19
529		3-[2-(1-Acetylpiperidin-4-yl)ethyl]-8-(2,3-dihydro-1-benzofuran-5-ylthio)-3H-purin-6-amine. LC-MS $[M+H]^+$ 439.2
530		9-[2-(1-Acetylpiperidin-4-yl)ethyl]-8-[(7-bromo-2,3-dihydro-1-benzofuran-5-yl)thio]-9H-purin-6-amine. ^{1}H NMR ($CDCl_3$) δ 8.23 (s, 1H), 7.54 (s, 1H), 7.31 (s, 1H), 4.72-4.60 (m, 3H), 4.25 (t, J = 7.8 Hz, 2H), 3.82 (d, J = 13.6 Hz, 1H), 3.33 (t, J = 8.5 Hz, 2H), 3.02 (t, J = 12.5 Hz, 1H), 2.52 (t, J = 12.8 Hz, 1H), 2.09 (s, 3H), 1.86 (t, J = 15.2 Hz, 2H), 1.76 (q, J = 7.4 Hz, 2H), 1.60-1.48 (m, 1H), 1.30-1.15 (m, 2H); TOF-MS $[M+H]^+$ 517.09

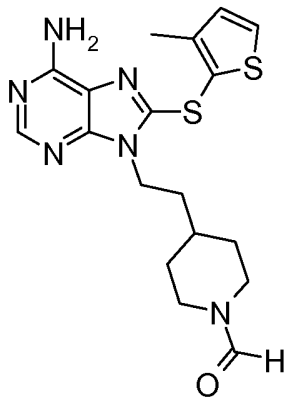
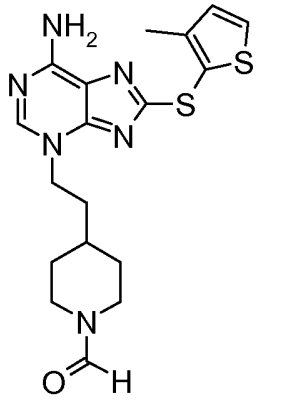
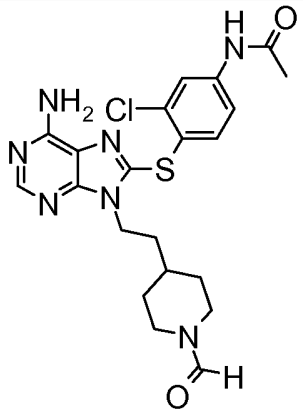
531		3-[2-(1-Acetylpiperidin-4-yl)ethyl]-8-[(7-bromo-2,3-dihydro-1-benzofuran-5-yl)thio]-3H-purin-6-amine. LC-MS $[M+H]^+$ 517.2
532		4-(2-{6-Amino-8-[(4-methyl-2-oxo-2H-chromen-7-yl)thio]-9H-purin-9-yl}ethyl)piperidine-1-carbaldehyde. ^{1}H NMR (DMSO-d_6) δ 8.33 (s, 1H), 7.92 (s, 1H), 7.76 (d, J = 8.0 Hz, 1H), 7.37 (s, 1H), 7.28 (d, J = 8.0 Hz, 1H), 6.42 (s, 1H), 4.24 (t, J = 7.6 Hz, 2H), 4.10-4.00 (m, 1H), 3.60-3.56 (m, 1H), 2.91-2.84 (m, 1H), 2.53-2.45 (m, 2H), 2.40 (s, 3H), 1.75-1.60 (m, 3H), 1.50-1.40 (m, 1H), 1.00-0.85 (m, 2H). TOF-MS $[M+H]^+$ 465.1
533		4-(2-{6-Amino-8-[(4-methyl-2-oxo-2H-chromen-7-yl)thio]-3H-purin-3-yl}ethyl)piperidine-1-carbaldehyde. ^{1}H NMR (DMSO-d_6) δ 8.59 (s, 1H), 7.93 (s, 1H), 7.78 (d, J = 8.4 Hz, 1H), 7.64 (s, 1H), 7.50 (d, J = 8.4 Hz, 1H), 6.43 (s, 1H), 4.34 (t, J = 8.0 Hz, 2H), 4.10-4.00 (m, 1H), 3.65-3.56 (m, 1H), 2.96-2.84 (m, 1H), 2.53-2.45 (m, 2H), 2.43 (s, 3H), 1.86-1.71 (m, 3H), 1.55-1.45 (m, 1H), 1.10-0.85 (m, 2H). TOF-MS $[M+H]^+$ 465.1

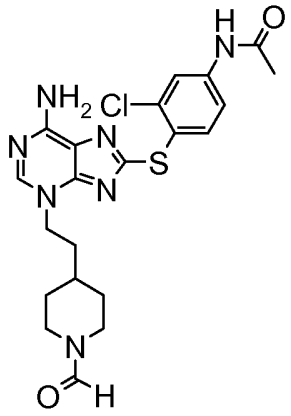
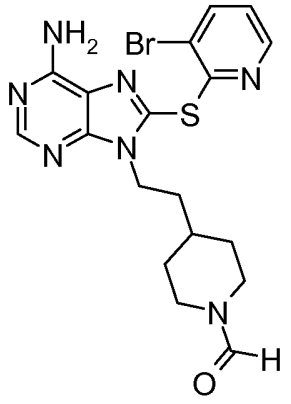
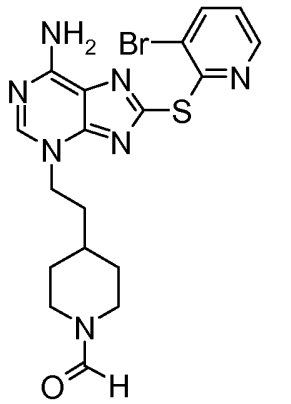
534		4-(2-{6-Amino-8-[(5-methoxy-1,3-benzoxazol-7-yl)thio]-9H-purin-9-yl}ethyl)piperidine-1-carbaldehyde. ^{1}H NMR (DMSO-d_6) δ 8.30 (s, 1H), 8.26 (s, 1H), 7.93 (s, 1H), 7.55 (s, 1H), 6.42 (s, 1H), 4.30-4.20 (m, 2H), 4.15-4.05 (m, 1H), 3.59 (s, 3H), 3.65-3.50 (m, 1H), 2.95-2.85 (m, 1H), 2.50-2.45 (m, 2H), 1.75-1.35 (m, 4H), 1.00-0.85 (m, 2H). TOF-MS $[M+H]^+$ 454.0
535		4-(2-{6-Amino-8-[(5-methoxy-1,3-benzoxazol-7-yl)thio]-3H-purin-3-yl}ethyl)piperidine-1-carbaldehyde.^{1}H NMR (DMSO-d_6) δ 8.35 (s, 1H), 8.12 (s, 1H), 7.96 (s, 1H), 7.87 (s, 1H), 6.88 (s, 1H), 4.33 (t, J = 7.2 Hz, 2H), 4.15-4.10 (m, 1H), 3.69 (s, 3H), 3.65-3.61 (m, 1H), 2.99-2.92 (m, 1H), 2.50-2.45 (m, 2H), 1.85-1.71 (m, 3H), 1.60-1.45 (m, 1H), 1.10-0.9 (m, 2H). TOF-MS $[M+H]^+$ 454.0
536		4-(2-{6-Amino-8-[(2-methoxy-5-nitrophenyl)thio]-9H-purin-9-yl}ethyl)piperidine-1-carbaldehyde. ^{1}H NMR (CD_3OD) δ 8.36 (d, J = 8.8 Hz, 1H), 8.33 (s, 1H), 8.29 (s, 1H), 7.97 (s, 1H), 7.31 (d, J = 8.8 Hz, 1H), 4.41 (t, J = 7.6 Hz, 2H), 3.96 (s, 3H), 3.74-3.68 (m, 1H), 3.13-3.04 (m, 2H), 2.67-2.60 (m, 2H), 1.93-1.80 (m, 3H), 1.70-1.55 (m, 1H), 1.22-1.09 (m, 2H). TOF-MS $[M+H]^+$ 458.0

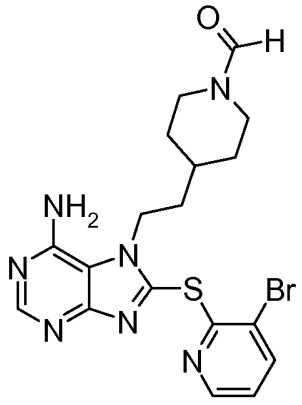
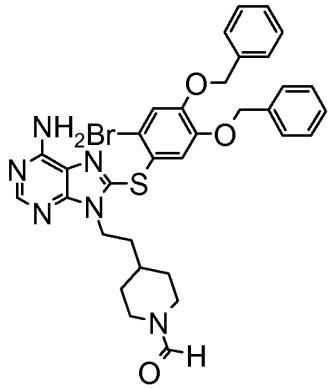
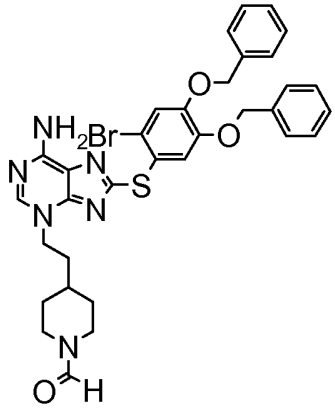
537		4-(2-{6-Amino-8-[(2-methoxy-5-nitrophenyl)thio]-3H-purin-3-yl}ethyl)piperidine-1-carbaldehyde. ^{1}H NMR (CD_3OD) δ 8.40-8.38 (m, 2H), 8.29 (d, J = 9.2 Hz, 1H), 7.97 (s, 1H), 7.27 (d, J = 9.2 Hz, 1H), 4.40 (t, J = 7.6 Hz, 2H), 3.99 (s, 3H), 2.96-2.84 (m, 2H), 1.93-1.00 (m, 5H). TOF-MS $[M+H]^+$ 458.0
538		4-(2-{6-Amino-8-[(4-methoxypyridin-2-yl)thio]-9H-purin-9-yl}ethyl)piperidine-1-carbaldehyde. ^{1}H NMR (CD_3OD) δ 8.25 (s, 1H), 8.20 (d, J = 5.2 Hz, 1H), 7.95 (s, 1H), 6.97 (s, 1H), 6.88 (d, J = 5.2 Hz, 1H), 4.35 (t, J = 7.6 Hz, 2H), 3.85 (s, 3H), 3.06-2.99 (m, 1H), 2.60-2.55 (m, 1H), 1.89-0.80 (m, 5H). TOF-MS $[M+H]^+$ 414.1
539		4-{2-[6-Amino-8-(1-benzofuran-5-ylthio)-9H-purin-9-yl]ethyl}piperidine-1-carbaldehyde. ^{1}H NMR (CD_3OD) δ 8.28 (s, 1H), 8.00-7.95 (m, 2H), 7.89-7.87 (m, 1H), 7.65-7.60 (m, 1H), 7.60-7.54 (m, 1H), 6.96 (s, 1H), 4.45-4.30 (m, 3H), 3.25-3.00 (m, 1H), 2.70-2.60 (m, 1H), 1.95-1.55 (m, 5H), 1.00-0.85 (m,1H). LC-MS $[M+H]^+$ 423.1

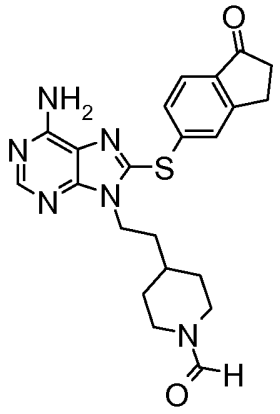
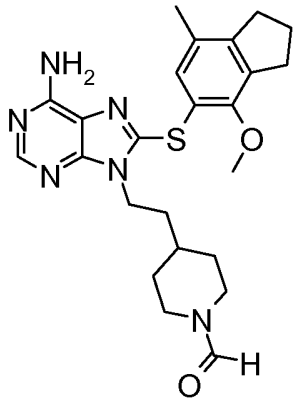
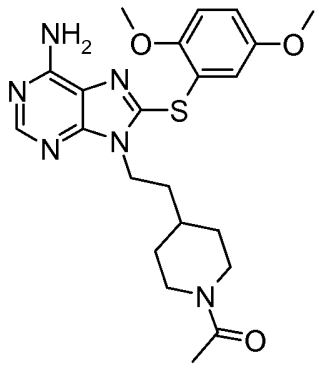
540		4-(2-{6-Amino-8-[(3,4,5-trimethoxyphenyl)thio]-9H-purin-9-yl}ethyl)piperidine-1-carbaldehyde.. LC-MS $[M+H]^+$ 473.2
541		4-(2-{6-Amino-8-[(3,4,5-trimethoxyphenyl)thio]-3H-purin-3-yl}ethyl)piperidine-1-carbaldehyde. ^1H NMR (DMSO-d_6) δ 8.64 (s, 1H), 7.96 (s, 1H), 7.06 (s, 2H), 4.35 (t, J = 7.2 Hz, 2H), 4.15-4.10 (m, 1H), 3.79 (s, 6H), 3.71 (s, 3H), 3.65-3.62 (m, 1H), 2.99-2.90 (m, 2H), 2.60-2.45 (m, 2H), 1.83-1.71 (m, 2H), 1.03-0.80 (m, 3H). LC-MS $[M+H]^+$ 473.2
542		Methyl 2-({6-amino-9-[2-(1-formylpiperidin-4-yl)ethyl]-9H-purin-8-yl}thio)isonicotinate. ^1H NMR (DMSO-d_6) δ 8.61 (d, J = 5.2 Hz, 1H), 8.28 (s, 1H), 7.91 (s, 1H), 7.70 (s, 1H), 7.68 (d, J = 5.2 Hz, 1H), 4.22 (t, J = 7.6 Hz, 2H), 4.07-4.03 (m, 1H), 3.86 (s, 3H), 3.59-3.56 (m, 1H), 2.90-2.82 (m, 1H), 2.50-2.45 (m, 2H), 1.70-1.60 (m, 3H), 1.48-1.35 (m, 1H), 0.97-0.83 (m, 2H). LC-MS $[M+H]^+$ 442.2

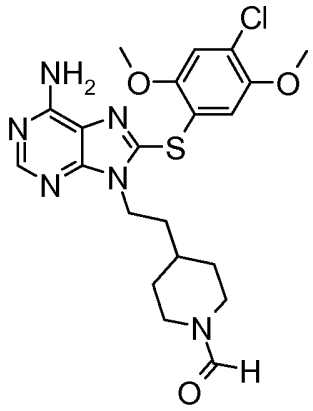
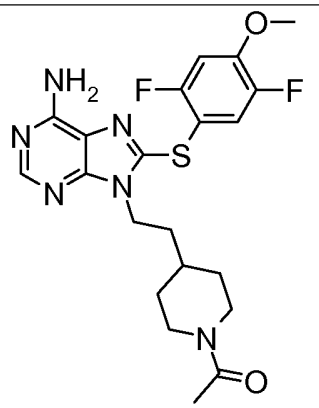
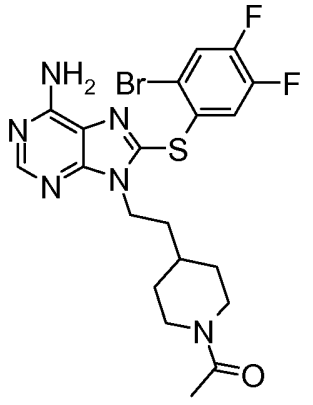
543		Methyl 2-({6-amino-3-[2-(1-formylpiperidin-4-yl)ethyl]-3H-purin-8-yl}thio)isonicotinate.^{1}H NMR (DMSO-d_6) δ 8.69 (d, J = 4.8 Hz, 1H), 8.58 (s, 1H), 8.09 (s, 1H), 7.95 (s, 1H), 7.69 (d, J = 4.8 Hz, 1H), 4.36 (t, J = 7.2 Hz, 2H), 4.15-4.05 (m, 1H), 3.85 (s, 3H), 3.65-3.60 (m, 1H), 2.99-2.90 (m, 1H), 2.50-2.45 (m, 2H), 1.90-1.7 (m, 3H), 1.60-1.50 (m, 1H), 1.10-0.90 (m, 2H). LC-MS $[M+H]^+$ 442.2
544		4-(2-{6-Amino-8-[(6-methoxypyrimidin-4-yl)thio]-9H-purin-9-yl}ethyl)piperidine-1-carbaldehyde. ^{1}H NMR (CD3OD) δ 8.50 (s, 1H), 8.33 (s, 1H), 7.95 (s, 1H), 6.79 (s, 1H), 4.35 (t, J = 7.2 Hz, 2H), 4.27-4.23 (m, 1H), 3.96 (s, 3H), 3.68-3.65 (m, 1H), 3.06-2.99 (m, 2H), 2.65-2.55 (m, 1H), 1.86-1.75 (m, 4H), 1.15-1.01 (m, 2H). LC-MS $[M+H]^+$ 415.2
545		4-(2-{6-Amino-8-[(7-bromo-2,3-dihydro-1,4-benzodioxin-6-yl)thio]-9H-purin-9-yl}ethyl)piperidine-1-carbaldehyde. ^{1}H NMR (DMSO-d_6) δ 8.17 (s, 1H), 7.93 (s, 1H), 7.28 (s, 1H), 6.96 (s, 1H), 4.25-4.05 (m, 3H), 3.65-3.55 (m, 1H), 2.95-2.85 (m, 1H), 2.50-2.45 (m, 4H), 1.75-1.35 (m, 6H), 1.00-0.85 (m, 2H).LC-MS $[M+H]^+$ 519.1

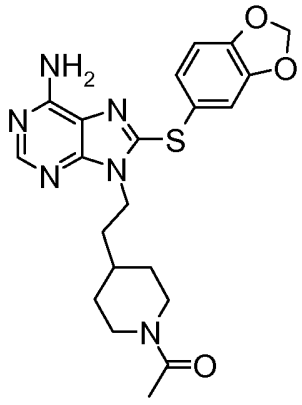
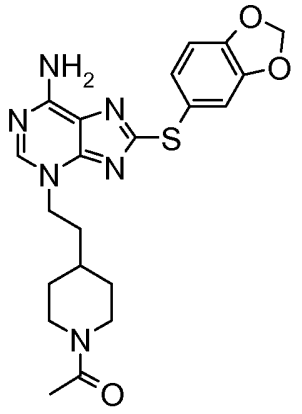
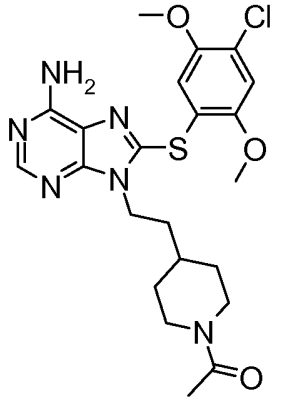
546		4-(2-{6-Amino-8-[(3-methyl-2-thienyl)thio]-9H-purin-9-yl}ethyl)piperidine-1-carbaldehyde. ^{1}H NMR (DMSO-d_6) δ 8.28 (s, 1H), 7.96 (s, 1H), 7.74 (d, J = 5.2 Hz, 1H), 7.10 (d, J = 5.2 Hz, 1H), 4.25 (t, J = 8.00 Hz, 2H), 4.14-4.10 (m, 2H), 3.16 (s, 3H), 3.00-2.90 (m, 2H), 1.60-0.80 (m, 7H). LC-MS $[M+H]^+$ 403.2
547		4-(2-{6-Amino-8-[(3-methyl-2-thienyl)thio]-3H-purin-3-yl}ethyl)piperidine-1-carbaldehyde. ^{1}H NMR (DMSO-d_6) δ 8.65 (s, 1H), 7.97 (s, 1H), 7.91 (d, J = 5.6, 1H), 7.23 (d, J = 5.6 Hz, 1H), 4.32 (t, J = 7.6 Hz, 2H), 4.13-4.09 (m, 2H), 2.98-2.91 (m, 1H), 2.57-2.50 (m, 2H), 2.30 (s, 3H), 1.60-0.80 (m, 6H). LC-MS $[M+H]^+$ 403.1
548		N-[4-({6-Amino-9-[2-(1-formylpiperidin-4-yl)ethyl]-9H-purin-8-yl}thio)-3-chlorophenyl]acetamide. ^{1}H NMR (DMSO-d_6) δ 8.21 (s, 1H), 7.98 (s, 1H), 7.93 (s, 1H), 7.39 (d, J = 8.4 Hz, 1H), 7.21 (d, J = 8.4 Hz, 1H), 4.19 (t, J = 7.2 Hz, 2 H), 4.12-4.06 (m, 1H), 3.70-3.50 (m, 3H), 2.92-2.86 (m, 1H), 2.50-2.45 (m, 2H), 2.05 (s, 3H), 1.70-0.80 (m, 4H). LC-MS $[M+H]^+$ 474.2

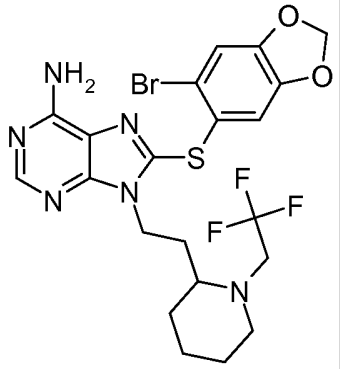
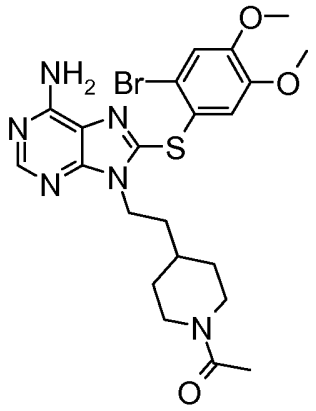
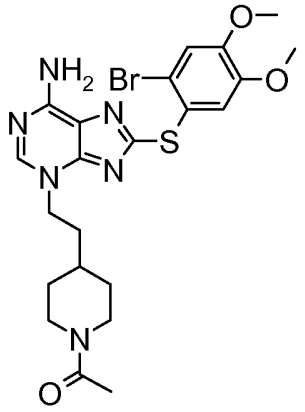
549		N-[4-({6-Amino-3-[2-(1-formylpiperidin-4-yl)ethyl]-3H-purin-8-yl}thio)-3-chlorophenyl]acetamide.. ^{1}H NMR (DMSO-d_6) δ 8.60 (s, 1H), 8.04 (s, 1H), 7.95 (s, 1H), 7.70-7.60 (m, 1H), 7.55-7.48 (m, 1H), 4.29 (t, J = 8.0 Hz, 2 H), 4.15-4.05 (m, 1H), 3.70-3.50 (m, 2H), 2.97-2.90 (m, 3H), 2.50-2.45 (m, 2H), 2.09 (s, 3H), 1.70-0.80 (m, 3H). LC-MS $[M+H]^+$ 474.1
550		4-(2-{6-Amino-8-[(3-bromopyridin-2-yl)thio]-9H-purin-9-yl}ethyl)piperidine-1-carbaldehyde. ^{1}H NMR (CD3OD) δ 8.41 (s, 1H), 8.22 (dd, J = 4.8, 1.6 Hz, 1H), 8.04 (dd, J = 8.0, 1.6 Hz, 1H), 7.95 (s, 1H), 7.17 (q, J = 8.0, 4.8 Hz, 1H), 4.33 (t, J = 8.4 Hz, 2H), 4.27-4.22 (m, 1H), 3.70-3.64 (m, 1H), 3.06-2.99 (m, 2H), 2.66-2.55 (m, 1H), 1.85-1.77 (m, 2H), 1.65-1.55 (m, 1H), 1.13-1.00 (m, 3H). TOF-MS $[M+H]^+$ 463.9
551		4-(2-{6-Amino-8-[(3-bromopyridin-2-yl)thio]-3H-purin-3-yl}ethyl)piperidine-1-carbaldehyde. ^{1}H NMR (CD_3OD) δ 8.64 (s, 1H), 8.61 (dd, J = 4.8, 1.6 Hz, 1H), 8.17 (dd, J = 8.0, 1.6 Hz, 1H), 7.99 (s, 1H), 7.36 (q, J = 8.0, 4.8 Hz, 1H), 4.51 (t, J = 8.0 Hz, 2H), 4.33-4.25 (m, 1H), 3.75-3.70 (m, 1H), 3.15-3.08 (m, 2H), 2.75-2.64 (m, 1H), 1.98-1.85 (m, 2H), 1.75-1.65 (m, 1H), 1.30-1.10 (m, 3H). TOF-MS $[M+H]^+$ 463.9

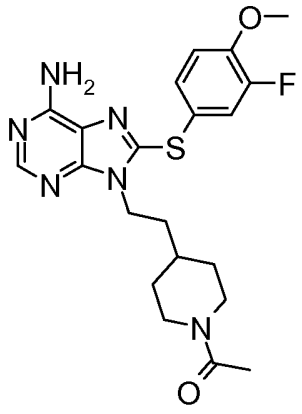
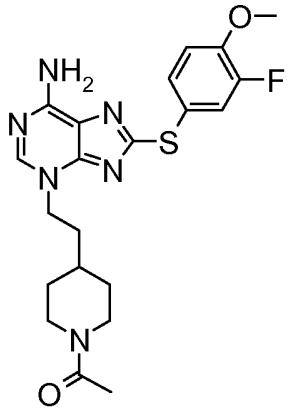
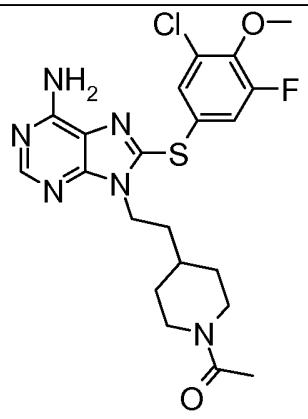
552		4-(2-{6-Amino-8-[(3-bromopyridin-2-yl)thio]-7H-purin-7-yl}ethyl)piperidine-1-carbaldehyde. ^{1}H NMR (CD_3OD) δ 8.46 (s, 1H), 8.27 (dd, J = 4.8, 1.6 Hz, 1H), 8.06 (dd, J = 8.0, 1.6 Hz, 1H), 7.94 (s, 1H), 7.20 (q, J = 8.0, 4.8 Hz, 1H), 4.55 (t, J = 8.0 Hz, 2H), 4.25-4.15 (m, 1H), 3.70-3.60 (m, 1H), 3.15-3.08 (m, 2H), 2.65-2.55 (m, 1H), 1.80-1.60 (m, 3H), 1.10-0.90 (m, 3H). TOF-MS $[M+H]^+$ 463.9
553		4-[2-(6-Amino-8-{[4,5-bis(benzyloxy)-2-bromophenyl]thio}-9H-purin-9-yl)ethyl]piperidine-1-carbaldehyde. ^{1}H NMR (CD_3OD) δ 8.21 (s, 1H), 7.94 (s, 1H), 7.47-7.30 (m, 6H), 7.12-7.01 (m, 5H), 6.86 (s, 1H), 5.15 (s, 2H), 5.07 (s, 2H), 4.25-4.18 (m, 1H), 4.11 (t, J= 7.6 Hz, 2H), 3.65-3.58 (m, 2H), 2.99-2.91 (m, 1H), 2.57-2.49 (m, 1H), 1.74-1.64 (m, 2H), 1.43-1.35 (m, 1H), 1.10-0.89 (m, 3H); TOF-MS $[M+H]^+$ 673.1
554		4-[2-(6-Amino-8-{[4,5-bis(benzyloxy)-2-bromophenyl]thio}-3H-purin-3-yl)ethyl]piperidine-1-carbaldehyde.^{1}H NMR (CD3OD) δ 8.26 (s, 1H), 7.95 (s, 1H), 7.47-7.14 (m, 12H), 5.15 (s, 2H), 5.05 (s, 2H), 4.33 (t, J = 7.6 Hz, 2H), 4.28-4.24 (m, 1H), 3.68-3.63 (m, 1H), 3.09-3.00 (m, 2H), 2.67-2.55 (m, 1H), 1.88-1.78 (m, 3H), 1.63-1.60 (m, 1H), 1.20-1.00 (m, 2H). TOF-MS $[M+H]^+$ 673.16

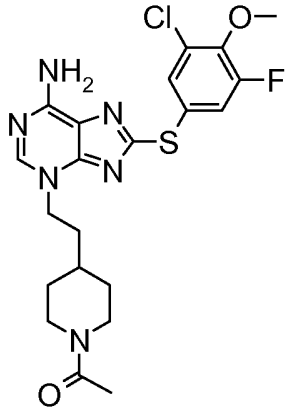
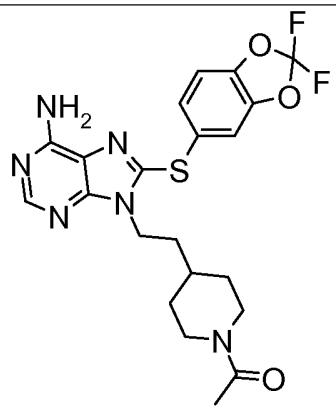
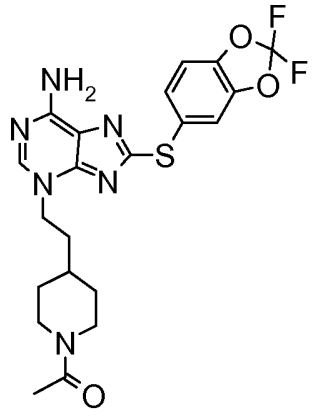
555		4-(2-{6-Amino-8-[(1-oxo-2,3-dihydro-1H-inden-5-yl)thio]-9H-purin-9-yl}ethyl)piperidine-1-carbaldehyde. ^{1}H NMR (CD_3OD) δ 8.29 (s, 1H), 7.95 (s, 1H), 7.70 (d, J = 8.4 Hz, 1H), 7.36 (s, 1H), 7.45 (d, J = 8.4 Hz, 1H), 4.35 (t, J = 7.6 Hz, 2H), 4.28-4.24 (m, 1H), 3.70-3.64 (m, 1H), 3.17-3.00 (m, 6H), 2.75-2.57 (m, 4H), 1.85-1.70 (m, 3H). TOF-MS $[M+H]^+$ 437.18
556		4-(2-{6-Amino-8-[(4-methoxy-7-methyl-2,3-dihydro-1H-inden-5-yl)thio]-9H-purin-9-yl}ethyl)piperidine-1-carbaldehyde. ^{1}H NMR (CD_3OD) δ 8.28 (s, 1H), 7.98 (s, 1H), 7.16 (s, 1H), 4.36 (t, J = 7.6 Hz, 2H), 4.35-4.27 (m, 1H), 3.73 (s, 3H), 3.72-3.68 (m, 1H), 3.14-3.05 (m, 2H), 3.01 (t, J = 8.0 Hz, 2H), 2.86 (t, J = 7.6 Hz, 2H), 2.70-2.64 (m, 1H), 2.21 (s, 3H), 2.15-2.10 (m, 2H), 1.89-1.55 (m, 3H), 1.20-1.05 (m, 3H); TOF-MS $[M+H]^+$ 467.2
557		9-[2-(1-Acetylpiperidin-4-yl)ethyl]-8-[(2,5-dimethoxyphenyl)thio]-9H-purin-6-amine. ^{1}H NMR (CD_3OD) δ 8.28 (s, 1H), 7.07-7.00 (m, 3H), 4.50-4.44 (m, 1H), 4.37 (t, J = 7.6 Hz, 2H), 3.94-3.85 (m, 1H), 3.74 (s, 6H), 3.13-3.04 (m, 2H), 2.60-2.52 (m, 1H), 2.08 (s, 3H), 1.90-1.74 (m, 3H), 1.60-1.55 (m, 1H), 1.24-1.06 (m, 2H). TOF-MS $[M+H]^+$ 457.2

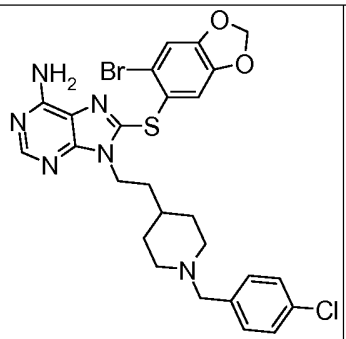
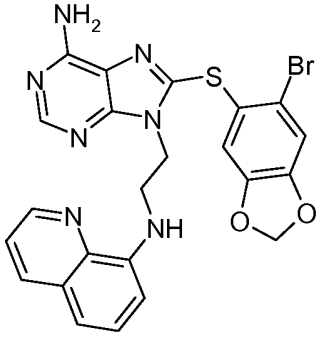
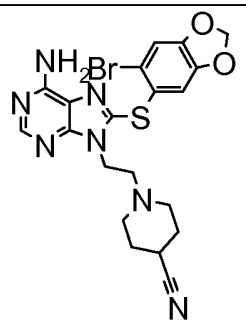
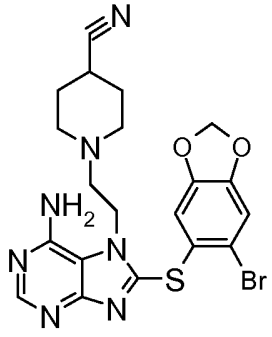
558		4-(2-{6-Amino-8-[(4-chloro-2,5-dimethoxyphenyl)thio]-9H-purin-9-yl}ethyl)piperidine-1-carbaldehyde. ^{1}H NMR (CD_3OD) δ 8.31 (s, 1H), 7.98 (s, 1H), 7.33 (s, 1H), 7.22 (s, 1H), 4.40 (t, J = 7.6 Hz, 2H), 4.33-4.29 (m, 1H), 3.84 (s, 3H), 3.74 (s, 3H), 3.74-3.68 (m, 1H), 3.14-3.06 (m, 2H), 2.69-2.62 (m, 1H), 1.95-1.58 (m, 4H), 1.29-1.11 (m, 2H). TOF-MS $[M+H]^+$ 477.1
559		9-[2-(1-Acetylpiperidin-4-yl)ethyl]-8-[(2,5-difluoro-4-methoxyphenyl)thio]-9H-purin-6-amine. ^{1}H NMR (CD_3OD) δ 8.28 (s, 1H), 7.51 (dd, J = 10.4, 3.2 Hz, 1H), 7.17 (dd, J = 10.4, 3.2 Hz, 1H), 4.53-4.48 (m, 1H), 4.38 (t, J = 7.6 Hz, 2H), 3.93 (s, 3H), 3.93-3.90 (m, 1H), 3.13-3.04 (m, 2H), 2.62-2.57 (m, 1H), 2.10-2.07 (m, 1H), 2.08 (s, 3H), 1.95-1.55 (m, 3H), 1.31-1.12 (m, 2H); TOF-MS $[M+H]^+$ 463.1
560		9-[2-(1-Acetylpiperidin-4-yl)ethyl]-8-[(2-bromo-4,5-difluorophenyl)thio]-9H-purin-6-amine. ^{1}H NMR (CD_3OD) δ 8.32 (s, 1H), 7.84 (dd, J = 10.0, 3.6 Hz, 1H), 7.69 (dd, J = 10.0, 3.6 Hz, 1H), 4.53-4.47 (m, 1H), 4.39 (t, J = 7.6 Hz, 2H), 3.93-3.88 (m, 1H), 3.13-3.00 (m, 2H), 2.65-2.52 (m, 1H), 2.10-2.07 (m, 1H), 2.08 (s, 3H), 1.90-1.56 (m, 3H), 1.30-1.08 (m, 2H). TOF-MS$[M+H]^+$ 511.0

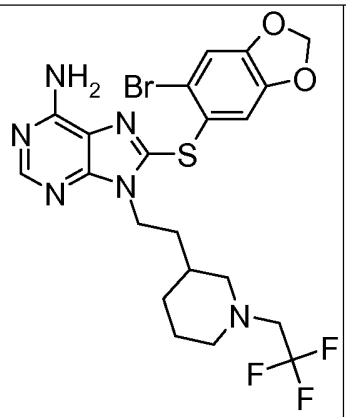
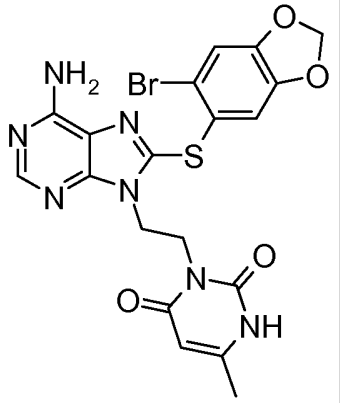
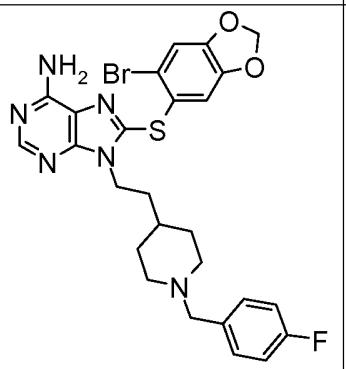
561		9-[2-(1-Acetylpiperidin-4-yl)ethyl]-8-(1,3-benzodioxol-5-ylthio)-9H-purin-6-amine. ^{1}H NMR (CD_3OD) δ 8.28 (s, 1H), 7.19-7.11 (m, 2H), 6.93 (d, J = 7.6 Hz, 1H), 6.04 (s, 2H), 4.52-4.48 (m, 1H), 4.33 (t, J = 8.4 Hz, 2H), 3.95-3.86 (m, 1H), 3.13-3.04 (m, 2H), 2.62-2.52 (m, 1H), 2.08 (s, 3H), 1.95-1.50 (m, 3H), 1.26-1.18 (m, 3H). TOF-MS $[M+H]^+$ 441.16
562		3-[2-(1-Acetylpiperidin-4-yl)ethyl]-8-(1,3-benzodioxol-5-ylthio)-3H-purin-6-amine. ^{1}H NMR (CD_3OD) δ 8.54 (s, 1H), 7.29 (dd, J = 8.4, 1.6 Hz,1H), 7.23 (d, J = 1.6 Hz, 1H), 7.03 (d, J= 8.4 Hz, 1H), 6.11 (s, 2H), 4.51-4.41 (m, 1H), 4.13 (t, J = 7.2 Hz, 2H), 3.95-3.86 (m, 1H), 3.13-3.04 (m, 2H), 2.64-2.55 (m, 1H), 2.10-2.02 (m, 1H), 2.03 (s, 3H), 1.92-1.50 (m, 3H), 1.20-1.10 (m, 2H). TOF-MS $[M+H]^+$ 441.16
563		9-[2-(1-Acetylpiperidin-4-yl)ethyl]-8-[(4-chloro-2,5-dimethoxyphenyl)thio]-9H-purin-6-amine. ^{1}H NMR (CD_3OD) δ 8.29 (s, 1H), 7.32 (s, 1H), 7.22 (s, 1H), 4.52-4.47 (m, 1H), 4.38 (t, J = 8.0 Hz, 2H), 3.94-3.88 (m, 1H), 3.84 (s, 3H), 3.74 (s, 3H), 3.14-3.02 (m, 2H), 2.69-2.55 (m, 1H), 2.09 (s, 3H), 1.95-1.78 (m, 2H), 1.60-1.55 (m, 2H), 1.29-1.11 (m, 2H). TOF-MS $[M+H]^+$ 491.15

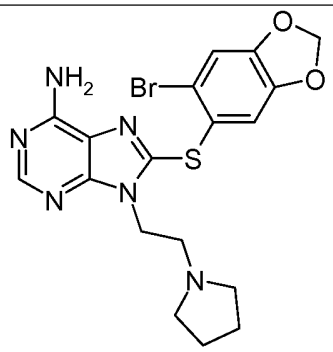
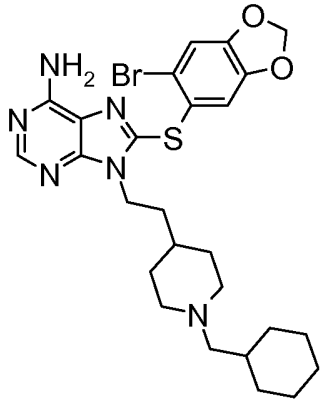
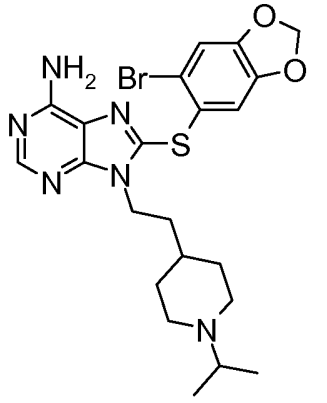
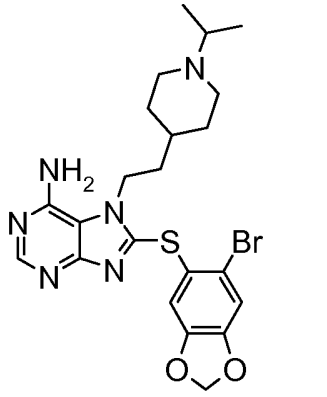
564		8-[(6-Bromo-1,3-benzodioxol-5-yl)thio]-9-{2-[1-(2,2,2-trifluoroethyl)piperidin-2-yl]ethyl}-9H-purin-6-amine.^{1}H NMR (CD_3OD) δ 8.27 (s, 1H), 7.19 (s, 1H), 7.08 (s, 1H), 6.04 (s, 2H), 4.40-4.28 (m, 2H), 4.08-4.04 (m, 1H), 3.72-3.60 (m, 1H), 3.18-3.10 (m, 2H), 2.96 (s, 2H), 2.95-2.92 (m, 1H), 2.6-2.52 (m, 1H), 2.1-2.00 (m, 1H), 1.82-1.74 (m, 1H), 1.68-1.50 (m, 3H). TOF-MS $[M+H]^+$ 557.98
565		9-[2-(1-Acetylpiperidin-4-yl)ethyl]-8-[(2-bromo-4,5-dimethoxyphenyl)thio]-9H-purin-6-amine.^{1}H NMR (CD_3OD) δ 8.32 (s, 1H), 7.35 (s, 1H), 7.34 (s, 1H), 4.52-4.47 (m, 1H), 4.39 (t, J = 7.6 Hz, 2H), 3.95-3.87 (m, 1H), 3.88 (s, 3H), 3.82 (s, 3H), 3.12-3.03 (m, 2H), 2.63-2.55 (m, 1H), 2.09 (s, 3H), 1.94-1.50 (m, 4H), 1.23-1.08 (m, 3H).TOF-MS $[M+H]^+$ 535.1
566		3-[2-(1-Acetylpiperidin-4-yl)ethyl]-8-[(2-bromo-4,5-dimethoxyphenyl)thio]-3H-purin-6-amine. ^{1}H NMR (CD_3OD) δ 8.53 (s, 1H), 7.45 (s, 1H), 7.43 (s, 1H), 4.52-4.47 (m, 1H), 4.42 (t, J = 8.0 Hz, 2H), 3.95-3.87 (m, 1H), 3.92 (s, 3H), 3.86 (s, 3H), 3.12-3.03 (m, 2H), 2.64-2.56 (m, 1H), 2.10 (s, 3H), 1.94-1.50 (m, 4H), 1.23-1.08 (m, 3H). TOF-MS $[M+H]^+$ 535.1

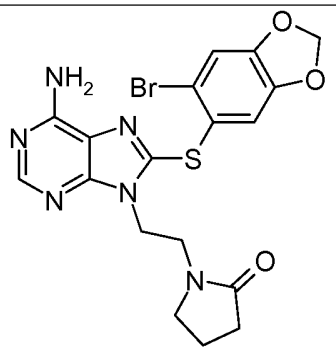
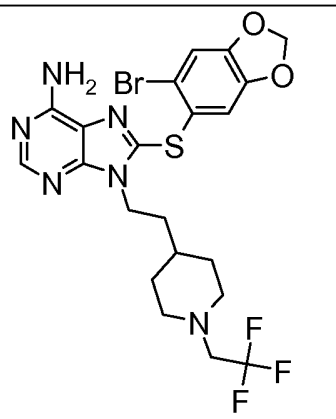
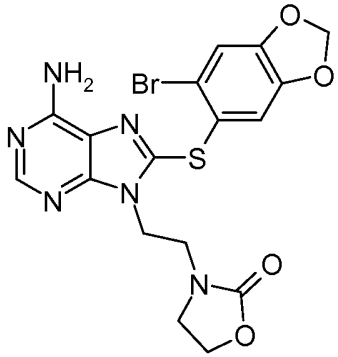
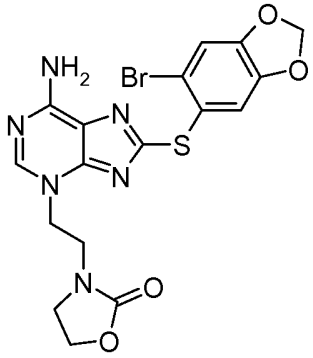
567		9-[2-(1-Acetylpiperidin-4-yl)ethyl]-8-[(3-fluoro-4-methoxyphenyl)thio]-9H-purin-6-amine. ^{1}H NMR (CD_3OD) δ 8.19 (s, 1H), 7.43-7.37 (m, 2H), 7.23-7.17 (m, 1H), 4.52-4.44 (m, 1H), 4.31 (t, J = 8.0 Hz, 2H), 3.95-3.87 (m, 1H), 3.91 (s, 3H), 3.14-3.00 (m, 2H), 2.62-2.53 (m, 1H), 2.08 (s, 3H), 1.89-1.50 (m, 4H), 1.23-1.08 (m, 2H). TOF-MS $[M+H]^+$ 445.17
568		3-[2-(1-Acetylpiperidin-4-yl)ethyl]-8-[(3-fluoro-4-methoxyphenyl)thio]-3H-purin-6-amine. ^{1}H NMR (CD_3OD) δ 8.53 (s, 1H), 7.58-7.50 (m, 2H), 7.32-7.28 (m, 1H), 4.52-4.44 (m, 1H), 4.41 (t, J = 7.6 Hz, 2H), 3.97 (s, 3H), 3.93-3.86 (m, 1H), 3.13-3.03 (m, 2H), 2.64-2.54 (m, 1H), 2.09 (s, 3H), 1.89-1.50 (m, 4H), 1.23-1.08 (m, 2H). TOF-MS $[M+H]^+$ 445.17 .
569		9-[2-(1-Acetylpiperidin-4-yl)ethyl]-8-[(3-chloro-5-fluoro-4-methoxyphenyl)thio]-9H-purin-6-amine.^{1}H NMR (CD_3OD) δ 8.26 (s, 1H), 7.51-7.49 (m, 1H), 7.46-7.42 (m, 1H), 4.52-4.45 (m, 1H), 4.34 (t, J = 7.6 Hz, 2H), 3.98 (s, 3H), 3.94-3.87 (m, 1H), 3.14-3.00 (m, 2H), 2.61-2.53 (m, 1H), 2.08 (s, 3H), 1.89-1.50 (m, 4H), 1.23-1.08 (m, 2H). TOF-MS $[M+H]^+$ 479.15

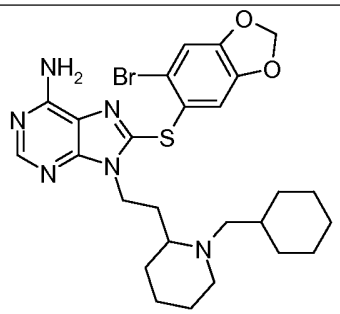
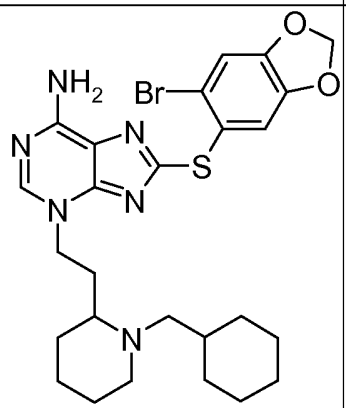
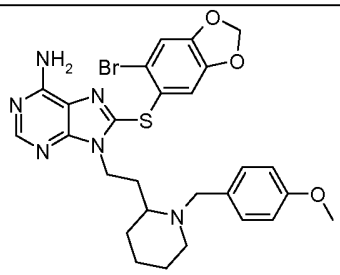
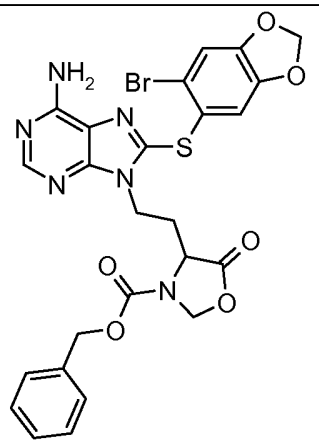
570		3-[2-(1-Acetylpiperidin-4-yl)ethyl]-8-[(3-chloro-5-fluoro-4-methoxyphenyl)thio]-3H-purin-6-amine. ^{1}H NMR (CD_3OD) δ 8.46 (s, 1H), 7.60-7.59 (m, 1H), 7.55-7.50 (m, 1H), 4.51-4.46 (m, 1H), 4.40 (t, J = 7.2 Hz, 2H), 4.02 (s, 3H), 3.94-3.86 (m, 1H), 3.16-3.02 (m, 2H), 2.62-2.55 (m, 1H), 2.09 (s, 3H), 1.89-1.50 (m, 4H), 1.30-1.10 (m, 2H). TOF-MS $[M+H]^+$ 479.15
571		9-[2-(1-Acetylpiperidin-4-yl)ethyl]-8-[(2,2-difluoro-1,3-benzodioxol-5-yl)thio]-9H-purin-6-amine. ^{1}H NMR (CD_3OD) δ 8.33 (s, 1H), 7.62 (d, J = 1.6 Hz,1H), 7.50 (dd, J = 8.4, 1.6 Hz, 1H), 7.34 (d, J = 8.4 Hz, 1H), 4.52-4.75 (m, 1H), 4.37 (t, J = 7.6 Hz, 2H), 3.93-3.88 (m, 1H), 3.11-3.02 (m, 2H), 2.62-2.55 (m, 1H), 2.10-2.06 (m, 1H), 2.08 (s, 3H), 1.92-1.50 (m, 3H), 1.20-1.10 (m, 2H). TOF-MS $[M+H]^+$ 477.15
572		3-[2-(1-Acetylpiperidin-4-yl)ethyl]-8-[(2,2-difluoro-1,3-benzodioxol-5-yl)thio]-3H-purin-6-amine. ^{1}H NMR (CD3OD) δ 8.54 (s, 1H), 7.70 (d, J = 1.6 Hz,1H), 7.60 (dd, J = 8.4, 1.6 Hz, 1H), 7.42 (d, J = 8.4 Hz, 1H), 4.51-4.46 (m, 1H), 4.41 (t, J = 7.6 Hz, 2H), 3.95-3.86 (m, 1H), 3.13-3.04 (m, 2H), 2.64-2.55 (m, 1H), 2.10-2.02 (m, 4H), 1.92-1.50 (m, 3H), 1.20-1.10 (m, 2H). TOF-MS $[M+H]^+$ 477.15

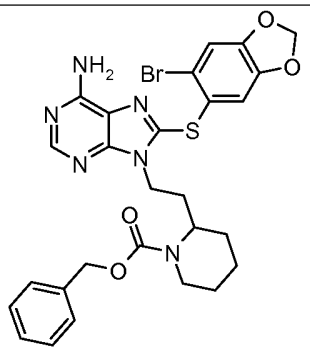
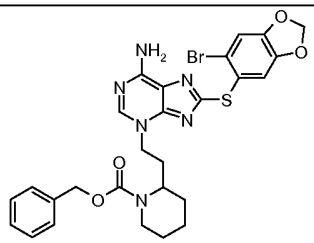
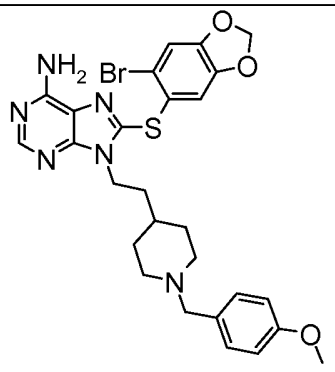
573		8-[(6-Bromo-1,3-benzodioxol-5-yl)thio]-9-{2-[1-(4-chlorobenzyl)piperidin-4-yl]ethyl}-9H-purin-6-amine. ^{1}H NMR (CD_3OD) δ 8.20 (s, 1H), 7.55-7.47 (m, 4H), 7.27 (s, 1H), 7.12 (s, 1H), 6.08 (s, 2H), 4.35-4.25 (m, 3H), 3.10-2.80 (m, 2H), 2.15-1.8 (m, 3H), 2.05 (s, 2H), 1.60-0.80 (m, 5H). TOF-MS $[M+H]^+$ 601.0
574		N-(2-{6-Amino-8-[(6-bromo-1,3-benzodioxol-5-yl)thio]-9H-purin-9-yl}ethyl)quinolin-8-amine. ^{1}H NMR (CD_3OD) δ 8.63 (dd, J = 4.0, 1.6 Hz, 1H), 8.17 (s, 1H), 8.11 (d, J = 8.4 Hz, 1H), 7.40 (dd, J = 8.4, 4.0 Hz, 1H), 7.27 (t, J = 8.0 Hz, 1H), 7.12 (s, 1H), 7.04 (d, J = 8.4 Hz, 1H), 6.83 (s, 1H), 6.69 (d, 8.0 Hz, 1H), 5.99 (s, 2H), 4.62 (t, J = 5.6 Hz, 2H), 3.92 (t, J = 5.6 Hz, 2H). TOF-MS $[M+H]^+$ 536.0
575		1-(2-{6-Amino-8-[(6-bromo-1,3-benzodioxol-5-yl)thio]-9H-purin-9-yl}ethyl)piperidine-4-carbonitrile. ^{1}H NMR (CD_3OD) δ 8.35 (s, 1H), 7.29 (s, 1H), 7.27 (s, 1H), 6.10 (s, 2H), 4.46-4.41 (m, 2H), 2.96-2.90 (m, 2H), 1.90-1.50 (m, 9H). TOF-MS $[M+H]^+$ 502.0
576		1-(2-{6-Amino-8-[(6-bromo-1,3-benzodioxol-5-yl)thio]-7H-purin-7-yl}ethyl)piperidine-4-carbonitrile. ^{1}H NMR (CD_3OD) δ 8.49(s, 1H), 7.36 (s, 1H), 7.34 (s, 1H), 6.14 (s, 2H), 4.78-4.70 (m, 2H), 3.62-3.58 (m, 2H), 1.90-1.50 (m, 9H). TOF-MS $[M+H]^+$ 502.0

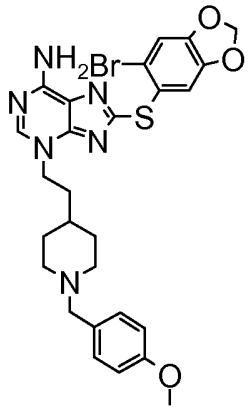
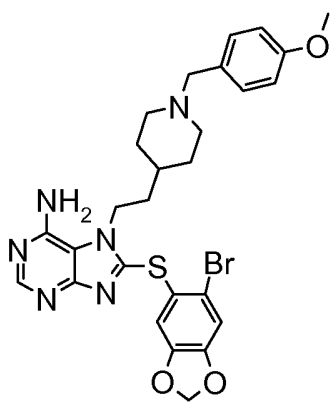
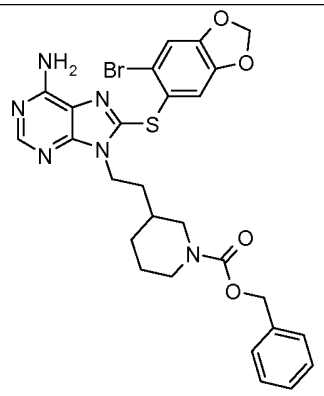
577		8-[(6-Bromo-1,3-benzodioxol-5-yl)thio]-9-{2-[1-(2,2,2-trifluoroethyl)piperidin-3-yl]ethyl}-9H-purin-6-amine. ^{1}H NMR (CD_3OD) δ 8.27 (s, 1H), 7.28 (s, 1H), 7.18 (s, 1H), 6.09 (s, 2H), 4.37 (t, J = 7.2 Hz, 2H), 3.59-3.50 (m, 2H), 2.84-2.76 (m, 1H), 2.79 (s, 2H), 2.58-2.50 (m, 1H), 1.94-1.50 (m, 7H). TOF-MS $[M-H]^+$ 557.04
578		3-(2-{6-amino-8-[(6-bromo-1,3-benzodioxol-5-yl)thio]-9H-purin-9-yl}ethyl)-6-methylpyrimidine-2,4(1H,3H)-dione. ^{1}H NMR (CD_3OD) δ 8.26 (s, 1H), 7.25 (s, 1H), 7.15 (s, 1H), 6.08 (s, 2H), 5.40 (s, 1H), 4.65-4.60 (m, 2H), 4.38-4.36 (m, 2H), 2.07 (s, 3H). LC-MS $[M-H]^+$ 517.8
579		8-[(6-Bromo-1,3-benzodioxol-5-yl)thio]-9-{2-[1-(4-fluorobenzyl)piperidin-4-yl]ethyl}-9H-purin-6-amine. ^{1}H NMR (CD_3OD) δ 8.18 (s, 1H), 7.55-7.50 (m, 2H), 7.27-7.22 (m, 3H), 7.09 (s, 1H), 6.08 (s, 2H), 4.31 (t, J = 7.2 Hz, 2H), 4.27 (s, 2H), 3.50-3.47 (m, 2H), 2.99-2.91 (m, 2H), 2.16-2.10 (m, 2H), 1.90-1.40 (m, 5H). TOF-MS $[M+H]^+$ 585.1

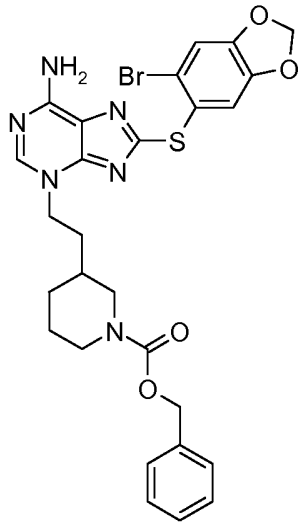
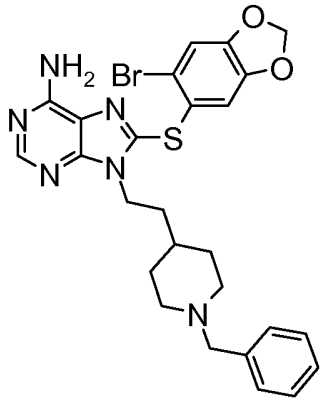
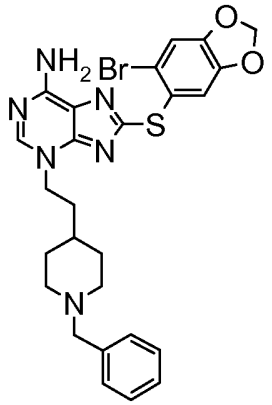
580		8-[(6-Bromo-1,3-benzodioxol-5-yl)thio]-9-(2-pyrrolidin-1-ylethyl)-9H-purin-6-amine. ^{1}H NMR (CD_3OD) δ 8.30 (s, 1H), 7.27 (s, 1H), 7.19 (s, 1H), 6.08 (s, 2H), 4.70 (t, J = 6.4 Hz, 2H), 3.78 (t, J = 6.4 Hz, 2H), 3.50-3.47 (m, 4H), 2.40-2.00 (m, 4H). LC-MS $[M+H]^+$ 463.3
581		8-[(6-Bromo-1,3-benzodioxol-5-yl)thio]-9-{2-[1-(cyclohexylmethyl)piperidin-4-yl]ethyl}-9H-purin-6-amine. ^{1}H NMR (CD_3OD) δ 8.20 (s, 1H), 7.27 (s, 1H), 7.10 (s, 1H), 6.08 (s, 2H), 4.35-4.30 (m, 2H), 3.60-3.53 (m, 2H), 2.93-2.84 (m, 4H), 2.16-0.80 (m, 18H). TOF-MS $[M+H]^+$ 573.1
582		8-[(6-Bromo-1,3-benzodioxol-5-yl)thio]-9-[2-(1-isopropylpiperidin-4-yl)ethyl]-9H-purin-6-amine. ^{1}H NMR (CD_3OD) δ 8.23 (s, 1H), 7.27 (s, 1H), 7.13 (s, 1H), 6.08 (s, 2H), 4.38-4.30 (m, 2H), 3.62-3.52 (m, 2H), 3.36-3.26 (m, 1H) 3.05-2.98 (m, 2H), 2.96-2.84 (m, 2H), 1.8-0.80 (m, 11H). TOF-MS $[M+H]^+$ 519.1
583		8-[(6-Bromo-1,3-benzodioxol-5-yl)thio]-7-[2-(1-isopropylpiperidin-4-yl)ethyl]-7H-purin-6-amine.^{1}H NMR (CD_3OD) δ 8.15 (s, 1H), 7.26 (s, 1H), 7.2 (s, 1H), 6.09 (s, 2H), 3.50-3.47 (m, 5H), 1.80-0.80 (m, 15H). TOF-MS $[M+H]^+$ 519.1

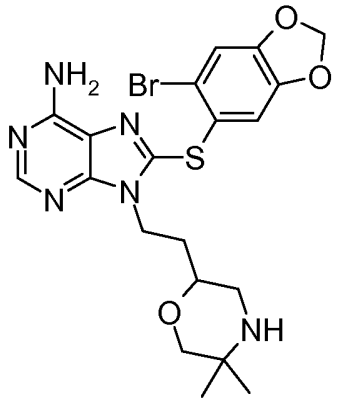
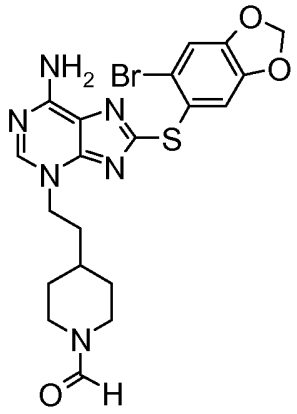
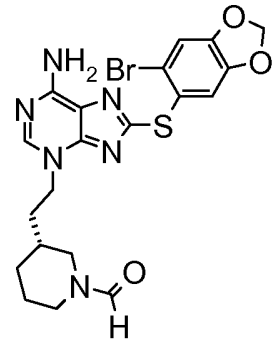
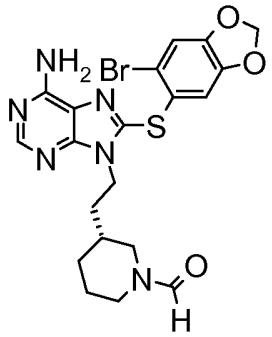
584		1-(2-{6-Amino-8-[(6-bromo-1,3-benzodioxol-5-yl)thio]-9H-purin-9-yl}ethyl)pyrrolidin-2-one. ^{1}H NMR ($CDCl_3$) δ 8.31 (s, 1H), 7.25 (s, 1H), 7.23 (s, 1H), 6.08 (s, 2H), 4.51-4.46 (m, 2H), 3.78-3.74 (m, 2H), 3.62-3.56 (m, 2H), 2.20-2.15 (m, 2H), 2.10-2.05 (m, 2H). TOF-MS $[M+H]^+$ 477.0
585		8-[(6-Bromo-1,3-benzodioxol-5-yl)thio]-9-{2-[1-(2,2,2-trifluoroethyl)piperidin-4-yl]ethyl}-9H-purin-6-amine. ^{1}H NMR (CD_3OD) δ 8.29 (s, 1H), 7.28 (s, 1H), 7.18 (s, 1H), 6.09 (s, 2H), 4.35 (t, J = 7.2 Hz, 2H), 3.56-3.50 (m, 2H), 3.35 (s, 2H), 3.30-3.25 (m, 2H), 2.69-2.59 (m, 3H), 2.00-1.40 (m, 4H). TOF-MS $[M+H]^+$ 559.0
586		3-(2-{6-Amino-8-[(6-bromo-1,3-benzodioxol-5-yl)thio]-9H-purin-9-yl}ethyl)-1,3-oxazolidin-2-one. ^{1}H NMR (CD_3OD) δ 8.31 (s, 1H), 7.27 (s, 1H), 7.22 (s, 1H), 6.08 (s, 2H), 4.52 (t, J = 7.6 Hz, 2H), 4.32 (t, J = 8.8 Hz, 2H), 3.81 (t, J = 8.8 Hz, 2H), 3.74 (t, J=7.6 Hz, 2H). TOF-MS $[M+H]^+$ 479.0
587		3-(2-{6-Amino-8-[(6-bromo-1,3-benzodioxol-5-yl)thio]-3H-purin-3-yl}ethyl)-1,3-oxazolidin-2-one. ^{1}H NMR (CD_3OD) δ 8.55 (s, 1H), 7.38 (s, 1H), 7.37 (s, 1H), 6.15 (s, 2H), 4.58 (t, J = 9.2 Hz, 2H), 4.32 (t, J = 7.6 Hz, 2H), 3.80-3.75 (m, 4H). TOF-MS $[M+H]^+$ 479.0

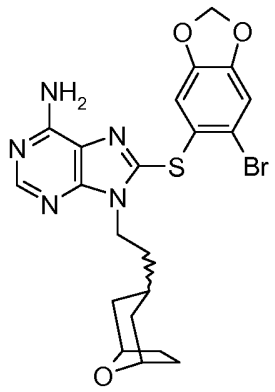
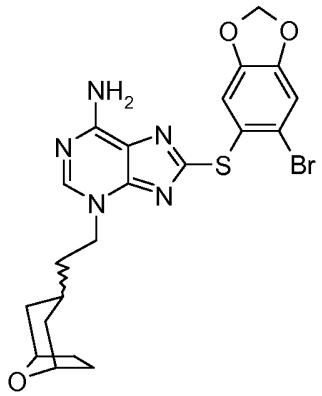
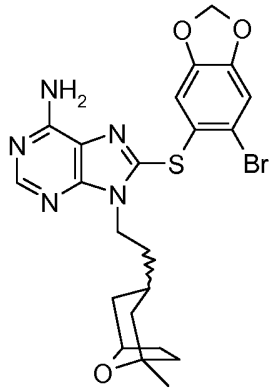
588		8-[(6-Bromo-1,3-benzodioxol-5-yl)thio]-9-{2-[1-(cyclohexylmethyl)piperidin-2-yl]ethyl}-9H-purin-6-amine. ^{1}H NMR (Acetone d_6) δ 8.36 (s, 1H), 7.27 (s, 1H), 7.01 (s, 1H), 6.13 (s, 2H), 4.50-4.48 (m, 2H), 3.70-3.50 (m, 5H), 3.30-3.20 (m, 2H), 2.10-0.80 (m, 17H). TOF-MS $[M+H]^+$ 573.1
589		8-[(6-Bromo-1,3-benzodioxol-5-yl)thio]-3-{2-[1-(cyclohexylmethyl)piperidin-2-yl]ethyl}-3H-purin-6-amine. TOF-MS $[M+H]^+$ 573.1
590		8-[(6-Bromo-1,3-benzodioxol-5-yl)thio]-9-{2-[1-(4-methoxybenzyl)piperidin-2-yl]ethyl}-9H-purin-6-amine. ^{1}H NMR (CD_3OD) δ 8.30 (s, 1H), 7.41-7.15 (m, 4H), 6.98-6.84 (m, 2H), 6.10-6.03 (m, 2H), 4.80-4.60 (m, 2H), 3.85-3.78 (m, 6H), 2.10-1.50 (m, 10H). TOF-MS $[M-H]^+$ 597.0
591		Benzyl 4-(2-{6-amino-8-[(6-bromo-1,3-benzodioxol-5-yl)thio]-9H-purin-9-yl}ethyl)-5-oxo-1,3-oxazolidine-3-carboxylate. ^{1}H NMR (DMSO-d_6) δ 8.23 (s, 1H), 7.37-7.13 (m, 7H), 6.64 (s, 2H), 6.02 (s, 2H), 5.38 (s, 2H), 5.10-5.00 (m, 1H), 4.80-4.70 (m, 2H), 3.60-3.30 (m, 2H).TOF-MS $[M+H]^+$ 613.0

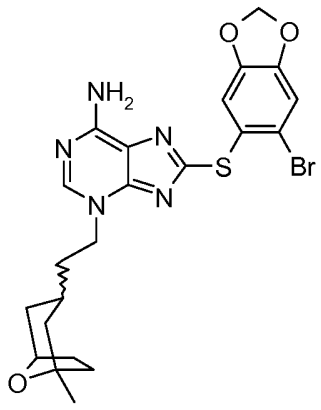
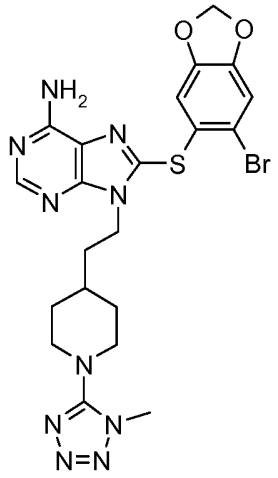
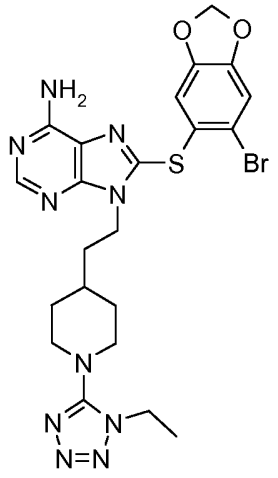
592		Benzyl 2-(2-{6-amino-8-[(6-bromo-1,3-benzodioxol-5-yl)thio]-9H-purin-9-yl}ethyl)piperidine-1-carboxylate. ^{1}H NMR (DMSO-d_6) δ 8.29 (s, 1H), 7.36 (s, 1H), 7.35-7.24 (m, 5H), 6.85 (s, 1H), 6.07 (s, 2H), 5.00 (s, 2H), 4.25-3.87 (m, 6H), 2.80-2.65 (m, 1H), 2.20-1.75 (m, 2H), 1.60-1.40 (m, 4H). TOF-MS $[M+H]^+$ 611.0
593		Benzyl 2-(2-{6-amino-8-[(6-bromo-1,3-benzodioxol-5-yl)thio]-3H-purin-3-yl}ethyl)piperidine-1-carboxylate. ^{1}H NMR (DMSO-d_6) δ 8.58 (s, 1H), 7.49 (s, 1H), 7.41-7.14 (m, 5H), 6.68 (s, 1H), 6.15 (s, 2H), 5.40 (s, 2H), 4.25-4.10 (m, 4H), 3.70-3.60 (m, 2H), 2.80-2.65 (m, 1H), 2.00-1.80 (m, 2H), 1.60-1.40 (m, 4H). TOF-MS $[M+H]^+$ 611.0
594		8-[(6-Bromo-1,3-benzodioxol-5-yl)thio]-9-{2-[1-(4-methoxybenzyl)piperidin-4-yl]ethyl}-9H-purin-6-amine. ^{1}H NMR (CD_3OD) δ 8.29 (s, 1H), 7.40 (d, J = 6.8 Hz, 2H), 7.28 (s, 1H), 7.19 (s, 1H), 7.02 (d, J = 6.8 Hz, 2H), 6.09 (s, 2H), 4.36 (t, J = 7.6 Hz, 2H), 4.20 (s, 2H), 3.82 (s, 3H), 3.50-3.45 (m, 2H), 2.98-2.86 (m, 2H), 2.16-2.10 (m, 2H), 1.88-1.80 (m, 2H), 1.64-1.54 (m, 1H).TOF-MS $[M+H]^+$ 597.0

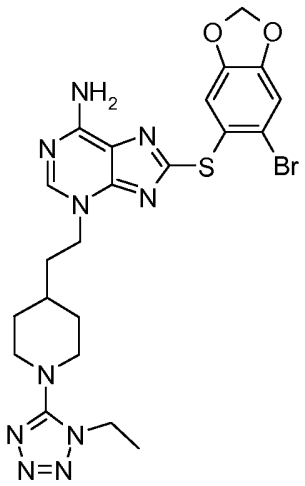
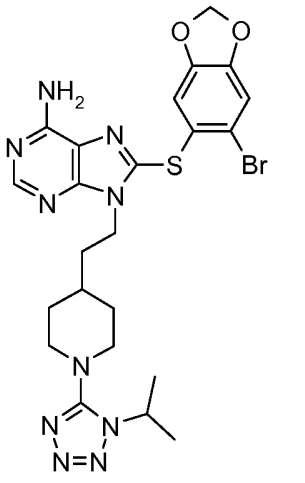
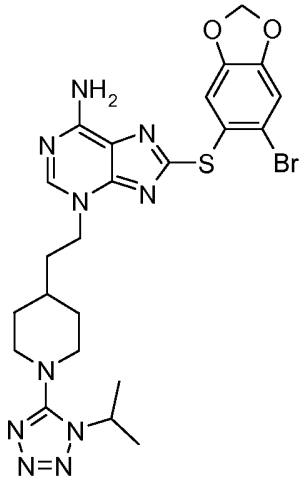
595		8-[(6-Bromo-1,3-benzodioxol-5-yl)thio]-3-{2-[1-(4-methoxybenzyl)piperidin-4-yl]ethyl}-3H-purin-6-amine. ^{1}H NMR (DMSO- d_6) δ 8.56 (s, 1H), 7.46 (s, 1H), 7.37 (d, J = 8.8 Hz, 2H), 7.31 (s, 1H), 7.02 (d, J = 8.8 Hz, 2H), 6.11 (s, 2H), 4.27 (t, J = 7.2 Hz, 2H), 4.17 (s, 2H), 3.75 (s, 3H), 3.32-3.28 (m, 2H), 2.80-2.70 (m, 2H), 2.00-1.75 (m, 3H), 1.45-1.25 (m, 4H). TOF-MS $[M+H]^+$ 597.0
596		8-[(6-Bromo-1,3-benzodioxol-5-yl)thio]-7-{2-[1-(4-methoxybenzyl)piperidin-4-yl]ethyl}-7H-purin-6-amine. ^{1}H NMR (CD_3OD) δ 8.19 (s, 1H), 7.54 (d, J = 9.2 Hz, 2H), 7.25 (s, 1H), 7.12 (s, 1H), 7.09 (d, J = 9.2 Hz, 2H), 6.09 (s, 2H), 4.35-4.25 (m, 3H), 3.86 (s, 3H), 3.50-3.12 (m, 4H), 2.10-1.80 (m, 4H), 1.48-1.25 (m, 4H). TOF-MS $[M+H]^+$ 597.0
597		Benzyl 3-(2-{6-amino-8-[(6-bromo-1,3-benzodioxol-5-yl)thio]-9H-purin-9-yl}ethyl)piperidine-1-carboxylate. LC-MS $[M+H]^+$ 611.9

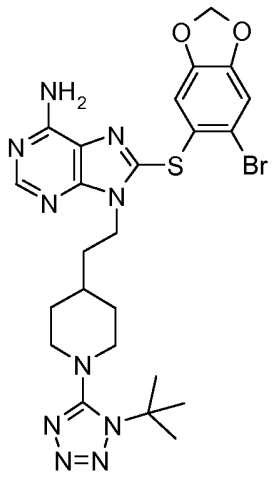
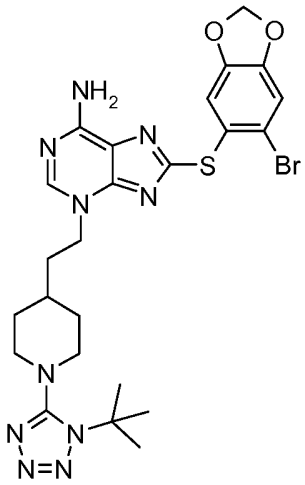
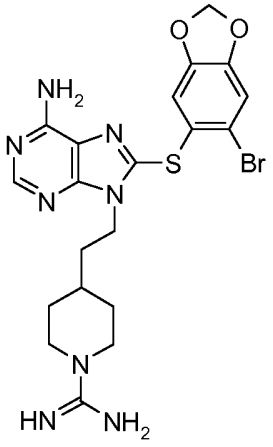
598		Benzyl 3-(2-{6-amino-8-[(6-bromo-1,3-benzodioxol-5-yl)thio]-3H-purin-3-yl}ethyl)piperidine-1-carboxylate. LC-MS $[M+H]^+$ 611.9
599		9-[2-(1-Benzylpiperidin-4-yl)ethyl]-8-[(6-bromo-1,3-benzodioxol-5-yl)thio]-9H-purin-6-amine. ^{1}H NMR (CD_3OD) δ 8.18 (s, 1H), 7.51-7.49 (m, 5H), 7.26 (s, 1H), 7.09 (s, 1H), 6.07 (s, 2H), 4.34-4.28 (m, 2H), 4.27 (s, 2H), 3.54-3.48 (m, 2H), 3.00-2.90 (m, 2H), 2.18-2.10 (m, 4H), 1.85-1.80 (m, 3H). TOF-MS $[M+H]^+$ 567.1
600		3-[2-(1-Benzylpiperidin-4-yl)ethyl]-8-[(6-bromo-1,3-benzodioxol-5-yl)thio]-3H-purin-6-amine. ^{1}H NMR (CD_3OD) δ 8.48 (s, 1H), 7.51-7.49 (m, 5H), 7.34 (s, 1H), 7.31 (s, 1H), 6.11 (s, 2H), 4.43-4.38 (m, 2H), 4.29 (s, 2H), 3.54-3.48 (m, 2H), 3.00-2.90 (m, 2H), 2.00-0.80 (m, 7H). TOF-MS $[M+H]^+$ 567.1

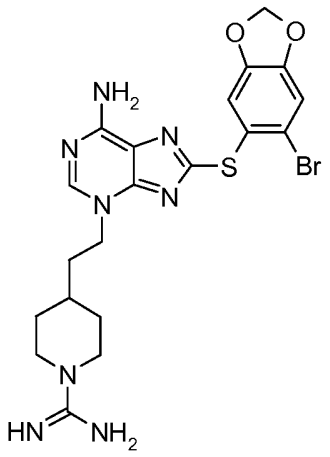
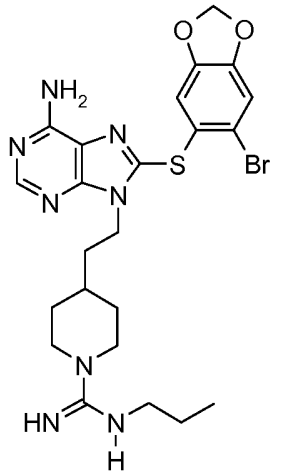
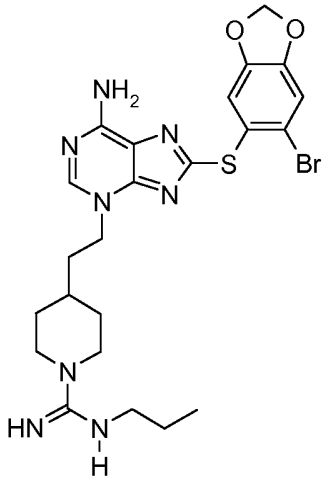
601		8-[(6-Bromo-1,3-benzodioxol-5-yl)thio]-9-[2-(5,5-dimethylmorpholin-2-yl)ethyl]-9H-purin-6-amine. ^{1}H NMR (Acetone -d_6) δ 8.30 (s, 1H), 7.11 (s, 1H), 6.92 (s, 1H), 6.09 (s, 2H), 4.50-4.42 (m, 2H), 3.70-3.30 (m, 5H), 3.00-2.80 (m, 2H), 2.94(s, 6H). LC-MS $[M+H]^+$ 507.0
602		4-(2-{6-Amino-8-[(6-bromo-1,3-benzodioxol-5-yl)thio]-3H-purin-3-yl}ethyl)piperidine-1-carbaldehyde. ^{1}H NMR (DMSO-d_6) δ 8.36 (s, 1H), 7.95 (s, 1H), 7.29 (s,1H), 7.10 (s, 1H), 6.06 (s, 2H), 4.29 (t, J = 7.6 Hz, 2H), 4.12-4.07 (m, 2H), 3.65-3.58 (m, 2H), 2.95-2.80 (m, 2H), 2.64-2.55 (m, 1H), 1.92-0.80 (m, 4H). TOF-MS $[M+H]^+$ 505.0
603		(3*R*)-3-(2-{6-Amino-8-[(6-bromo-1,3-benzodioxol-5-yl)thio]-3H-purin-3-yl}ethyl)piperidine-1-carbaldehyde. LC-MS $[M+H]^+$ 505
604		(3*R*)-3-(2-{6-Amino-8-[(6-bromo-1,3-benzodioxol-5-yl)thio]-9H-purin-9-yl}ethyl)piperidine-1-carbaldehyde. ^{1}H NMR (CD_3OD) δ 8.30 (s, 1H), 8.01-7.98 (m, 1H), 7.30 (s, 1H), 7.20-7.10 (m, 1H), 6.10 (s, 2H), 4.40 (t, J = 7.2 Hz, 2H), 3.70-3.60 (m, 2H), 2.90-2.80 (m, 2H), 1.90-1.70 (m, 5H), 1.50-1.30 (m, 2H). LC-MS $[M+H]^+$ 505

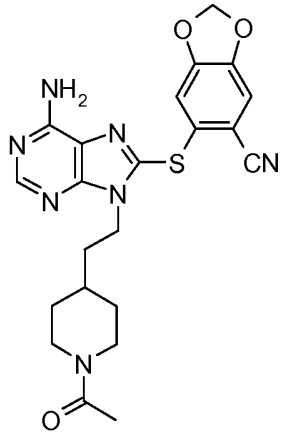
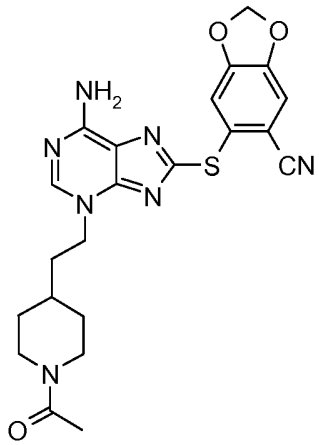
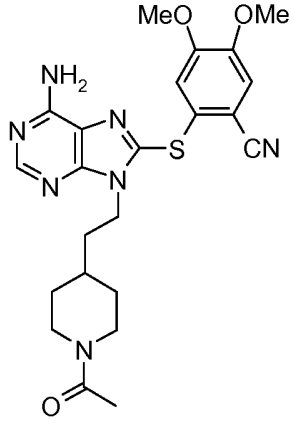
605		8-[(6-Bromo-1,3-benzodioxol-5-yl)thio]-9-{2-[(8-oxabicyclo[3.2.1]oct-3-yl]ethyl}-9H-purin-6-amine. ^{1}H NMR (CD_3OD): δ 8.202 and 8.199 (s, 1H), 7.265 and 7.262 (s, 1H), 7.092 and 7.077 (s, 1H), 6.08 (s, 2H), 4.37-4.30 (m, 2H), 4.29-4.24 (m, 2H), 2.17 (m, 1H), 2.02-1.75 (m, 5H), 1.74-1.62 (m, 3H), 1.43-1.34 (m, 2H); TOF-MS $[M+H]^+$ 504.4
606		8-[(6-Bromo-1,3-benzodioxol-5-yl)thio]-3-{2-[(8-oxabicyclo[3.2.1]oct-3-yl]ethyl}-3H-purin-6-amine.^{1}H NMR (CD_3OD): δ 8.512 and 8.509 (s, 1H), 7.384 and 7.376 (s, 1H), 7.364 and 7.363 (s, 1H), 6.16 and 6.153 (s, 2H), 4.39-4.30 (m, 4H), 2.19-2.06 (m, 2H), 1.95-1.88 (m, 2H), 1.83-1.79 (m, 2H), 1.78-1.72 (m, 2H), 1.62 (m, 1H), 1.44-1.32 (m, 2H); TOF-MS $[M+1]^+$ 503.8
607		8-[(6-Bromo-1,3-benzodioxol-5-yl)thio]-9-{2-[1-methyl-8-oxabicyclo[3.2.1]oct-3-yl]ethyl}-9H-purin-6-amine. ^{1}H NMR (CD_3OD): δ 8.251 and 8.248 (s, 1H), 7.271 and 7.269 (s, 1H), 7.124 and 7.112 (s, 1H), 6.08 (s, 2H), 4.38-4.27 (m, 3H), 2.12-2.0 (m, 3H), 1.94-1.77 (m, 3H), 1.74-1.48 (m, 4H), 1.35 (m, 1H), 1.29and 1.28 (s, 3H); TOF-MS $[M+1]^+$ 518.0

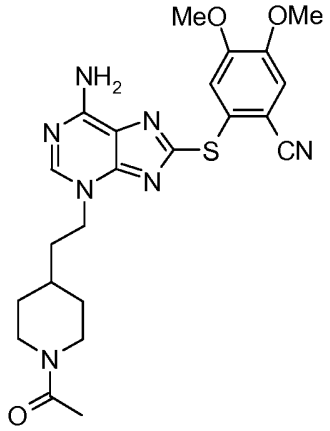
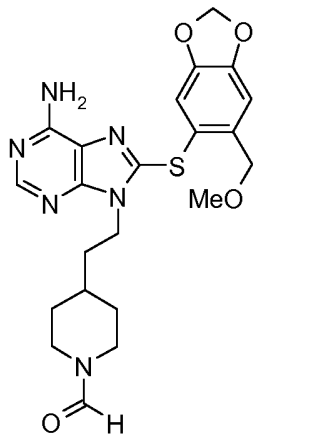
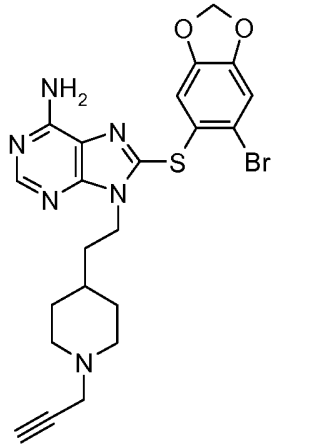
608		8-[(6-Bromo-1,3-benzodioxol-5-yl)thio]-3-{2-[1-methyl-8-oxabicyclo[3.2.1]oct-3-yl]ethyl}-3H-purin-6-amine. ^{1}H NMR (CD_3OD): δ 8.509 and 8.507 (s, 1H), 7.376 and 7.367 (s, 1H), 7.353 (s, 1H), 6.156 and 6.149 (s, 2H), 4.40-4.32 (m, 3H), 2.13-2.08 (m, 3H), 1.89-1.48 (m, 7H), 1.35 (m, 1H), 1.295 and 1.291 (s, 3H); TOF-MS $[M+1]^+$ 518.1
609		8-[(6-Bromo-1,3-benzodioxol-5-yl)thio]-9-{2-[1-(1-methyl-1H-tetrazol-5-yl)piperidin-4-yl]ethyl}-9H-purin-6-amine.^{1}H NMR (DMSO-d_6) δ 8.20 (s, 1H), 7.65-7.50 (brs, 2H), 7.40 (s, 1H), 6.85 (s, 1H), 6.10 (s, 2H), 4.22 (t, J = 7.6 Hz, 2H), 3.85 (s, 3H), 3.55 (brd, J =12.8 Hz, 2H), 2.85 (t, J = 12.8 Hz, 2H), 1.78 (brd, J = 12.8 Hz, 2H), 1.70-1.62 (m, 2H), 1.43 (m, 1H), 1.35-1.22 (m, 2H); TOF-MS $[M+H]^+$ 559.10
610		8-[(6-Bromo-1,3-benzodioxol-5-yl)thio]-9-{2-[1-(1-ethyl-1H-tetrazol-5-yl)piperidin-4-yl]ethyl}-9H-purin-6-amine.^{1}H NMR (CD_3OD) δ 8.24 (s, 1H), 7.27 (s, 1H), 7.14 (s, 1H), 6.08 (s, 2H), 4.37 (t, J = 7.2 Hz, 2H), 4.25 (q, J = 7.6 Hz, 2H), 3.56 (brd, J =12.8 Hz, 2H), 2.98 (t, J = 11.6 Hz, 2H), 1.93 (brd, J = 12.8 Hz, 2H), 1.84 (brq, 2H), 1.57-1.42 (m, 3H), 1.51 (t, J = 7.6 Hz, 3H); TOF-MS $[M+H]^+$ 573.11

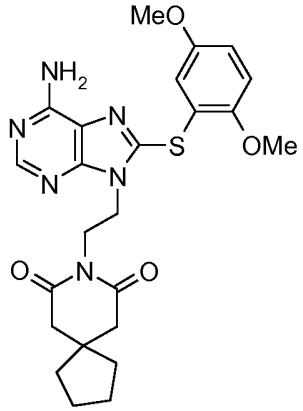
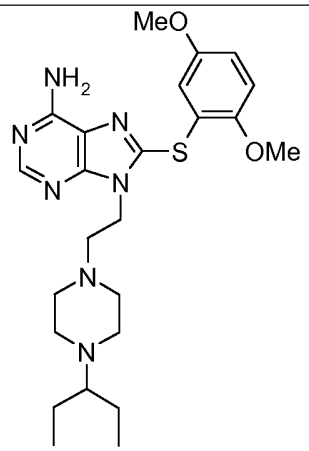
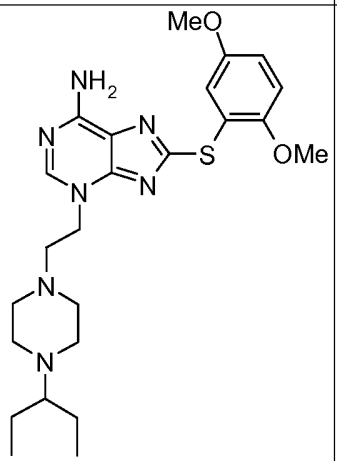
611		8-[(6-Bromo-1,3-benzodioxol-5-yl)thio]-3-{2-[1-(1-ethyl-1H-tetrazol-5-yl)piperidin-4-yl]ethyl}-3H-purin-6-amine. ^{1}H NMR (CD_3OD) δ 8.54 (s, 1H), 7.36 (s, 1H), 7.45 (s, 1H), 6.13 (s, 2H), 4.45 (t, J = 7.6 Hz, 2H), 4.26 (q, J = 7.6 Hz, 2H), 3.56 (brd, J =12.8 Hz, 2H), 2.98 (t, J = 12.4 Hz, 2H), 1.96-1.86 (m, 4H), 1.61-1.44 (m, 3H), 1.52 (t, J = 7.6 Hz, 3H); TOF-MS $[M+H]^+$ 573.11
612		8-[(6-Bromo-1,3-benzodioxol-5-yl)thio]-9-{2-[1-(1-isopropyl-1H-tetrazol-5-yl)piperidin-4-yl]ethyl}-9H-purin-6-amine. ^{1}H NMR (CD_3OD) δ 8.21 (s, 1H), 7.26 (s, 1H), 7.11 (s, 1H), 6.08 (s, 2H), 4.60 (sep, J = 6.8 Hz, 1H), 4.34 (t, J = 7.6 Hz, 2H), 3.45 (brd, J = 12.4 Hz, 2H), 2.96 (t, J = 12.4 Hz, 2H), 1.93 (brd, J = 10.8 Hz, 2H), 1.82 (brq, J = 6.4 Hz, 2H), 1.59-1.44 (m, 3H), 1.54 (d, J = 6.8 Hz, 6H); TOF-MS $[M+H]^+$ 587.13
613		8-[(6-Bromo-1,3-benzodioxol-5-yl)thio]-3-{2-[1-(1-isopropyl-1H-tetrazol-5-yl)piperidin-4-yl]ethyl}-3H-purin-6-amine. ^{1}H NMR (CD_3OD) δ 8.55 (s, 1H), 7.370 (s, 1H), 7.366 (s, 1H), 6.14 (s, 2H), 4.61 (sep, J = 6.4 Hz, 1H), 4.45 (t, J = 7.6 Hz, 2H), 3.46 (brd, J = 12.0 Hz, 2H), 2.99 (t, J = 11.6 Hz, 2H), 1.97-1.86 (m, 4H), 1.56 (d, J = 6.4 Hz, 6H), 1.55-1.45 (m, 3H); TOF-MS $[M+H]^+$ 587.13

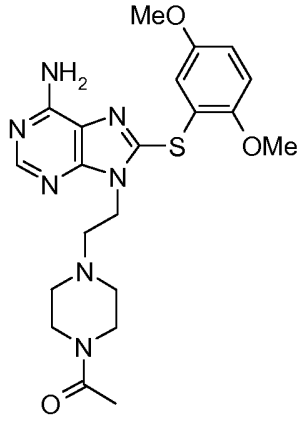
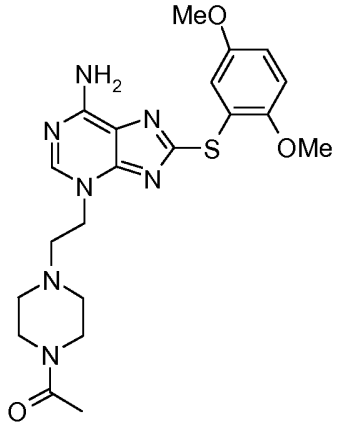
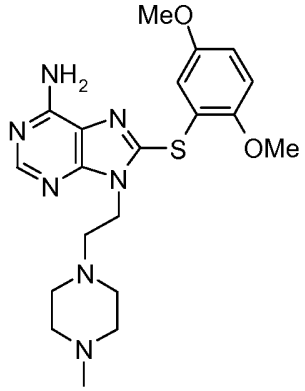
614		8-[(6-Bromo-1,3-benzodioxol-5-yl)thio]-9-{2-[1-(1-*tert*-butyl-1H-tetrazol-5-yl)piperidin-4-yl]ethyl}-9H-purin-6-amine. ^{1}H NMR (CD_3OD) δ 8.21 (s, 1H), 7.27 (s, 1H), 7.10 (s, 1H), 6.08 (s, 2H), 4.35 (t, J = 7.6 Hz, 2H), 3.14 (brd, J = 12.4 Hz, 2H), 2.92 (t, J = 12.0 Hz, 2H), 1.92 (brd, J = 10.0 Hz, 2H), 1.83 (brq, J = 8.0 Hz, 2H), 1.73 (s, 9H), 1.58-1.42 (m, 3H); TOF-MS $[M+H]^+$ 601.1
615		8-[(6-Bromo-1,3-benzodioxol-5-yl)thio]-3-{2-[1-(1-*tert*-butyl-1H-tetrazol-5-yl)piperidin-4-yl]ethyl}-3H-purin-6-amine. ^{1}H NMR (CD_3OD) δ 8.54 (s, 1H), 7.357 (s, 1H), 7.352 (s, 1H), 6.13 (s, 2H), 4.46 (t, J = 7.6 Hz, 2H), 3.16 (brd, J = 12.0 Hz, 2H), 2.95 (t, J = 11.6 Hz, 2H), 1.99-1.80 (m, 4H), 1.75 (s, 9H), 1.58-1.44 (m, 3H); TOF-MS $[M+H]^+$ 601.1
616		4-(2-{6-Amino-8-[(6-bromo-1,3-benzodioxol-5-yl)thio]-9H-purin-9-yl}ethyl)piperidine-1-carboximidamide.^{1}H NMR (CD_3OD) δ 8.25 (s, 1H), 7.28 (s, 1H), 7.16 (s, 1H), 6.09 (s, 2H), 4.36 (t, J = 7.2 Hz, 2H), 3.87 (brd, J = 14.0 Hz, 2H), 3.04 (td, J = 14.0, 2.4 Hz, 2H), 1.94 (brd, J = 12.0 Hz, 2H), 1.84 (q, J = 7.6 Hz, 2H), 1.65 (m, 1H), 1.30 (brq, J = 12.0 Hz, 2H); TOF-MS $[M+H]^+$ 519.09

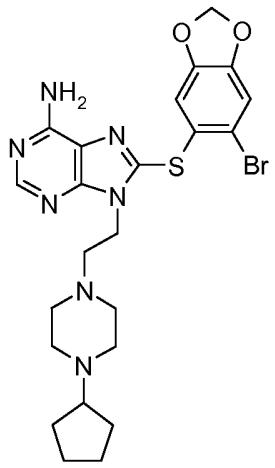
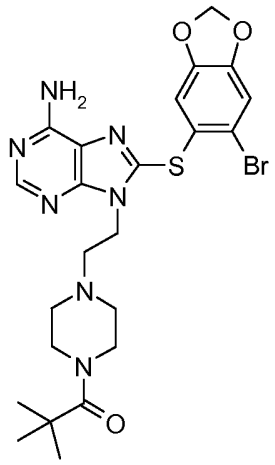
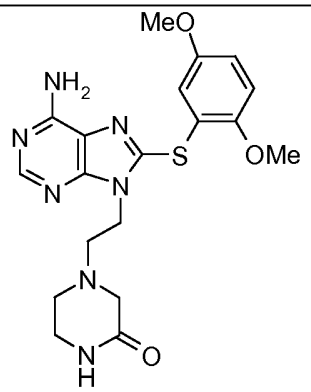
617		4-(2-{6-Amino-8-[(6-bromo-1,3-benzodioxol-5-yl)thio]-3H-purin-3-yl}ethyl)piperidine-1-carboximidamide.TOF-MS $[M+H]^+$ 519.09
618		4-(2-{6-Amino-8-[(6-bromo-1,3-benzodioxol-5-yl)thio]-9H-purin-9-yl}ethyl)-N-propylpiperidine-1-carboximidamide. ^{1}H NMR (CD_3OD) δ 8.33 (s, 1H), 7.29 (s, 1H), 7.23 (s, 1H), 6.10 (s, 2H), 4.43-4.34 (m, 2H), 3.87 (brd, J = 12.8 Hz, 2H), 3.19 (t, J = 6.8 Hz, 2H), 3.02 (t, J = 12.0 Hz, 2H), 1.96-1.82 (m, 4H), 1.69-1.56 (m, 3H), 1.36-1.24 (m, 2H), 0.97 (t, J = 6.8 Hz, 3H); TOF-MS $[M+H]^+$ 561.14
619		4-(2-{6-Amino-8-[(6-bromo-1,3-benzodioxol-5-yl)thio]-3H-purin-3-yl}ethyl)-N-propylpiperidine-1-carboximidamide.^{1}H NMR (CD_3OD) δ 8.55 (s, 1H), 7.37 (s, 2H), 6.15 (s, 2H), 4.44 (t, J = 7.2 Hz, 2H), 3.87 (d, J = 13.2 Hz, 2H), 3.20 (t, J = 7.6 Hz, 2H), 3.04 (t, J = 12.0 Hz, 2H), 1.96-1.84 (m, 4H), 1.68-1.58 (m, 3H), 1.35-1.24 (m, 2H), 0.97 (t, J = 7.6 Hz, 3H); TOF-MS $[M+H]^+$ 561.14

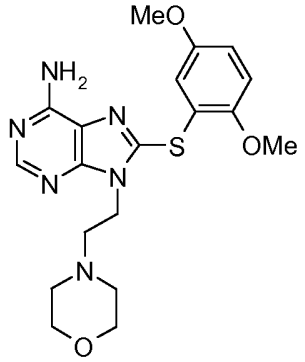
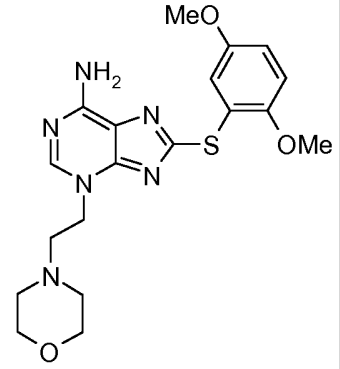
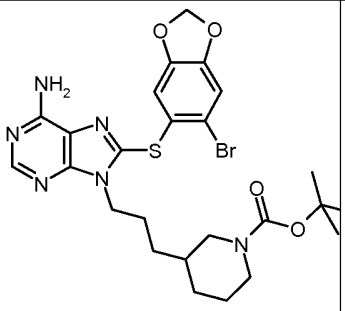
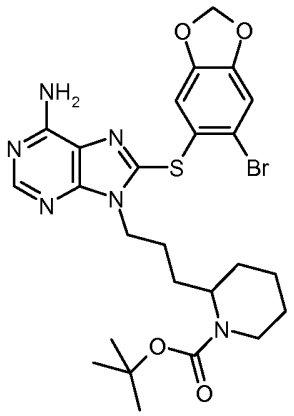
620		6-({9-[2-(1-Acetylpiperidin-4-yl)ethyl]-6-amino-9H-purin-8-yl}thio)-1,3-benzodioxole-5-carbonitrile. ^{1}H NMR (CD_3OD) δ 8.31 (s, 1H), 7.39 (s, 1H), 7.37 (s, 1H), 6.21 (s, 2H), 4.49 (d, J = 12.8 Hz, 1H), 4.40 (t, J = 6.8 Hz, 2H), 3.91 (d, J = 13.2 Hz, 1H), 3.08 (t, J = 12.8 Hz, 1H), 2.60 (t, J = 12.4 Hz, 1H), 2.09 (s, 3H), 1.95-1.83 (m, 4H), 1.62 (m, 1H), 1.27 (t, J = 12.4 Hz, 1H), 1.16 (t, J = 10.4 Hz, 1H); TOF-MS $[M+H]^+$ 466.16
621		6-({3-[2-(1-Acetylpiperidin-4-yl)ethyl]-6-amino-3H-purin-8-yl}thio)-1,3-benzodioxole-5-carbonitrile. TOF-MS $[M+H]^+$ 466.17.
622		2-({9-[2-(1-Acetylpiperidin-4-yl)ethyl]-6-amino-9H-purin-8-yl}thio)-4,5-dimethoxybenzonitrile. ^{1}H NMR (CD_3OD): δ 8.25 (s, 1H), 7.47 (s, 1H), 7.44 (s, 1H), 4.50 (brd, J = 13.6 Hz, 1H), 4.39 (t, J = 7.2 Hz, 2H), 3.92 (s, 3H), 3.91 (s, 3H), 3.90 (m, 1H), 3.09 (td, J = 13.6, 3.2 Hz, 1H), 2.60 (td, J = 12.4, 2.4 Hz, 1H), 2.09 (s, 3H), 1.95-1.83 (m, 4H), 1.62 (m, 1H), 1.25 (qd, J = 12.0, 4.0 Hz, 1H), 1.15 (qd, J = 11.6, 2.8 Hz, 1H); TOF-MS $[M+H]^+$ 482.20

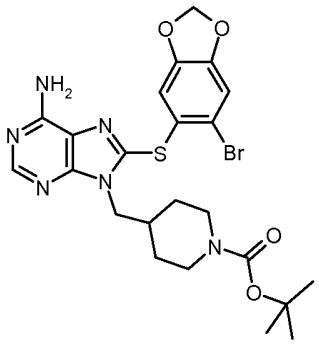
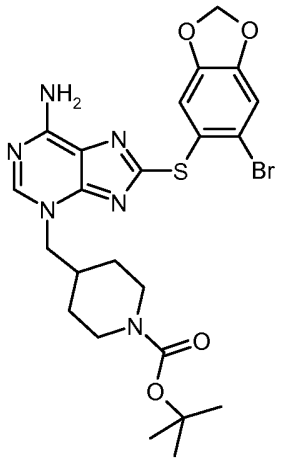
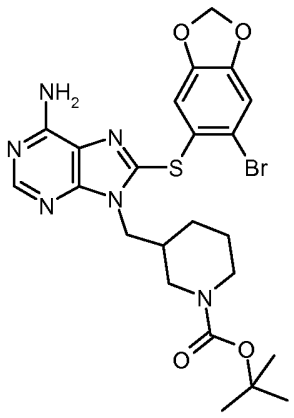
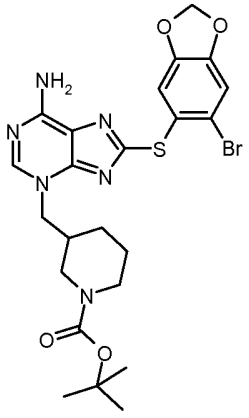
623		2-({3-[2-(1-Acetylpiperidin-4-yl)ethyl]-6-amino-3H-purin-8-yl}thio)-4,5-dimethoxybenzonitrile. ^{1}H NMR (CD_3OD): δ 8.53 (s, 1H), 7.53 (s, 1H), 7.50 (s, 1H), 4.52-4.43 (m, 1H), 4.39 (t, J = 7.6 Hz, 2H), 3.95 (s, 3H), 3.93 (s, 3H), 3.85 (brd, J = 12.8 Hz, 1H), 3.06 (td, J = 13.6, 2.8 Hz, 1H), 2.58 (td, J = 12.8, 2.4 Hz, 1H), 2.10 (s, 3H), 1.94-1.82 (m, 4H), 1.6-1.5 (m, 1H), 1.16 (qd, J = 12.4, 4.0 Hz, 1H), 1.06 (qd, J = 12.0, 4.0 Hz, 1H); TOF-MS $[M+H]^+$ 482.20
624		4-[2-(6-Amino-8-{[6-(methoxymethyl)-1,3-benzodioxol-5-yl]thio}-9H-purin-9-yl)ethyl]piperidine-1-carbaldehyde. ^{1}H NMR (CD_3OD): δ 8.27 (s, 1H), 7.99 (s, 1H), 7.11 (s, 1H), 7.10 (s, 1H), 6.05 (s, 2H), 4.54 (s, 2H), 4.35 (t, J = 8.0 Hz, 2H), 4.31-4.27 (m, 1H), 3.76-3.69 (m, 1H), 3.30 (s, 3H), 3.14-3.07 (m, 1H), 2.66 (td, J = 12.8, 2.8 Hz, 1H), 1.91 (td, J = 14.4, 2H), 1.80 (q, J = 7.6 Hz, 2H), 1.62 (m, 1H), 1.22 (qd, J = 11.2, 3.6 Hz, 1H), 1.20 (qd, J = 12.4, 4.0 Hz, 1H); TOF-MS $[M+H]^+$ 471.21
625		8-[(6-Bromo-1,3-benzodioxol-5-yl)thio]-9-[2-(1-prop-2-yn-1-ylpiperidin-4-yl)ethyl]-9H-purin-6-amine. ^{1}H NMR (CD_3OD): δ 8.26 (s, 1H), 7.28 (s, 1H), 7.16 (s, 1H), 6.09 (s, 2H), 4.36 (t, J = 7.6 Hz, 2H), 4.1-4.02 (m, 2H), 3.68 (brd, J = 14.0 Hz, 2H), 3.02 (brt, J = 12.4 Hz, 2H), 2.66 (s, 1H), 2.21 (brd, J = 14.8, 2H), 1.9-1.81 (m, 2H), 1.62-1.60 (m, 1H), 1.56-1.44 (m, 2H); TOF-MS

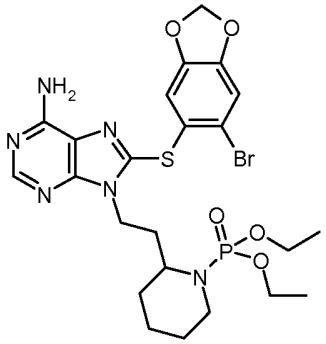
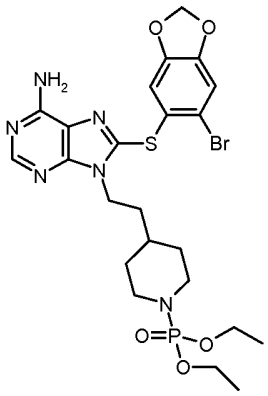
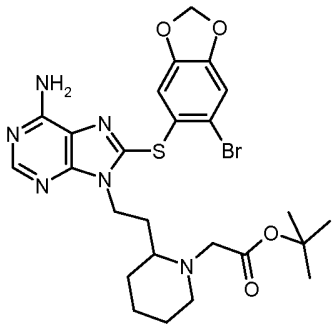
		$[M+H]^+$ 515.08
626		8-(2-{6-Amino-8-[(2,5-dimethoxyphenyl)thio]-9H-purin-9-yl}ethyl)-8-azaspiro[4.5]decane-7,9-dione.^{1}H NMR (CD_3OD): δ 8.30 (s, 1H), 7.10 (d, J = 2.4 Hz, 1H), 7.06 (d, J = 8.8 Hz, 1H), 7.01 (dd, J = 8.8, 3.2 Hz, 1H), 4.53-4.50 (m, 2H), 4.25-4.23 (m, 2H), 3.77 (s, 3H), 3.75 (s, 3H), 2.53 (s, 4H), 1.70-1.66 (m, 4H), 1.46-1.42 (m, 4H); LC-MS $[M+H]^+$ 497.2
627		8-[(2,5-Dimethoxyphenyl)thio]-9-{2-[4-(1-ethylpropyl)piperazin-1-yl]ethyl}-9H-purin-6-amine.^{1}H NMR (CD_3OD): δ 8.35 (s, 1H), 7.08-6.98 (m, 3H), 4.51 (t, J = 5.6 Hz, 2H), 3.80 (s, 3H), 3.76 (s, 3H), 3.50-3.36 (m, 2H), 3.24-3.12 (m, 2H), 3.09-2.98 (m, 3H), 2.92 (t, J = 5.6 Hz, 2H), 2.64-2.51 (m, 2H), 1.88-1.78 (m, 2H), 1.76-1.65 (m, 2H), 1.033 (t, J = 6.4 Hz, 6H); TOF-MS $[M+H]^+$ 486.27
628		8-[(2,5-Dimethoxyphenyl)thio]-3-{2-[4-(1-ethylpropyl)piperazin-1-yl]ethyl}-3H-purin-6-amine ^{1}H NMR (CD_3OD): δ 8.52 (s, 1H), 7.28 (dd, J = 2.4, 0.8 Hz, 1H), 7.23-7.18 (m, 2H), 4.52 (t, J = 5.6 Hz, 2H), 3.81 (s, 6H), 3.43 (brd, J = 11.2 Hz, 2H), 3.16 (brd, J = 12.0 Hz, 2H), 3.08-3.00 (m, 3H), 2.94 (t, J = 5.6 Hz, 2H), 2.54 (brt, J = 12.0 Hz, 2H), 1.89-1.79 (m, 2H), 1.76-1.68 (m, 2H), 1.05 (t, J = 7.2 Hz, 6H); TOF-MS $[M+H]^+$ 486.27

629		9-[2-(4-Acetylpiperazin-1-yl)ethyl]-8-[(2,5-dimethoxyphenyl)thio]-9H-purin-6-amine. ^{1}H NMR (CD_3OD): δ 8.21 (s, 1H), 6.98 (d, J = 8.8 Hz, 1H), 6.92 (d, J = 3.2 Hz, 1H), 6.88 (dd, J = 8.8, 3.2 Hz, 1H), 4.43 (t, J = 5.6 Hz, 2H), 3.77 (s, 3H), 3.70 (s, 3H), 3.49 (brt, J = 4.8 Hz, 2H), 3.43 (brt, J = 4.8 Hz, 2H), 2.85 (t, J = 5.6 Hz, 2H), 2.50 (t, J = 4.8 Hz, 2H), 2.46 (t, J = 4.8 Hz, 2H), 2.06 (s, 3H); TOF-MS $[M+H]^+$ 458.20
630		3-[2-(4-Acetylpiperazin-1-yl)ethyl]-8-[(2,5-dimethoxyphenyl)thio]-3H-purin-6-amine. ^{1}H NMR (CD_3OD): δ 8.41 (s, 1H), 7.19 (dd, J = 2.0, 1.2 Hz, 1H), 7.05-7.04 (m, 2H), 4.67 (t, J = 5.6 Hz, 2H), 3.77 (s, 3H), 3.73 (s, 3H), 3.59 (brt, J = 4.8 Hz, 2H), 3.56 (brt, J = 4.8 Hz, 2H), 2.90 (t, J = 5.6 Hz, 2H), 2.65 (t, J = 4.8 Hz, 2H), 2.59 (t, J = 4.8 Hz, 2H), 2.09 (s, 3H); TOF-MS $[M+H]^+$ 458.20
631		8-[(2,5-Dimethoxyphenyl)thio]-9-[2-(4-methylpiperazin-1-yl)ethyl]-9H-purin-6-amine. ^{1}HNMR (CD_3OD) δ 8.32 (s, 1H), 7.06-6.98 (m, 3H), 4.49 (t, J = 5.6 Hz, 2H), 3.75 (s, 6H), 3.48-3.36 (m, 2H), 3.21-3.06 (m, 2H), 3.00-2.90 (m, 2H), 2.88 (t, J = 5.6 Hz, 2H), 2.84 (s, 3H), 2.56-2.40 (m, 2H); LC-MS $[M+H]^+$ 430.5

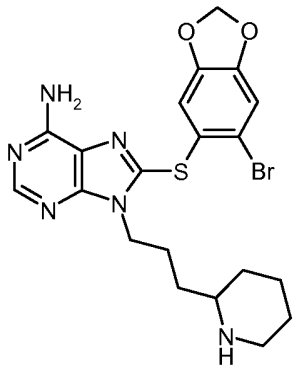
632		8-[(6-Bromo-1,3-benzodioxol-5-yl)thio]-9-[2-(4-cyclopentylpiperazin-1-yl)ethyl]-9H-purin-6-amine. ^{1}H NMR (CD_3OD) δ 8.20 (s, 1H), 7.21 (s, 1H), 7.07 (s, 1H), 6.05 (s, 2H), 4.43 (t, J = 5.6 Hz, 2H), 4.60-3.65 (m, 4H), 3.10-2.42 (m, 5H), 2.91 (t, J = 5.6 Hz, 2H), 2.14-2.04 (m, 2H), 1.86-1.76 (m, 2H), 1.71-1.54 (m, 4H); TOF-MS $[M+H]^+$ 546.13
633		8-[(6-Bromo-1,3-benzodioxol-5-yl)thio]-9-{2-[4-(2,2-dimethylpropanoyl)piperazin-1-yl]ethyl}-9H-purin-6-amine. TOF-MS $[M+H]^+$ 562.11
634		4-(2-{6-Amino-8-[(2,5-dimethoxyphenyl)thio]-9H-purin-9-yl}ethyl)piperazin-2-one.^{1}H NMR (CD_3OD) δ 8.33 (s, 1H), 7.07 (d, J = 3.2 Hz, 1H), 7.05 (d, J = 8.4 Hz, 1H), 7.01 (dd, J = 8.4, 2.8 Hz, 1H), 4.54 (t, J = 5.6 Hz, 2H), 3.75 (s, 3H), 3.74 (s, 3H), 3.28-3.24 (m, 2H), 3.25 (s, 2H), 2.98 (t, J = 5.6 Hz, 2H), 2.83 (t, J = 5.2 Hz, 2H); LC-MS $[M+H]^+$ 430.5

635		8-[(2,5-Dimethoxyphenyl)thio]-9-(2-morpholin-4-ylethyl)-9H-purin-6-amine.^{1}H NMR (CD_3OD) δ 8.40 (s, 1H), 7.17 (dd, J = 2.0, 1.6 Hz, 1H), 7.05-7.04 (m, 2H), 4.74 (t, J= 5.6 Hz, 2H), 3.78-3.75 (m, 7H), 3.73 (s, 3H), 3.06 (t, J = 5.6 Hz, 2H), 2.9-2.8 (m, 4H); LC-MS$[M+H]^+$ 417.5
636		8-[(2,5-Dimethoxyphenyl)thio]-3-(2-morpholin-4-ylethyl)-3H-purin-6-amine.LC-MS $[M+H]^+$ 417.5
637		*tert*-Butyl 3-(3-{6-amino-8-[(6-bromo-1,3-benzodioxol-5-yl)thio]-9*H*-purin-9-yl}propyl)piperidine-1-carboxylate. LC-MS $[M+H]^+$ 591.5
638		*tert*-Butyl 2-(3-{6-amino-8-[(6-bromo-1,3-benzodioxol-5-yl)thio]-9*H*-purin-9-yl}propyl)piperidine-1-carboxylate. LC-MS $[M+H]^+$ 591.5

639		*tert*-Butyl 4-({6-amino-8-[(6-bromo-1,3-benzodioxol-5-yl)thio]-9*H*-purin-9-yl}methyl)piperidine-1-carboxylate. LC-MS $[M+H]^+$ 563.4
640		*tert*-Butyl 4-({6-amino-8-[(6-bromo-1,3-benzodioxol-5-yl)thio]-3*H*-purin-3-yl}methyl)piperidine-1-carboxylate. LC-MS $[M+H]^+$ 563.4
641		*tert*-Butyl 3-({6-amino-8-[(6-bromo-1,3-benzodioxol-5-yl)thio]-9*H*-purin-9-yl}methyl)piperidine-1-carboxylate. LC-MS $[M+H]^+$ 563.4
642		*tert*-Butyl 3-({6-amino-8-[(6-bromo-1,3-benzodioxol-5-yl)thio]-3*H*-purin-3-yl}methyl)piperidine-1-carboxylate. LC-MS $[M+H]^+$ 563.4

643		Diethyl [2-(2-{6-amino-8-[(6-bromo-1,3-benzodioxol-5-yl)thio]-9*H*-purin-9-yl}ethyl)piperidin-1-yl]phosphonate. LC-MS $[M+H]^+$ 613.4
644		Diethyl [4-(2-{6-amino-8-[(6-bromo-1,3-benzodioxol-5-yl)thio]-9*H*-purin-9-yl}ethyl)piperidin-1-yl]phosphonate. LC-MS $[M+H]^+$ 613.4
645		*tert*-Butyl [2-(2-{6-amino-8-[(6-bromo-1,3-benzodioxol-5-yl)thio]-9*H*-purin-9-yl}ethyl)piperidin-1-yl]acetate. LC-MS [M+H]+ 591.4

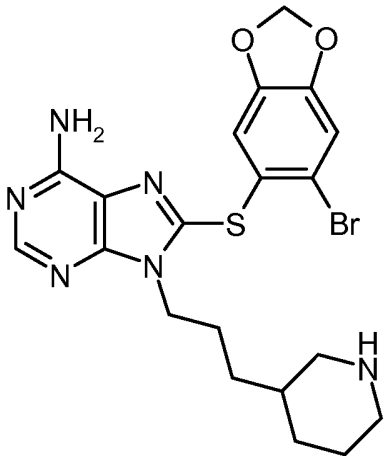
[00870] Example 646



[00871] 8-[(6-bromo-1,3-benzodioxol-5-yl)thio]-9-(3-piperidin-2-ylpropyl)-9*H*-purin-6-amine

[00872] The title compound was prepared according to the procedure described for example 465 using product obtained from example 638. LC-MS $[M+H]^+$ 491.4

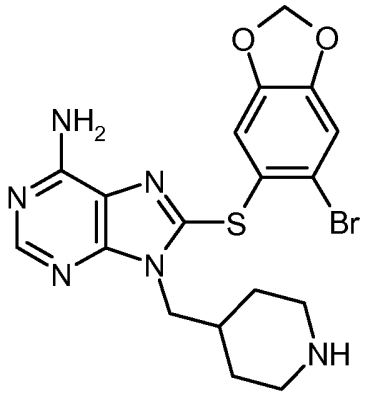
[00873] Example 647



[00874] 8-[(6-bromo-1,3-benzodioxol-5-yl)thio]-9-(3-piperidin-3-ylpropyl)-9*H*-purin-6-amine

[00875] The title compound was prepared according to the procedure described for example 465 using product obtained from example 637. LC-MS $[M+H]^+$ 491.4

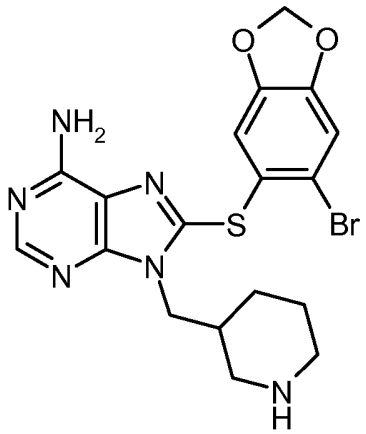
[00876] Example 648



[00877] 8-[(6-bromo-1,3-benzodioxol-5-yl)thio]-9-(piperidin-4-ylmethyl)-9*H*-purin-6-amine

[00878] The title compound was prepared according to the procedure described for example 465 using product obtained from example 639. LC-MS $[M+H]^+$ 463.3

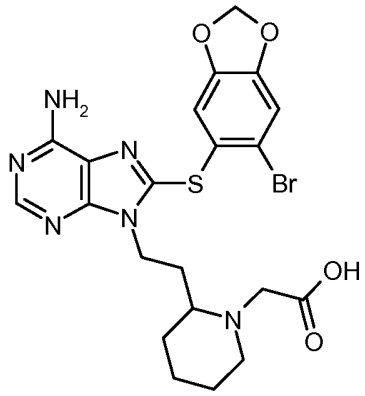
[00879] Example 649



[00880] 8-[(6-bromo-1,3-benzodioxol-5-yl)thio]-9-(piperidin-3-ylmethyl)-9*H*-purin-6-amine

[00881] The title compound was prepared according to the procedure described for example 465 using product obtained from example 641. LC-MS $[M+H]^+$ 463.3

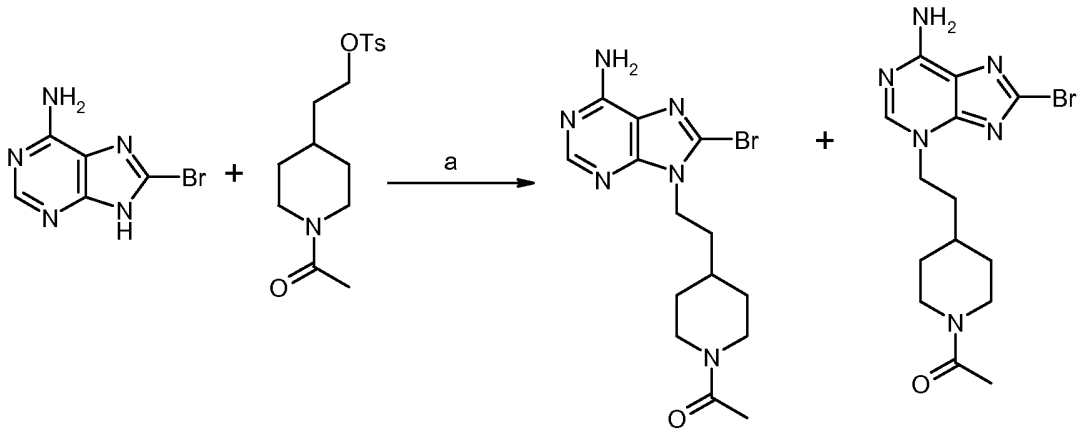
[00882] Example 650



[00883] [2-(2-{6-amino-8-[(6-bromo-1,3-benzodioxol-5-yl)thio]-9*H*-purin-9-yl}ethyl)piperidin-1-yl]acetic acid

[00884] The title product was prepared according to the procedure described for example 465 using product obtained from example 645. LC-MS $[M+H]^+$ 535.4

[00885] Example 651

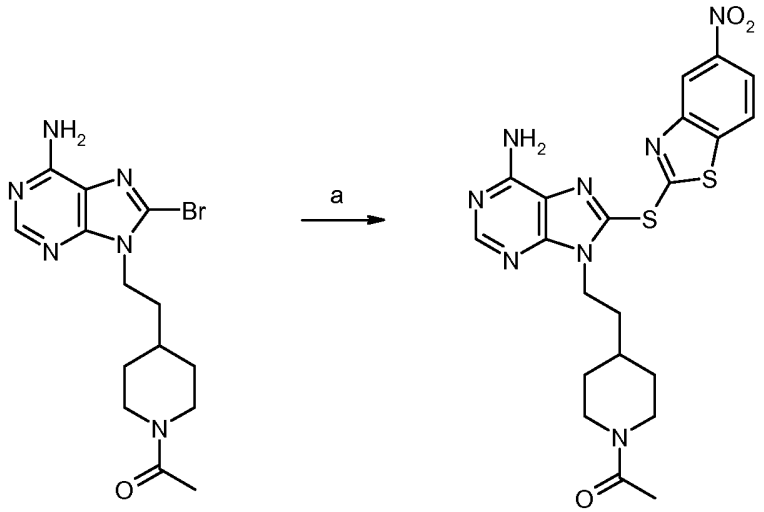


[00886] Reagents: a) Barton's base, THF, 100 °C, MW, 15 min; b) t-BuOK, DMF, 90 -100 °C, 6h

[00887] *Step 1:* 9-[2-(1-acetylpiperidin-4-yl)-ethyl]-8-bromo-9H-purin-6-amine and 3-[2-(1-acetylpiperidin-4-yl)-ethyl]-8-bromo-3H-purin-6-amine.

To a suspension of 8-bromoadenine (0.042 g, 0.197 mmol) and toluene-4-sulfonic 2-(1-acetyl-piperidin-4-yl)-ethyl ester (0.077 g, 0.237 mmol) in THF was added Barton's base (50 µl, 0.237 mmol) at room temperature. The reaction mixture was heated at 100°C for 15 min in microwave reactor, at the end of this period reaction was cooled to room temperature and the crude was purified by Isco silica gel flash column using 0-5% gradient of methanol in dichloromethane to give 0.030g (42%) of 9-[2-(1-acetylpiperidin-4-yl)-ethyl]-8-bromo-9H-purin-6-amine, LC-MS $[M+H]^+$ 366.2 and 0.015g (21%) of 3-[2-(1-acetylpiperidin-4-yl)-ethyl]-8-bromo-3H-purin-6-amine, LC-MS $[M+H]^+$ 366.2

[00888] *Step 2:* 9-[2-(1-Acetylpiperidin-4-yl)ethyl]-8-[(6-nitro-1,3-benzothiazol-2-yl)thio]-9H-purin-6-amine.



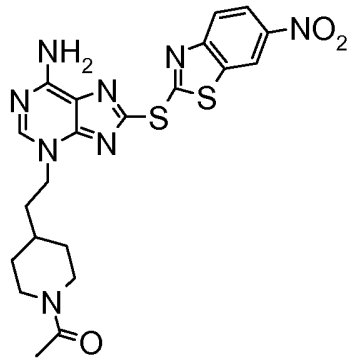
[00889] Reagents: a) t-BuOK, 5-nitro-2-mercaptobenzothiazole, DMF, 90 – 100 °C, 6h

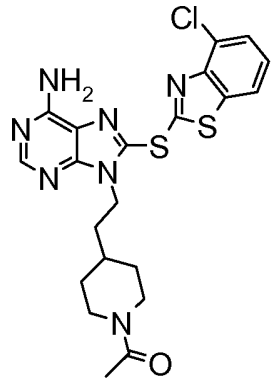
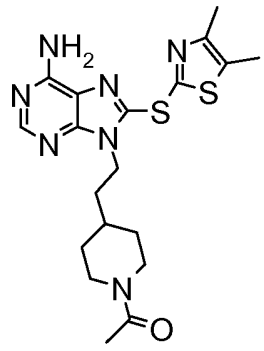
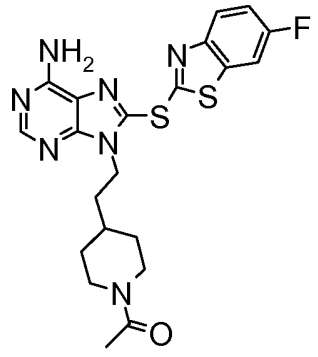
[00890] To a suspension of 5-nitro-2-mercaptobenzothiazole (0.040 g, 0.246 mmol) in DMF (1.0 mL) was added $(CH_3)_3COK$ (0.028 g, 0.246 mmol) at room temperature and stirring continued for 30 min. To the above reaction mixture 9-[2-(1-acetylpiperidin-4-yl)-ethyl]-8-bromo-9H-purin-6-amine (0.030 g, 0.082

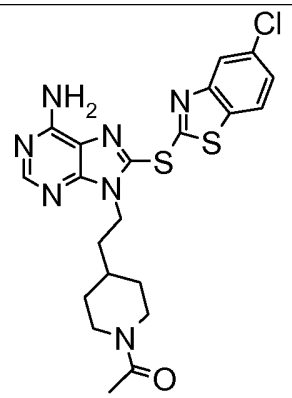
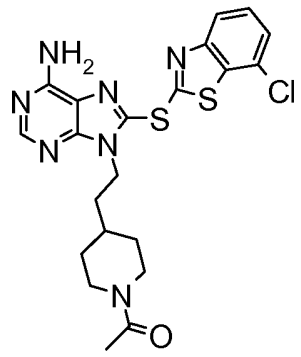
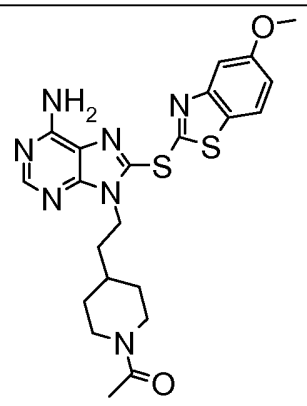
mmol) in (1 mL) of DMF was added at room temperature. The reaction mixture was heated to 130°C for 6h, at the end of this period solvent was evaporated and crude was purified by preparative HPLC [X-Terra prep-RP18 10 um, 19x250 mm(waters), Mobile phase: solvent A: Water HPLC grade containing 0.01% TFA, and solvent B: acetonitrile containing 0.01% TFA, general eluting gradient - solvent B 15% to 80 over 15 to 25 minutes run time]. After lyophilization of HPLC fractions to afford title product. 9-[2-(1-Acetylpiperidin-4-yl)ethyl]-8-[(6-nitro-1,3-benzothiazol-2-yl)thio]-9H-purin-6-amine. ^{1}H NMR (CD_3OD) δ 8.80 (s, 1H), 8.30 (d, J = 2.4 Hz, 1H), 8.00 (d, J = 9.2 Hz, 1H), 7.84 (s, 1H), 4.80 (t, J = 7.6 Hz, 2H), 3.90-3.80 (m, 2H), 3.20-3.10 (m, 3H), 3.10-2.60 (m, 3H), 2.00 (s, 3H), 1.94-1.80 (m, 3H).LC-MS $[M+H]^+$ 499.13

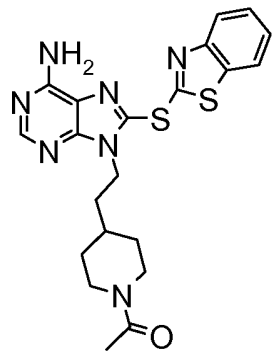
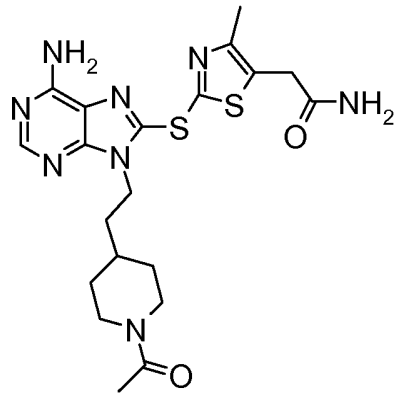
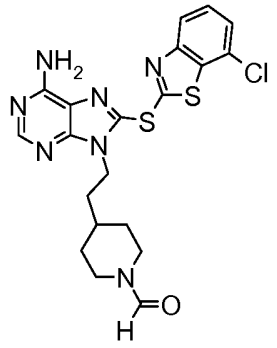
[00891] Examples 652- 661 were prepared according to the procedure described for example 651 using appropriate starting materials and their analytical data is summarized in table 11. All the compounds were isolated as a trifluoroacetate salt after preparative HPLC purification.

[00892] Table 11

Example	Structure	Name and analytical data
652		3-[2-(1-Acetylpiperidin-4-yl)ethyl]-8-[(6-nitro-1,3-benzothiazol-2-yl)thio]-3H-purin-6-amine. ^{1}H NMR (CD_3OD) δ 8.90 (d, J = 2.4 Hz, 1H), 8.36 (dd, J = 8.8, 2.4 Hz, 1H), 8.30 (s, 1H), 8.01 (d, J = 8.8 Hz, 1H), 4.40 (t, J = 7.6 Hz, 2H), 3.90-3.80 (m, 2H), 3.00-2.91 (m, 2H), 2.51-2.43 (m, 2H), 2.02 (s, 3H), 1.82-1.72 (m, 3H), 1.55-1.49 (m, 2H). LC-MS $[M+H]^+$ 499.13

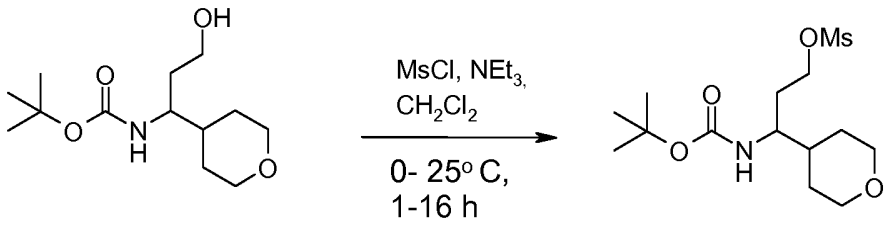
653		9-[2-(1-Acetylpiperidin-4-yl)ethyl]-8-[(4-chloro-1,3-benzothiazol-2-yl)thio]-9H-purin-6-amine. ^{1}H NMR (CD_3OD) δ 8.30 (s, 1H), 7.80 (d, J = 8.8 Hz, 1H), 7.50 (d, J = 8.8 Hz, 1H), 7.40-7.30 (m, 1H), 4.40 (t, J = 7.6 Hz, 2H), 3.80-3.78 (m, 2H), 3.00-2.90 (m, 2H), 2.50-2.40 (m, 2H), 2.35-2.15 (m, 2H), 2.00 (s, 3H), 1.80-1.70 (m, 3H). LC-MS $[M+H]^+$ 488.10
654		9-[2-(1-Acetylpiperidin-4-yl)ethyl]-8-[(4,5-dimethyl-1,3-thiazol-2-yl)thio]-9H-purin-6-amine. ^{1}H NMR (CD_3OD) δ 8.50 (s, 1H), 4.40 (t, J = 7.2 Hz, 2H), 3.90-3.87 (m, 2H), 2.60-2.51 (m, 2H), 2.50 (s, 3H), 2.30 (s, 3H), 2.00 (s, 3H), 1.90-1.80 (m, 3H), 1.70-1.60 (m, 2H), 1.60-1.50 (m, 2H). LC-MS $[M+H]^+$ 432.10
655		9-[2-(1-Acetylpiperidin-4-yl)ethyl]-8-[(6-fluoro-1,3-benzothiazol-2-yl)thio]-9H-purin-6-amine. ^{1}H NMR (CD_3OD) δ 8.40 (s, 1H), 7.90-7.80 (m, 1H), 7.74-7.70 (m, 1H), 7.33-7.30 (m, 1H), 4.50 (t, J = 7.2 Hz, 2H), 3.80-3.70 (m, 1H), 3.00-2.90 (m, 2H),

		2.00 (s, 3H), 1.80-1.70 (m, 4H), 1.50-1.40 (m, 2H), 1.20-1.00 (m, 2H). LC-MS $[M+H]^+$ 472.14
656		9-[2-(1-Acetylpiperidin-4-yl)ethyl]-8-[(5-chloro-1,3-benzothiazol-2-yl)thio]-9H-purin-6-amine. LC-MS $[M+H]^+$ 488.01
657		9-[2-(1-Acetylpiperidin-4-yl)ethyl]-8-[(7-chloro-1,3-benzothiazol-2-yl)thio]-9H-purin-6-amine. ^{1}H NMR (CD_3OD) δ 8.30 (s, 1H), 7.85-7.83 (m, 1H), 7.50-7.40 (m, 2H), 4.50 (t, J = 7.2 Hz, 2H), 3.83-3.80 (m, 2H), 3.00-2.90 (m, 2H), 2.50-2.40 (m, 2H), 2.10 (s, 3H), 2.00-1.90 (m, 3H), 1.50-1.40 (m, 2H). LC-MS $[M+H]^+$ 488.12
658		9-[2-(1-Acetylpiperidin-4-yl)ethyl]-8-[(5-methoxy-1,3-benzothiazol-2-yl)thio]-9H-purin-6-amine. ^{1}H NMR (CD_3OD) δ 8.30 (s, 1H), 7.70 (d, J = 8.8 Hz, 1H), 7.40 (d, J = 2.4 Hz, 1H), 7.00 (dd, J = 8.8, 2.4 Hz, J = 8.8 Hz, 1H), 4.40 (t, J = 7.6 Hz, 2H), 3.90

		(s, 3H), 3.50-3.40 (m, 2H), 3.14-3.12 (m, 2H), 2.20 (s, 3H), 1.72-1.70 (m, 3H), 1.30-1.20 (m, 4H). LC-MS $[M+H]^+$ 484.15
659		9-[2-(1-Acetylpiperidin-4-yl)ethyl]-8-(1,3-benzothiazol-2-ylthio)-9H-purin-6-amine. ^1H NMR (CD_3OD) δ 8.30 (s, 1H), 7.93-7.90 (m, 2H), 7.50-7.40 (m, 2H), 4.40 (t, J = 7.6 Hz, 2H), 3.81-3.80 (m, 2H), 3.14-3.12 (m, 2H), 3.00-2.90 (m, 2H), 2.20 (s, 3H), 1.80-1.70 (m, 2H), 1.50-1.40 (m, 3H). LC-MS $[M+H]^+$ 454.15
660		2-[2-({9-[2-(1-Acetylpiperidin-4-yl)ethyl]-6-amino-9H-purin-8-yl}thio)-4-methyl-1,3-thiazol-5-yl]acetamide. LC-MS $[M+H]^+$ 475.16.
661		4-(2-{6-Amino-8-[(7-chloro-1,3-benzothiazol-2-yl)thio]-9H-purin-9yl}-ethyl)-piperidin-1-carbaldehyde.LC-MS $[M+H]^+$ 474.0

[00893] Intermediate 115

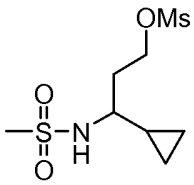
Methanesulfonic acid 3-tert-butoxycarbonylamino-3-(tetrahydro-pyran-4-yl)-propyl ester.



[00894] To a solution of [3-hydroxy-1-(tetrahydro-pyran-4-yl)-propyl]-carbamic acid tert-butyl ester (0.200 g, 0.770 mmol) and NEt_3 (192 μL, 0.920 mmol) in CH_2Cl_2 (8 mL) was added MsCl (72 μL, 0.92 mmol) at 0 °C and the mixture was stirred at room temperature for 10 h. The solvent was evaporated to dryness and EtOAC was added. The ethyl acetate layer was washed with aq. $NaHCO_3$, dried (Na_2SO_4), filtered, and solvent was evaporated under reduced pressure to afford methanesulfonic acid 3-tert-butoxycarbonylamino-3-(tetrahydro-pyran-4-yl)-propyl ester (0.162g). LC-MS [M+Na] 360.2. The product was sufficiently pure for the next step and used without further purification.

[00895] Intermediate 116

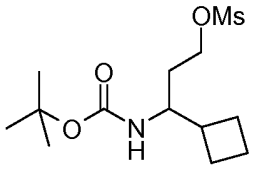
[00896] Methanesulfonic acid 3-cyclopropyl-3-methanesulfonylamino-propyl ester



[00897] The title compound (0.120 g) was prepared from N-(1-cyclopropyl-3-hydroxy-propyl)-methanesulfonamide according to the procedure described intermediate 115. The product was used for the next step without further purifications.

[00898] Intermediate 117

[00899] Methanesulfonic acid 3-tert-butoxycarbonylamino-3-cyclobutyl-propyl ester

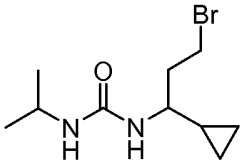


[00900] To a solution of 3-tert-butoxycarbonylamino-3-cyclobutyl-propionic acid (0.300 g, 1.23 mmol) in THF (12 mL) was added BH_3-SMe_2 (1.70 mL, 3.33 mmol; 2.0 M solution in THF) at 0 °C. After stiriring at rt for 10h, the reaction mixture was quenched with satd. $NaHCO_3$, extracted with EtOAc, washed with brine, dried (Na_2SO_4), and concentrated in vacuo to afford (1-cyclobutyl-3-hydroxy-propyl)-carbamic acid tert-butyl ester (0.100 g); LC-MS $[M+H]^+$ 230.0. The product is sufficiently pure for the next step and used for the next step without further purification.

[00901] The title product (0.082 g) was prepared using the above alcohol by similar procedure described for intermediate 115. LC-MS $[M+H]^+$ 308.3.

[00902] Intermediate 118

[00903] 1-(3-Bromo-1-cyclopropyl-propyl)-3-isopropyl-urea



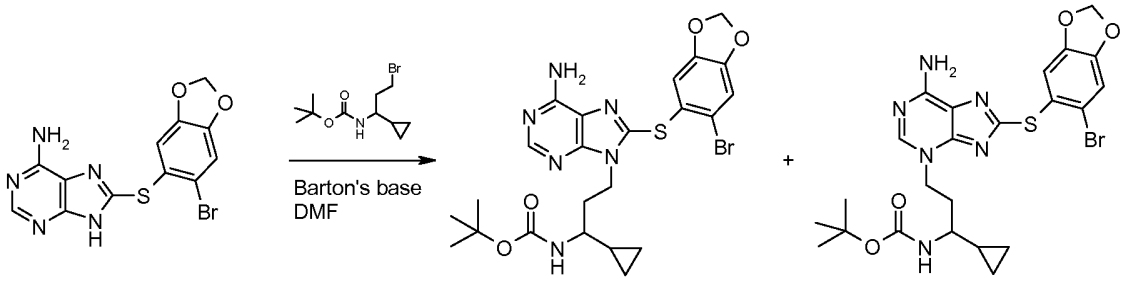
[00904] To a solution of 3-amino-3-cyclopropan-1-ol hydrochloride (0.25 g, 1.65 mmol) and NEt_3 (690 μL, 4.95 mmol) in CH_3CN (5 mL) was added 2-isocyanatopropane (180 μL, 1.80 mmol) at 0 °C. After stirring for 10 h at rt, the reaction mixture was quenched with H_2O and extracted with EtOAC, washed with brine, dried (Na_2SO_4), filtered, and concentrated in vacuo to furnish 1-(1-cyclopropyl-3-hydroxy-propyl)-3-isopropyl-urea (0.189 g).

[00905] The1-(1-cyclopropyl-3-hydroxy-propyl)-3-isopropyl-urea (0.189 g, 0.950 mmol) was then dissolved in CH_2Cl_2 (10 mL) and CBr_4 (0.477 g, 1.40 mmol) was added and the mixture was cooled to 0°C. To the mixture was added PPh_3-polymer-bound resin (0.889 g, 1.40 mmol; 1.6 mmol/g) in portionwise. After stirring for at rt for 3 h, the mixture was diluted with CH_2Cl_2 (50 mL), filtered, and

washed with CH_2Cl_2/MeOH/Acetone. The combined filtrates were concentrated in vacuo to give 1-(3-Bromo-1-cyclopropyl-propyl)-3-isopropyl-urea (0.212 g). GC-MS m/z 262.

[00906] Examples 662 and 663

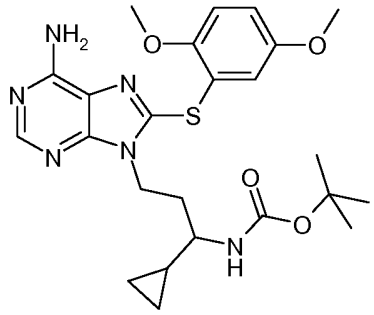
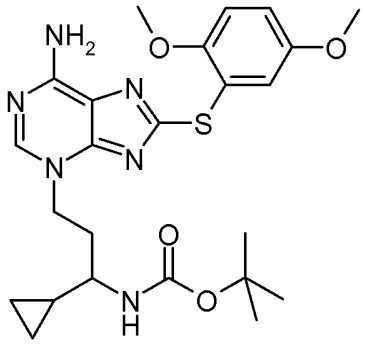
[00907] *tert*-Butyl (3-{6-amino-8-[(6-bromo-1,3-benzodioxol-5-yl)thio]-9H-purin-9-yl}-1-cyclopropylpropyl)carbamate and *tert*-butyl (3-{6-amino-8-[(6-bromo-1,3-benzodioxol-5-yl)thio]-3H-purin-3-yl}-1-cyclopropylpropyl)carbamate

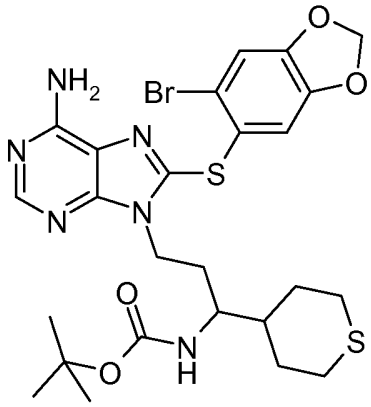
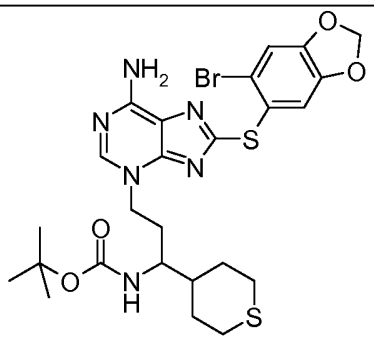
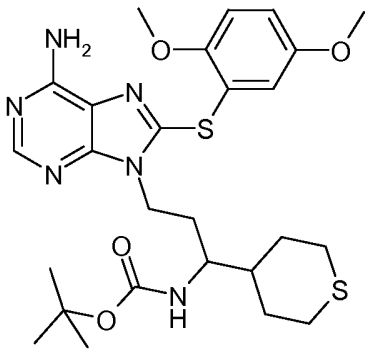


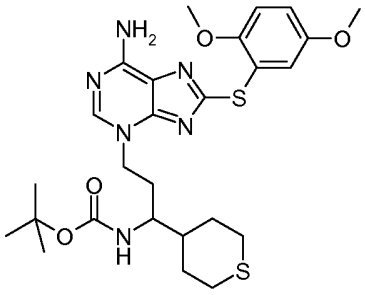
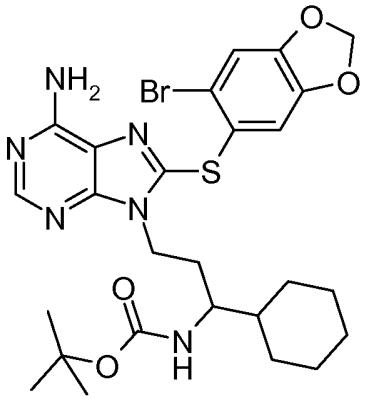
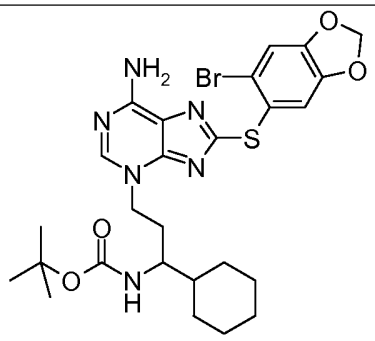
[00908] A mixture of 8-(6-Bromo-benzo[1,3]dioxol-5-ylsulfanyl)-9H-purin-6-ylamine (0.145 g, 0.396 mmol), (3-bromo-1-cyclopropyl-propyl)-carbamic acid tert-butyl ester (0.228 g, 0.82 mmol), and Barton's base (0.140 g, 0.82 mmol) in DMF (4 mL) was heated at 80-100 °C for 6-15 h. After cooling, the reaction mixture was concentrated under reduced pressure. The residue was purified by preparative HPLC [X-Terra prep-RP18 10 um, 19x250 mm(waters), Mobile phase: solvent A: Water HPLC grade containing 0.01% TFA, and solvent B: acetonitrile containing 0.01% TFA, general eluting gradient - solvent B 15% to 80 over 15 to 25 minutes run time]. After lyophilization of HPLC fractions N-9 and N-3 isomers were isolated as trifluoroacetate salts. *tert*-Butyl (3-{6-amino-8-[(6-bromo-1,3-benzodioxol-5-yl)thio]-9H-purin-9-yl}-1-cyclopropylpropyl)carbamate. ^{1}H NMR (DMSO-d_6) δ 8.17 (s, 1H), 7.37 (s, 1H), 6.79 (s, 1H), 6.10 (s, 2H), 4.20-4.19 (m, 2H), 2.90-2.85 (m, 2H), 2.00-1.80 (m, 2H), 1.38 (s, 9H), 0.40-0.20 (m, 4H); LC-MS $[M+H]^+$ 563.10. *tert*-Butyl (3-{6-amino-8-[(6-bromo-1,3-benzodioxol-5-yl)thio]-3H-purin-3-yl}-1-cyclopropylpropyl)carbamate. ^{1}H NMR (DMSO-d_6) δ 8.49 (s, 1H), 7.51 (s, 1H), 7.40 (s, 1H), 6.18 (s, 2H), 4.35-4.30 (m, 2H), 2.92-2.85 (m, 2H), 2.20-1.50 (m, 6H), 1.38 (s, 9H); LC-MS $[M+H]^+$ 563.10.

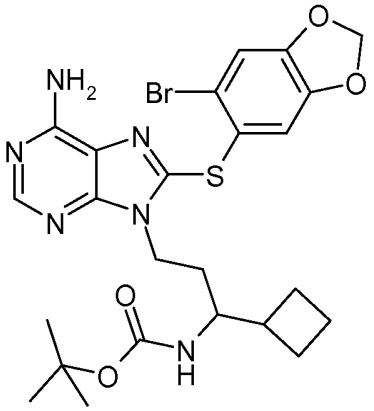
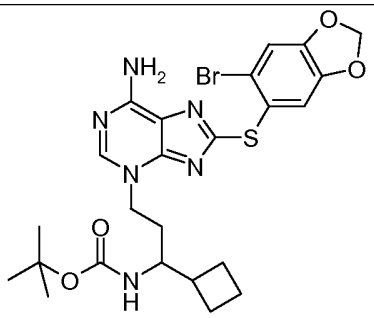
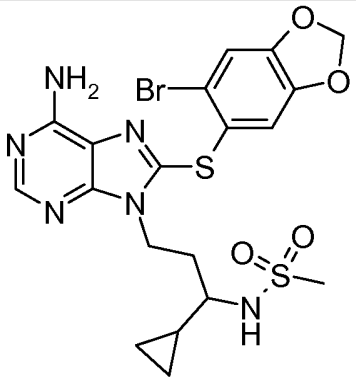
[00909] Examples 664- 685 were synthesized analogously to the procedure described for examples 662and 663 using appropriate starting materials and are isolated as a trifluoroacetate salt after preparative HPLC purification.

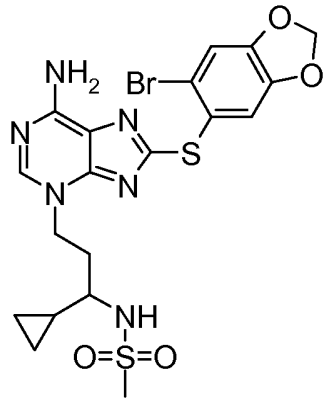
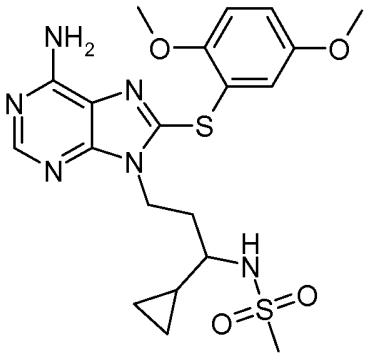
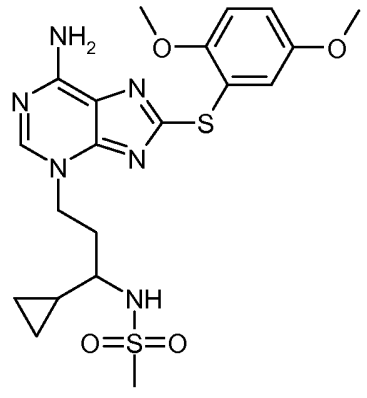
[00910] Table 12

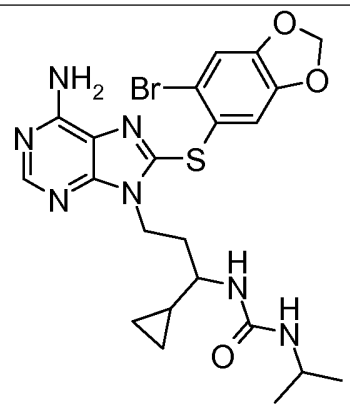
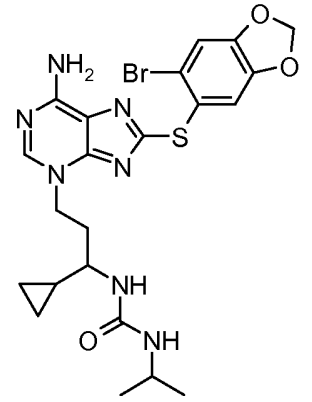
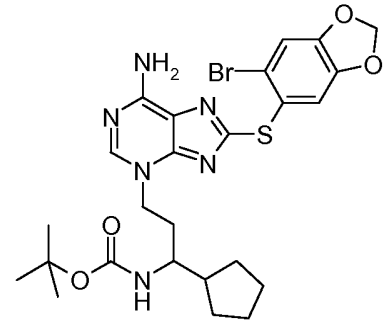
Example #	Structure	Name and analytical data
664		*tert*-Butyl (3-{6-amino-8-[(2,5-dimethoxyphenyl)thio]-9H-purin-9-yl}-1-cyclopropylpropyl)carbamate.^{1}H NMR (DMSO-d_6) δ 8.26 (s, 1H), 7.03 (d, J= 9.2 Hz, 1H), 6.89-6.86 (m, 2H), 6.52 (s, 1H), 4.30-4.15 (m, 2H), 3.74 (s, 3H), 3.70-3.50 (m, 2H), 3.62 (s, 3H), 2.85-2.80 (m, 1H), 2.05-1.85 (m, 1H), 1.36 (s, 9H), 0.40-0.20 (m, 4H); LC-MS $[M+H]^+$ 501.2.
665		*tert*-Butyl (3-{6-amino-8-[(2,5-dimethoxyphenyl)thio]-3H-purin-3-yl}-1-cyclopropylpropyl)carbamate LC-MS $[M+H]^+$ 501.2

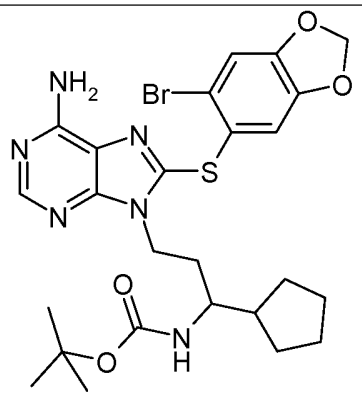
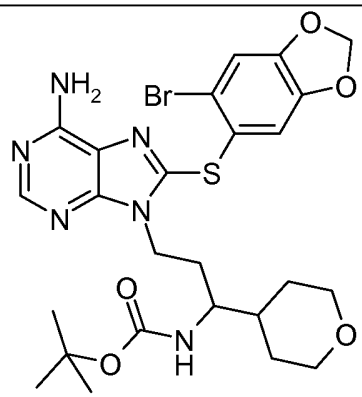
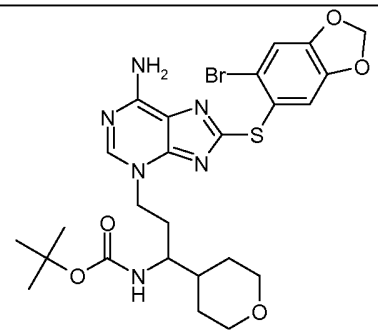
666		*tert*-Butyl [3-{6-amino-8-[(6-bromo-1,3-benzodioxol-5-yl)thio]-9H-purin-9-yl}-1-(tetrahydro-2H-thiopyran-4-yl)propyl]carbamate. ^{1}H NMR (DMSO-d_6) δ 8.26 (s, 1H), 7.39 (s, 1H), 6.81 (s, 1H), 6.09 (s, 2H), 4.20-4.10 (m, 2H), 3.45-3.30 (m, 2H), 2.54-2.49 (m, 2H), 1.90-1.70 (m, 4H), 1.38 (s, 9H), 1.30-1.10 (m, 4H); TOF LC-MS $[M+H]^+$ 623.1.
667		*tert*-Butyl [3-{6-amino-8-[(6-bromo-1,3-benzodioxol-5-yl)thio]-3H-purin-3-yl}-1-(tetrahydro-2H-thiopyran-4-yl)propyl]carbamate. LC-MS $[M+H]^+$ 623.1
668		*tert*-Butyl [3-{6-amino-8-[(2,5-dimethoxyphenyl)thio]-9H-purin-9-yl}-1-(tetrahydro-2H-thiopyran-4-yl)propyl]carbamate. ^{1}H NMR (Acetone-d_6) δ 8.35 (s, 1H), 7.06 (d, J=8.4 Hz, 1H), 6.93 (dd, J= 8.4 Hz, 2.8 Hz, 1H), 6.76 (d, J= 2.8 Hz, 1H), 4.40-4.30 (m, 2H), 3.83 (s, 3H), 3.69 (s, 3H), 3.50-3.40 (m, 1H), 2.65-2.50 (m, 5H), 2.10-1.80 (m, 4H), 1.41 (s, 9H); LC-MS $[M+H]^+$ 561.05.

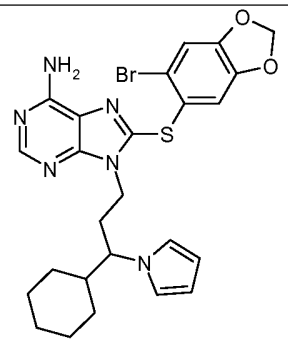
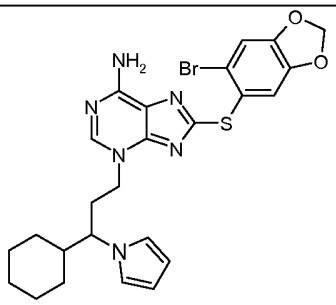
669		*tert*-Butyl [3-{6-amino-8-[(2,5-dimethoxyphenyl)thio]-3H-purin-3-yl}-1-(tetrahydro-2H-thiopyran-4-yl)propyl]carbamate. ^{1}H NMR (Acetone-d_6) δ 8.50 (s, 1H), 7.29 (d, J= 2.8 Hz, 1H), 7.01 (d, J= 8.8 Hz, 1H), 7.03 (dd, J= 8.8, 2.8 Hz, 1H), 4.50-4.39 (m, 2H), 3.81 (s, 3H), 3.79 (s, 3H), 3.58-3.50 (m, 4H), 2.65-2.50 (m, 3H), 2.10-1.80 (m, 5H), 1.41 (s, 9H); LC-MS $[M+H]^+$ 561.3.
670		*tert*-Butyl (3-{6-amino-8-[(6-bromo-1,3-benzodioxol-5-yl)thio]-9H-purin-9-yl}-1-cyclohexylpropyl)carbamate. ^{1}H NMR (DMSO-d_6) δ 8.18 (s, 1H), 7.37 (s, 1H), 6.70 (s, 1H), 6.08 (s, 2H), 4.17-4.15 (m, 2H), 3.30-3.20 (m, 2H), 2.50-2.40 (m, 2H), 1.80-1.50 (m, 6H), 1.38 (s, 9H), 1.20-0.80 (m, 4H); LC-MS $[M+H]^+$ 605.1.
671		*tert*-Butyl (3-{6-amino-8-[(6-bromo-1,3-benzodioxol-5-yl)thio]-3H-purin-3-yl}-1-cyclohexylpropyl)carbamate. ^{1}H NMR (DMSO-d_6) δ 8.46 (s, 1H), 7.50 (s, 1H), 7.38 (s, 1H), 6.18 (s, 2H), 4.33-4.22 (m, 2H), 3.27-3.15 (m, 2H), 2.50-2.40 (m, 2H), 1.80-1.50 (m, 6H), 1.39 (s, 9H), 1.20-0.80 (m, 4H); LC-MS $[M+H]^+$ 605.1.

672		*tert*-Butyl (3-{6-amino-8-[(6-bromo-1,3-benzodioxol-5-yl)thio]-9H-purin-9-yl}-1-cyclobutylpropyl)carbamate. ^{1}H NMR (CD_3OD) δ 8.25 (s, 1H), 7.26 (s, 1H), 7.16 (s, 1H), 6.08 (s, 2H), 4.40-4.28 (m, 2H), 3.49-3.4 (m, 4H), 1.90-1.50 (m, 6H), 1.43 (s, 9H); LC-MS $[M+H]^+$ 577.1.
673		*tert*-Butyl (3-{6-amino-8-[(6-bromo-1,3-benzodioxol-5-yl)thio]-3H-purin-3-yl}-1-cyclobutylpropyl)carbamate. ^{1}H NMR (CD_3OD) δ 8.41 (s, 1H), 7.35 (s, 1H), 7.30 (s, 1H), 6.14 (s, 2H), 4.40-4.28 (m, 2H), 3.57-3.52 (m, 4H), 1.90-1.60 (m, 6H), 1.43 (s, 9H); LC-MS $[M+H]^+$ 577.1
674		N-(3-{6-Amino-8-[(6-bromo-1,3-benzodioxol-5-yl)thio]-9H-purin-9-yl}-1-cyclopropylpropyl)methanesulfonamide ^{1}H NMR (Acetone-d_6) δ 8.39 (s, 1H), 7.27 (s, 1H), 7.05 (s, 1H), 6.14 (s, 2H), 4.54-4.40 (m, 2H), 3.30-3.20 (m, 1H), 3.02 (s, 3H), 2.98-2.87 (m, 3H), 2.20-2.19 (m, 2H), 2.08-2.04 (m, 2H); TOF LC- MS $[M+H]^+$ 541.4

675		N-(3-{6-Amino-8-[(6-bromo-1,3-benzodioxol-5-yl)thio]-3H-purin-3-yl}-1-cyclopropylpropyl)methanesulfonamide. ^{1}H NMR (Acetone-d_6) δ 8.56 (s, 1H), 7.34 (s, 1H), 7.28 (s, 1H), 6.17 (s, 2H), 4.59-4.50 (m, 2H), 3.30-3.20 (m, 1H), 3.10-3.04 (m, 6H), 3.01 (s, 3H), 2.98-2.87 (m, 1H); TOF LC-MS $[M+H]^+$ 541.4.
676		N-(3-{6-Amino-8-[(2,5-dimethoxyphenyl)thio]-9H-purin-9-yl}-1-cyclopropylpropyl)methanesulfonamide ^{1}H NMR (Acetone-d6) δ 8.38 (s, 1H), 7.06 (d, J= 7.6Hz, 1H), 6.96 (d, J=7.6 Hz, 1H), 6.87 (s, 1H), 4.52-4.47 (m, 2H), 3.81 (s, 3H), 3.71 (s, 3H), 3.30 (s, 3H), 2.90-2.80 (m, 3H), 2.20-2.00 (m, 4H), 1.10-1.00 (m, 1H); LC-MS $[M+H]^+$ 479.4.
677		N-(3-{6-Amino-8-[(2,5-dimethoxyphenyl)thio]-3H-purin-3-yl}-1-cyclopropylpropyl)methanesulfonamide ^{1}H NMR (Acetone-d_6) δ 8.56 (s, 1H), 7.26 (d, J= 2.8Hz, 1H), 7.08 (d, J=9.2 Hz, 1H), 7.01 (dd, J=9.2, 2.8Hz, 1H), 4.59-4.53 (m, 2H), 3.80 (s, 3H), 3.79 (s, 3H), 3.30-3.04 (m, 6H), 1.90-1.70 (m, 5H); LC-MS $[M+H]^+$ 479.4.

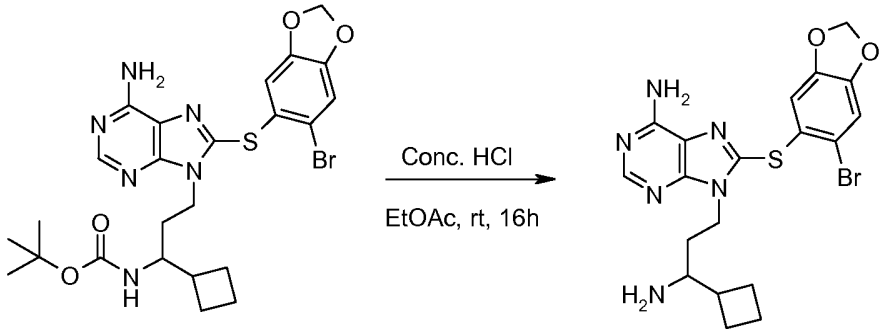
678		N-(3-{6-Amino-8-[(6-bromo-1,3-benzodioxol-5-yl)thio]-9H-purin-9-yl}-1-cyclopropylpropyl)-N'-isopropylurea ^{1}H NMR (DMSO-d_6) δ 8.28 (s, 1H), 7.39 (s, 1H), 6.91 (s, 1H), 6.10 (s, 2H), 5.72-5.70 (m, 1H), 5.61-5.58 (m, 1H), 4.22 (t, J= 7.6 Hz, 2H), 3.11-3.08 (m, 2H), 1.94-1.84 (m 1H), 1.02-0.99 (m, 6H),0.83-0.80(m, 2H), 0.40-0.11 (m, 4H); LC-MS $[M+H]^+$ 548.3
679		N-(3-{6-Amino-8-[(6-bromo-1,3-benzodioxol-5-yl)thio]-3H-purin-3-yl}-1-cyclopropylpropyl)-N'-isopropylurea. LC-MS $[M+H]^+$ 548.4
680		{3-[6-Amino-8-(6-bromo-benzo[1,3]dioxol-5-ylsulfanyl)-purin-3-yl]-1-cyclopentyl-propyl}-carbamic acid tert-butyl ester. ^{1}H NMR (Acetone-d_6) δ 8.43 (s, 1H), 7.46 (s, 1H), 6.81 (s, 1H), 6.14 (s, 2H), 4.35-4.20 (m, 2H), 3.20-3.18 (m, 3H), 1.84-1.40 (m, 9H), 1.37 (s, 9H); LC-MS $[M+H]^+$ 591.1

681		{3-[6-Amino-8-(6-bromo-benzo[1,3]dioxol-5-ylsulfanyl)-purin-9-yl]-1-cyclopentyl-propyl}-carbamic acid *tert*-butyl ester. ^{1}H NMR (Acetone-d_6) δ 8.16 (s, 1H), 7.34 (s, 1H), 6.74 (s, 1H), 6.06 (s, 2H), 4.17-4.10 (m, 2H), 3.38-3.20 (m, 3H), 1.80-1.40 (m, 9H), 1.36 (s, 9H); TOF LC-MS $[M+H]^+$ 591.14
682		[3-[6-Amino-8-(6-bromo-benzo[1,3]dioxol-5-ylsulfanyl)-purin-9-yl]-1-(tetrahydro-pyran-4-yl)-propyl]-carbamic acid *tert*-butyl ester. ^{1}H NMR (Acetone-d_6) δ 8.19 (s, 1H), 7.36 (s, 1H), 6.76 (s, 1H), 6.06 (s, 2H), 4.20-4.10 (m, 2H), 3.80-3.70 (m, 3H), 3.25-3.10 (m, 4H), 2.50-2.40 (m, 5H), 1.36 (s, 9H); LC-MS $[M+H]^+$ 607.1
683		[3-[6-Amino-8-(6-bromo-benzo[1,3]dioxol-5-ylsulfanyl)-9H-purin-3-yl]-1 -(tetrahydro-pyran-4-yl)-propyl]-carbamic acid *tert*-butyl ester. ^{1}H NMR (Acetone-d_6) δ 8.45 (s, 1H), 7.48 (s, 1H), 6.81 (s, 1H), 6.15 (s, 2H), 4.35-4.20 (m, 2H), 3.80-3.70 (m, 3H), 3.25-3.10 (m, 4H), 2.50-2.40 (m, 5H), 1.37 (s, 9H); LC-MS $[M+H]^+$ 607.1

684		8-[(6-Bromo-1,3-benzodioxol-5-yl)thio]-9-[3-cyclohexyl-3-(1*H*-pyrrol-1-yl)propyl]-9*H*-purin-6-amine. ^{1}H NMR (CD_3OD) δ 8.23 (s, 1H), 7.26 (s, 1H), 7.08 (s, 1H), 6.70-6.80 (m, 2H), 6.07 (s, 2H), 6.04-6.02 (m, 2H), 4.23-4.16 (m, 2H), 3.95-3.85 (m, 1H), 3.78-3.70 (m, 2H), 2.38-2.38 (m, 2H), 1.80-1.70 (m,3H), 1.68-1.55 (m, 4H), 1.30-1.10 (m, 2H); LC-MS $[M+H]^+$ 555.1
685		8-[(6-Bromo-1,3-benzodioxol-5-yl)thio]-3-[3-cyclohexyl-3-(1*H*-pyrrol-1-yl)propyl]-3*H*-purin-6-amine. ^{1}H NMR (CD_3OD) δ 7.93 (s, 1H), 7.30 (s, 1H), 7.25 (s, 1H), 6.59 (m, 2H), 6.11 (s, 2H), 6.00-5.98 (m, 2H), 4.20—4.09 (m, 2H), 3.70-3.60 (m, 2H), 3.36 – 3.25 (m, 1H), 2.60-2.40 (m, 2H), 1.81-1.70 (m, 3H), 1.65-1.51 (m, 4H), 1.30-1.10 (m, 2H); LC-MS $[M+H]^+$ 555.1

[00911] Example 686

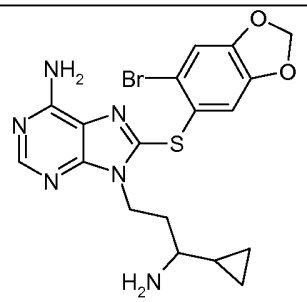
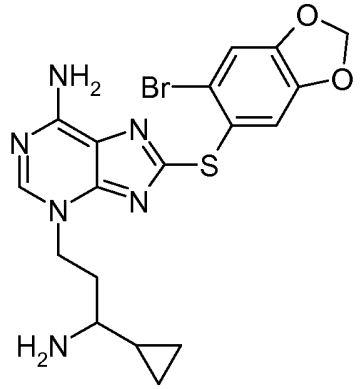
[00912] 9-(3-Amino-3-cyclobutylpropyl)-8-[(6-bromo-1,3-benzodioxol-5-yl)thio]-9H-purin-6-amine.

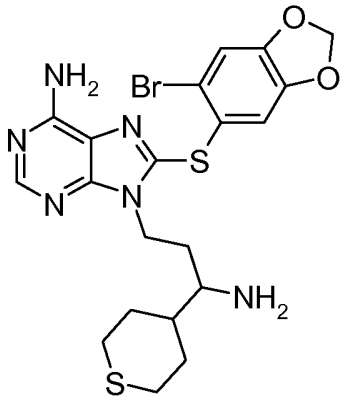
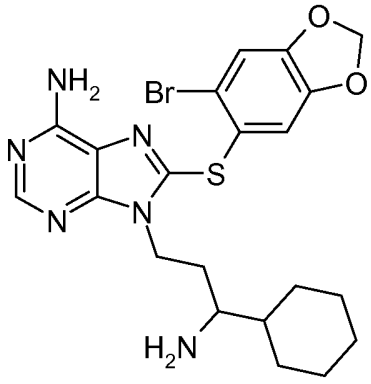
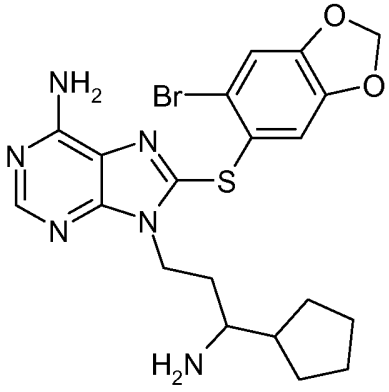


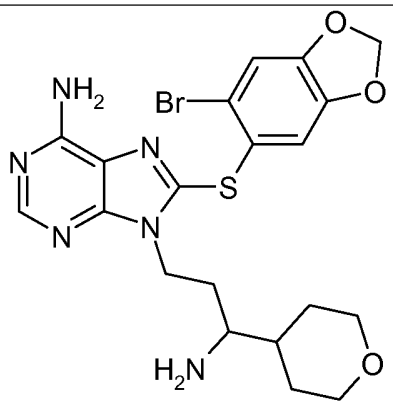
[00913] To a solution of *tert*-Butyl (3-{6-amino-8-[(6-bromo-1,3-benzodioxol-5-yl)thio]-9H-purin-9-yl}-1-cyclobutylpropyl)carbamate (0.015 g, 0.026 mmol) in EtOAc (2 mL) was added dropwise conc. HCl (1 mL) and the resulting mixture was stirred for overnight at room temperature. After concentration under reduced pressure, the residual HCl was removed by co-evaporation with toluene afford title product (0.005 g) as a hydrochloride salt. ^{1}H MNR (CD_3OD) δ 8.33 (s, 1H), 7.29 (s, 1H), 7.19 (s, 1H), 6.09 (s, 2H), 4.40-4.28 (m, 2H), 3.49-3.40 (m, 4H), 2.50-1.70 (m, 6H); LC-MS $[M+23]^+$ 477.9.

[00914] Examples 687- 692 were synthesized in the same manner as described for example 686 using appropriate starting materials and are isolated as a hydrochloride salts.

[00915] Table 13

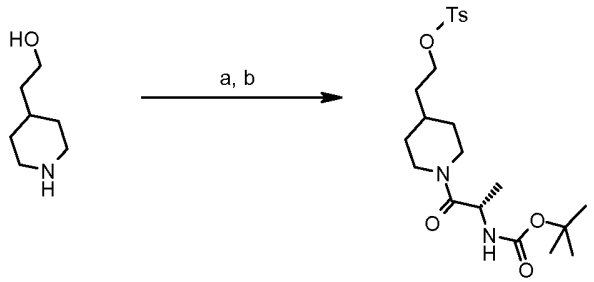
Example	Structure	Analytical data
687		9-(3-Amino-3-cyclopropylpropyl)-8-[(6-bromo-1,3-benzodioxol-5-yl)thio]-9H-purin-6-amine. ^{1}H NMR (DMSO-d_6) δ 8.30 (s, 1H), 7.41 (s, 1H), 6.93 (s, 1H), 6.11 (s, 2H), 4.35 (t, J= 7.6 Hz, 2H), 2.56-2.52 (m, 1H), 2.20-2.00 (m, 2H), 0.95-0.80 (m, 1H), 0.64-0.41 (m, 4H); LC-MS $[M+H]^+$ 463.0
688		3-(3-Amino-3-cyclopropylpropyl)-8-[(6-bromo-1,3-benzodioxol-5-yl)thio]-3H-purin-6-amine. ^{1}H NMR (DMSO-d_6) δ 8.56 (s, 1H), 7.94 (s, 1H), 7.47 (s, 1H), 6.16 (s, 2H), 4.44 (t, J= 7.2 Hz, 2H), 2.51-2.49 (m, 1H), 2.32-2.29 (m, 2H), 0.95-0.84 (m, 1H), 0.59-0.40 (m, 4H); LC-MS

		$[M+H]^+$ 463.0
689		9-[3-Amino-3-(tetrahydro-2H-thiopyran-4-yl)propyl]-8-[(6-bromo-1,3-benzodioxol-5-yl)thio]-9H-purin-6-amine. ^{1}H NMR (DMSO-d_6) δ 8.36 (s, 1H), 7.42 (s, 1H), 6.91 (s, 1H), 6.11 (s, 2H), 4.42-4.22 (m, 2H), 3.10-3.6 (m, 2H), 2.67-2.52 (m, 4H), 1.9-1.8 (m, 4H), 1.43-1.20 (m, 2H); LC-MS $[M+H]^+$ 523.0
690		9-(3-Amino-3-cyclohexylpropyl)-8-[(6-bromo-1,3-benzodioxol-5-yl)thio]-9H-purin-6-amine. ^{1}H NMR δ (DMSO-d_6) 8.22 (s, 1H), 7.40 (s, 1H), 6.78 (s, 1H), 6.08 (s, 2H), 4.17-4.15 (m, 2H), 3.30-3.20 (m, 2H), 2.33-2.30 (m, 2H), 1.80-1.50 (m, 6H), 1.20-0.80 (m, 4H); LC-MS $[M+H]^+$ 505.1.
691		9-(3-Amino-3-cyclopentyl-propyl)-8-(6-bromo-benzo[1,3]dioxol-5-ylsulfanyl)-9H-purin-6-ylamine. ^{1}H NMR (Acetone-d_6) δ 8.18 (s, 1H), 7.36 (s, 1H), 6.77 (s, 1H), 6.07 (s, 2H), 4.35-4.25 (m, 2H), 3.38-3.20 (m, 3H), 1.70-1.50 (m, 9H); LC-MS $[M+H]^+$ 491

692		9-[3-Amino-3-(tetrahydro-pyran-4-yl)-propyl]-8-(6-bromo-benzo[1,3]dioxol-5-ylsulfanyl)-9H-purin-6-ylamine. ^{1}H NMR (Acetone-d_6) δ 8.36 (s, 1H), 7.39 (s, 1H), 6.89 (s, 1H), 6.09 (s, 2H), 4.4-4.25 (m, 2H), 3.87-3.85 (m, 3H), 3.25-3.19 (m, 4H), 1.98-1.96 (m, 4H); LC-MS $[M+H]^+$ 507.0

[00916] Intermediate 119

[00917] Toluene-4-sulfonic acid 2-[1-((*S*)-2-*tert*-butoxycarbonylamino-propionyl)-piperidin-4-yl]-ethyl ester



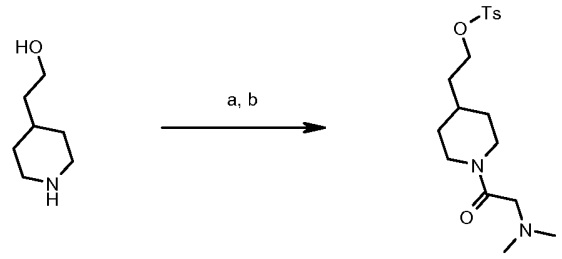
[00918] Reagents : (a) N-boc-L-Ala-OSu, Et_3N, DMF, 120 °C, (b) *p*-TsCl, Et_3N, cat. DMAP, THF.

[00919] To a solution of 4-piparidine ethanol (0.25 g, 1.93 mmol) and NEt_3 (403 µL, 2.89 mmol) in DMF (3 mL) was added N-boc-L-Ala-Osu (0.553 g, 193 mmol) at rt and the mixture was stirred at 120 °C temperature for 10 h. The reaction mixture was diluted with EtOAc (60 mL). The ethyl acetate layer was washed with H_2O (60 mL) and brine (60 mL), dried over Na_2SO_4, filtered, and solvent was evaporated under reduced pressure to afford {(S)-2-[4-(2-Hydroxy-ethyl)-piperidin-

1-yl]-1-methyl-2-oxo-ethyl}-carbamic acid tert-butyl ester (0.581 g). LC-MS $[M+H]^+$ 301.0. The product was sufficiently pure for the next step and used without further purification. To the mixture of alcohol (0.581 g, 1.93 mmol), triethyl amine (808 μL, 5.8 mmol), N,N-dimethyl pyridine (10 mg) in THF (10 mL) was added *p*-TsCl (0.479 g, 2.51 mmol) at room temperature and stirred the reaction mixture for 12 h. The reaction mixture was concentrated under vacuum and diluted with EtOAc (90 mL), washed with sat. aq. $NaHCO_3$ solution (75 mL), H_2O (75 mL) and brine (75 mL). The EtOAc layer was dried over Na_2SO_4, filtered, and solvent was evaporated under reduced pressure to afford crude product. The crude was purified by Isco silica gel flash column using Hexane-EtOAc (1:3) to give pure toluene-4-sulfonic acid 2-[1-((S)-2-tert-butoxycarbonylamino-propionyl)-piperidin-4-yl]-ethyl ester (0.805 g). ^1H NMR ($CDCl_3$) δ 7.79 (d, J = 8.2 Hz, 2H), 7.36 (d, J = 8.2 Hz, 2H), 5.55 (d, J = 7.8 Hz, 1H), 4.62-4.50 (m, 2H), 4.06 (q, J = 6.2 Hz, 2H), 3.88-3.75 (m, 1H), 2.97 (q, J = 12.1 Hz, 1H), 2.53 (dt, J = 2.7, 12.8 Hz, 1H), 2.46 (s, 3H), 1.75-1.55 (m, 4H), 1.49-1.40 (m, 10 H), 1.27 (d, J = 7.0 Hz, 3H), 1.12-0.98 (m, 2H); LC-MS $[M+H]^+$ 455.2.

[00920] Intermediate 120

[00921] Toluene-4-sulfonic acid 2-[1-(2-dimethylamino-acetyl)-piperidin-4-yl]-ethyl ester



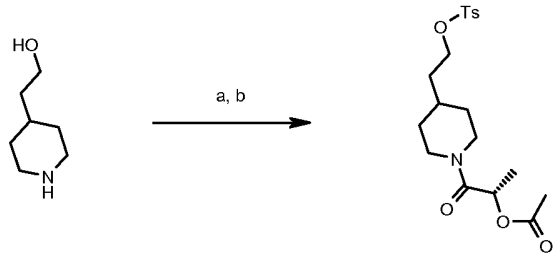
[00922] Reagents: (a) Me_2NCH_2COOH, EDCI, DMAP, DMF. (b) *p*-TsCl, Et_3N, cat. DMAP, THF

[00923] To the mixture of N,N-dimethylamino pyridine (1.18 g, 9.66 mmol), EDCI (1.48 g, 7.73 mmol), in DMF (5 mL) was added carboxylic acid (0.398 g, 3.86 mmol), then followed by the addition of 4-piperadinethanol (0.5 g,

3.86 mmol). The reaction mixture was allowed to stir at room temperature for 12 h. The reaction mixture was diluted with EtOAc (75 mL) and washed with brine (60 mL). The EtOAc layer was dried over Na_2SO_4, filtered, and solvent was evaporated under reduced pressure to afford crude amide. The crude was used for the next tosylation reaction without further purification. To the above crude product (0.827 g, 3.86 mmol), triethyl amine (3.22 mL, 23.18 mmol), in THF (20 mL) was added tosyl chloride (2.21 g, 11.59 mmol) at room temperature and stirred for 12 h. The reaction mixture was concentrated *in vacuo* and the crude was dissolved in EtOAc (100 mL), washed with sat. aq. $NaHCO_3$ solution (90 mL), followed by brine (90 mL). The EtOAc layer was dried over Na_2SO_4, filtered, and solvent was evaporated under reduced pressure to afford crude product, which was purified by Isco silica gel flash column using Hexane-EtOAc (1:9) to obtain 0.45 g of toluene-4-sulfonic acid 2-[1-(2-dimethylamino-acetyl)-piperidin-4-yl]-ethyl ester . LC-MS $[M+H]^+$ 369.2

[00924] Intermediate 121

[00925] Acetic acid (*S*)-1-methyl-2-oxo-2-{4-[2-(toluene-4-sulfonyloxy)-ethyl]-piperidin-1-yl}-ethyl ester



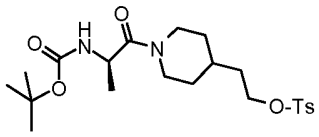
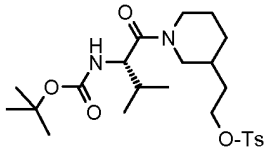
[00926] Reagents : a) (*S*)-$CH_3CH(OCOCH_3)COCl$, NEt_3, THF; b) *p*-TsCl, Et_3N, cat. DMAP, THF

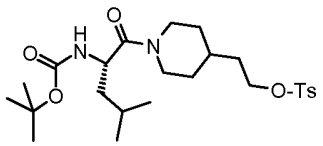
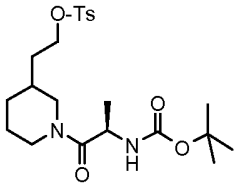
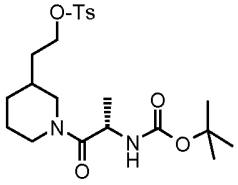
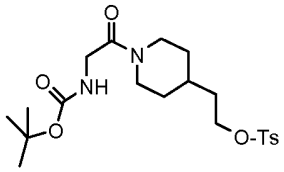
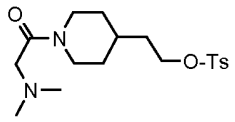
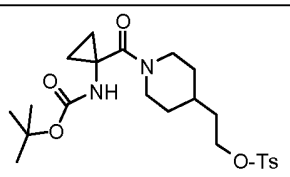
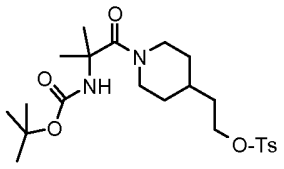
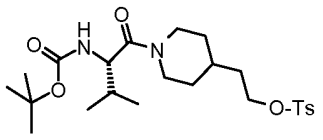
[00927] To the mixture of piperidine ethanol (2 g, 15.5 mmol), triehtylamine (4.3 mL, 31.0 mmol) in tetrahydrofuran (15 mL) at room temperature was added acetic acid (*S*)-1-chlorocarbonyl-ethyl ester (2.1 mL, 17.0 mmol) drop wise. The reaction mixture was allowed to stir at room temperature for 8 h, The reaction mixture was dissolved in ethyl acetate (100 mL) and washed with sat. aq.

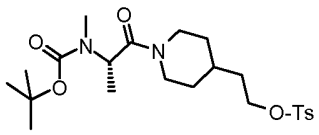
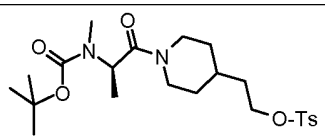
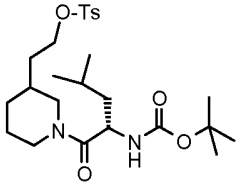
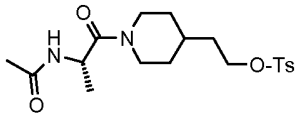
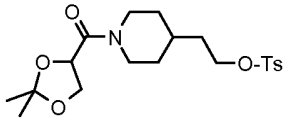
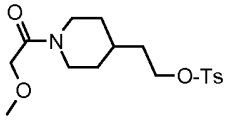
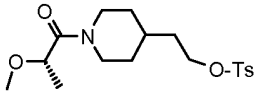
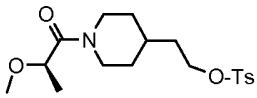
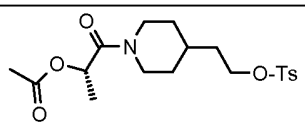
$NaHCO_3$ solution (90 mL) followed by brine solution (90 mL). The ethyl acetate layer was dried over Na_2SO_4, filtered, and solvent was evaporated under reduced pressure to afford crude product (1.6 g), which was used in next tosylation reaction without further purification. The crude obtained in the previous step was dissolved in tetrahydrofuran (20 mL) and added triethyl amine (2.28 mL, 16.4 mmol), N,N-dimethyl pyridine (20 mg) followed by *p*-TsCl (1.5 g, 7.9 mmol) at room temperature and stirred the reaction mixture for 12 h. The reaction mixture was concentrated *in vacuo* and diluted with EtOAc (90 mL), washed with sat. aq. $NaHCO_3$ solution (75 mL), H_2O (75 mL) and brine (75 mL). The EtOAc layer was dried over Na_2SO_4, filtered, and solvent was evaporated under reduced pressure to afford crude product. The crude was purified by Isco silica gel flash column using Hexane-EtOAc (1:3) solvent system to afford pure acetic acid (*S*)-1-methyl-2-oxo-2-{4-[2-(toluene-4-sulfonyloxy)-ethyl]-piperidin-1-yl}-ethyl ester (2.3 g). ^1H NMR ($CDCl_3$) δ 7.79 (d, J = 8.2 Hz, 2H), 7.36 (d, J = 8.2 Hz, 2H), 5.37 (d, J = 6.6 Hz, 1H), 4.53 (t, J = 14.0 Hz, 1H), 4.14-4.00(m, 2H), 3.78 (t, J = 13.0 Hz, 1H), 3.10-2.92 (m, 1H), 2.60-2.40 (m, 4H), 2.12 (s, 3H), 1.80-1.50 (m, 5 H), 1.41 (d, J = 6.6 Hz, 3H), 1.20-1.00 (m, 2H); LC-MS $[M+H]^+$ 398.3.

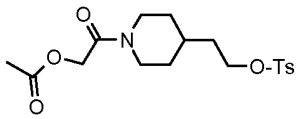
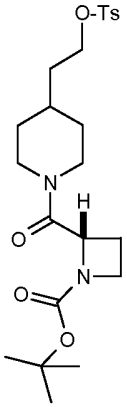
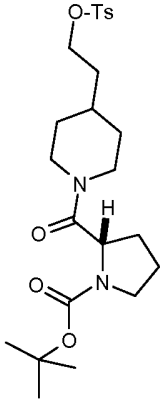
[00928] Intermediates 122-151 were prepared using one of the methods described for intermediates 119-121 and are summarized in table 14.

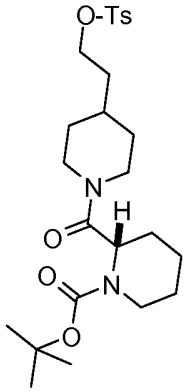
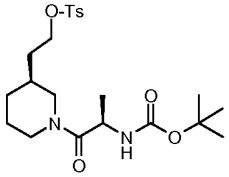
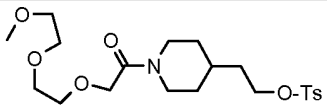
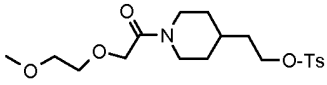
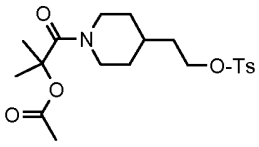
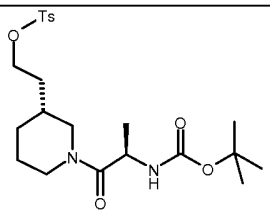
[00929] Table 14

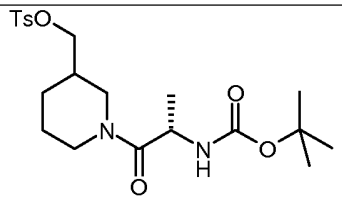
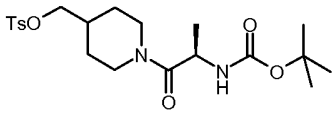
Intermediate	Structure	Name and Analytical data
122		Toluene -4-sulfonic acid 2-[1-((*R*)-2-*tert*-butoxycarbonylamino-propionyl)-piperidin-4-yl]-ethyl ester. LC-MS $[M+H]^+$ 455.2
123		Toluene-4-sulfonic acid 2-[1-((*S*)-2-*tert*-butoxycarbonylamino-3-methyl-butyry)-piperidin-3-yl]-ethyl ester. LC-MS $[M+H]^+$ 483.3

124		Toluene-4-sulfonic acid 2-[1-((*S*)-2-*tert*-butoxycarbonylamino-4-methyl-pentanoyl)-piperidin-4-yl]-ethyl ester. LC-MS $[M+H]^+$ 497.3
125		Toluene -4-sulfonic acid 2-[1-((*R*)-2-*tert*-butoxycarbonylamino-propionyl)-piperidin-3-yl]-ethyl ester. LC-MS $[M+H]^+$ 455.2
126		Toluene -4-sulfonic acid 2-[1-((*S*)-2-tert-butoxycarbonylamino-propionyl)-piperidin-3-yl]-ethyl ester. LC-MS $[M+H]^+$ 455.2
127		Toluene -4-sulfonic acid 2-[1-(2-*tert*-butoxycarbonylamino-acetyl)-piperidin-4-yl]-ethyl ester. LC-MS $[M+H]^+$ 441.3
128		Toluene -4-sulfonic acid 2-[1-(2-dimethylamino-acetyl)-piperidin-4-yl]-ethyl ester. LC-MS $[M+H]^+$ 369.2
129		Toluene -4-sulfonic acid 2-[1-(1-*tert*-butoxycarbonylamino-cyclopropanecarbonyl)-piperidin-4-yl]-ethyl ester. LC-MS $[M+H]^+$ 467.4
130		Toluene -4-sulfonic acid 2-[1-(2-*tert*-butoxycarbonylamino-2-methyl-propionyl)-piperidin-4-yl]-ethyl ester. LC-MS $[M+H]^+$ 469.3
131		Toluene-4-sulfonic acid 2-[1-((*S*)-2-*tert*-butoxycarbonylamino-3-methyl-butyry)-piperidin-4-yl]-ethyl ester. LC-MS $[M+H]^+$ 483.2

132		Toluene-4-sulfonic acid 2-{1[(*S*)-2-(*tert*-butoxycarbonyl-methyl-amino)-propionyl]-piperidin-4-yl}-ethyl ester. LC-MS $[M+H]^+$469.2
133		Toluene-4-sulfonic acid 2-{1[(*R*)-2-(*tert*-butoxycarbonyl-methyl-amino)-propionyl]-piperidin-4-yl}-ethyl ester. LC-MS $[M+H]^+$ 469.3
134		Toluene-4-sulfonic acid 2-[1-((*S*)-2-*tert*-butoxycarbonylamino-4-methyl-pentanoyl)-piperidin-4-yl]-ethyl ester. LC-MS $[M+H]^+$ 497.4
135		Toluene-4-sulfonic acid 2-[1-((*S*)-2-acetylamino-propionyl)-piperidin-4-yl]-ethyl ester. LC-MS $[M+H]^+$ 397.1
136		Toluene-4-sulfonic acid 2-[1-(2, 2-dimethyl-[1,3]dioxolane-4-carbonyl)-piperidin-4-yl]-ethyl ester. LC-MS $[M+H]^+$ 412.2
137		Toluene-4-sulfonic acid 2-[1-(2-methoxy-acetyl)-piperidin-4-yl]-ethyl ester. LC-MS $[M+H]^+$356.1
138		Toluene-4-sulfonic acid 2-[1-((S)-2-methoxy-propionyl)-piperidin-4-yl]-ethyl ester. LC-MS $[M+H]^+$ 370.2
139		Toluene-4-sulfonic acid 2-[1-((*R*)-2-methoxy-propionyl)-piperidin-4-yl]-ethyl ester. LC-MS $[M+H]^+$ 370.2
140		Acetic acid (*S*)-1-methyl-2-oxo-2-{4-[2-(toluene-4-sulfonyloxy)-ethyl]-piperidin-1-yl}-ethyl ester. LC-MS

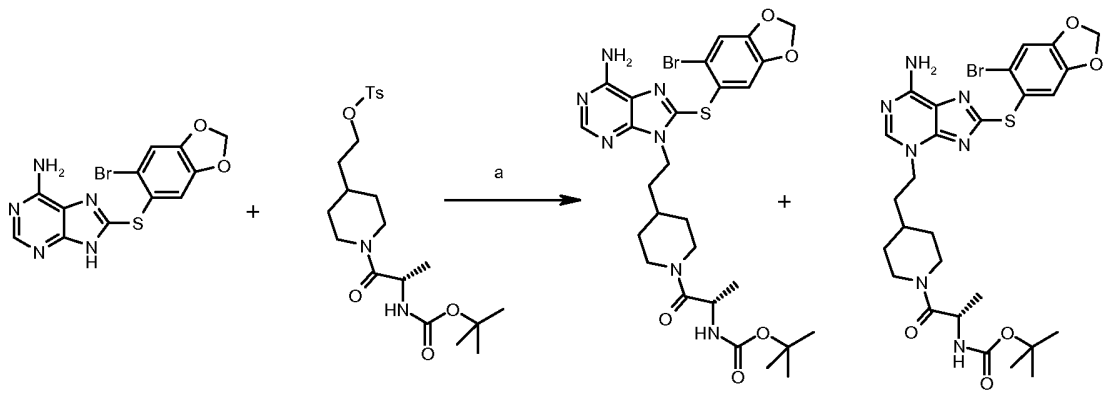
		$[M+H]^+$ 398.3
141		Acetic acid 2-oxo-2-{4-[2-(toluene-4-sulfonyloxy)-ethyl]-piperidin-1-yl}-ethyl ester LC-MS $[M+H]^+$ 384.2
142		(*S*)-2-{4-[2-(Toluene-4-sulfonyloxy)-ethyl]-piperidine-1-carbonyl}-azetidine-1carboxylic acid *tert*-butyl ester. ^{1}H NMR ($CDCl_3$) δ 7.79 (d, J = 8.4 Hz, 2H), 7.36 (d, J = 8.4 Hz, 2H), 4.90 (m, 1H), 4.57 (m, 1H), 4.10-3.98 (m, 3H), 3.85 (m, 1H), 3.68 (m, 1H), 2.97 and 2.89 (td, J = 13.2, 2.4 Hz, and J = 14.0, 2.4 Hz, 1H), 2.51 (m, 1H), 2.46 (s, 3H), 2.12 (m, 1H), 1.73-1.56 (m, 6H), 1.43 (s, 9H), 1.15-0.97 (m, 2H);
143		(*S*)-2-{4-[2-(Toluene-4-sulfonyloxy)-ethyl]-piperidine-1-carbonyl}-pyrrolidine-1carboxylic acid *tert*-butyl ester.^{1}H NMR ($CDCl_3$) δ 7.79 (d, J = 8.4 Hz, 2H), 7.36 (d, J = 8.4 Hz, 2H), 4.67-4.50 (m, 2H), 4.10-4.05 (m, 2H), 3.86 (m, 1H), 3.62-3.38 (m, 2H), 3.04 and 2.93 (brt, J = 13.0 Hz, 1H), 2.41 (s, 3H), 2.40 (m, 1H), 2.15 (m, 1H), 2.09 (m, 1H), 1.88-1.76 (m, 2H), 1.71-1.52 (m, 5H), 1.45 and 1.39 (s, 9H), 1.12-0.96 (m, 2H)

144		(*S*)-2-{4-[2-(Toluene-4-sulfonyloxy)-ethyl]-piperidine-1-carbonyl}-piperidine-1carboxylic acid *tert*-butyl ester. ^{1}H NMR ($CDCl_3$) δ 7.79 (brd, J = 8.4 Hz, 2H), 7.36 (brd, J = 8.4 Hz, 2H), 5.01 (m, 1H), 4.51 (m, 1H), 4.09-4.04 (m, 2H), 3.88-3.78 (m, 2H), 3.27 (m, 1H), 2.91 (m, 1H), 2.46 (s, 3H), 2.42 (m, 1H), 1.82 (m, 1H), 1.70-1.52 (m, 10H), 1.44 (s, 9H), 1.03 (m, 2H)
145		Toluene-4-sulfonic acid 2-[(*S*)-1-((*R*)-2-*tert*-butoxycarbonylamino-propionyl)-piperidin-3-yl]-ethyl ester. LC-MS $[M+H]^+$ 455.2
146		Toluene-4-sulfonic acid 2-(1-{2-[2-(2-methoxy-ethoxy)-ethoxy]-acetyl}-piperidin-4-yl)-ethyl ester. LC-MS $[M+H]^+$ 444.4
147		Toluene-4-sulfonic acid 2-{1-[2-(2-methoxy-ethoxy)-acetyl]-piperidin-4-yl)-ethyl ester. LC-MS $[M+H]^+$ 400.2
148		Acetic acid 1,1-dimethyl-2-oxo-2-{4-[2-(toluene-4-sulfonyloxy)-ethyl]-piperidin-1-yl}-ethyl ester. LC-MS $[M+H]^+$ 412.2
149		Toluene-4-sulfonic acid 2[(*R*)-1-((*R*)-2-*tert*-butoxycarbonylamino-propionyl)-piperidin-3-yl]-ethyl ester. LC-MS $[M+H]^+$ 455.2

150		Toluene-4-sulfonic acid 1-((*S*)-2-tert-butoxycarbonylamino-propionyl)-piperidin-3-ylmethyl ester. LC-MS $[M+23]^+$ 463.5
151		Toluene-4-sulfonic acid 1-((*R*)-2-*tert*-butoxycarbonylamino-propionyl)-piperidin-4-ylmethyl ester. LC-MS $[M+23]^+$ 463.2

[00930] Examples 693 and 694

[00931] [(*S*)-2-(4-{2-[6-Amino-8-(6-bromo-benzo[1,3]dioxol-5-ylsulfanyl)-purin-9-yl]-ethyl}-piperidin-1-yl)-1-methyl-2-oxo-ethyl]-carbamic acid *tert*-butyl ester and [(*S*)-2-(4-{2-[6-amino-8-(6-bromo-benzo[1,3]dioxol-5-ylsulfanyl)-purin-3-yl]-ethyl}-piperidin-1-yl)-1-methyl-2-oxo-ethyl]-carbamic acid *tert*-butyl ester.



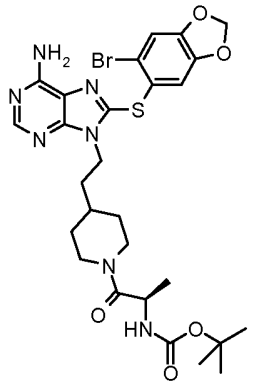
[00932] Reagents: (a) Barton's base, DMF, 90-100° C

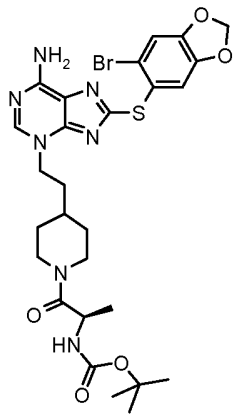
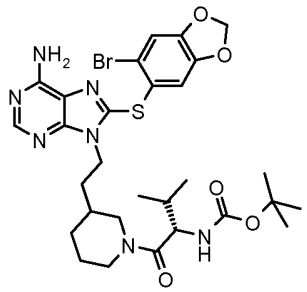
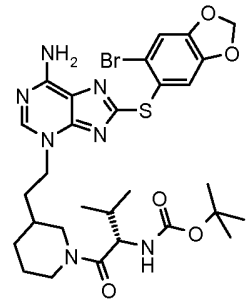
[00933] A mixture of toluene-4-sulfonic acid 2-[1-((*S*)-2-*tert*-butoxycarbonylamino-propionyl)-piperidin-4-yl]-ethyl ester (0.223 g, 0.49 mmol), 8-(6-bromo-benzo[1,3]dioxol-5-ylsulfanyl)-9H-purin-6-ylamine (0.075 g, 0.20 mmol), and Barton's base (101 μL, 0.49 mmol) in DMF (2.5 mL) was heated at 90-100 °C for 15 h. After cooling, the reaction mixture was concentrated under reduced pressure. The residue was purified by preparative HPLC [X-Terra prep-

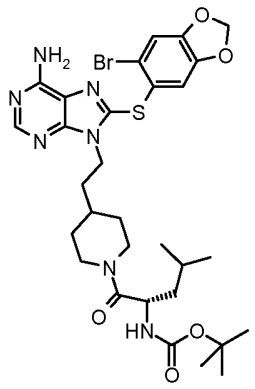
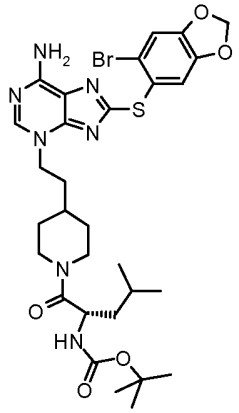
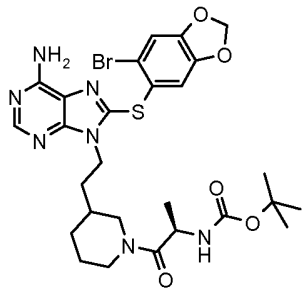
RP18 10 um, 19x250 mm(waters), Mobile phase: solvent A: Water HPLC grade containing 0.01% TFA, and solvent B: acetonitrile containing 0.01% TFA, general eluting gradient - solvent B 15% to 80 over 15 to 25 minutes run time]. After lyophilization of HPLC fractions N-9 and N-3 isomers were isolated as trifluoroacetate salts. [(*S*)-2-(4-{2-[6-Amino-8-(6-bromo-benzo[1,3]dioxol-5-ylsulfanyl)-purin-9-yl]-ethyl}-piperidin-1-yl)-1-methyl-2-oxo-ethyl]-carbamic acid *tert*-butyl ester: ^{1}H NMR ($CDCl_3$) δ 8.20 (s, 1H), 7.15 (s, 1H), 7.06 (s, 1H), 6.07 (s, 2H), 5.57 (d, J = 7.8 Hz, 1H), 4.68-4.55 (m, 2H), 4.29 (t, J = 7.4 Hz, 2H), 3.96-3.85 (m, 1H), 1.98-1.75 (m, 4H), 1.66-1.5 (m, 1H), 1.44 (s, 9H), 1.36–1.22 (m, 5H); TOF-MS $[M+H]^+$ 648.16. {(*S*)-2-(4-{2-[6-Amino-8-(6-bromo-benzo[1,3]dioxol-5-ylsulfanyl)-purin-3-yl]-ethyl}-piperidin-1-yl)-1-methyl-2-oxo-ethyl]-carbamic acid *tert*-butyl ester, TOF-MS $[M+H]^+$ 648.16.

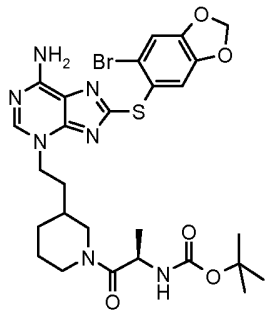
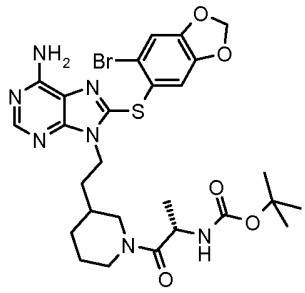
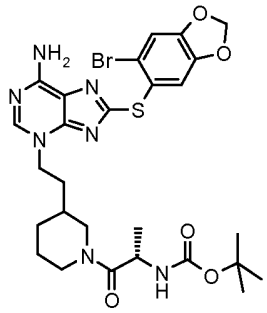
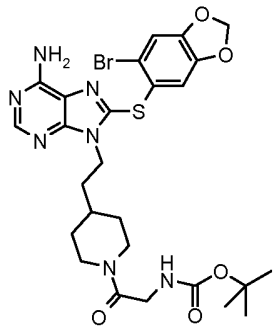
[00934] Examples 695-741 were synthesized in the same manner as described for examples 693 and 694 using appropriate starting materials and are isolated as a trifluoroacetate salts after preparative HPLC purification.

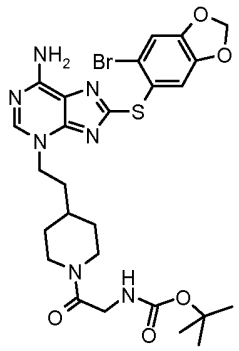
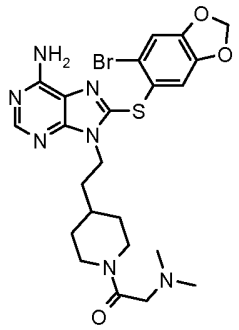
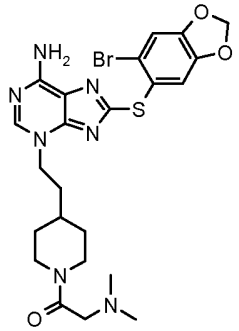
[00935] Table 15

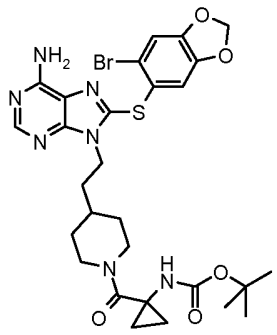
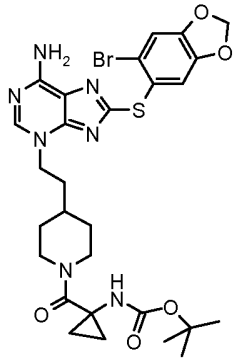
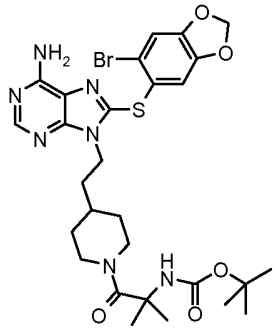
Example	Structure	Name and analytical data
695		*tert*-Butyl {(1*R*)-2-[4-(2-{6-amino-8-[(6-bromo-1,3-benzodioxol-5-yl)thio]-9H-purin-9-yl}ethyl)piperidin-1-yl]-1-methyl-2-oxoethyl}carbamate. ^{1}H NMR ($CDCl_3$) δ8.19 (s, 1H), 7.16 (s, 1H), 7.09 (s, 1H), 6.08 (s, 2H), 5.57 (d, J = 7.8 Hz, 1H), 4.5-4.68 (m, 2H), 4.3 (t, J = 7.4 Hz, 2H), 3.85-3.96 (m, 1H), 1.98-1.75 (m, 4H), 1.66-1.50 (m, 1H), 1.44 (s, 9H), 1.36-1.22 (m, 5H); TOF-MS $[M+H]^+$ 648.1

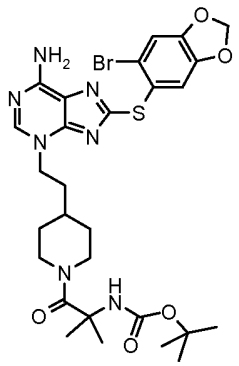
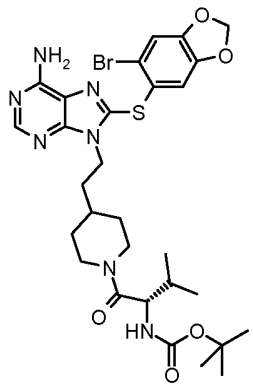
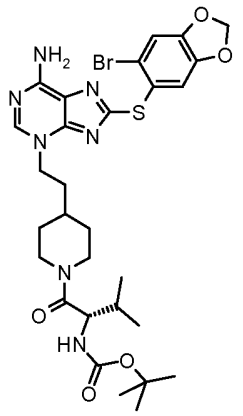
696		*tert*-Butyl {(1*R*)-2-[4-(2-{6-amino-8-[(6-bromo-1,3-benzodioxol-5-yl)thio]-3H-purin-3-yl}ethyl)piperidin-1-yl]-1-methyl-2-oxoethyl}-carbamate. TOF-MS $[M+H]^+$ 648.1
697		*tert*-Butyl ((1*S*)-1-{[3-(2-{6-amino-8-[(6-bromo-1,3-benzodioxol-5-yl)thio]-9H-purin-9-yl}ethyl)piperidin-1-yl]carbonyl}-2-methylpropyl)-carbamate. ^{1}H NMR ($CDCl_3$) δ 8.19 (s, 1H), 7.16 (s, 1H), 7.11 (s, 1H), 6.08 (s, 2H), 5.40-5.32 (m, 1H), 4.5-4.25 (m, 4H), 3.90-3.75 (m, 1H), 3.25-3.05 (m, 1H), 2.80-2.60 (m, 1H), 2.10-1.65 (m, 4H), 1.65-1.25 (m, 12H), 1.00-0.82 (m, 6H); TOF-MS $[M+H]^+$ 676.1
698		*tert*-Butyl ((1*S*)-1-{[3-(2-{6-amino-8-[(6-bromo-1,3-benzodioxol-5-yl)thio]-3H-purin-3-yl}ethyl)piperidin-1-yl]carbonyl}-2-methylpropyl)carbamate. TOF-MS $[M+H]^+$ 676.1

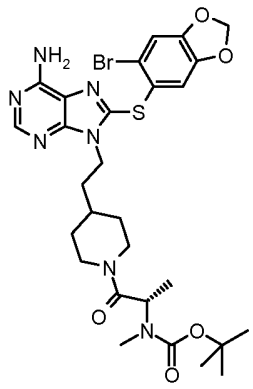
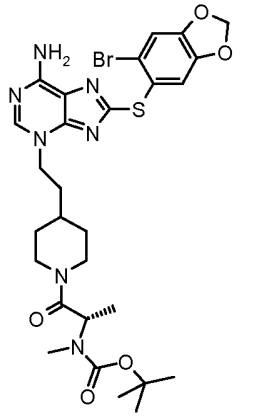
699		*tert*-Butyl ((1*S*)-1-{[4-(2-{6-amino-8-[(6-bromo-1,3-benzodioxol-5-yl)thio]-9H-purin-9-yl}ethyl)piperidin-1-yl]carbonyl}-3-methylbutyl)carbamate. ^{1}H NMR ($CDCl_3$) δ 8.19 (s, 1H), 7.16 (s, 1H), 7.09 (s, 1H), 6.08 (s, 2H), 5.42-5.30 (m, 1H), 4.70-4.50 (m, 1H), 4.30 (t, J = 6.6 Hz, 2H), 4.00-3.85 (m, 1H), 3.03 (q, J = 12.1 Hz, 1H), 2.57 (q, J = 12.5 Hz, 1H), 1.98-1.65 (m, 6H), 1.60-1.20 (m, 13H), 1.02-0.90 (m, 6H); TOF-MS $[M+H]^+$ 690.2
700		*tert*-Butyl ((1*S*)-1-{[4-(2-{6-amino-8-[(6-bromo-1,3-benzodioxol-5-yl)thio]-3H-purin-3-yl}ethyl)piperidin-1-yl]carbonyl}-3-methylbutyl)carbamate. TOF-MS $[M+H]^+$ 690.2
701		*tert*-Butyl {(1*R*)-2-[3-(2-{6-amino-8-[(6-bromo-1,3-benzodioxol-5-yl)thio]-9H-purin-9-yl}ethyl)piperidin-1-yl]-1-methyl-2-oxoethyl}carbamate. ^{1}H NMR ($CDCl_3$) δ 8.19 (s, 1H), 7.15 (s, 1H), 7.10 (s, 1H), 6.08 (s, 2H), 5.55 (m, 1H), 4.70-4.55 (m, 1H), 4.38-4.25 (m, 3H), 6.82-3.65 (m, 1H), 3.20-3.05 (m, 1H), 2.85-2.70 (m, 1H), 2.10-1.95 (m, 1H), 1.95-1.65 (m, 3H), 1.62-1.48 (m, 2H), 1.43 (s, 9H), 1.29 (d, J =7.0 Hz, 3H);

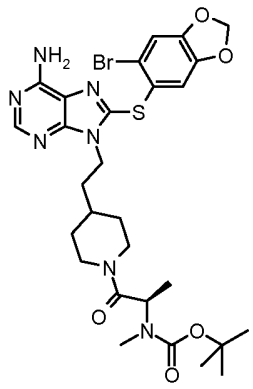
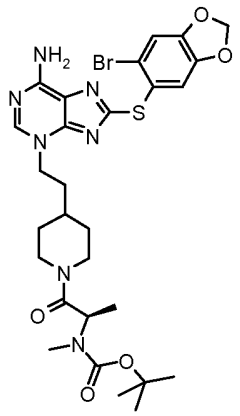
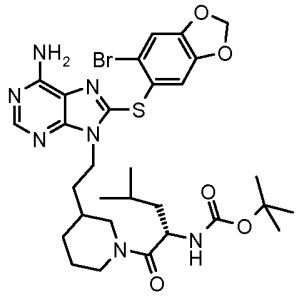
		LC-MS $[M+H]^+$ 648.1
702		*tert*-Butyl {(1*R*)-2-[3-(2-{6-amino-8-[(6-bromo-1,3-benzodioxol-5-yl)thio]-3H-purin-3-yl}ethyl)piperidin-1-yl]-1-methyl-2-oxoethyl}carbamate. LC-MS $[M+H]^+$ 648.1
703		*tert*-Butyl {(1*S*)-2-[3-(2-{6-amino-8-[(6-bromo-1,3-benzodioxol-5-yl)thio]-9H-purin-9-yl}ethyl)piperidin-1-yl]-1-methyl-2-oxoethyl}carbamate. TOF-MS $[M+H]^+$ 648.1
704		*tert*-Butyl {(1*S*)-2-[3-(2-{6-amino-8-[(6-bromo-1,3-benzodioxol-5-yl)thio]-3H-purin-3-yl}ethyl)piperidin-1-yl]-1-methyl-2-oxoethyl}carbamate. TOF-MS $[M+H]^+$ 648.1
705		*tert*-Butyl {2-[4-(2-{6-amino-8-[(6-bromo-1,3-benzodioxol-5-yl)thio]-9H-purin-9-yl}ethyl)piperidin-1-yl]-2-oxoethyl}carbamate. ^{1}H NMR ($CDCl_3$) δ 8.27 (s, 1H), 7.11 (s, 1H), 6.93 (s, 1H), 6.03 (s, 2H), 5.55 (broad s, 1H), 4.58 (d, J = 13.2 Hz, 1H), 4.27 (t, J = 7.4 Hz, 2H), 3.94 (dq, J = 3.9, 16.8 Hz, 2H), 3.69 (d, J = 12.5 Hz, 1H), 2.95 (t, J = 11.3 Hz, 1H), 2.57 (t, J = 11.3 Hz, 1H), 1.92-1.70 (m, 4H), 1.60-1.48 (m, 1H), 1.44 (s, 9H), 1.35-1.10 (m, 2H);

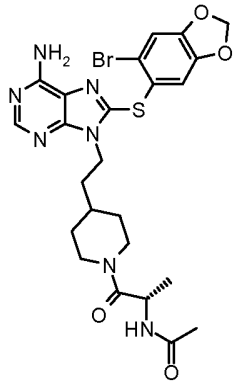
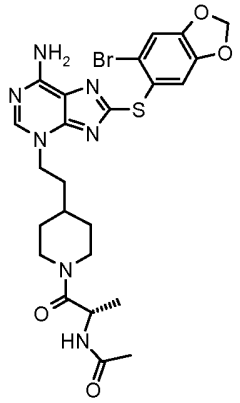
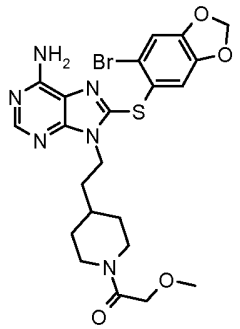
		TOF-MS $[M+H]^+$ 634.1
706		*tert*-Butyl {2-[4-(2-{6-amino-8-[(6-bromo-1,3-benzodioxol-5-yl)thio]-3H-purin-3-yl}ethyl)piperidin-1-yl]-2-oxoethyl}carbamate. TOF-MS $[M+H]^+$ 634.1
707		8-[(6-Bromo-1,3-benzodioxol-5-yl)thio]-9-(2-{1-[(dimethylamino)acetyl]piperidin-4-yl}ethyl)-9H-purin-6-amine. ^{1}H NMR (CD_3OD) δ 8.26 (s, 1H), 7.28 (s, 1H), 7.16 (s, 1H), 6.08 (s, 2H), 4.55-4.45 (m, 1H), 4.35 (t, J = 7.8 Hz, 2H), 4.22 (q, J = 16.4 Hz, 2H), 3.70-3.62 (m, 1H), 3.12-3.01 (m, 1H), 2.92 (s, 6H), 2.74-2.65 (m, 1H), 1.96-1.75 (m, 4H), 1.69-1.48 (m, 1H), 1.25-1.10 (m, 2H); TOF-MS $[M+H]^+$ 562.1
708		8-[(6-Bromo-1,3-benzodioxol-5-yl)thio]-3-(2-{1-[(dimethylamino)acetyl]piperidin-4-yl}ethyl)-3H-purin-6-amine. LC-MS $[M+H]^+$ 562.8

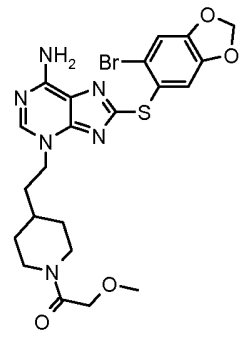
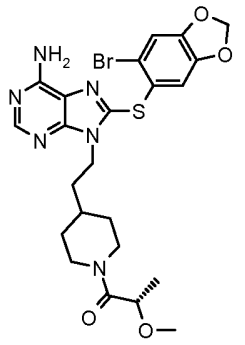
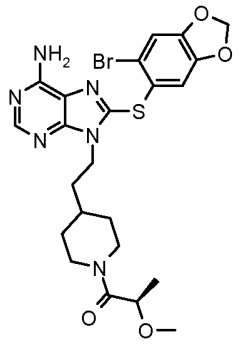
709		*tert*-Butyl (1-{[4-(2-{6-amino-8-[(6-bromo-1,3-benzodioxol-5-yl)thio]-9H-purin-9-yl}ethyl)piperidin-1-yl]carbonyl}cyclopropyl)carbamate. ^{1}H NMR ($CDCl_3$) δ 8.10 (s, 1H), 7.17 (s, 1H), 7.10 (s, 1H), 6.09 (s, 2H), 5.35-5.25 (m, 1H), 4.68-4.55 (m, 1H), 4.30 (t, J = 7.8 Hz, 2H), 2.86-2.7 (m, 2H), 1.87 (d, J = 13.2 Hz, 2H), 1.79 (q, J = 7.0 Hz, 2H), 1.65-1.50 (m, 1H), 1.42 (s, 9H), 1.30-1.10 (m, 6H); TOF-MS $[M+H]^+$ 660.1
710		*tert*-Butyl (1-{[4-(2-{6-amino-8-[(6-bromo-1,3-benzodioxol-5-yl)thio]-3H-purin-3-yl}ethyl)piperidin-1-yl]carbonyl}cyclopropyl)carbamate. LC-MS $[M+H]^+$ 660.1
711		*tert*-Butyl {2-[4-(2-{6-amino-8-[(6-bromo-1,3-benzodioxol-5-yl)thio]-9H-purin-9-yl}ethyl)piperidin-1-yl]-1,1-dimethyl-2-oxoethyl}carbamate. ^{1}H NMR (CD_3OD) δ 8.19 (s, 1H), 7.26 (s, 1H), 7.10 (s, 1H), 6.07 (s, 2H), 4.60-4.50 (m, 1H), 4.36-4.28 (m, 2H), 3.50-3.46 (m, 1 H), 3.10-3.00 (m, 1H), 2.70-2.60 (m, 1H), 1.85-1.71 (m, 4H), 1.64-1.52 (m, 1H), 1.46-1.38 (m, 15 H), 1.28-1.10 (m, 2H); TOF-MS $[M+H]^+$ 662.1

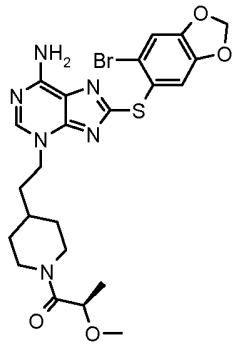
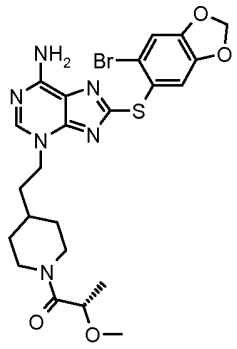
712		*tert*-Butyl {2-[4-(2-{6-amino-8-[(6-bromo-1,3-benzodioxol-5-yl)thio]-3H-purin-3-yl}ethyl)piperidin-1-yl]-1,1-dimethyl-2-oxoethyl}carbamate. LC-MS $[M+H]^+$ 662.1
713		*tert*-Butyl ((1*S*)-1-{[4-(2-{6-amino-8-[(6-bromo-1,3-benzodioxol-5-yl)thio]-9H-purin-9-yl}ethyl)piperidin-1-yl]carbonyl}-2-methylpropyl)carbamate. ^{1}H NMR (CD_3OD) δ 8.30 (s, 1H), 7.28 (s, 1H), 7.18 (d, J = 5.86 Hz, 1H), 6.08 (s, 2H), 4.55-4.44 (m, 1H), 4.40-4.32 (m, 3H), 4.58-4.06 (m, 1H), 3.15-3.05 (m, 1H), 2.69-2.59 (m, 1H), 2.00-1.72 (m, 5H), 1.68-1.56 (m, 1H), 1.43 (d, J = 3.9 Hz, 6 H), 1.28 (s, 9 H), 1.20-1.06 (m, 2H); TOF-MS $[M+H]^+$ 676.1
714		*tert*-Butyl ((1*S*)-1-{[4-(2-{6-amino-8-[(6-bromo-1,3-benzodioxol-5-yl)thio]-3H-purin-3-yl}ethyl)piperidin-1-yl]carbonyl}-2-methylpropyl)carbamate. LC-MS $[M+H]^+$ 676.1

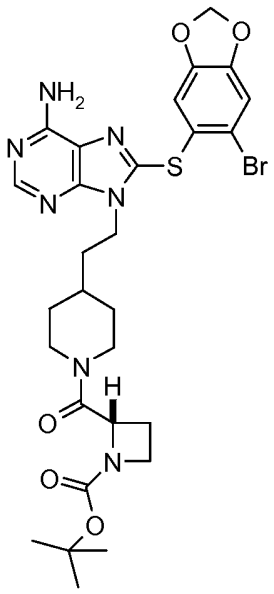
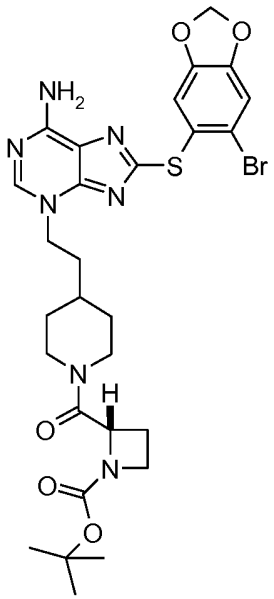
715		*tert*-Butyl {(1*S*)-2-[4-(2-{6-amino-8-[(6-bromo-1,3-benzodioxol-5-yl)thio]-9H-purin-9-yl}ethyl)piperidin-1-yl]-1-methyl-2-oxoethyl}methylcarbamate. ^{1}H NMR ($CDCl_3$) δ 8.19 (s, 1H), 7.17 (s, 1H), 7.10 (s, 1H), 6.09 (s, 2H), 5.15-5.05 (m, 1H), 4.70-4.50 (m, 1H), 4.35-4.25 (m, 2H), 4.10-4.00 (m, 1H), 3.00-2.80 (m, 1H), 2.74 (s, 3H), 2.60-2.45 (m, 1H), 1.90-1.68 (m, 4H), 1.70-1.45 (m, 10H), 1.30-1.00 (m, 5H), TOF-MS $[M+H]^+$ 662.1
716		*tert*-Butyl {(1*S*)-2-[4-(2-{6-amino-8-[(6-bromo-1,3-benzodioxol-5-yl)thio]-3H-purin-3-yl}ethyl)piperidin-1-yl]-1-methyl-2-oxoethyl}methylcarbamate. LC-MS $[M+H]^+$ 662.1

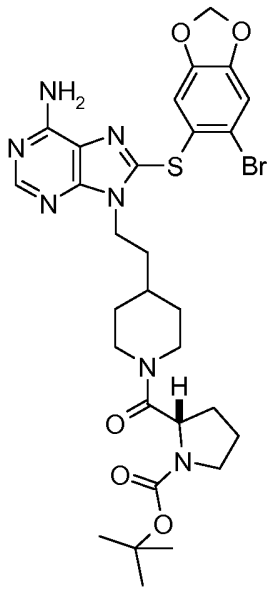
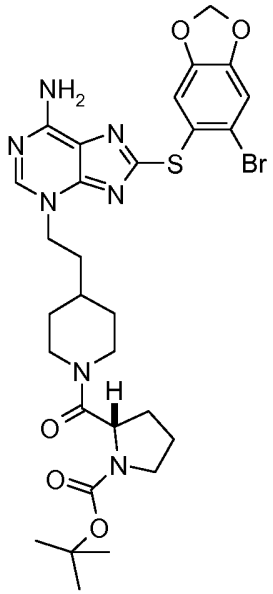
717		*tert*-Butyl {(1*R*)-2-[4-(2-{6-amino-8-[(6-bromo-1,3-benzodioxol-5-yl)thio]-9H-purin-9-yl}ethyl)piperidin-1-yl]-1-methyl-2-oxoethyl}methylcarbamate. ^{1}H NMR (CD_3OD) δ 8.28 (s, 1H), 7.27 (s, 1H), 7.20-7.14 (m, 1H), 6.08 (s, 2H), 5.10-4.99 (m, 1H), 4.51 (d, J = 11.3 Hz, 1H), 4.50-4.30 (m, 2H), 4.00-3.88 (m, 1H), 3.05-2.96 (m, 1H), 2.78-2.55 (m, 4H), 1.95-1.70 (m, 4H), 1.70-1.55 (m, 1H), 1.46 (s, 9H), 1.20-1.00 (m, 5 H); TOF-MS $[M+H]^+$ 662.1
718		*tert*-Butyl {(1*R*)-2-[4-(2-{6-amino-8-[(6-bromo-1,3-benzodioxol-5-yl)thio]-3H-purin-3-yl}ethyl)piperidin-1-yl]-1-methyl-2-oxoethyl}methylcarbamate. LC-MS $[M+H]^+$ 662.1
719		*tert*-Butyl ((1*S*)-1-{[3-(2-{6-amino-8-[(6-bromo-1,3-benzodioxol-5-yl)thio]-9H-purin-9-yl}ethyl)piperidin-1-yl]carbonyl}-3-methylbutyl)carbamate. ^{1}H NMR ($CDCl_3$) δ 8.23 (s, 1H), 7.80-7.15 (m, 1H), 7.13-7.10 (m, 1H), 6.73-6.62 (broad s, 1H), 6.09 (s, 2H), 5.48-5.35 (m, 1H), 4.70-4.60 (m, 1H), 4.40-4.10 (m, 3H), 3.90-3.70 (m, 1H), 3.30-3.00 (m, 1H), 2.90-2.60 (m, 1H), 2.10-

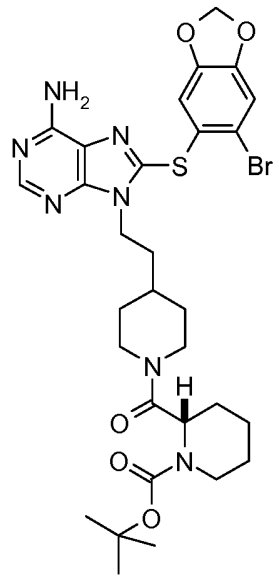
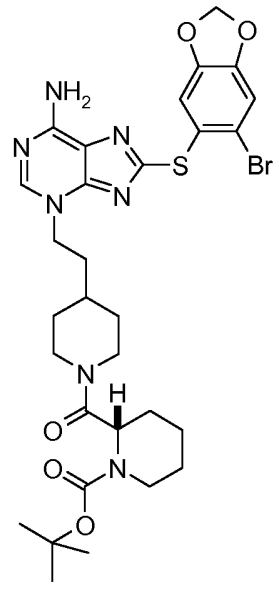
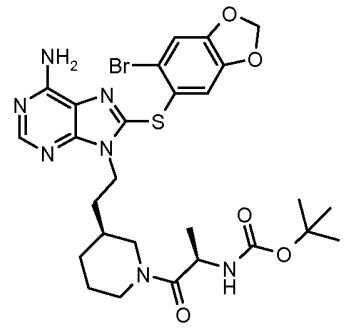
		1.20 (m, 24H); TOF-MS $[M+H]^+$ 690.2
720		*N*-{(1*S*)-2-[4-(2-{6-amino-8-[(6-bromo-1,3-benzodioxol-5-yl)thio]-9*H*-purin-9-yl}ethyl)piperidin-1-yl]-1-methyl-2-oxoethyl}acetamide. LC-MS $[M+H]^+$ 590.1
721		*N*-{(1*S*)-2-[4-(2-{6-Amino-8-[(6-bromo-1,3-benzodioxol-5-yl)thio]-3*H*-purin-3-yl}ethyl)piperidin-1-yl]-1-methyl-2-oxoethyl}acetamide. LC-MS $[M+H]^+$ 590.1
722		8-[(6-Bromo-1,3-benzodioxol-5-yl)thio]-9-{2-[1-(methoxyacetyl)piperidin-4-yl]ethyl}-9H-purin-6-amine. ^{1}H NMR (CD_3OD) δ 8.29 (s, 1H), 7.28 (s, 1H), 7.18 (s, 1H), 6.08 (s, 2H), 4.47 (d, J = 12.8 Hz, 1H), 4.36 (t, J = 7.42 Hz, 2H), 4.13 (q, J = 14.0 Hz, 2H), 3.83 (d, J = 13.6 Hz, 1H), 3.38 (s, 3H), 3.00 (dt, J = 2.3, 13.28 Hz, 1H), 2.61 (dt, J = 2.7, 12.8 Hz, 1H), 1.87 (d, J = 12.0 Hz, 2H), 1.81 (q, J = 7.0 Hz, 2H), 1.65-1.52 (m, 1H), 1.3-1.10 (m, 2H); TOF-MS $[M+H]^+$ 549.0

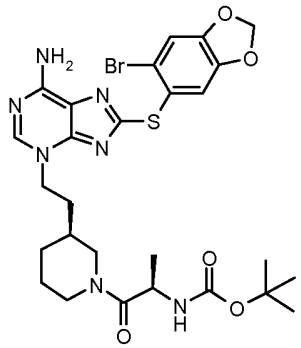
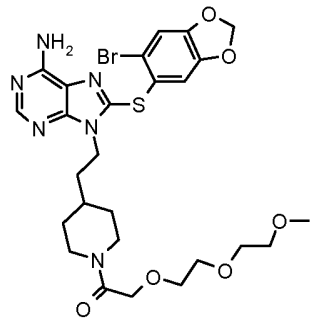
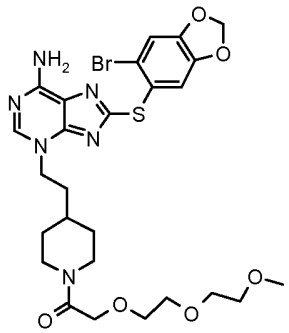
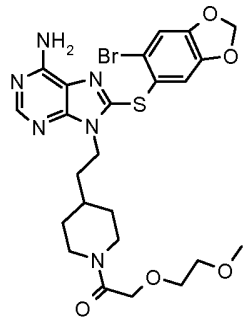
723		8-[(6-Bromo-1,3-benzodioxol-5-yl)thio]-3-{2-[1-(methoxyacetyl)piperidin-4-yl]ethyl}-3H-purin-6-amine. TOF-MS $[M+H]^+$ 549.0
724		8-[(6-Bromo-1,3-benzodioxol-5-yl)thio]-9-(2-{1-[(2*S*)-2-methoxypropanoyl]piperidin-4-yl}ethyl)-9H-purin-6-amine.^{1}H NMR ($CDCl_3$) δ 8.31 (s, 1H), 7.10 (s, 1H), 6.87 (s, 1H), 6.30-5.90 (broad peak with singlet at 6.01, 3H), 4.65-4.56 (m, 1H), 4.27 (t, J = 7.42 Hz, 2H), 4.22-4.10 (m, 2H), 3.33 (d, J = 7.8 Hz, 3H), 3.00-2.88 (m, 1H), 2.60-2.50 (m, 1H), 1.85 (d, J = 12.5 Hz, 2H), 1.74 (q, J = 6.2 Hz, 2H), 1.60-1.47 (m, 1H), 1.38 (d, J = 6.6 Hz, 3H), 1.30-1.10 (m, 2H); TOF-MS $[M+H]^+$ 563.11
725		8-[(6-Bromo-1,3-benzodioxol-5-yl)thio]-9-(2-{1-[(2*R*)-2-methoxypropanoyl]piperidin-4-yl}ethyl)-9H-purin-6-amine. ^{1}H NMR ($CDCl_3$) δ 8.22 (s, 1H), 7.14 (s, 1H), 7.03 (s, 1H), 6.06 (s, 2H), 4.65-4.56 (m, 1H), 4.27 (t, J = 7.42 Hz, 2H), 4.22-4.10 (m, 2H), 3.33 (d, J = 7.8 Hz, 3H), 3.00-2.88 (m, 1H), 2.60-2.50 (m, 1H), 1.85 (d, J = 12.5 Hz, 2H), 1.74 (q, J =

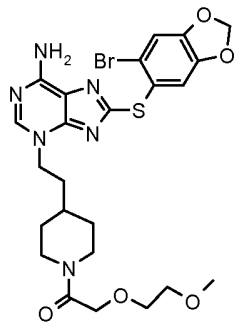
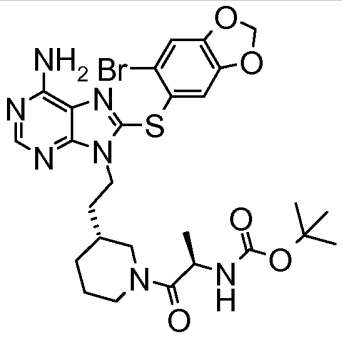
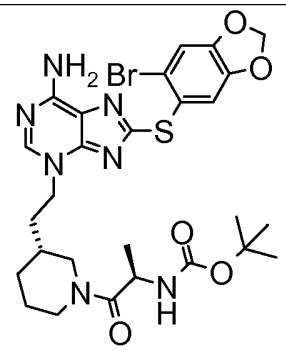
		6.2 Hz, 2H), 1.60-1.47 (m, 1H), 1.38 (d, J = 6.6 Hz, 3H), 1.30-1.10 (m, 2H); TOF-MS $[M+H]^+$ 563.1
726		8-[(6-Bromo-1,3-benzodioxol-5-yl)thio]-3-(2-{1-[(2*R*)-2-methoxypropanoyl]piperidin-4-yl}ethyl)-3H-purin-6-amine. ^{1}H NMR ($CDCl_3$) δ 10.71 (s, 1H), 8.06 (s, 1H), 7.21 (s, 1H), 7.18 (s, 1H), 6.17 (s, 1H), 6.11 (s, 2H), 4.65-4.55 (m, 1H), 4.40-4.30 (m, 2H), 4.30-4.10 (m, 2H), 3.35 (d, J = 8.5 Hz, 3H), 3.02-2.9 (m, 1H), 2.60-2.50 (m, 1H), 1.89 (q, J = 7.0 Hz, 2H), 1.85-1.75 (m, 2H), 1.60-1.47 (m, 1H), 1.39 (d, J = 6.6 Hz, 3H), 1.30-1.10 (m, 2H); TOF-MS $[M+H]^+$ 563.1
727		8-[(6-Bromo-1,3-benzodioxol-5-yl)thio]-3-(2-{1-[(2*S*)-2-methoxypropanoyl]piperidin-4-yl}ethyl)-3H-purin-6-amine. ^{1}H NMR ($CDCl_3$) δ 10.62 (s, 1H), 8.07 (s, 1H), 7.21 (s, 1H), 7.18 (s, 1H), 6.11 (s, 2H), 4.65-4.55 (m, 1H), 4.40-4.30 (m, 2H), 4.30-4.10 (m, 2H), 3.35 (d, J = 8.5 Hz, 3H), 3.02-2.90 (m, 1H), 2.60-2.50 (m, 1H), 1.89 (q, J = 7.0 Hz, 2H), 1.85-1.75 (m, 2H), 1.60-1.47 (m, 1H), 1.39 (d, J = 6.6 Hz, 3H), 1.30-1.10 (m, 2H); TOF-MS $[M+H]^+$ 563.1

728		*tert*-Butyl (2*S*)-2-{[4-(2-{6-amino-8-[(6-bromo-1,3-benzodioxol-5-yl)thio]-9*H*-purin-9-yl}ethyl)piperidin-1-yl]carbonyl}azetidine-1-carboxylate. ^{1}H NMR (CD_3OD) δ 8.27 (s, 1H), 7.28 (s, 1H), 7.17 and 7.15 (s, 1H), 6.09 (s, 2H), 5.05 (m, 1H), 4.48 (m, 1H), 4.36 (t, J = 6.0 Hz, 2H), 3.93-3.87 (m, 2H), 3.76 (m, 1H), 3.02 (m, 1H), 2.66 (m, 1H), 2.56 (m, 1H), 1.42 (s, 9H), 2.07 (m, 1H), 1.87-1.77 (m, 5H), 1.62 (m, 1H), 1.17 (m, 1H); LC-MS $[M+H]^+$ 660.1
729		*tert*-Butyl (2*S*)-2-{[4-(2-{6-amino-8-[(6-bromo-1,3-benzodioxol-5-yl)thio]-3*H*-purin-3-yl}ethyl)piperidin-1-yl]carbonyl}azetidine-1-carboxylate. LC-MS $[M+H]^+$ 660.1

730		*tert*-Butyl (2*S*)-2-{[4-(2-{6-amino-8-[(6-bromo-1,3-benzodioxol-5-yl)thio]-9*H*-purin-9-yl}ethyl)piperidin-1-yl]carbonyl}pyrrolidine-1-carboxylate. ^{1}H NMR (CD_3OD) δ 8.30 and 8.29 (s, 1H), 7.29 and 7.286 (s, 1H), 7.20, 7.19, and 7.18 (s, 1H), 6.09 (s, 2H), 4.69 (m, 1H), 4.49 (m, 1H), 4.39-4.34 (m, 2H), 4.02 (m, 1H), 3.53-3.42 (m, 2H), 3.06 (m, 1H), 2.62 (m, 1H), 2.26 (m, 1H), 1.89-1.78 (m, 7H), 1.62 (m, 1H), 1.46, 1.45, 1.42, and 1.37 (s, 9H), 1.32-1.15 (m, 2H); LC-MS $[M+H]^+$ 674.2
731		*tert*-Butyl (2*S*)-2-{[4-(2-{6-amino-8-[(6-bromo-1,3-benzodioxol-5-yl)thio]-3*H*-purin-3-yl}ethyl)piperidin-1-yl]carbonyl}pyrrolidine-1-carboxylate. ^{1}H NMR (CD_3OD) δ 8.55, 8.54, and 8.535 (s, 1H), 7.40,-7.37 (m, 2H), 6.17 and 6.16 (s, 2H), 4.69 (m, 1H), 4.48 (m, 1H), 4.43 (t, J = 7.2 Hz, 2H), 4.01 (m, 1H), 3.54-3.41 (m, 2H), 3.06 (m, 1H), 2.64 (m, 1H), 2.28 (m, 1H), 1.89-1.78 (m, 7H), 1.62 (m, 1H), 1.47, 1.46, 1.43, and 1.38 (s, 9H), 1.19 (m, 2H); LC-MS $[M+H]^+$ 674.2

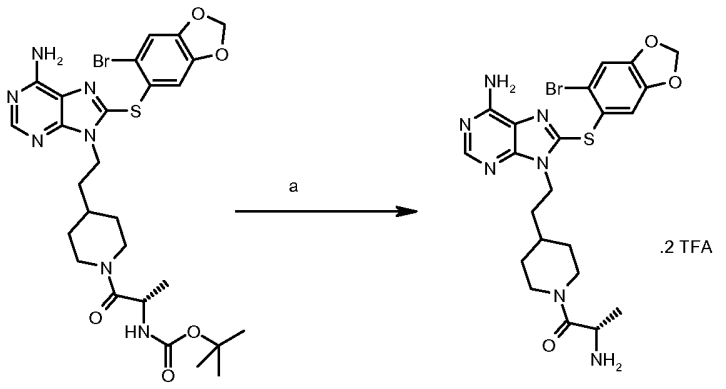
732		*tert*-Butyl (2*S*)-2-{[4-(2-{6-amino-8-[(6-bromo-1,3-benzodioxol-5-yl)thio]-9*H*-purin-9-yl}ethyl)piperidin-1-yl]carbonyl}piperidine-1-carboxylate. ^{1}H NMR (CD_3OD) δ 8.30 (s, 1H), 7.29 (s, 1H), 7.20 (s, 1H), 6.09 (s, 2H), 4.47 (m, 1H), 4.37 (t, J =7.2 Hz, 2H), 3.97-3.84 (m, 2H), 3.31-3.29 (m, 1H), 3.25 (m, 2H), 3.06 (m, 1H), 2.59 (m, 1H), 1.96-1.78 (m, 7H), 1.74-1.58 (m, 4H), 1.45 (s, 9H), 1.18 (m, 1H); LC-MS $[M+H]^+$ 688.2
733		*tert*-Butyl (2*S*)-2-{[4-(2-{6-amino-8-[(6-bromo-1,3-benzodioxol-5-yl)thio]-3*H*-purin-3-yl}ethyl)piperidin-1-yl]carbonyl}piperidine-1-carboxylate.LC-MS $[M+H]^+$ 688.2
734		*tert*-Butyl {(1*R*)-2-[(3*S*)-3-(2-{6-amino-8-[(6-bromo-1,3-benzodioxol-5-yl)thio]-9H-purin-9-yl}ethyl)piperidin-1-yl]-1-methyl-2-oxoethyl}carbamate. ^{1}H NMR δ (CD_3OD), 8.18 (s, 1H), 7.30 (s, 1H), 7.10 (s, 1H), 6.10 (s, 2H), 4.30-4.20 (m, 2H), 3.60-3.50 (m, 2H),

		3.20-3.14 (m, 2H), 3.10 (m, 2H), 2.80-2.70 (m, 2H), 2.40 (m, 2H), 1.60-1.50 (m, 2H), 1.43 (s, 9H), 1.40 (s, 3H). LC-MS $[M+H]^+$ 648.2
735		*tert*-Butyl {(1*R*)-2-[(3*S*)-3-(2-{6-amino-8-[(6-bromo-1,3-benzodioxol-5-yl)thio]-3H-purin-3-yl}ethyl)piperidin-1-yl]-1-methyl-2-oxoethyl}carbamate. LC-MS $[M+H]^+$ 648.2
736		8-[(6-Bromo-1,3-benzodioxol-5-yl)thio]-9-[2-(1-{[2-(2-methoxyethoxy)-ethoxy]-acetyl}-piperidin-4-yl)-ethyl]-9H-purin-6-amine. LC-MS $[M+H]^+$ 637.4
737		8-[(6-Bromo-1,3-benzodioxol-5-yl)thio]-3-[2-(1-{[2-(2-methoxyethoxy)-ethoxy]-acetyl}-piperidin-4-yl)-ethyl]-3H-purin-6-amine. LC-MS $[M+H]^+$ 637.4
738		8-[(6-Bromo-1,3-benzodioxol-5-yl)thio]-9-(2-{1-[(2-methoxyethoxy)-acetyl]-piperidin-4-yl}-ethyl)-9H-purin-6-amine. LC-MS $[M+H]^+$ 593.1

739		8-[(6-Bromo-1,3-benzodioxol-5-yl)-thio]-3-(2-{1-[(2-methoxyethoxy)-acetyl]-piperidin-4-yl}-ethyl)-3H-purin-6-amine. LC-MS $[M+H]^+$ 593.4
740		*tert*-Butyl {(1*R*)-2-[(3*R*)-3-(2-{6-amino-8-[(6-bromo-1,3-benzodioxol-5-yl)thio]-9*H*-purin-9-yl}ethyl)piperidin-1-yl]-1-methyl-2-oxoethyl}carbamate. LC-MS $[M+H]^+$ 649.3
741		*tert*-Butyl {(1*R*)-2-[(3*R*)-3-(2-{6-amino-8-[(6-bromo-1,3-benzodioxol-5-yl)thio]-9*H*-purin-9-yl}ethyl)piperidin-1-yl]-1-methyl-2-oxoethyl}carbamate. LC-MS $[M+H]^+$ 649.3

[00936] Example 742

[00937] 9-(2-{1-[(2*S*)-2-Aminopropanoyl]piperidin-4-yl}ethyl)-8-[(6-bromo-1,3-benzodioxol-5-yl)thio]-9H-purin-6-amine



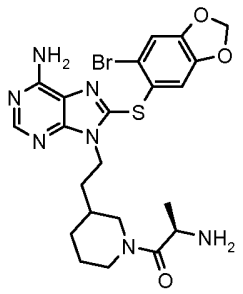
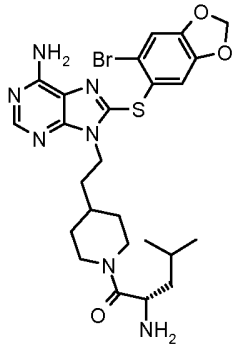
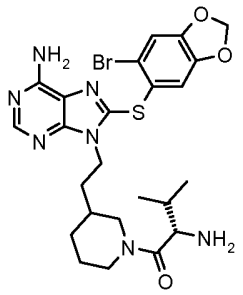
[00938] Reagent: (a) TFA, DCM.

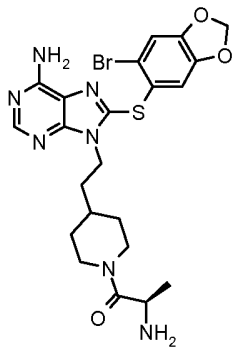
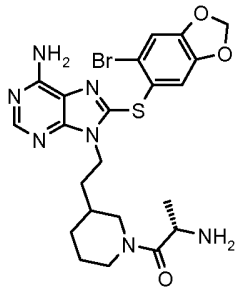
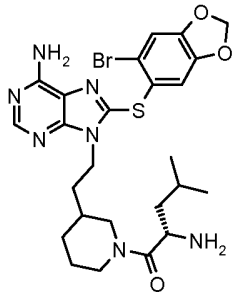
[00939] To a solution of [(*S*)-2-(4-{2-[6-Amino-8-(6-bromo-benzo[1,3]dioxol-5-ylsulfanyl)-purin-9-yl]-ethyl}-piperidin-1-yl)-1-methyl-2-oxo-ethyl]-carbamic acid *tert*-butyl ester (0.014 g, 0.021 mmol) in DCM (3 mL) was added drop wise TFA (100 μL) and the resulting mixture was stirred for overnight at room temperature. After concentration under reduced pressure, the residual TFA was removed to afford a title product (0.015 g) as a TFA salt. ^{1}H NMR (CD_3OD) δ 8.34 (s, 1H), 7.28 (s, 1H), 7.23 (s, 1H), 6.09 (s, 2H), 4.54-4.44 (m, 2H), 4.39 (t, J = 7.42 Hz, 2H), 3.85 (broad d, J = 13.2 Hz, 1H), 3.19-3.08 (m, 1H), 2.75-2.63 (m, 1H), 2.00-1.80 (m, 4H), 1.70-1.58 (m, 1H), 1.44 (dd, J = 14.8, 7.0 Hz, 3H), 1.35-1.13 (m, 2H); LC-MS $[M+H]^+$ 548.2

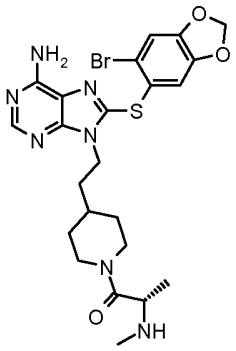
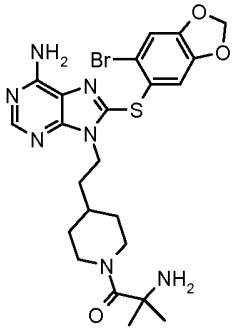
[00940] The examples 743 -755 are summarized in table 16, were synthesized in the same manner as described for example 742 using appropriate starting materials and are isolated as a trifluoroacetate salt.

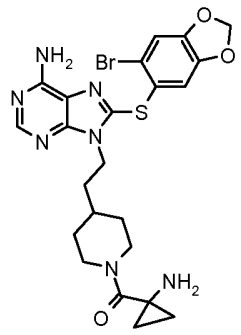
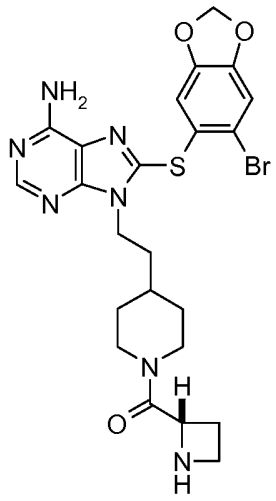
[00941] Table 16

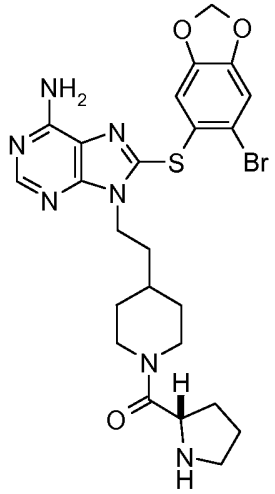
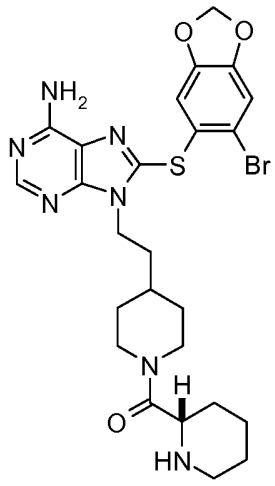
Example	Structure	Name and analytical data

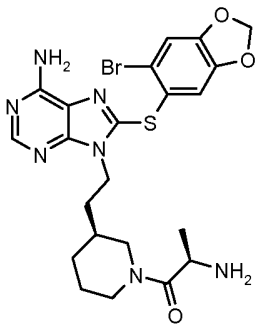
743		9-(2-{1-[(2*R*)-2-Aminopropanoyl]piperidin-3-yl}ethyl)-8-[(6-bromo-1,3-benzodioxol-5-yl)thio]-9H-purin-6-amine. ^{1}H NMR (CD_3OD) δ 8.30 (s, 1H), 7.28 (s, 1H), 7.23 (s, 1H), 6.09 (s, 2H), 4.50-4.20 (m, 4H), 4.30-4.18 (m, 1H), 3.80-3.65 (m, 1H), 3.20-3.10 (m, 1H), 2.78-2.65 (m, 1H), 2.10-2.00 (m, 1H), 2.00-1.75 (m, 3H), 1.60-1.30 (m, 5H); LC-MS $[M+H]^+$ 548.1
744		9-(2-{1-[(2*S*)-2-Amino-4-methylpentanoyl]piperidin-4-yl}ethyl)-8-[(6-bromo-1,3-benzodioxol-5-yl)thio]-9H-purin-6-amine.^{1}H NMR (CD_3OD) δ 8.34 (s, 1H), 7.28 (s, 1H), 7.22 (s, 1H), 6.09 (s, 2H), 4.58-4.28 (m, 4H), 3.79 (broad d, J = 13.2 Hz, 1H), 3.13 (t, J = 12.8 Hz, 1H), 2.76-2.62 (m, 1H), 2.00-1.50 (m, 7H), 1.35-1.10 (m, 3H), 1.08-0.95 (m, 6H); LC-MS $[M+H]^+$ 590.1
745		9-(2-{1-[(2*S*)-2-Amino-3-methylbutanoyl]piperidin-3-yl}ethyl)-8-[(6-bromo-1,3-benzodioxol-5-yl)thio]-9H-purin-6-amine. TOF-MS $[M+H]^+$ 576.1

746		9-(2-{1-[(2*R*)-2-Aminopropanoyl]piperidin-4-yl}ethyl)-8-[(6-bromo-1,3-benzodioxol-5-yl)thio]-9H-purin-6-amine. ^{1}H NMR (CD_3OD) δ 8.34 (s, 1H), 7.28 (s, 1H), 7.23 (s, 1H), 6.09 (s, 2H), 4.54-4.44 (m, 2H), 4.39 (t, J = 7.42 Hz, 2H), 3.85 (broad d, J – 13.2 Hz, 1H), 3.19-3.08 (m, 1H), 2.75-2.63 (m, 1H), 2.00-1.80 (m, 4H), 1.70-1.58 (m, 1H), 1.44 (dd, J = 14.8, 7.0 Hz, 3H), 1.35-1.13 (m, 2H); LC-MS $[M+H]^+$ 548.2
747		9-(2-{1-[(2*S*)-2-Aminopropanoyl]piperidin-3-yl}ethyl)-8-[(6-bromo-1,3-benzodioxol-5-yl)thio]-9H-purin-6-amine.^{1}H NMR (CD_3OD) δ 8.34 (s, 1H), 7.28 (s, 1H), 7.24 (s, 1H), 6.10 (s, 2H), 4.50-4.35 (m, 3H), 4.30-4.20 (m, 1H), 3.78-3.68 (m, 1H), 3.24-3.16 (m, 1H), 2.72 (dd, J = 10.1, 12.8 Hz, 1H), 2.10-2.00 (m, 1H), 2.00-1.75 (m, 3H), 1.60-1.30 (m, 6H); LC-MS $[M+H]^+$ 548.1
748		9-(2-{1-[(2*S*)-2-Amino-4-methylpentanoyl]piperidin-3-yl}ethyl)-8-[(6-bromo-1,3-benzodioxol-5-yl)thio]-9H-purin-6-amine. ^{1}H NMR (CD_3OD) δ 8.38-8.32 (m, 1H), 7.28 (s, 1H), 7.25-7.20

		(m, 1H), 6.10 (s, 2H), 4.60-4.20 (m, 4H), 3.70-3.60 (m, 1H), 3.45-3.15 (m, 1H), 3.00-2.65 (m, 2H), 2.30-1.20 (m, 15H); LC-MS $[M+H]^{+}$ - 590.2
749		8-[(6-Bromo-1,3-benzodioxol-5-yl)thio]-9-(2-{1-[(2*S*)-2-(methylamino)propanoyl]piperidin-4-yl}ethyl)-9H-purin-6-amine. ^{1}H NMR (CD_3OD) δ 8.34 (s, 1H), 7.29 (s, 1H), 7.23 (s, 1H), 6.09 (s, 2H), 4.50 (d, J = 13.2 Hz, 1H), 4.30-4.44 (m, 2H), 3.83 (d, J = 14.8 Hz, 1H), 3.08-3.20 (m, 2H), 2.62-2.76 (m, 4H), 1.80-2.00 (m, 4H), 1.55-1.70 (m, 1H), 1.46 (dd, J = 15.6, 7.0 Hz, 3H), 1.35-1.10 (m, 2H); LC-MS $[M+H]^{+}$ 562.1
750		9-{2-[1-(2-Amino-2-methylpropanoyl)piperidin-4-yl]ethyl}-8-[(6-bromo-1,3-benzodioxol-5-yl)thio]-9H-purin-6-amine. ^{1}H NMR (CD_3OD) δ 8.34 (s, 1H), 7.28 (s, 1H), 7.22 (s, 1H), 6.09 (s, 2H), 4.45-4.16 (m, 4H), 3.10-2.80 (m, 2H), 1.94 (d, J = 12.8 Hz, 2H), 1.84 (q, J = 7.0 Hz, 2H), 1.66 (s, 7H), 1.32-1.15 (m, 2H); TOF-MS $[M+H]^{+}$ 562.0

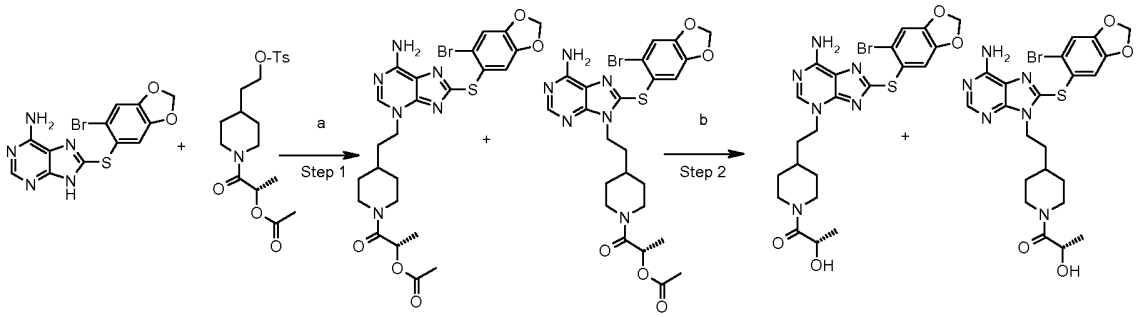
751		9-(2-{1-[(1-Aminocyclopropyl)carbonyl]piperidin-4-yl}ethyl)-8-[(6-bromo-1,3-benzodioxol-5-yl)thio]-9H-purin-6-amine. ^{1}H NMR (CD_3OD) δ 8.27 (s, 1H), 7.28 (s, 1H), 7.18 (s, 1H), 6.09 (s, 2H), 4.36 (t, J = 7.42 Hz, 2H), 4.28 (d, J = 12.8 Hz, 2H), 2.95 (t, J = 12.1 Hz, 2H), 1.92 (d, J = 11.3 Hz, 2H), 1.83 (q, J = 7.03 Hz, 2H), 1.70-1.58 (m, 1H), 1.39-1.33 (m, 2H), 1.32-1.21 (m, 4H); TOF-MS $[M+H]^+$ 560.1
752		9-(2-{1-[(2*S*)-Azetidin-2-ylcarbonyl]piperidin-4-yl}ethyl)-8-[(6-bromo-1,3-benzodioxol-5-yl)thio]-9H-purin-6-amine. ^{1}H NMR (CD_3OD) δ 8.30 (s, 1H), 7.29 (s, 1H), 7.20 and 7.19 (two s, 1H), 6.09 (s, 2H), 5.36 (m, 1H), 4.48 (m, 1H), 4.37 (t, J = 7.6 Hz, 2H), 4.11 (m, 1H), 3.90 (m, 1H), 3.41 (m, 1H), 3.30 (m, 1H), 2.89 (m, 1H), 2.75 (m, 1H), 2.56 (m, 1H), 1.96-1.88 (m, 3H), 1.86-1.81 (m, 2H), 1.33-1.19 (m, 2H); LC-MS $[M+H]^+$ 560.1

753		8-[(6-Bromo-1,3-benzodioxol-5-yl)thio]-9-[2-(1-L-prolylpiperidin-4-yl)ethyl]-9H-purin-6-amine. ^{1}H NMR (CD_3OD) δ 8.31 (s, 1H), 7.29 (s, 1H), 7.21 and 7.20 (s, 1H), 6.09 (s, 2H), 4.66 and 4.62 (t, J = 8.4 and 7.2 Hz, 1H), 4.59 (m, 1H), 4.38 (t, J = 8.0 Hz, 2H), 3.87 (m, 1H), 3.43-3.38 (m, 1H), 3.16-3.10 (m, 2H), 2.73 (m, 1H), 2.49 (m, 1H), 2.10-1.82 (m, 8H), 1.65 (m, 1H), 1.30-1.16 (m, 4H), 0.88 (m, 1H); LC-MS $[M+H]^+$ 574.1
754		8-[(6-Bromo-1,3-benzodioxol-5-yl)thio]-9-(2-{1-[(2*S*)-piperidin-2-ylcarbonyl]piperidin-4-yl}ethyl)-9*H*-purin-6-amine. ^{1}H NMR (CD_3OD) δ 8.31 (s, 1H), 7.29 (s, 1H), 7.21 (s, 1H), 6.10 (s, 2H), 4.48 (m, 1H), 4.38 (t, J = 7.2 Hz, 2H), 4.29 (m, 1H), 3.84 (brd, J = 13.6 Hz, 1H), 3.41-3.38 (m, 2H), 3.15-3.00 (m, 2H), 2.68 (m, 1H), 2.10 (m, 1H), 1.94-1.81 (m, 6H), 1.76-1.60 (m, 4H), 1.28-1.12 (m, 1H); LC-MS $[M+H]^+$ 588.1

755		9-(2-{(3*S*)-1-[(2*R*)-2-Aminopropanoyl]piperidin-3-yl}ethyl)-8-[(6-bromo-1,3-benzodioxol-5-yl)thio]-9H-purin-6-amine. ^{1}H NMR (CD_3OD) δ 8.20 (s, 1H), 7.30 (s, 1H), 7.20 (s, 1H), 6.10 (s, 2H), 4.30-4.20 (m, 2H), 3.50-3.40 (m, 2H), 3.20-3.10 (m, 2H), 2.90-2.80 (m, 2H), 2.40-2.30 (m, 2H), 2.10-2.00 (m, 2H), 1.60-1.50 (m, 2H), 1.40 (s, 3H); LC-MS $[M+H]^+$ 548.2

[00942] Examples 756 and 757

[00943] (2*S*)-1-[4-(2-{6-Amino-8-[(6-bromo-1,3-benzodioxol-5-yl)thio]-3H-purin-3-yl}ethyl)piperidin-1-yl]-1-oxopropan-2-ol and (2*S*)-1-[4-(2-{6-amino-8-[(6-bromo-1,3-benzodioxol-5-yl)thio]-9H-purin-9-yl}ethyl)piperidin-1-yl]-1-oxopropan-2-ol



[00944] Reagents : (a) Barton's base, DMF, 90-100° C; (b) $LiOH.H_2O$, MeOH-THF-H_2O (1:1:1).

[00945] *Step 1:* The alkylation reaction was carried out according to the procedure described for example 1 and 2 using 8-(6-bromo-benzo[1,3]dioxol-5-

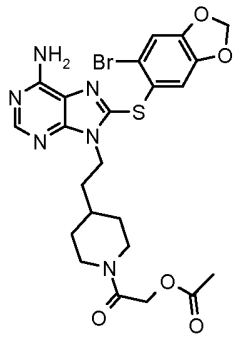
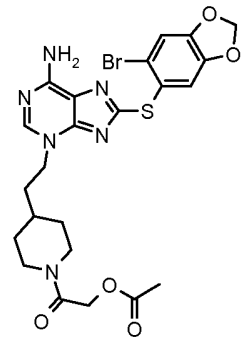
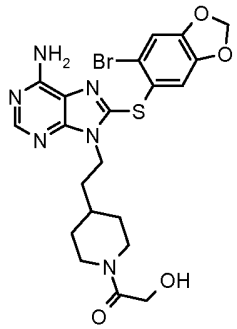
ylsulfanyl)-9H-purin-6-ylamine (0.200g, 0.54 mmol) and acetic acid (*S*)-1-methyl-2-oxo-2-{4-[2-(toluene-4-sulfonyloxy)-ethyl]-piperidin-1-yl}-ethyl ester (0.325 g, 0.81 mmol) to afford mixture of N-3 and N-9 isomers. (1*S*)-2-[4-(2-{6-amino-8-[(6-bromo-1,3-benzodioxol-5-yl)thio]-3*H*-purin-3-yl}ethyl)piperidin-1-yl]-1-methyl-2-oxoethyl acetate, LC-MS $[M+H]^+$ 591.1 and (1*S*)-2-[4-(2-{6-amino-8-[(6-bromo-1,3-benzodioxol-5-yl)thio]-9*H*-purin-9-yl}ethyl)piperidin-1-yl]-1-methyl-2-oxoethyl acetate, LC-MS $[M+H]^+$ 591.1. The crude mixture was used in the next hydrolysis reaction without further purification.

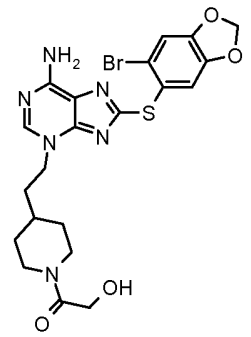
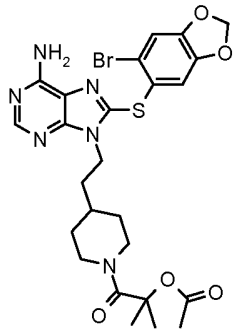
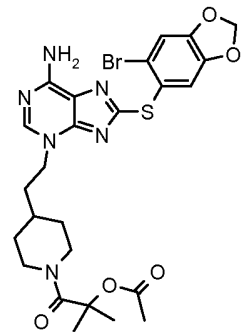
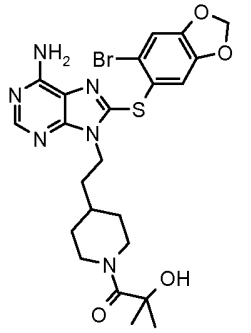
[00946] *Step 2:* To a solution of above product in mixture of MeOH-THF-H_2O (1:1:1, 10 mL) was added $LiOH.H_2O$ (0.1 g) and the resulting mixture was stirred for overnight at room temperature. After concentration of reaction mixture under reduced pressure, the residue was subjected to purification by preparative HPLC [X-Terra prep-RP18 10 um, 19x250 mm(waters), Mobile phase: solvent A: Water HPLC grade containing 0.01% TFA, and solvent B: acetonitrile containing 0.01% TFA, general eluting gradient - solvent B 15% to 80 over 15 to 25 minutes run time]. After lyophilization of HPLC fractions the title compounds were isolated as trifluoro acetate salt. (2*S*)-1-[4-(2-{6-amino-8-[(6-bromo-1,3-benzodioxol-5-yl)thio]-3H-purin-3-yl}ethyl)piperidin-1-yl]-1-oxopropan-2-ol. TOF-MS $[M+H]^+$ 549.1 and (2*S*)-1-[4-(2-{6-amino-8-[(6-bromo-1,3-benzodioxol-5-yl)thio]-9H-purin-9-yl}ethyl)piperidin-1-yl]-1-oxopropan-2-ol, ^1H NMR (CD_3OD) δ 8.31 (s, 1H), 7.28 (s, 1H), 7.20 (s, 1H), 6.09 (s, 2H), 4.60-4.45 (m, 2H), 4.37 (t, J = 7.8 Hz, 2H), 4.00 (d, J= 12.0 Hz, 1H), 3.10-2.98 (m, 1H), 2.70-2.56 (m, 1H), 1.96-1.79 (m, 4H), 1.70-1.55 (m, 1H), 1.30 (dd, J = 7.0, 10.1 Hz, 3H), 1.26-1.10 (m, 2H); LC-MS $[M+H]^+$ 549.1

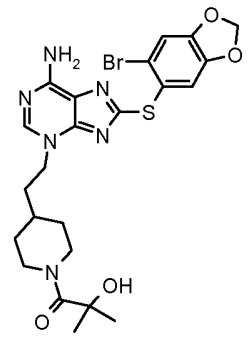
[00947] Examples 758-765

[00948] Examples 758-765 are prepared according to the procedure described for examples 756 and 757 using appropriate starting materials. All the compounds summarized in the table 17 are isolated as a trifluoroacetate salt after HPLC purification.

[00949] Table 17

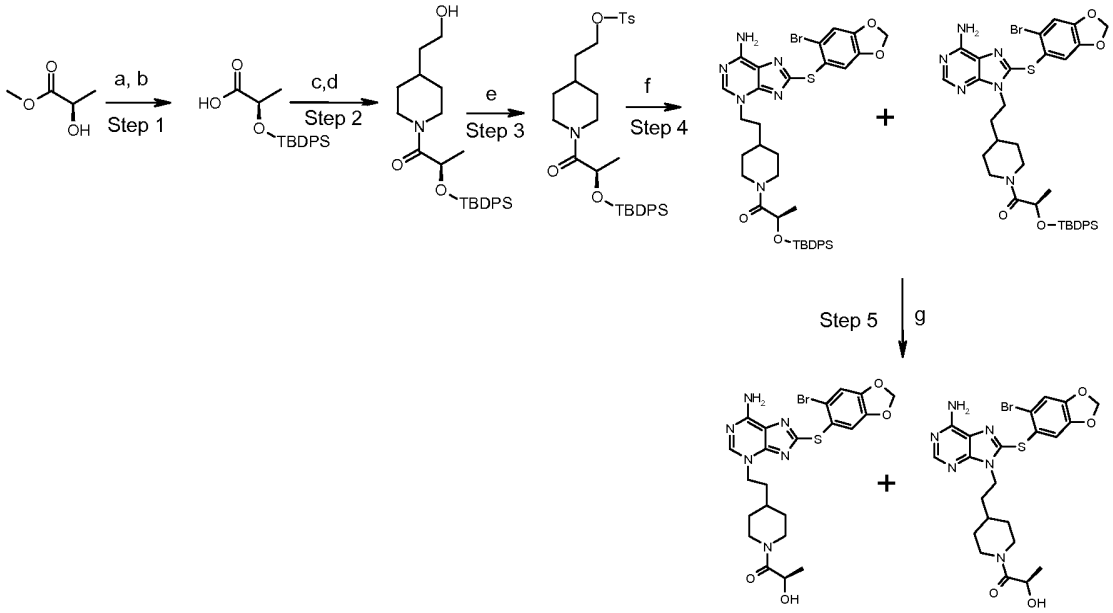
Example	Structure	Name and analytical data
758		2-[4-(2-{6-Amino-8-[(6-bromo-1,3-benzodioxol-5-yl)thio]-9H-purin-9-yl}ethyl)piperidin-1-yl]-2-oxoethyl acetate. LC-MS $[M+H]^+$ 577.1
759		2-[4-(2-{6-Amino-8-[(6-bromo-1,3-benzodioxol-5-yl)thio]-3H-purin-3-yl}ethyl)piperidin-1-yl]-2-oxoethyl acetate LC-MS $[M+H]^+$ 577.1
760		2-[4-(2-{6-Amino-8-[(6-bromo-1,3-benzodioxol-5-yl)thio]-9H-purin-9-yl}ethyl)piperidin-1-yl]-2-oxoethanol. ^1H NMR (DMSO-D_6) δ 8.20 (s, 1H), 7.74-7.58 (broad s, 1H), 7.39 (s, 1H), 6.84 (s, 1H), 6.09 (s, 2H), 4.29 (d, J = 12.5 Hz, 1H), 4.19 (t, J = 7.4 Hz, 2H), 4.00 (d, J = 7.0 Hz, 2H), 3.60 (d, J = 13.6 Hz, 1H), 2.82 (t, J = 11.7 Hz, 1H), 2.56-2.44 (m, merged with solvent peak, 1H), 1.70 (d, J = 11.7 Hz, 2H), 1.61 (q, J = 7.0 Hz, 2H), 1.49-1.36 (m, 1H), 1.12-0.90 (m, 2H); TOF-MS $[M+H]^+$ 535.06

761		2-[4-(2-{6-Amino-8-[(6-bromo-1,3-benzodioxol-5-yl)thio]-3H-purin-3-yl}ethyl)piperidin-1-yl]-2-oxoethanol. LC-MS $[M+H]^+$ 535.1
762		2-[4-(2-{6-Amino-8-[(6-bromo-1,3-benzodioxol-5-yl)thio]-9*H*-purin-9-yl}ethyl)piperidin-1-yl]-1,1-dimethyl-2-oxoethyl acetate. LC-MS $[M+H]^+$ 605.1
763		2-[4-(2-{6-Amino-8-[(6-bromo-1,3-benzodioxol-5-yl)thio]-3*H*-purin-3-yl}ethyl)piperidin-1-yl]-1,1-dimethyl-2-oxoethyl acetate. LC-MS $[M+H]^+$ 605.1
764		1-[4-(2-{6-Amino-8-[(6-bromo-1,3-benzodioxol-5-yl)thio]-9H-purin-9-yl}ethyl)piperidin-1-yl]-2-methyl-1-oxopropan-2-ol. LC-MS $[M+H]^+$ 563.1

765		1-[4-(2-{6-Amino-8-[(6-bromo-1,3-benzodioxol-5-yl)thio]-3H-purin-3-yl}ethyl)piperidin-1-yl]-2-methyl-1-oxopropan-2-ol. LC-MS $[M+H]^+$ 563.1

[00950] Examples 766 and 767

[00951] (2*R*)-1-[4-(2-{6-Amino-8-[(6-bromo-1,3-benzodioxol-5-yl)thio]-3*H*-purin-3-yl}ethyl)piperidin-1-yl]-1-oxopropan-2-ol and (2*R*)-1-[4-(2-{6-amino-8-[(6-bromo-1,3-benzodioxol-5-yl)thio]-9*H*-purin-9-yl}ethyl)piperidin-1-yl]-1-oxopropan-2-ol



[00952] Reagensts: (a) TBDPS-Cl, Et_3N, THF, (b) $LiOH.H_2O$, MeOH, THF, H_2O, (c) $(COCl)_2$, DCM, cat. DMF, (d) 4-piperidine ethanol, Et_3N, THF, (e) *p*-TsCl, Et_3N, cat. DMAP, THF, (f) intermediate 34, Barton's base, DMF, 90-100° C, (g) TBAF, THF.

[00953] *Step 1*: (2*R*)-2-{[*tert*-Butyl(diphenyl)silyl]oxy}propanoic acid

[00954] To the mixture of (*R*)-2-Hydroxy-propionic acid methyl ester (1.0 g, 9.6 mmol), triethyl amine (4.0 mL, 28.81 mmol) in tetrahydrofuran (12 mL), was added *tert*-butyldiphenylsilylchloride (3.68 mL, 14.4 mmol) at room temperature and allowed the reaction mixture to stir for 12 h. After completion of the reaction, the reaction mixture was diluted with EtOAc (80 mL) and washed with water (70 mL) and brine (70 mL). The EtOAc layer was dried over Na_2SO_4 and solvent was evaporated *in vacuo* to afford methyl (2*R*)-2-{[*tert*-butyl(diphenyl)silyl]oxy}propanoate (3.28 g). The above crude material was sufficiently pure for the next step and used without further purification. The crude material was diluted with THF-MeOH-H_2O (1:1:1, 20 mL) and added LiOH. H_2O (1.17 g, 28.0 mmol). The reaction mixture was stirred for over night at room temperature. The reaction mixture neutralized with conc.HCl and concentrated *in vacuo*. The residue was diluted with 75 mL water and extracted with EtOAc (3 X 50 mL), the combined EtOAc layers were dried over Na_2SO_4 and evaporated *in vacuo*. The crude carboxylic acid was purified by Isco silica gel flash column using EtOAc to obtain the carboxylic acid (0.6 g). ^{1}H NMR ($CDCl_3$) δ 7.70-7.60 (m, 4H), 7.50-7.38 (m, 6H), 4.32 (q, J = 6.6 Hz, 1H), 1.30 (d, J = 7.0 Hz, 9H); LC-MS $[M-H]^+$ 327.2

[00955] *Step 2*: 2-[1-((2*R*)-2-{[*tert*-Butyl-(diphenyl)silyl]-oxy}propanoyl)-piperidin-4-yl]-ethanol

[00956] To above carboxylic acid (0.6 g, 1.82 mmol) in dicloromethane (15 mL), oxalyl chloride (464 μL, 3.65 mmol) was added at ice cold temperature followed by two drops of N,N-dimethyl formamide. The reaction mixture was brought to room temperature and stirred for 6 h. At the end of this period excess oxalyl chloride was evaporated under reduced pressure to give the corresponding acid chloride. The acid chloride was diluted with 2 mL THF and added to a mixture of 4-piperidine ethanol (0.235 g, 1.8 mmol), triethyl amine (763 μL, 5.48 mmol) in

THF (7 mL) at room temperature. The reaction mixture was stirred for over night, after completion of reaction the reaction mixture was diluted with EtOAc (60 mL) and washed with sat. aq. $NaHCO_3$ solution (60 mL) and brine (60 mL). The EtOAc layer was dried over Na_2SO_4, filtered, and solvent was evaporated under reduced pressure to afford crude product. The crude was purified by Isco silica gel flash column using Hexane-EtOAc (1:3) to give 0.748 g of 2-[1-((2*R*)-2-{[*tert*-butyl-(diphenyl)silyl]-oxy}propanoyl)-piperidin-4-yl]-ethanol. ^{1}H NMR ($CDCl_3$) δ 7.70-7.60 (m, 4H), 7.46-7.33 (m, 6H), 4.55 (t, J = 5.4 Hz, 1H), 4.43 (d, J = 12.8 Hz, 1H), 4.26 and 4.06 (2 d, J = 12.5 Hz, 1H), 3.66 (q, J = 5.8 Hz, 2H), 2.86 and 2.69 (2 t, J = 12.8 Hz, 1H), 2.5-2.34 (m, 1H), 1.70-1.54 (m, 4H), 1.43 (q, J = 6.6 Hz, 2H), 1.34 (t, J = 7.0 Hz, 3H), 1.20-1.28 (m, 1H), 1.08 (s, 9H); LC-MS [M+H] 440.3

[00957] *Step 3*: 2-[1-((2*R*)-2-{[*tert*-Butyl-(diphenyl)-silyl]-oxy}-propanoyl)-piperidin-4-yl]-ethyl 4-methylbenzenesulfonate

[00958] To the solution of 2-[1-((2*R*)-2-{[*tert*-butyl-(diphenyl)silyl]-oxy}propanoyl)-piperidin-4-yl]-ethanol (0.748 g, 1.7 mmol) in tetrahydrofuran (10 mL) and added triethyl amine (711 μL, 5.11 mmol), N,N-dimethyl pyridine (10 mg) followed by *p*-TsCl (0.487 g, 2.55 mmol) at room temperature and stirred the reaction mixture for 12 h. The reaction mixture was concentrated under vacuum and diluted with EtOAc (60 mL), washed with sat. aq. $NaHCO_3$ solution (50 mL) and brine (50 mL). The EtOAc layer was dried over Na_2SO_4, filtered, and solvent was evaporated under reduced pressure to afford crude product. The crude was purified by Isco silica gel flash column using Hexane-EtOAc (1:3) to give 0.69 g of 2-[1-((2*R*)-2-{[*tert*-butyl-(diphenyl)-silyl]-oxy}-propanoyl)-piperidin-4-yl]-ethyl 4-methylbenzenesulfonate. ^{1}H NMR ($CDCl_3$) δ 7.79 (d, J = 7.8 Hz, 2H), 7.68-7.58 (m, 4H), 7.40-7.32 (m, 8H), 4.60-4.50 (m,1H), 4.44-4.35 (m,1H), 4.30-3.96 (m, 4H), 2.85-2.58 (m, 1H), 2.45 (s, 3H), 2.40-2.25 (m, 1H), 1.58-1.42 (m, 5H), 1.40-1.30 (m, 5H), 1.07 (s, 9H), 1.00-0.80 (m, 1H); LC-MS $[M+23]^+$ 616.2

[00959] *Step 4:* 8-[(6-Bromo-1,3-benzodioxol-5-yl)thio]-9-{2-[1-((2*R*)-2-{[*tert*-butyl(diphenyl)silyl]oxy}propanoyl)piperidin-4-yl]ethyl}-9*H*-purin-6-amine and 8-[(6-bromo-1,3-benzodioxol-5-yl)thio]-3-{2-[1-((2*R*)-2-{[*tert*-butyl(diphenyl)silyl]oxy}propanoyl)piperidin-4-yl]ethyl}-3*H*-purin-6-amine

[00960] The alkylation reaction was carried out according to the procedure described for example 1 and 2 using 8-(6-Bromo-benzo[1,3]dioxol-5-ylsulfanyl)-9H-purin-6-ylamine (0.172 g, 0.47 mmol) and 2-[1-((2*R*)-2-{[*tert*-butyl-(diphenyl)-silyl]-oxy}-propanoyl)-piperidin-4-yl]-ethyl 4-methylbenzenesulfonate(0.280 g, 0.47 mmol) obtained from step 3 to afford 8-[(6-bromo-1,3-benzodioxol-5-yl)thio]-9-{2-[1-((2*R*)-2-{[*tert*

[00961] butyl(diphenyl)silyl]oxy}propanoyl)piperidin-4-yl]ethyl}-9*H*-purin-6-amine; LC-MS $[M+1]^+$ 787.1 and 8-[(6-bromo-1,3-benzodioxol-5-yl)thio]-3-{2-[1-((2*R*)-2-{[*tert*-butyl(diphenyl)silyl]oxy}propanoyl)piperidin-4-yl]ethyl}-3*H*-purin-6-amine; LC-MS $[M+H]^+$ 787.1

[00962] *Step 5*: (2*R*)-1-[4-(2-{6-amino-8-[(6-bromo-1,3-benzodioxol-5-yl)thio]-9*H*-purin-9-yl}ethyl)piperidin-1-yl]-1-oxopropan-2-ol and (2*R*)-1-[4-(2-{6-amino-8-[(6-bromo-1,3-benzodioxol-5-yl)thio]-3*H*-purin-3-yl}ethyl)piperidin-1-yl]-1-oxopropan-2-ol

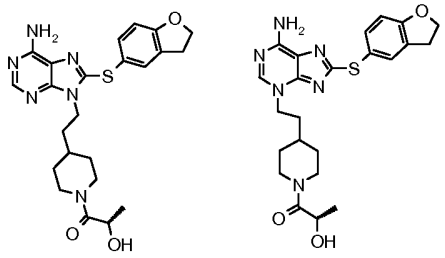
[00963] To the mixture of 8-[(6-bromo-1,3-benzodioxol-5-yl)thio]-9-{2-[1-((2*R*)-2-{[*tert*-butyl(diphenyl)silyl]oxy}propanoyl)piperidin-4-yl]ethyl}-9*H*-purin-6-amine and 8-[(6-bromo-1,3-benzodioxol-5-yl)thio]-3-{2-[1-((2*R*)-2-{[*tert*-butyl(diphenyl)silyl]oxy}propanoyl)piperidin-4-yl]ethyl}-3*H*-purin-6-amine.

[00964] (0.314 g, 0.398 mmol) in THF (5 mL), was added 1.0 M. THF solution of tetra-*n*-butylammonium fluoride (0.47 mL, 0.47 mmol) and stirred the reaction mixture at room temperature for over night. After completion of reaction the reaction mixture was concentrated and purified by preparative HPLC [X-Terra prep-RP18 10 um, 19x250 mm(waters), Mobile phase: solvent A: Water HPLC grade containing 0.01% TFA, and solvent B: acetonitrile containing 0.01% TFA, general

eluting gradient - solvent B 15% to 80 over 15 to 25 minutes run time]. After lyophilization of HPLC fractions N9 and N-3 isomers were isolated as trifluoroacetate salts. (2*R*)-1-[4-(2-{6-Amino-8-[(6-bromo-1,3-benzodioxol-5-yl)thio]-3*H*-purin-3-yl}ethyl)piperidin-1-yl]-1-oxopropan-2-ol; LC-MS $[M+H]^+$ 549.1 and (2*R*)-1-[4-(2-{6-amino-8-[(6-bromo-1,3-benzodioxol-5-yl)thio]-9*H*-purin-9-yl}ethyl)piperidin-1-yl]-1-oxopropan-2-ol and LC-MS $[M+H]^+$ 549.1.

[00965] Examples 768 and 769

[00966] (2*S*)-1-(4-{2-[6-Amino-8-(2,3-dihydro-1-benzofuran-5-ylthio)-9H-purin-9-yl]ethyl}piperidin-1-yl)-1-oxopropan-2-ol and (2*S*)-1-(4-{2-[6-amino-8-(2,3-dihydro-1-benzofuran-5-ylthio)-3H-purin-3-yl]ethyl}piperidin-1-yl)-1-oxopropan-2-ol



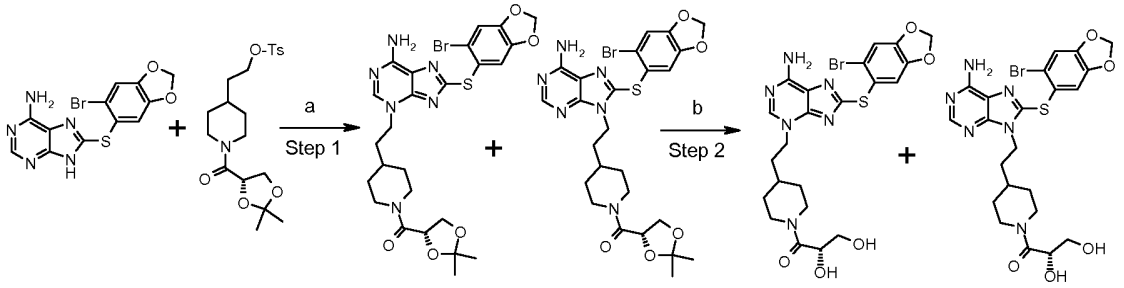
[00967] The title compounds were prepared by a procedure similar to examples 756 and 757 using 8-(2,3-dihydro-benzofuran-5-ylsulfanyl)-9H-purin-6-ylamine (0.100 g, 0.350 mmol) and acetic acid (*S*)-1-methyl-2-oxo-2-{4-[2-(toluene-4-sulfonyloxy)-ethyl]-piperidin-1-yl}-ethyl ester (0.278 g, 0.700 mmol) to give the mixture of (1*S*)-2-(4-{2-[6-amino-8-(2,3-dihydro-1-benzofuran-5-ylthio)-9*H*-purin-9-yl]ethyl}piperidin-1-yl)-1-methyl-2-oxoethyl acetate, LC-MS $[M+H]^+$ 511.2 and (1*S*)-2-(4-{2-[6-amino-8-(2,3-dihydro-1-benzofuran-5-ylthio)-3*H*-purin-3-yl]ethyl}piperidin-1-yl)-1-methyl-2-oxoethyl acetate, LC-MS $[M+H]^+$ 511.2.

[00968] The above mixture was treated with $LiOH.H_2O$ as described in example 62 and 63, the isomers were separated by preparative HPLC. (2*S*)-1-(4-{2-

[6-amino-8-(2,3-dihydro-1-benzofuran-5-ylthio)-9H-purin-9-yl]ethyl}piperidin-1-yl)-1-oxopropan-2-ol. ^{1}H NMR (CD_3OD) δ 8.28 (s, 1H), 7.49 (s, 1H), 7.40 (dd, J = 1.9, 8.2 Hz, 1H), 6.84 (d, J = 8.2 Hz, 1H), 4.62 (t, J = 8.5 Hz, , 2H), 4.59-4.42 (m, 2H), 4.34 (t, J = 7.4 Hz, , 2H), 4.06-3.97 (m, 1H), 3.25 (t, J = 8.5 Hz, , 2H), 3.10-2.98 (m, 1H), 2.70-2.39 (m, 1H), 1.96-1.74 (m, 4H), 1.70-1.55 (m, 1H), 1.35-1.10 (m, 5H); TOF-MS $[M+H]^+$ 469.2 . (2*S*)-1-(4-{2-[6-amino-8-(2,3-dihydro-1-benzofuran-5-ylthio)-3H-purin-3-yl]ethyl}piperidin-1-yl)-1-oxopropan-2-ol. TOF-MS $[M+H]^+$ 469.2

[00969] Examples 770 and 771

[00970] (2*S*)-3-[4-(2-{6-Amino-8-[(6-bromo-1,3-benzodioxol-5-yl)thio]-3H-purin-3-yl}ethyl)piperidin-1-yl]-3-oxopropane-1,2-diol and (2*S*)-3-[4-(2-{6-amino-8-[(6-bromo-1,3-benzodioxol-5-yl)thio]-9H-purin-9-yl}ethyl)piperidin-1-yl]-3-oxopropane-1,2-diol



[00971] Reagents: Barton's base, DMF, 90 -100 °C, 16 h; b) aq AcOH, rt, 12 h

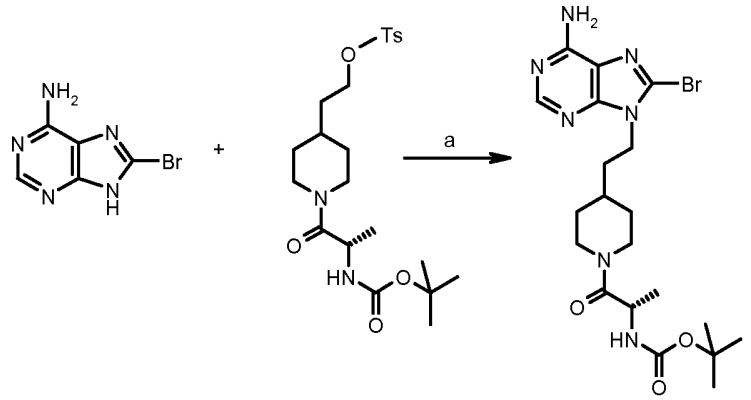
[00972] *Step 1:* The alkylation reaction was carried out according to the procedure described for example 1 and 2 using 8-(6-bromo-benzo[1,3]dioxol-5-ylsulfanyl)-9H-purin-6-ylamine (0.100g, 0.27 mmol) and toluene -4-sulfonic acid 2-[1-((*S*)-2,2-dimethyl-[1,3]dioxolone-4-carbonyl)-piperidin-4-yl]-ethyl ester (0.224 g, 0.54 mmol) to give the mixture of 8-[(6-bromo-1,3-benzodioxol-5-yl)thio]-3-[2-(1-{[(4*S*)-2,2-dimethyl-1,3-dioxolan-4-yl]carbonyl}piperidin-4-yl)ethyl]-3*H*-purin-6-amine, LC-MS $[M+H]^+$ 605.2 and 8-[(6-bromo-1,3-benzodioxol-5-yl)thio]-9-[2-

(1-{[(4*S*)-2,2-dimethyl-1,3-dioxolan-4-yl]carbonyl}piperidin-4-yl)ethyl]-9*H*-purin-6-amine, LC-MS $[M+H]^+$ 605.2. The crude mixture used in the next reaction without further purification.

[00973] *Step 2*: The crude mixture of 8-[(6-bromo-1,3-benzodioxol-5-yl)thio]-3-[2-(1-{[(4*S*)-2,2-dimethyl-1,3-dioxolan-4-yl]carbonyl}piperidin-4-yl)ethyl]-3*H*-purin-6-amine and 8-[(6-bromo-1,3-benzodioxol-5-yl)thio]-9-[2-(1-{[(4*S*)-2,2-dimethyl-1,3-dioxolan-4-yl]carbonyl}piperidin-4-yl)ethyl]-9*H*-purin-6-amine from step 1 (0.31 g, 0.51 mmol) was dissolved in 60% aq. AcOH solution (5 mL) and the reaction mixture was allowed to stir for 12 hr. The reaction mixture was neutralized using K_2CO_3 and evaporated the contents. The residue was diluted with MeOH-DCM (1:2) (10 mL) and filtered. The filtrate was evaporated under reduced pressure. The mixture was purified by preparative HPLC [X-Terra prep-RP18 10 um, 19x250 mm(waters), Mobile phase: solvent A: Water HPLC grade containing 0.01% TFA, and solvent B: acetonitrile containing 0.01% TFA, general eluting gradient - solvent B 15% to 80 over 15 to 25 minutes run time]. After lyophilization of HPLC fractions N-9 and N-3 isomers were isolated as trifluoroacetate salts. (2S)-3-[4-(2-{6-amino-8-[(6-bromo-1,3-benzodioxol-5-yl)thio]-3H-purin-3-yl}ethyl)piperidin-1-yl]-3-oxopropane-1,2-diol. TOF-MS $[M+H]^+$ 565.09 and (2S)-3-[4-(2-{6-amino-8-[(6-bromo-1,3-benzodioxol-5-yl)thio]-9H-purin-9-yl}ethyl)piperidin-1-yl]-3-oxopropane-1,2-diol. ^{1}H NMR (CD_3OD) δ 8.34 (s, 1H), 7.28 (s, 1H), 7.22 (s, 1H), 6.09 (s, 2H), 4.55-4.45 (m, 2H), 4.38 (t, J = 7.0 Hz, 2H), 4.12-4.02 (m, 1H), 3.73-3.58 (m, 2H), 3.12-3.00 (m, 1H), 2.70-2.60 (m, 1H), 1.95-1.55 (m, 5H), 1.30-1.10 (m, 2H); TOF-MS $[M+H]^+$ 565.09.

[00974] Example 772

[00975] *tert*-Butyl ((1*S*)-2-{4-[2-(6-amino-8-bromo-9*H*-purin-9-yl)ethyl]piperidin-1-yl}-1-methyl-2-oxoethyl)carbamate

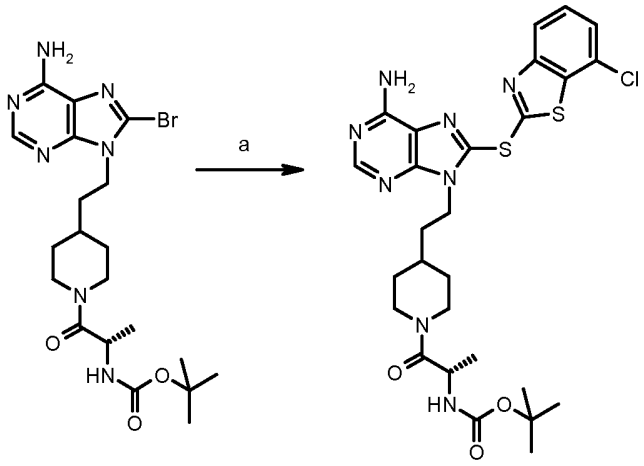


[00976] Reagents: a) Barton's base, THF, 100 °C, MW, 15 min;

[00977] To a suspension of 8-bromoadenine (0.08 g, 0.367 mmol) and toluene-4-sulfonic acid 2-[1-((*S*)-2-*tert*-butoxycarbonylamino-propionyl)-piperidin-4-yl]-ethyl ester (0.200 g, 0.440 mmol) in THF was added Barton's base (91 µl, 0.40 mmol) at room temperature. The reaction mixture was heated at 100°C for 15 min in microwave reactor, at the end of this period reaction was cooled to room temperature and the crude was purified by Isco silica gel flash column using 0-30% gradient of EtOAc- Hexane to give *tert*-butyl {(1*S*)-2-[4-(2-{6-amino-8-[(7-chloro-1,3-benzothiazol-2-yl)thio]-3*H*-purin-3-yl}ethyl)piperidin-1-yl]-1-methyl-2-oxoethyl}carbamate and *tert*-butyl {(1*S*)-2-[4-(2-{6-amino-8-[(7-chloro-1,3-benzothiazol-2-yl)thio]-9*H*-purin-9-yl}ethyl)piperidin-1-yl]-1-methyl-2-oxoethyl}carbamate(0.090 g, 49%)

[00978] Example 773

[00979] *tert*-Butyl {(1*S*)-2-[4-(2-{6-amino-8-[(7-chloro-1,3-benzothiazol-2-yl)thio]-9*H*-purin-9-yl}ethyl)piperidin-1-yl]-1-methyl-2-oxoethyl}carbamate

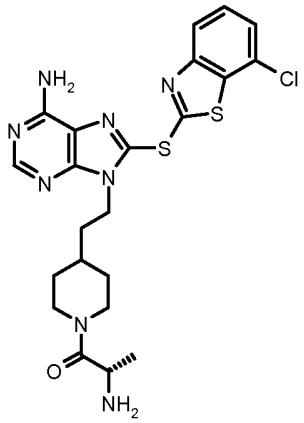


[00980] Reagents: a) 7-Chloro-2-mercaptobenzothiazole, $(CH_3)_3COK$, DMF, 130°C, 6 h;

[00981] To a suspension of 7-Chloro-2-mercaptobenzothiazole (0.020 g, 0.097 mmol) in DMF (2.0 mL) was added $(CH_3)_3COK$ (0.011 g, 0.97 mmol) at room temperature and stirring continued for 30 min. To the above reaction mixture *tert*-butyl ((1*S*)-2-{4-[2-(6-amino-8-bromo-9*H*-purin-9-yl)ethyl]piperidin-1-yl}-1-methyl-2-oxoethyl)carbamate (0.040 g, 0.081 mmol) in (1 mL) of DMF was added at room temperature. The reaction mixture was heated to 130°C for 6h, at the end of this period solvent was evaporated and crude was purified by preparative HPLC [X-Terra prep-RP18 10 um, 19x250 mm(waters), Mobile phase: solvent A: Water HPLC grade containing 0.01% TFA, and solvent B: acetonitrile containing 0.01% TFA, general eluting gradient - solvent B 15% to 80 over 15 to 25 minutes run time]. After lyophilization of HPLC fractions to afford title product. ^{1}H NMR δ (CD_3OD), 8.35 (s, 1H), 7.85-7.82 (m, 1H), 7.50-7.40 (m, 2H), 4.40 (t, J=7.2 Hz, 2H), 4.00-3.90 (m, 2H), 1.80-1.70 (m, 4H), 1.21-1.15 (m, 6H), 1.15 (s, 9H), 1.10 (s, 3H); LC-MS $[M+H]^+$ 617.1

[00982] Example 774

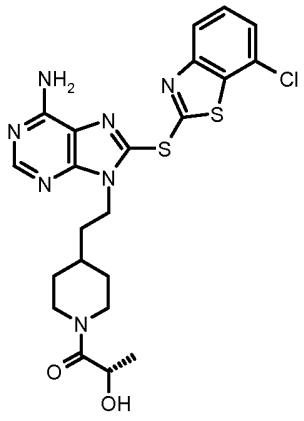
[00983] 9-(2-{1-[(2*S*)-2-Aminopropanoyl]piperidin-4-yl}ethyl)-8-[(7-chloro-1,3-benzothiazol-2-yl)thio]-9*H*-purin-6-amine



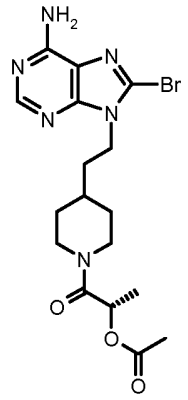
[00984] To a solution of Boc protected product from example 773 in DCM was added TFA and stirred at room temperature for 3h. The solvent and excess TFA was evaporated under reduced pressure and the residual TFA was removed by co-evaporating with toluene to give title product as trifluoroacetate salt. ^{1}H NMR δ (CD_3OD), 8.35 (s, 1H), 7.84-7.82 (m, 1H), 7.50-7.40 (m, 2H), 4.40 (t, J=7.2 Hz, 2H), 4.00-3.90 (m, 1H), 1.80-1.70 (m, 4H), 1.41-1.37 (m, 4H), 1.32-1.30 (m, 3H), 1.20 (s, 3H); LC-MS $[M+H]^+$ 517.1

[00985] Example 775

[00986] (2*S*)-1-[4-(2-{6-Amino-8-[(7-chloro-1,3-benzothiazol-2-yl)thio]-9*H*-purin-9-yl}ethyl)piperidin-1-yl]-1-oxopropan-2-ol

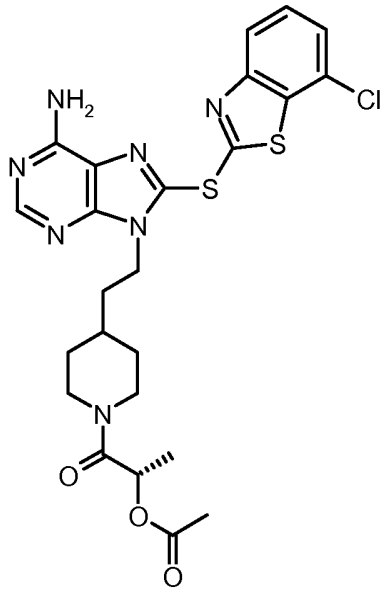


[00987] *Step 1:* (1*S*)-2-{4-[2-(6-Amino-8-bromo-9*H*-purin-9-yl)ethyl]piperidin-1-yl}-1-methyl-2-oxoethyl acetate



[00988] The title compound was prepared according to the procedure described for examples 756 and 757 (step 1) using acetic acid (*S*)-1-methyl-2-oxo-2-{4-[2-(toluene-4-sulfonyloxy)-ethyl]-piperidin-1-yl}-ethyl ester and 8-bromoadenine to give the mixture of (1*S*)-2-{4-[2-(6-amino-8-bromo-9*H*-purin-9-yl)ethyl]piperidin-1-yl}-1-methyl-2-oxoethyl acetate and (1*S*)-2-{4-[2-(6-amino-8-bromo-3*H*-purin-3-yl)ethyl]piperidin-1-yl}-1-methyl-2-oxoethyl acetate. This mixture was purified by Isco silica gel flash column using EtOAc to give (1*S*)-2-{4-[2-(6-amino-8-bromo-9*H*-purin-9-yl)ethyl]piperidin-1-yl}-1-methyl-2-oxoethyl acetate. LC-MS $[M+H]^+$ 439.1

[00989] Step 2: (1*S*)-2-[4-(2-{6-Amino-8-[(7-chloro-1,3-benzothiazol-2-yl)thio]-9*H*-purin-9-yl}ethyl)piperidin-1-yl]-1-methyl-2-oxoethyl acetate



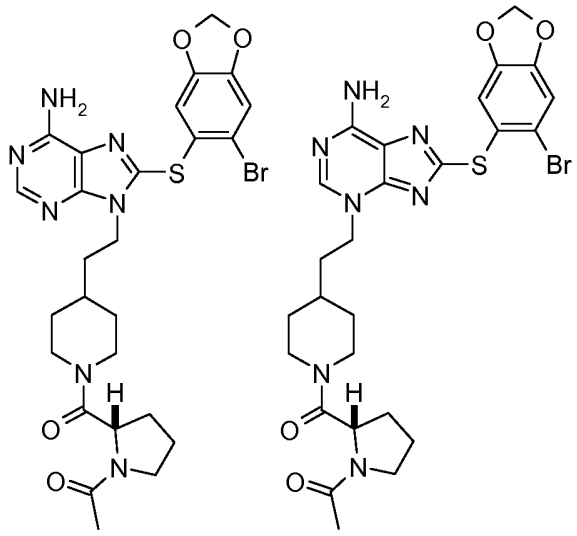
[00990] The title product was prepared according to the procedure described for example 81 using (1*S*)-2-{4-[2-(6-amino-8-bromo-9*H*-purin-9-yl)ethyl]piperidin-1-yl}-1-methyl-2-oxoethyl acetate and 7-chloro-2-mercaptobenzothiazole. LC-MS $[M+H]^+$ 562.1, along with hydrolyzed product, the mixture was used fo the next step without any further purification.

[00991] *Step 3:* (2*S*)-1-[4-(2-{6-Amino-8-[(7-chloro-1,3-benzothiazol-2-yl)thio]-9*H*-purin-9-yl}ethyl)piperidin-1-yl]-1-oxopropan-2-ol

[00992] The crude product from Step 2 was suspended in methanol and K_2CO_3 was added and stirring continued for 2 h. The title product was isolated after preparative HPLC purification as a trifluoroacetate salt. LC-MS $[M+H]^+$ 518.1

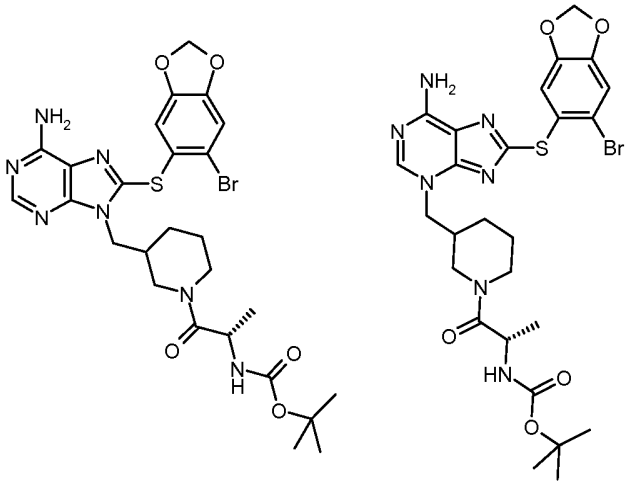
[00993] Examples 776 and 777

[00994] 9-{2-[1-(1-Acetyl-L-prolyl)piperidin-4-yl]ethyl}-8-[(6-bromo-1,3-benzodioxol-5-yl)thio]-9H-purin-6-amine and 3-{2-[1-(1-acetyl-L-prolyl)piperidin-4-yl]ethyl}-8-[(6-bromo-1,3-benzodioxol-5-yl)thio]-3H-purin-6-amine



[00995] The title compounds were prepared according to the procedure described for examples 1 and 2 using 8-(6-bromo-benzo[1,3]dioxol-5-ylsulfanyl)-9H-purin-6-ylamine and toluene-4-sulfonic acid 2-[1-[(*S*)-1-acetyl-pyrrolidine-2-carbonyl)-piperidin-4-yl]-ethyl ester. The products are isolated as trifluoroacetate salts after preparative HPLC purification and lyophilization of HPLC fractions. 9-{2-[1-(1-Acetyl-L-prolyl)piperidin-4-yl]ethyl}-8-[(6-bromo-1,3-benzodioxol-5-yl)thio]-9H-purin-6-amine ^{1}H NMR (CD_3OD) δ 8.28 (s, 1H), 7.28 (s, 1H), 7.19 and 7.17 (s, 1H), 6.09 (s, 2H), 4.47 (m, 1H), 4.37 (t, J = 7.2 Hz, 2H), 4.04 (m 1H), 3.67-3.56 (m, 2H), 3.15 (m, 1H), 2.64 (m, 1H), 2.23 (m, 1H), 2.08 and 2.076 (s, 3H), 2.06-1.96 (m, 2H), 1.91-1.78 (m, 6H), 1.62 (m, 1H), 1.23 (m, 1H), 1.11 (m, 1H); LC-MS $[M+H]^+$ 616.1. 3-{2-[1-(1-Acetyl-L-prolyl)piperidin-4-yl]ethyl}-8-[(6-bromo-1,3-benzodioxol-5-yl)thio]-3H-purin-6-amine. LC-MS $[M+H]^+$ 616.1

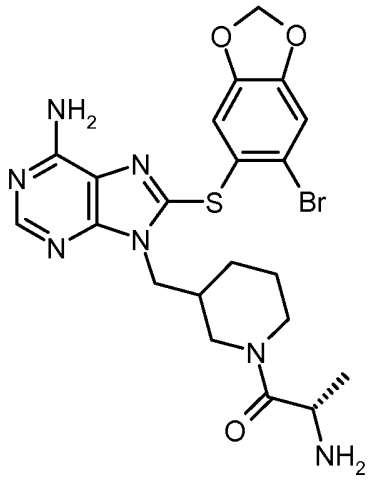
[00996] Examples 778 and 779



[00997] *tert*-Butyl {(1*S*)-2-[3-({6-amino-8-[(6-bromo-1,3-benzodioxol-5-yl)thio]-9*H*-purin-9-yl}methyl)piperidin-1-yl]-1-methyl-2-oxoethyl}carbamate and *tert*-butyl {(1*S*)-2-[3-({6-amino-8-[(6-bromo-1,3-benzodioxol-5-yl)thio]-3*H*-purin-3-yl}methyl)piperidin-1-yl]-1-methyl-2-oxoethyl}carbamate

[00998] The title compounds were prepared according to the procedure described for examples 1 and 2 using 8-(6-bromo-benzo[1,3]dioxol-5-ylsulfanyl)-9H-purin-6-ylamine and toluene-4-sulfonic acid 1-((*S*)-2-tert-butoxycarbonylamino-propionyl)-piperidin-3-ylmethyl ester. The products isolated as a trifluoroacetate salt. *tert*-Butyl {(1*S*)-2-[3-({6-amino-8-[(6-bromo-1,3-benzodioxol-5-yl)thio]-9*H*-purin-9-yl}methyl)piperidin-1-yl]-1-methyl-2-oxoethyl}carbamate. LC-MS $[M+H]^+$ 634.5 and *tert*-butyl {(1*S*)-2-[3-({6-amino-8-[(6-bromo-1,3-benzodioxol-5-yl)thio]-3*H*-purin-3-yl}methyl)piperidin-1-yl]-1-methyl-2-oxoethyl}carbamate. LC-MS $[M+H]^+$ 634.5

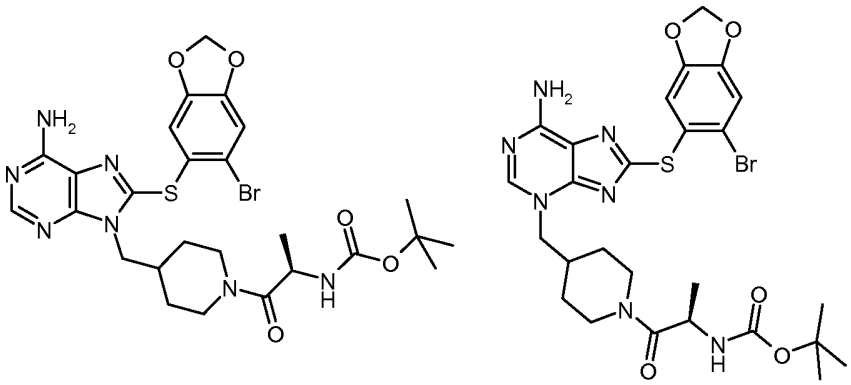
[00999] Examples 780



[001000] 9-({1-[(2*S*)-2-Aminopropanoyl]piperidin-3-yl}methyl)-8-[(6-bromo-1,3-benzodioxol-5-yl)thio]-9*H*-purin-6-amine

[001001] The title compound was prepared according to the procedure described for example 50 using *tert*-butyl {(1*S*)-2-[3-({6-amino-8-[(6-bromo-1,3-benzodioxol-5-yl)thio]-9*H*-purin-9-yl}methyl)piperidin-1-yl]-1-methyl-2-oxoethyl}carbamate and isolated as trifluoroacetate salt. LC-MS $[M+H]^+$ 534.4

[001002] Examples 781 and 782



[001003] *tert*-Butyl {(1*R*)-2-[4-({6-amino-8-[(6-bromo-1,3-benzodioxol-5-yl)thio]-9*H*-purin-9-yl}methyl)piperidin-1-yl]-1-methyl-2-oxoethyl}carbamate and *tert*-butyl {(1*R*)-2-[4-({6-amino-8-[(6-bromo-1,3-benzodioxol-5-yl)thio]-3*H*-purin-3-yl}methyl)piperidin-1-yl]-1-methyl-2-oxoethyl}carbamate

[001004] The title compounds were prepared according to the procedure described for examples 1 and 2 using 8-(6-bromo-benzo[1,3]dioxol-5-ylsulfanyl)-9H-purin-6-ylamine and Toluene-4-sulfonic acid 1-((*R*)-2-*tert*-butoxycarbonylamino-propionyl)-piperidin-4-ylmethyl ester. Title compounds were isolated as a trifluoroacetate salt after preparative HPLC purification. *tert*-Butyl {(1*R*)-2-[4-({6-amino-8-[(6-bromo-1,3-benzodioxol-5-yl)thio]-9*H*-purin-9-yl}methyl)piperidin-1-yl]-1-methyl-2-oxoethyl}carbamate. LC-MS $[M+H]^+$ 634.5 and *tert*-butyl {(1*R*)-2-[4-({6-amino-8-[(6-bromo-1,3-benzodioxol-5-yl)thio]-3*H*-purin-3-yl}methyl)piperidin-1-yl]-1-methyl-2-oxoethyl}carbamate. LC-MS $[M+H]^+$ 634.5

[001005] Activity Examples

[001006] Binding Assay

[001007] Compound binding to purified Hsp90 was monitored using BODIPY-labeled geldanamycin (BODIPY-GM) in a fluorescence polarization assay adapted from Kim et al. (*Journal of Biomolecular Screening* 2004, 9(5):375-381). Compound dilutions (in 100% DMSO) were added to black-bottom 96-well plates (Greiner; 2% DMSO final), and equal volumes of BODIPY-GM (10 nM final) and purified human Hsp90 (Stressgen, SPP-770; 30 nM final) in assay buffer (20 mM HEPES-KOH pH 7.3, 50 mM KCl, 5 mM $MgCl_2$, 20 mM Na_2MoO_4, 0.01% NP-40, 0.1 mg/mL bovine gamma globulin [Invitrogen, P2045], 2 mM DTT) were added sequentially to yield a final volume of 50 microliters. Plates were incubated overnight at room temperature. Parallel and perpendicular fluorescence measurements were read (LJL BioSystems Analyst AD plate reader) with excitation/emission wavelengths of 485/530 nm. Background fluorescence (buffer only) was subtracted, and fluorescence polarization (FP) values, expressed in mP units, were calculated from parallel and perpendicular fluorescence readings as follows:

[001008] FP = (parallel – perpendicular)/(parallel + perpendicular)*1000

[001009] Percent inhibition was calculated by normalizing the FP values to those obtained in parallel reactions containing DMSO and subtracting these normalized values from 100%. Intrinsic compound fluorescence was independently monitored, and FP data points confounded by compound fluorescence were excluded from the analysis.

[001010] Her2-Luciferase Assay

[001011] HCT116 cells stably transfected with a Her2 (kinase domain)-Luciferase fusion were seeded into black 96-well plates at 10,000 cells per well in 100 microliters (DMEM supplemented with 10% serum) and incubated overnight. Compound dilutions (in 100% DMSO) were added to individual wells (0.4% DMSO final), and plates were incubated for four hours. Plates were equilibrated to room temperature (5 min), 100 microliters Steady-Glo reagent (Promega #E2520) was added per well, and plates were incubated at room temperature for 5 minutes. Luminescence was then measured (TopCount, Perkin-Elmer).

[001012] Cytotoxicity Assay

[001013] HCT116 cells were seeded into black 96-well plates at 5,000 cells per well in 100 microliters (DMEM supplemented with 10% serum) and incubated overnight. Compound dilutions (in 100% DMSO) were added to individual wells (0.4% DMSO final), and plates were incubated for 72 hours. Plates were equilibrated to room temperature (5 min). Fifty microliters lysis buffer followed by 50 microliters substrate

[001014] solution (ATPLite [2 step], Perkin-Elmer, #601941) were added to each well, and plates were incubated at room temperature 5 minutes. Luminescence was then measured (TopCount, Perkin-Elmer).

[001015] Table 18

Example	% Inhibition at 5 μM Compound Concentration	IC50 (μ M)
1		0.34
2		3.47
3	36	
4	75	0.65
5	8	
6	66	1.06
7	22	
8		18.0
9		1.0
10		>50
11		0.6
12		>10
13		0.045
14		5.0
15		6.5
16	6	
17		>10
18	0	
19		>10
20	0	>10
21		>10
22		>10
23		>10
24		>10
25		0.041
26		>10
27		>10
28	0	
29		0.15
30	16	>10
31		>10
32		>10
33		0.017
34		>10
35		0.80
36		>5
37		0.8
38		>10
39		0.23
40		>10
41		0.50
42		>5

43		0.70
44		27
45		8.1
46		>10
47		>10
48		>10
49	55	1.2
50	3	
51	52	1.5
52	0	
53		0.045
46		>10
47		>10
48		>10
49	55	1.2
50	3	
51	52	1.5
52	0	
53		0.045
46		>10
47		>10
48		>10
49	55	1.2
50	3	
51	52	1.5
52	0	
53		0.045
46		>10
47		>10
48		>10
49	55	1.2
50	3	
51	52	1.5
52	0	
53		0.045
54	13	
55		1.7
56	3	
57		0.4
58	8	
59		>25
60	30	
61		>10
62		>10
63		>5

64		>5
65	61	0.50
66	5	
67	56	1.5
68	0	
69	69	0.25
70	7	
71	41	>25
72	0	
73	2	>3
74	0	
75		2.9
76	6	
77		1.9
78	17	
79		0.30
80	10	
81	23	
82	5	
83	0	
84	0	>5
85		0.36
86		>5
87	12	
88		1.3
89		>10
90	6	
91		0.2
92	0	
93		0.19
94	0	
95		>3
96	2	
97		0.45
98	0	
99		0.3
100	39	
101		>3
102	39	
103		>1
104	38	
105		>1
106	41	
107	0	
108	30	

109		0.3
110	16	
111		10.00
112	0	
113		0.55
114	14	
115		0.110
116	0	
117	54	0.30
118	0	
119	15	
120	0	
121	54	0.52
122		0.085
123	0	
124		0.22
125	12	
126		0.30
127	51	
128		0.066
129	54	
130		0.04
131	18	
132	54	0.50
133	0	
134		>3
135		1.3
136	16	
137		0.210
138	0	
139		0.09
140	0	
141		0.04
142	0	
143		>3
144	0	
145		>3
146	0	
147		0.044
148	35	
149		0.07
150	0	
151		0.05
152	20	
153		0.60

154	>10	
155		0.095
156	16	
157	58	0.50
158	0	
159	63	0.80
160	0	
161	17	0.32
162	0	
163	>10	
164	0	
165	60	0.30
166	0	
167	44	>25
168	0	
169	37	0.470
170	3	
171		>25
172	>10	
173	44	>25
174	37	>25
175	46	14.00
135		1.3
136	16	
137		0.210
138	0	
139		0.09
140	0	
141		0.04
142	0	
143		>3
144	0	
145		>3
146	0	
147		0.044
148	35	
149		0.07
150	0	
151		0.05
152	20	
153		0.60
154	>10	
155		0.095
156	16	
157	58	0.50

158	0	
159	63	0.80
160	0	
161	17	0.32
162	0	
163	>10	
164	0	
165	60	0.30
166	0	
167	44	>25
168	0	
169	37	0.470
170	3	
171		>25
172	>10	
173	44	>25
174	37	>25
175	46	14.00
176	6	
177	0	
178	9	
179	8	
180	>10	
181		>25
182	>10	
183	100	1.100
184	0	
185		>2.5
186	0	
187		>2.5
188	21	
189		>8
190	8	
191		>8
192	0	
193	39	0.31
194	0	
195	80	0.079
196	10	
197		0.170
198	18	
199		0.110
200	18	
201		0.072
202	9	

203		0.09
204	11	
205	80	0.240
206	0	
207		0.038
208	46	>25
209		0.45
210	8	
211		>25
212	4	
213	52	0.310
214		0.950
215	0	
216	78	>8
217		>10
218		>3
219		>8
220		2
221		>9
222	71	0.062
223		0.50
224		>5
225		>25
226		>25
227	0	
228		>8
229	24	
230		0.210
231		>25
232		>25
233		0.500
234	0	
235		>8
236	0	
237		>25
238		>25
239		>25
240		>8
241	0	
242		ND
243		>1
244		ND
245	1	
246		ND
247		3.0

248		>5
249		0.100
250		0.900
251		0.075
252		>25
253		>8
254		>8
255		0.250
256		0.470
257		>25
258		>25
259		12.0
260		1.50
261		>25
262		>25
263		>25
264		ND
265	20	
266		12.0
267		>25
268	7.0	
269		5.50
270	7.0	
271		>25
272	16	
273		1.30
274	0.0	
275		>3.0
276	0.0	
277		>8.0
278	1.0	
279		>25.0
280	0.0	
281		0.120
282		0.055
283		12.0
284	3.0	
285		1.30
286		3.0
287		0.06
288		4.00
289		1.60
290		0.07
291	0.0	
292		>25.0

293	0.0	
294		>25.0
295	0.0	
296		0.350
297	8.0	
298		>25.0
299	0.0	
300		0.400
301	5.0	
302		>25.0
303	21.0	
304		>25.0
305	29.0	
306		>25.0
307	40.0	
308		0.180
309	25.0	
310		>25.0
311	0.0	
312		>25
313	3.0	
314		6.80
315	21.0	
316		18.0
317	0.0	
318		7.0
319	27.0	
320		0.240
321	49.0	
322		0.100
323	0.0	
324		2.80
325	0.0	
326		0.035
327	33.0	
328		>8.0
329	25.0	
330		0.070
331	25.0	
332		1.00
333	43.0	
334		2.30
335		3.00
336	13.0	
337		>8

338	0	
339		0.115
340	23	
341		0.200
342		19
343	0	
344	22	
345	3	
346		0.325
347		2.5
348		0.800
349	12	
350	25	
351	8	
352	35	
353		0.057
354		0.250
355		>25
356		>25
357	0	
358		0.450
359	3	
360	5	
361		2.90
362		>25
363		0.300
364		0.102
365	31	
366	20	
367		>25
368	*Fluorescent	
369		0.035
370		0.600
371		0.700
372		0.100
373	15	
374		>25
375		>1
376	0	
377	*Fluorescent	
378		0.240
379		9.80
380	4	
381		0.390
382		0.140

383		21
384		>1
385	ND	ND
386		0.110
387		>8
388	13	
389	38	
390		0.310
391		1.2
392		2.9
393	0	
394		0.700
395	0	
396		0.810
397	1	
398		0.140
399		0.950
400		6.0
401	2	
402		0.590
403	14	
404	ND	ND
405		>8
406		>25
407		>25
408	ND	ND
409		0.130
410	11	
411		0.200
412	0	
413	28	
414		0.54
415		0.46
416		0.200
417	0	
418		0.300
419		2.90
420	7	
421	28	
422		>3
423	0	
424		0.152
425	6	
426		0.150
427	32	

428		>8
429		3.8
430	15	
431		0.130
432		0.065
433		0.125
434		0.037
435		0.195
436		0.390
437		0.390
438	ND	ND
439	24	
440	60	
441	45	
442	4	
443	36	
444		1.10
445		0.305
446	4	
447		0.210
448	45	
449		0.200
450	57	
451		0.195
452	21	
453		0.700
454		0.305
455		0.060
456		ND
457		>2.00
458		0.380
459	18	
460		2.80
461	15	
462		7.90
463	14%	
464		0.40
465		0.470
466		0.060
467	0	
468	9	
469		8.8
470		0.280
471		0.600
472		0.070

473		0.035
474		0.140
475		0.172
476		0.090
477		0.467
478		0.140
479		0.199
480		0.160
481		0.050
482	0.0	
483		0.184
484		0.600
485		1
486		7
487		0.900
488	29	
489		1.40
490		25
491		0.039
492		0.900
493		8.9
494		5.5
495	6	
496		0.081
497		25
498		0.525
499	21	
500		0.060
501		ND
502		0.140
503		0.190
504		ND
505		0.085
506		ND
507		0.405
508		ND
509		ND
510		0.250
511		ND
512		0.110
513		ND
514		0.110
515		ND
516		0.600
517		ND

518		0.140
519		ND
520		>2.00
521		ND
522		0.053
523		ND
524		0.100
525	13.00	
526		0.300
527	19.00	
528		>5.00
529		ND
530		2.50
531		ND
532		5.00
533	0.00	
534		5.00
535	1.00	
536		>5.00
537		>5.00
538		1.60
539		>5.00
540		>5.00
541	4.00	
542		>5.00
543	0.00	
544		1.40
545		0.050
546		>5.00
547	12.00	
548		>5.00
549	11.00	
550		>5.00
551	0.00	
552		ND
553		>5.00
554	0.00	
555		0.700
556		2.00
557		1.50
558		>5.00
559		>5.00
560		>5.00
561		>5.00
562		ND

563		>5.00
564		>2.00
565		>5.00
566	1.00	
567		>5.00
568	0.00	
569		>5.00
570	0.00	
571		>5.00
572	0.00	
573		1.40
574		1.80
575		0.80
576	31	
577		0.140
578		0.550
579		0.310
580		0.400
581		0.240
582		0.900
583	55.00	
584		1.40
585		0.600
586		0.450
587		ND
588		>2.00
589		ND
590		0.500
591		ND
592		>5.00
593		ND
594		0.270
595	43.00	
596		ND
597		0.310
598		ND
599		0.260
600		ND
601		>8.00
602	31.00	
603	4.00	
604		0.190
605		0.056
606	49.00	
607		0.062

608	5.00	
609		0.045
610		0.088
611	22.00	
612		0.230
613	15.00	
614		1.80
615	13.00	
616		0.090
617	83.00	
618		0.041
619	76.00	
620		0.170
621		>5.00
622		>5.00
623		>4.00
624		0.580
625		0.110
626		ND
627		>8.00
628	23.00	
629		> 25.00
630		9.00
631		2.00
632		>3.00
633		1.50
634		8.10
635		2.10
636	25.00	
637		> 25.00
638		> 25.00
639		0.900
640	19.00	
641		1.10
642	15.00	
643		5.00
644		0.200
645		0.450
646		0.060
647		ND
648		0.684
649		ND
650		>2.00
651		>5.00
652	0.00	

653		>2.00
654		2.00
655		>5.00
656		>5.00
657		0.190
658		>5.00
659		4.00
660		>5.00
661		0.060
649		ND
650		>2.00
651		>5.00
652	0.00	
653		>2.00
654		2.00
655		>5.00
656		>5.00
657		0.190
658		>5.00
659		4.00
660		>5.00
661		0.060
662		0.300
663	15	
664	*Fluorescent	
665	0	
666		0.800
667	0	
668		4.8
669	10	
670		1.6
671		1.0
672		0.9
673	0	
674		0.08
675	49	
676		0.95
677	ND	
678	*Fluorescent	
679	ND	
680	14	
681		1.0
682		0.19
683	5	

684		
685		
686		ND
687		0.080
688	30	
689		0.120
690		0.29
691		0.125
692		2.00
693		0.059
695		0.410
697		0.600
698	55	
699		0.600
701		0.200
703		0.190
705		0.080
707		0.070
709		0.230
711		0.600
713		0.495
715		>2
717		0.200
719		0.800
720	ND	
722		0.130
723	ND	
724		0.105
725		0.100
726	26	
727		32
728		0.200
730		>5
731	1.0	
732		>5
734		>2
736	ND	
738	ND	
740		>5
741	ND	ND
742		0.140
743		0.040
744		0.068
745		0.123
746		0.240

747		0.110
748		0.210
749		0.330
750		0.180
751		0.195
752		0.130
753		0.059
754		0.050
755		0.140
756	ND	
757		0.205
760		0.325
761	ND	ND
764	ND	
765	ND	
766	ND	
767	ND	
768		>5
769	ND	
771		0.120
772		>5
773		0.390
774		0.200
775		1.80
776		0.310
778		2.00
779	43.00	
780		ND
781		ND
782		ND

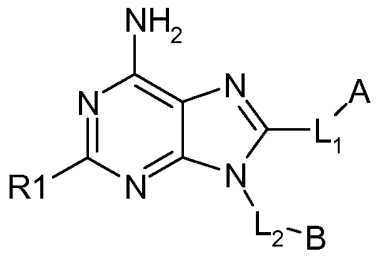
[001016] *Compound is active in Luciferase refolding assay

ND- not determined

CLAIMS

What is claimed is:

1. A compound of Formula I below or a pharmaceutically acceptable salt thereof



Formula I

wherein:

A is chosen from a substituted or unsubstituted aryl, heteroaryl, heterocyclic, or carbocyclic group;

B is chosen from a substituted or unsubstituted aryl, heteroaryl, heterocyclic, or carbocyclic group;

R1 is chosen from hydro, alkyl, aryl, heteroaryl, amino, halo, sulfur, and thioalkyl.

L_1 can be saturated, partially saturated, or unsaturated, and is chosen from -$(CH_2)_n$-$(CH_2)_n$-, -$(CH_2)_n$C(=O)$(CH_2)_n$-, -$(CH_2)_n$C(=O)N$(CH_2)_n$-, -$(CH_2)_n$NC(=O)O$(CH_2)_n$-, -$(CH_2)_n$NC(=O)N$(CH_2)_n$-, -$(CH_2)_n$NC(=S)S$(CH_2)_n$-, -$(CH_2)_n$OC(=O)S$(CH_2)_n$-, -$(CH_2)_n$NH$(CH_2)_n$-, -$(CH_2)_n$O$(CH_2)_n$-, -$(CH_2)_n$S$(CH_2)_n$-, and -$(CH_2)_n$NC(=S)N$(CH_2)_n$-, where each n is independently chosen from 0, 1, 2, 3, 4, 5, 6, 7, and 8, and wherein each carbon and/or nitrogen can be optionally substituted with one or more substituents independently chosen from hydroxyl, halo, alkoxy, alkyl, amino, cycloalkyl, -NR_2R_3, -NSO_2R_4, -NC(=O)NR_2R_3, heteroaryl, aryl, cycloalkyl, and heterocyclic; wherein -R_2 and -R_3 are independently chosen from –H, alkyl, and -C(=O)OR_4; and wherein R_4 is an alkyl group (*e.g.*, methyl, ethyl, propyl, isopropyl, butyl, isobutyl, or *tert*-butyl);

L_2 can be saturated, partially saturated, or unsaturated, and is chosen from -$(CH_2)_n$-$(CH_2)_n$-, -$(CH_2)_n$C(=O)$(CH_2)_n$-, -$(CH_2)_n$C(=O)N$(CH_2)_n$-, -

$(CH_2)_nNC(=O)O(CH_2)_n$-, -$(CH_2)_nNC(=O)N(CH_2)_n$-, -$(CH_2)_nNC(=S)S(CH_2)_n$-, -$(CH_2)_nOC(=O)S(CH_2)_n$-, -$(CH_2)_nNH(CH_2)_n$-, -$(CH_2)_nO(CH_2)_n$-, -$(CH_2)_nS(CH_2)_n$-, and -$(CH_2)_nNC(=S)N(CH_2)_n$-, where each n is independently chosen from 0, 1, 2, 3, 4, 5, 6, 7, and 8, and wherein each carbon and/or nitrogen can be optionally substituted with one or more substituents independently chosen from hydroxyl, halo, alkoxy, alkyl, amino, cycloalkyl, -NR_2R_3, -NSO_2R_4, -$NC(=O)NR_2R_3$, heteroaryl, aryl, cycloalkyl, and heterocyclic; wherein -R_2 and -R_3 are independently chosen from –H, alkyl, and -$C(=O)OR_4$; and wherein R_4 is an alkyl group (*e.g.*, methyl, ethyl, propyl, isopropyl, butyl, isobutyl, or *tert*-butyl); and

pharmaceutically acceptable salts thereof.

2. The compound of claim 1 wherein A is an aryl group having one or more substituents chosen from halo, alkyl, alkoxy, haloalkyl, haloalkoxy, nitro, -C(=O)alkyl, hydroxyl, -C≡N, -SO_3, and –COOH.

3. The compound of claim 1, wherein A is a phenyl group having one or more substituents chosen from halo, alkyl, alkoxy, haloalkyl, haloalkoxy, nitro, -C(=O)alkyl, hydroxyl, and –COOH.

4. The compound of claim 1, wherein A is an aryl group with one or more substituents chosen from hydroxyl, halo, alkyl, alkoxy, haloalkyl, haloalkoxy, -$N(C_{1-3}$ alkyl$)_2$, -$NH(C_{1-3}$ alkyl), -$C(=O)NH_2$, -$C(=O)NH(C_{1-3}$ alkyl), -$C(=O)N(C_{1-3}$ alkyl$)_2$, -$S(=O)_2(C_{1-3}$alkyl), -$S(=O)_2NH_2$, -$S(=O)_2N(C_{1-3}$ alkyl$)_2$, -$S(=O)_2NH(C_{1-3}$ alkyl), -CHF_2, -OCF_3, -$OCHF_2$, -SCF_3, -CF_3, -CN, -NH_2, and -NO_2.

5. The compound of claim 1, wherein A is a phenyl group having from 1-5 substituents independently chosen from acylamino, acyloxy, alkenyl, alkoxy, alkyl, alkylthio, alkynyl, amino, aryl, arylalkyl, arylalkenyl, arylalkynyl, arylalkoxy, aryloxy, arylthio, carbocycle, cyano, cyanato, halo, haloalkyl, halophenyl, hydroxyl, heteroaryl, heteroaryloxy, heterocycle, heteroarylalkoxy, isocyanato, isothiocyanato, nitro, sulfinyl, sulfonyl, sulfonamide, thiocarbonyl, thiocyanato, trihalomethanesulfonamido, O-carbamyl, N-carbamyl, O-thiocarbamyl, N-thiocarbamyl, and C-amido.

6. The compound of claim 1 wherein B is an aryl group having one or more substituents chosen from halo, alkyl, alkoxy, haloalkyl, haloalkoxy, nitro, -C(=O)alkyl, hydroxyl, $-SO_3$, and –COOH.

7. The compound of claim 1 wherein B is an aryl group with one or more substituents chosen from hydroxyl, halo, alkyl, alkoxy, haloalkyl, haloalkoxy, $-N(C_{1-3}$ alkyl$)_2$, $-NH(C_{1-3}$ alkyl), $-C(=O)NH_2$, $-C(=O)NH(C_{1-3}$ alkyl), $-C(=O)N(C_{1-3}$ alkyl$)_2$, $-S(=O)_2(C_{1-3}$alkyl), $-S(=O)_2NH_2$, $-S(=O)_2N(C_{1-3}$ alkyl$)_2$, $-S(=O)_2NH(C_{1-3}$ alkyl), $-CHF_2$, $-OCF_3$, $-OCHF_2$, $-SCF_3$, $-CF_3$, -CN, $-NH_2$, $-SO_3$, and $-NO_2$.

8. The compound of claim 1 wherein B is a phenyl group having from 1-5 substituents independently chosen from acylamino, acyloxy, alkenyl, alkoxy, alkyl, alkylthio, alkynyl, amino, aryl, arylalkyl, arylalkenyl, arylalkynyl, arylalkoxy, aryloxy, arylthio, carbocycle, cyano, cyanato, halo, haloalkyl, halophenyl, hydroxyl, heteroaryl, heteroaryloxy, heterocycle, heteroarylalkoxy, isocyanato, isothiocyanato, nitro, sulfinyl, sulfonyl, sulfonamide, thiocarbonyl, thiocyanato, trihalomethanesulfonamido, O-carbamyl, N-carbamyl, O-thiocarbamyl, N-thiocarbamyl, and C-amido.

9. The compound of claim 1 wherein A is a substituted or unsubstituted indanone group.

10. The compound of claim 9 wherein A has from 1-5 substituents independently chosen from acylamino, acyloxy, alkenyl, alkoxy, alkyl, alkylthio, alkynyl, amino, aryl, arylalkyl, arylalkenyl, arylalkynyl, arylalkoxy, aryloxy, arylthio, carbocycle, cyano, cyanato, halo, haloalkyl, halophenyl, hydroxyl, heteroaryl, heteroaryloxy, heterocycle, heteroarylalkoxy, isocyanato, isothiocyanato, nitro, sulfinyl, sulfonyl, sulfonamide, thiocarbonyl, thiocyanato, trihalomethanesulfonamido, O-carbamyl, N-carbamyl, O-thiocarbamyl, N-thiocarbamyl, and C-amido.

11. The compound of claim 1, wherein A is a substituted or unsubstituted indane group.

12. The compound of claim 11, wherein A has from 1-5 substituents independently chosen from acylamino, acyloxy, alkenyl, alkoxy, alkyl, alkylthio, alkynyl, amino, aryl,

arylalkyl, arylalkenyl, arylalkynyl, arylalkoxy, aryloxy, arylthio, carbocycle, cyano, cyanato, halo, haloalkyl, halophenyl, hydroxyl, heteroaryl, heteroaryloxy, heterocycle, heteroarylalkoxy, isocyanato, isothiocyanato, nitro, sulfinyl, sulfonyl, sulfonamide, thiocarbonyl, thiocyanato, trihalomethanesulfonamido, O-carbamyl, N-carbamyl, O-thiocarbamyl, N-thiocarbamyl, and C-amido.

13. The compound of claim 1 wherein B is a homopiperidine group.

14. The compound of claim 1 wherein B is a homopiperidine group substituted with one or more substituents chosen from hydro, halo, alkyl, alkoxy, haloalkyl, haloalkoxy, nitro, -CH_2-aryl, -C(=O)alkyl, -C(=O)cycloalkyl, -C(=O)-NH-Alkyl, cycloalkyl, hydroxyl, -SO_3, –COOH (and esters thereof), amino acid (chosen from natural and non-natural amino acids), peptide having 1-5 amino acid residues (chosen from natural and non-natural amino acids), -C(=O)alkyl where the alkyl is substituted with one or more substituents (chosen from alkyl, amino, alkoxy, haloalkyl, haloalkoxy, nitro, cyano, hydroxyl, –COOH (and esters thereof), sulfonyl, sulfonamide) and sulfonyl.

15. The compound of claim 1, wherein B is a homopiperidine group having one or more substituents chosen from hydro, halo, alkyl, alkoxy, haloalkyl, haloalkoxy, nitro, -CH_2-aryl, -C(=O)alkyl, -C(=O)-NH-Alkyl, cycloalkyl, hydroxyl, -SO_3, –COOH (and esters thereof), and sulfonyl.

16. The compound of claim 1, wherein B is a homopiperidine group having one or more substituents chosen from –C(=O), –C(=O)CH_3, -CH_3, -CH_2CH_3, -$CH_2CH_2CH_3$, -C(=O)OCH_2CH_3, -S(=O)$_2CH_3$, -S(=O)$_2CF_3$, -C(=O)$OC(CH_3)_3$, –C(=O)OCH_2-phenyl, -CH_2-phenyl, -$CH(CH_3)_2$, -C(=O)$NHCH_2CH_3$, -C(=O)$NHCH(CH_3)_2$, -C(=O)$NHC(CH_3)_3$, -C(=O)$NHCH_2C$(=O)OCH_2CH_3, -C(=O)$C(CH_3)_3$, -$CH(CH_3)_2$, -$CH_2CH(CH_3)_2$, -C(=O)$CH_2C(CH_3)_3$, and cyclopentyl.

17. The compound of claim 1 wherein B is a piperidine group.

18. The compound of claim 1 wherein B is a piperidine group substituted with one or more substituents chosen from hydro, halo, alkyl, alkoxy, haloalkyl, haloalkoxy, nitro, -CH_2-aryl, -C(=O)alkyl, -C(=O)cycloalkyl, -C(=O)-NH-Alkyl, cycloalkyl, hydroxyl, -SO_3, –COOH (and esters thereof), amino acid (chosen from natural and non-natural amino acids), peptide having 1-5 amino acid residues (chosen from natural and non-natural amino acids), -C(=O)alkyl where the alkyl is substituted with one or more substituents (chosen from alkyl, amino, alkoxy, haloalkyl, haloalkoxy, nitro, cyano, hydroxyl, –COOH (and esters thereof), sulfonyl, sulfonamide) and sulfonyl.

19. The compound of claim 1, wherein B is a piperidine group having one or more substituents chosen from hydro, halo, alkyl, alkoxy, haloalkyl, haloalkoxy, nitro, -CH_2-aryl, -C(=O)alkyl, -C(=O)-NH-Alkyl, cycloalkyl, hydroxyl, -SO_3, –COOH (and esters thereof), and sulfonyl.

20. The compound of claim 1, wherein B is a piperidine group having one or more substituents chosen from –C(=O), –C(=O)CH_3, -CH_3, -CH_2CH_3, -$CH_2CH_2CH_3$, -C(=O)OCH_2CH_3, -S(=O)$_2CH_3$, -S(=O)$_2CF_3$, -C(=O)$OC(CH_3)_3$, –C(=O)OCH_2-phenyl, -CH_2-phenyl, -$CH(CH_3)_2$, -C(=O)$NHCH_2CH_3$, -C(=O)$NHCH(CH_3)_2$, -C(=O)$NHC(CH_3)_3$, -C(=O)$NHCH_2C$(=O)OCH_2CH_3, -C(=O)$C(CH_3)_3$, -$CH(CH_3)_2$, -$CH_2CH(CH_3)_2$, -C(=O)$CH_2C(CH_3)_3$, and cyclopentyl.

21. The compound of claim 1 wherein B is a piperazine group.

22. The compound of claim 1 wherein B is a piperazine group substituted with one or more substituents chosen from hydro, halo, alkyl, alkoxy, haloalkyl, haloalkoxy, nitro, -CH_2-aryl, -C(=O)alkyl, -C(=O)cycloalkyl, -C(=O)-NH-Alkyl, cycloalkyl, hydroxyl, -SO_3, –COOH (and esters thereof), amino acid (chosen from natural and non-natural amino acids), peptide having 1-5 amino acid residues (chosen from natural and non-natural amino acids), -C(=O)alkyl where the alkyl is substituted with one or more substituents (chosen from alkyl, amino, alkoxy,

haloalkyl, haloalkoxy, nitro, cyano, hydroxyl, –COOH (and esters thereof), sulfonyl, sulfonamide) and sulfonyl.

23. The compound of claim 1, wherein B is a piperazine group having one or more substituents chosen from hydro, halo, alkyl, alkoxy, haloalkyl, haloalkoxy, nitro, -CH_2-aryl, -C(=O)alkyl, -C(=O)-NH-Alkyl, cycloalkyl, hydroxyl, -SO_3, –COOH (and esters thereof), and sulfonyl.

24. The compound of claim 1, wherein B is a piperazine group having one or more substituents chosen from –C(=O), –C(=O)CH_3, -CH_3, -CH_2CH_3, -$CH_2CH_2CH_3$, -C(=O)OCH_2CH_3, -S(=O)$_2CH_3$, -S(=O)$_2CF_3$, -C(=O)$OC(CH_3)_3$, –C(=O)OCH_2-phenyl, -CH_2-phenyl, -$CH(CH_3)_2$, -C(=O)$NHCH_2CH_3$, -C(=O)$NHCH(CH_3)_2$, -C(=O)$NHC(CH_3)_3$, -C(=O)$NHCH_2C$(=O)OCH_2CH_3, -C(=O)$C(CH_3)_3$, -$CH(CH_3)_2$, -$CH_2CH(CH_3)_2$, -C(=O)$CH_2C(CH_3)_3$, and cyclopentyl.

25. The compound of claim 1 wherein B is a pyrrolidine group.

26. The compound of claim 1 wherein B is a pyrrolidine group substituted with one or more substituents chosen from hydro, halo, alkyl, alkoxy, haloalkyl, haloalkoxy, nitro, -CH_2-aryl, -C(=O)alkyl, -C(=O)cycloalkyl, -C(=O)-NH-Alkyl, cycloalkyl, hydroxyl, -SO_3, –COOH (and esters thereof), amino acid (chosen from natural and non-natural amino acids), peptide having 1-5 amino acid residues (chosen from natural and non-natural amino acids), -C(=O)alkyl where the alkyl is substituted with one or more substituents (chosen from alkyl, amino, alkoxy, haloalkyl, haloalkoxy, nitro, cyano, hydroxyl, –COOH (and esters thereof), sulfonyl, sulfonamide) and sulfonyl.

27. The compound of claim 1, wherein B is a pyrrolidine group having one or more substituents chosen from hydro, halo, alkyl, alkoxy, haloalkyl, haloalkoxy, nitro, -CH_2-aryl, -C(=O)alkyl, -C(=O)-NH-Alkyl, cycloalkyl, hydroxyl, -SO_3, –COOH (and esters thereof), and sulfonyl.

28. The compound of claim 1, wherein B is a pyrrolidine group having one or more substituents chosen from –C(=O), –C(=O)CH_3, -CH_3, -CH_2CH_3, -$CH_2CH_2CH_3$, -C(=O)OCH_2CH_3, -S(=O)$_2CH_3$, -S(=O)$_2CF_3$, -C(=O)$OC(CH_3)_3$, –C(=O)OCH_2-phenyl, -CH_2-phenyl, -$CH(CH_3)_2$, -C(=O)$NHCH_2CH_3$, -C(=O)$NHCH(CH_3)_2$, -C(=O)$NHC(CH_3)_3$, -C(=O)$NHCH_2C$(=O)OCH_2CH_3, -C(=O)$C(CH_3)_3$, -$CH(CH_3)_2$, -$CH_2CH(CH_3)_2$, -C(=O)$CH_2C(CH_3)_3$, and cyclopentyl.

29. The compound of claim 1, wherein B is an azetidine group.

30. The compound of claim 1, wherein B is an azetidine group substituted with one or more substituents chosen from hydro, halo, alkyl, alkoxy, haloalkyl, haloalkoxy, nitro, -CH_2-aryl, -C(=O)alkyl, -C(=O)cycloalkyl, -C(=O)-NH-Alkyl, cycloalkyl, hydroxyl, -SO_3, –COOH (and esters thereof), amino acid (chosen from natural and non-natural amino acids), peptide having 1-5 amino acid residues (chosen from natural and non-natural amino acids), -C(=O)alkyl where the alkyl is substituted with one or more substituents (chosen from alkyl, amino, alkoxy, haloalkyl, haloalkoxy, nitro, cyano, hydroxyl, –COOH (and esters thereof), sulfonyl, sulfonamide) and sulfonyl.

31. The compound of claim 1, wherein B is an azetidine group having one or more substituents chosen from hydro, halo, alkyl, alkoxy, haloalkyl, haloalkoxy, nitro, -CH_2-aryl, -C(=O)alkyl, -C(=O)-NH-Alkyl, cycloalkyl, hydroxyl, -SO_3, –COOH (and esters thereof), and sulfonyl.

32. The compound of claim 1, wherein B is an azetidine group having one or more substituents chosen from –C(=O), –C(=O)CH_3, -CH_3, -CH_2CH_3, -$CH_2CH_2CH_3$, -C(=O)OCH_2CH_3, -S(=O)$_2CH_3$, -S(=O)$_2CF_3$, -C(=O)$OC(CH_3)_3$, –C(=O)OCH_2-phenyl, -CH_2-phenyl, -$CH(CH_3)_2$, -C(=O)$NHCH_2CH_3$, -C(=O)$NHCH(CH_3)_2$, -C(=O)$NHC(CH_3)_3$, -C(=O)$NHCH_2C$(=O)OCH_2CH_3, -C(=O)$C(CH_3)_3$, -$CH(CH_3)_2$, -$CH_2CH(CH_3)_2$, -C(=O)$CH_2C(CH_3)_3$, and cyclopentyl.

33. The compound of claim 1, wherein L_1 is –S-.

34. The compound of claim 1, wherein L_2 is $-(CH_2)_n-(CH_2)_n-$, and each n is independently chosen from 0, 1, 2, and 3 and wherein each carbon can be optionally substituted with one or more substituents independently chosen from hydroxyl, halo, alkoxy, alkyl, amino, cycloalkyl, $-NR_2R_3$, $-NSO_2R_4$, $-NC(=O)NR_2R_3$, heteroaryl, aryl, cycloalkyl, and heterocyclic; wherein $-R_2$ and $-R_3$ are independently chosen from –H, alkyl, and $-C(=O)OR_4$; and wherein R_4 is an alkyl group (*e.g.*, methyl, ethyl, propyl, isopropyl, butyl, isobutyl, or *tert*-butyl).

35. The compound of claim 1, wherein R1 is hydro.

36. A compound chosen from 9-[2-(1-Acetylpiperidin-4-yl)ethyl]-8-[(6-bromo-1,3-benzodioxol-5-yl)thio]-9H-purin-6-amine, 4-(2-{6-Amino-8-[(6-bromo-1,3-benzodioxol-5-yl)thio]-9H-purin-9-yl}ethyl)piperidine-1-carbaldehyde, 4-(2-{6-Amino-8-[(7-bromo-2,3-dihydro-1,4-benzodioxin-6-yl)thio]-9H-purin-9-yl}ethyl)piperidine-1-carbaldehyde, 9-(3-Amino-3-cyclopropylpropyl)-8-[(6-bromo-1,3-benzodioxol-5-yl)thio]-9H-purin-6-amine, 9-(3-Amino-3-cyclohexylpropyl)-8-[(6-bromo-1,3-benzodioxol-5-yl)thio]-9H-purin-6-amine, (2S)-1-[4-(2-{6-Amino-8-[(6-bromo-1,3-benzodioxol-5-yl)thio]-9H-purin-9-yl}ethyl)piperidin-1-yl]-1-oxopropan-2-ol, 4-(2-{6-Amino-8-[(1-oxo-2,3-dihydro-1H-inden-5-yl)thio]-9H-purin-9-yl}ethyl)piperidine-1-carbaldehyde, 2-[4-(2-{6-Amino-8-[(6-bromo-1,3-benzodioxol-5-yl)thio]-9H-purin-9-yl}ethyl)piperidin-1-yl]-2-oxoethanol, and 6-({9-[2-(1-Acetylpiperidin-4-yl)ethyl]-6-amino-9H-purin-8-yl}thio)-1,3-benzodioxole-5-carbonitrile.

37. A compound chosen from 8-(2,5-dimethoxy-phenylsulfanyl)-9-phenethyl-9H-purin-6-ylamine, 8-(2,5-dimethoxy-phenylsulfanyl)-3-phenethyl-3H-purin-6-ylamine, 8-

(2,5-dimethoxy-phenylsulfanyl)-9-(3-phenyl-propyl)-9H-purin-6-ylamine, 8-(benzo[1,3]dioxol-5-ylsulfanyl)-9-phenethyl-9H-purin-6-ylamine, 8-(benzo[1,3]dioxol-5-ylsulfanyl)-3-phenethyl-3H-purin-6-ylamine, 8-(benzo[1,3]dioxol-5-ylsulfanyl)-9-(3-phenyl-propyl)-9H-purin-6-ylamine, 8-(benzo[1,3]dioxol-5-ylsulfanyl)-9-[2-(4-nitro-phenyl)-ethyl]-9H-purin-6-ylamine, 8-(2,5-dimethoxy-phenylsulfanyl)-9-[2-(4-nitro-phenyl)-ethyl]-9H-purin-6-ylamine, 8-(2,5-dimethoxy-phenylsulfanyl)-9-[2-(4-fluoro-phenyl)-ethyl]-9H-purin-6-ylamine, 8-(2,5-dimethoxy-phenylsulfanyl)-3-[2-(4-fluoro-phenyl)-ethyl]-3H-purin-6-ylamine, 8-(benzo[1,3]dioxol-5-ylsulfanyl)-9-[2-(4-fluoro-phenyl)-ethyl]-9H-purin-6-ylamine, 8-(benzo[1,3]dioxol-5-ylsulfanyl)-3-[2-(4-fluoro-phenyl)-ethyl]-3H-purin-6-ylamine, 8-(6-bromo-benzo[1,3]dioxol-5-ylsulfanyl)-9-phenethyl-9H-purin-6-ylamine, 8-(6-bromo-benzo[1,3]dioxol-5-ylsulfanyl)-3-phenethyl-3H-purin-6-ylamine, 8-(2,4-dimethoxy-phenylsulfanyl)-9-phenethyl-9H-purin-6-ylamine, 8-(2,4-dimethoxy-phenylsulfanyl)-3-phenethyl-3H-purin-6-ylamine, 8-(4-chloro-phenylsulfonyl)-9-phenethyl-9H-purin-6-ylamine, 8-(4-chloro-phenylsulfanyl)-3-phenethyl-3H-purin-6-ylamine, 4-(6-amino-9-phenethyl-9H-purin-8-ylsulfanyl)-benzonitrile, 4-(6-amino-3-phenethyl-3H-purin-8-ylsulfanyl)-benzonitrile, 9-[2-(3, 4-dimethoxy-phenyl)-ethyl]-8-(2, 5-dimethoxy-phenylsulfanyl)-9H-purin-6-ylamine, 3-[2-(3, 4-dimethoxy-phenyl)-ethyl]-8-(2, 5-dimethoxy-phenylsulfanyl)-3H-purin-6-ylamine, 8-(2, 5-dimethoxy-phenylsulfanyl)-9-(2-p-tolyl-ethyl)-9H-purin-6-ylamine, 8-(2,5-dimethoxy-phenylsulfanyl)-3-(2-p-tolyl-ethyl)-3H-purin-6-ylamine, 9-[2-(2-chloro-phenyl)-ethyl]-8-(2, 5-dimethoxy-phenylsulfanyl)-9H-purin-6-ylamine, 3-[2-(2-chloro-phenyl)-ethyl]-8-(2, 5-dimethoxy-phenylsulfanyl)-3H-purin-6-ylamine, 9-[2-(2, 4-dichloro-phenyl)-ethyl]-8-(2, 5-dimethoxy-phenylsulfanyl)-9H-purin-6-ylamine, 3-[2-(2, 4-dichloro-phenyl)-ethyl]-8-(2, 5-dimethoxy-phenyl-sulfanyl)-3H-purin-6-ylamine, 8-(2, 5-dimethoxy-phenylsulfanyl)-9-[2-(2-fluoro-phenyl)-ethyl]-9H-purin-6-ylamine, 8-(2, 5-dimethoxy-phenylsulfanyl)-3-[2-(2-fluoro-phenyl)-ethyl]-3H-purin-6-ylamine, 9-[2-(4-chloro-phenyl)-ethyl]-8-(3,4,5-trimethoxy-phenylsulfanyl)-9H-purin-6-ylamine, 3-[2-(4-chloro-phenyl)-ethyl]-8-(3,4,5-trimethoxy-phenylsulfanyl)-3H-purin-6-ylamine, 8-(-6-iodo-benzo[1,3]dioxol-5-ylsulfanyl)-9-phenethyl-9H-purin-6-ylamine, 8-(6-iodo-benzo[1,3]dioxol-5-ylsulfanyl)-3-phenethyl-3H-purin-6-ylamine, 8-(2, 5-dimethoxy-phenylsulfanyl)-9-[2-(3-methoxy-phenyl)-ethyl]-9H-purin-6-ylamine, 8-(2, 5-dimethoxy-phenylsulfanyl)-3-[2-(3-methoxy-phenyl)-ethyl]-3H-purin-6-ylamine, 8-(2, 5-dimethoxy-phenylsulfanyl)-9-[2-(3-fluoro-phenyl)-ethyl]-9H-purin-6-ylamine, 8-(2, 5-dimethoxy-phenylsulfanyl)-3-[2-(3-fluoro-phenyl)-ethyl]-3H-purin-6-ylamine, 8-(6-bromo-benzo[1,3]dioxol-5-ylsulfanyl)-9-[2-

(4chloro-2-fluorophenyl)-ethyl]-9H-purin-6-ylamine, 8-(6-bromo-benzo[1,3]dioxol-5-ylsulfanyl)-3-[2-(4chloro-2-fluoro-phenyl)-ethyl]-3H-purin-6-ylamine, 8-(6-bromo-benzo[1,3]dioxol-5-ylsulfanyl)-9-(2-pentafluorophenyl-ethyl)-9H-purin-6-ylamine, 8-(6-bromo-benzo[1,3]dioxol-5-ylsulfanyl)-3-(2-pentafluorophenyl-ethyl)-3H-purin-6-ylamine, 8-(6-bromo-benzo[1,3]dioxol-5-ylsulfanyl)-9-(3-phenyl-propyl)-9H-purin-6-ylamine, 8-(6-bromo-benzo[1,3]dioxol-5-ylsulfanyl)-3-(3-phenyl-propyl)-3H-purin-6-ylamine, 9-phenethyl-8-(3,4,5-trimethoxy-phensulfanyl)-9H-purin-6-ylamine, 3-phenethyl-8-(3,4,5-trimethoxy-phenylsulfanyl)-3H-purin-6-ylamine, 9-(3-phenyl-propyl)-8-(3,4,5-trimethoxy-phenylsulfanyl)-9H-purin-6-ylamine. 3-(3-phenyl-propyl)-8-(3,4,5-trimethoxy-phenylsulfanyl)-3H-purin-6-ylamine, 8-(benzo[1,3]dioxol-5-ylsulfanyl)-9-(2-pyrrol-1-yl-ethyl)-9H-purin-6-ylamine, 8-(benzo[1,3]dioxol-5-ylsulfanyl)-3-(2-pyrrol-1-yl-ethyl)-3H-purin-6-ylamine, 8-(benzo[1,3]dioxol-5-ylsulfanyl)-9-(3-pyrrol-1-yl-propyl)-9H-purin-6-ylamine, 8-(benzo[1,3]dioxol-5-ylsulfanyl)-3-(3-pyrrol-1-yl-propyl)-3H-purin-6-ylamine, 8-(6-bromo-benzo[1,3]dioxol-5-ylsulfanyl)-9-[2-(2-chloro-phenyl)-ethyl]-9H-purin-6-ylamine, 8-(6-bromo-benzo[1,3]dioxol-5-ylsulfanyl)-3-[2-(2-chloro-phenyl)-ethyl]-3H-purin-6-ylamine, 8-(2,5-dimethoxy-phenylsulfanyl)-9-[2-(2,4,6-trimethyl-phenyl)-ethyl]-9H-purin-6-ylamine, 8-(2, 5-dimethoxy-phenylsulfanyl)-3-[2-(2, 4, 6-trimethyl-phenyl)-ethyl]-3H-purin-6-ylamine, 8-(6-bromo-benzo[1,3]dioxol-5-ylsulfanyl)-9-(2-phenyl-butyl)-9H-purin-6-ylamine, 8-(6-bromo-benzo[1,3]dioxol-5-ylsulfanyl)-3-(2-phenyl-butyl)-3H-purin-6-ylamine, 8-(6-bromo-benzo[1,3]dioxol-5-ylsulfanyl)-9-[1-(4-methoxy-phenyl)-cyclopropylmethyl]-9H-purin-6-ylamine, 8-(6-bromo-benzo[1,3]dioxol-5-ylsulfanyl)-3-[1-(4-methoxy-phenyl)-cyclopropylmethyl]-3H-purin-6-ylamine, 9-[1-(4-chloro-phenyl)-cyclobutylmethyl]-8-(2, 5-dimethoxy-phenylsulfanyl)-9H-purin-6-ylamine, 3-[1-(4-chloro-phenyl)-cyclobutylmethyl]-8-(2,5-dimethoxy-phenylsulfanyl)-3H-purin-6-ylamine, 1-(4-{2-[6-amino-8-(2,5-dimethoxy-phenylsulfanyl)-purin-9-yl]-ethyl}-phenyl)-ethanone, 1-(4-{2-[6-amino-8-(2,5-dimethoxy-phenylsulfanyl)-purin-3-yl]-ethyl}-phenyl)-ethanone, 8-(2, 5-dimethoxy-phenylsulfanyl)-9-(2-pyrrol-1-yl-ethyl)-9H-purin-6-ylamine, 8-(2, 5-dimethoxy-phenylsulfanyl)-3-(2-pyrrol-1-yl-ethyl)-3H-purin-6-ylamine, 8-(2, 5-dimethoxy-phenylsulfanyl)-9-(2-naphthalen-1-yl-ethyl)-9H-purin-6-ylamine, 8-(2, 5-dimethoxy-phenylsulfanyl)-3-(2-naphthalen-1-yl-ethyl)-3H-purin-6-ylamine, 8-(2, 5-dimethoxy-phenylsulfanyl)-9-(2-o-tolyl-ethyl)-9H-purin-6-ylamine,8-(2, 5-dimethoxy-phenylsulfanyl)-3-(2-o-tolyl-ethyl)-3H-purin-6-ylamine, 9-[2-(4-bromo-phenyl)-ethyl]-8-(2, 5-dimethoxy-phenylsulfanyl)-9H-purin-6-ylamine, 3-[2-(4-bromo-phenyl)-ethyl]-8-(2, 5-dimethoxy-phenylsulfanyl)-3H-purin-6-ylamine, 9-[2-(2, 3-dichloro-phenyl)-ethyl]-8-(2, 5-dimethoxy-

phenylsulfanyl)-9H-purin-6-ylamine, 3-[2-(2, 3-dichloro-phenyl)-ethyl]-8-(2, 5-dimethoxy-phenylsulfanyl)-3H-purin-6-ylamine, 4-{2-[6-Amino-8-(2, 5-dimethoxy-phenylsulfanyl)-purin-9-yl]-ethyl}-phenol, 4-{2-[6-amino-8-(2, 5-dimethoxy-phenylsulfanyl)-purin-9-yl]-ethyl}-phenol, 8-(2, 5-dimethoxy-phenylsulfanyl)-9-[2-(3-trifluoromethyl-phenyl)-ethyl]-9H-purin-6-ylamine, 8-(2, 5-dimethoxy-phenylsulfanyl)-3-[2-(3-trifluoromethyl-phenyl)-ethyl]-3H-purin-6-ylamine, 4-{2-[6-amino-8-(2, 5-dimethoxy-phenylsulfanyl)-purin-9-yl]-ethyl}-benzoic acid, 4-{2-[6-amino-8-(2, 5-dimethoxy-phenylsulfanyl)-purin-3-yl]-ethyl}-benzoic acid, 8-(2,5-dimethoxy-phenylsulfanyl)-3-(4-fluoro-benzyl)-3H-purin-6-ylamine, 8-(2,5-dimethoxy-phenylsulfanyl)-9-(4-nitro-benzyl)-9H-purin-6-ylamine, 8-(2, 5-dimethoxy-phenylsulfanyl)-9-[2-(2-methoxy-phenyl)-ethyl]-9H-purin-6-ylamine, 8-(2, 5-dimethoxy-phenylsulfanyl)-3-[2-(2-methoxy-phenyl)-ethyl]-3H-purin-6-ylamine, 8-(2, 5-dimethoxy-phenylsulfanyl)-9-(2-phenyl-butyl)-9H-purin-6-ylamine, 8-(2, 5-dimethoxy-phenylsulfanyl)-3-(2-phenyl)-butyl)-3H-purin-6-ylamine, 8-(2, 5-dimethoxy-phenylsulfanyl)-9-[2-(3, 4, 5-trimethoxy-phenyl)-ethyl]-9H-purin-6-ylamine, 8-(2, 5-dimethoxy-phenylsulfanyl)-3-[2-(3, 4, 5-trimethoxy-phenyl)-ethyl]-3H-purin-6-ylamine, 8-(6-bromo-benzo[1,3]dioxol-5-ylsulfanyl)-9-[2-(3, 4, 5-trimethoxy-phenyl)-ethyl]-9H-purin-6-ylamine, 8-(6-bromo-benzo[1,3]dioxol-5-ylsulfanyl)-3-[2-(3, 4,5-trimethoxy-phenyl)-ethyl]-3H-purin-6-ylamine, 8-(6-bromo-benzo[1,3]dioxol-5-ylsulfanyl)-9-[2-(2,4,6-trimethyl-phenyl)-ethyl]-9H-purin-6-ylamine, 8-(6-bromo-benzo[1,3]dioxol-5-ylsulfanyl)-3-[2-(2,4,6-trimethyl-phenyl)-ethyl]-3H-purin-6-ylamine, 8-(6-bromo-benzo[1,3]dioxol-5-ylsulfanyl)-9-[1-(4-chloro-phenyl)-cyclobutylmethyl]-9H-purin-6-ylamine, 8-(6-bromo-benzo[1,3]dioxol-5-ylsulfanyl)-3-[1-(4-chloro-phenyl)-cyclobutylmethyl]-3H-purin-6-ylamine, 9-[2-(4-chloro-2-fluoro-phenyl)-ethyl]-8-(2, 5-dimethoxy-phenylsulfanyl)-9H-purin-6-ylamine, 3-[2-(4-chloro-2-fluoro-phenyl)-ethyl]-8-(2, 5-dimethoxy-phenylsulfanyl)-3H-purin-6-ylamine, 8-(6-bromo-benzo[1,3]dioxol-5-ylsulfanyl)-9-(3-methyl-2-phenyl-pentyl)-9H-purin-6-ylamine, 8-(6-bromo-benzo[1,3]dioxol-5-ylsulfanyl)-3-(3-methyl-2-phenyl-pentyl)-3H-purin-6-ylamine, 8-(6-bromo-benzo[1,3]dioxol-5-ylsulfanyl)-9-(2-cyclopentyl-2-phenyl-ethyl)-9H-purin-6-ylamine, 8-(6-bromo-benzo[1,3]dioxol-5-ylsulfanyl)-3-(2-cyclopentyl-2-phenyl-ethyl)-3H-purin-6-ylamine, 9-(2-cyclopentyl-2-phenyl-ethyl)-8-(2, 5-dimethoxy-phenylsulfanyl)-9H-purin-6-ylamine, 3-(2-cyclopentyl-2-phenyl-ethyl)-8-(2, 5-dimethoxy-phenylsulfanyl)-3H-purin-6-ylamine, 8-(2, 5-dimethoxy-phenylsulfanyl)-9-(3-methyl-2-phenyl-pentyl)-9H-purin-6-ylamine, 8-(2, 5-dimethoxy-phenylsulfanyl)-3-(3-methyl-2-phenyl-pentyl)-3H-purin-6-ylamine, 2-[6-amino-8-(2, 5-dimethoxy-phenylsulfanyl)-purin-9-yl]-1-(2, 4-dichloro-phenyl)ethanol, 2-[6-

amino-8-(2, 5-dimethoxy-phenylsulfanyl)-purin-3-yl]-1-(2, 4-dichloro-phenyl)ethanol, 8-(6-bromo-benzo[1,3]dioxol-5-ylsulfanyl)-9-[2-(3-fluoro-phenyl)-ethyl]-9H-purin-6-ylamine, 8-(6-bromo-benzo[1,3]dioxol-5-ylsulfanyl)-3-[2-(3-fluoro-phenyl)-ethyl]-3H-purin-6-ylamine, 8-(2,5-dimethoxy-phenylsulfanyl)-9-[2-(3-ethoxy-4-methoxy-phenyl)-ethyl]-9H-purin-6-ylamine, 8-(2, 5-dimethoxy-phenylsulfanyl)-3-[2-(3-ethoxy-4-methoxy-phenyl)-ethyl]-3H-purin-6-ylamine, 8-(2,5-Dimethoxy-phenylsulfanyl)-9-(3-methyl-2-phenyl-butyl)-9H-purin-6-ylamine, 8-(2, 5-dimethoxy-phenylsulfanyl)-3-(3-methyl-2-phenyl-butyl)-3H-purin-6-ylamine, 8-(2,5-dimethoxy-phenylsulfanyl)-9-[2-(2, 5-dimethyl-phenyl)-ethyl]-9H-purin-6-ylamine, 8-(2, 5-dimethoxy-phenylsulfanyl)-3-[2-(2, 5-dimethyl-phenyl)-ethyl]-3H-purin-6-ylamine, 8-(6-bromo-benzo[1,3]dioxol-5-ylsulfanyl)-9-[2-(3-ethoxy-4-methoxy-phenyl)-ethyl]-9H-purin-6-ylamine, 8-(6-bromo-benzo[1,3]dioxol-5-ylsulfanyl)-3-[2-(3-ethoxy-4-methoxy-phenyl)-ethyl]-3H-purin-6-ylamine, 9-[2-(4-Chloro-phenyl)-3-methyl-butyl]-8-(2, 5-dimethoxy-phenylsulfanyl)-9H-purine-6-ylamine, 3-[2-(4-chloro-phenyl)-3-methyl-butyl]-8-(2, 5-dimethoxy-phenylsulfanyl)-3H-purine-6-ylamine, 9-[2-(2, 4-difluoro-phenyl)-ethyl]-8-(2, 5-dimethoxy-phenylsulfanyl)-9H-purine-6-ylamine, 9-[2-(2-chloro-6-fluoro-phenyl)-ethyl]-8-(2, 5-dimethoxy-phenylsulfanyl)-9H-purine-6-ylamine, 3-[2-(2-chloro-6-fluoro-phenyl)-ethyl]-8-(2, 5-dimethoxy-phenylsulfanyl)-3H-purine-6-ylamine, 8-(6-bromo-benzo[1,3]dioxol-5-ylsulfanyl)-9-[2-(2,5-dimethyl-phenyl)-ethyl]-9H-purin-6-ylamine, 8-(6-bromo-benzo[1,3]dioxol-5-ylsulfanyl)-3-[2-(2,5-dimethyl-phenyl)-ethyl]-3H-purin-6-ylamine, 8-(6-bromo-benzo[1,3]dioxol-5-ylsulfanyl)-9-(3-methyl-2-phenyl-butyl)-9H-purin-6-ylamine, 8-(6-bromo-benzo[1,3]dioxol-5-ylsulfanyl)-3-(3-methyl-2-phenyl-butyl)-3H-purin-6-ylamine, 8-(2,5-dimethoxy-phenylsulfanyl)-9-[2-(3,5-dimethyl-phenyl)-ethyl]-9H-purine-6-ylamine, 8-(2,5-dimethoxy-phenylsulfanyl)-3-[2-(3,5-dimethyl-phenyl)-ethyl]-3H-purine-6-ylamine, 8-(2,5-dimethoxy-phenylsulfanyl)-9-(2-pyridin-4-yl-ethyl)-9H-purin-6-ylamine, 8-(2, 5-dimethoxy-phenylsulfanyl)-9-(2-pyridin-2-yl-ethyl)-9H-purin-6-ylamine, 8-(2, 5-Dimethoxy-phenylsulfanyl)-3-(2-pyridin-2-yl-ethyl)-3H-purin-6-ylamine, 8-(2, 5-dimethoxy-phenylsulfanyl)-9-[2-(3-iodo-phenyl)-ethyl]-9H-purin-6-ylamine, 8-(2, 5-dimethoxy-phenylsulfanyl)-3-[2-(3-iodo-phenyl)-ethyl]-3H-purin-6-ylamine, 9-[2-(2-chloro-4-fluoro-phenyl)-ethyl]-8-(2,5-dimethoxy-phenylsulfanyl)-9H-purin-6-ylamine, 3-[2-(2-chloro-4-fluoro-phenyl)-ethyl]-8-(2,5-dimethoxy-phenylsulfanyl)-3H-purin-6-ylamine, 9-[2-(2-bromo-phenyl)-ethyl]-8-(2,5-dimethoxy-phenylsulfanyl)-9H-purin-6-ylamine, 3-[2-(2-bromo-phenyl)-ethyl]-8-(2, 5-dimethoxy-phenylsulfanyl)-3H-purin-6-ylamine, 9-[2-(3, 5-difluoro-phenyl)-ethyl]-8-(2,5-dimethoxy-phenylsulfanyl)-9H-purin-6-

ylamine, 3-[2-(3,5-difluoro-phenyl)-ethyl]-8-(2, 5-dimethoxy-phenylsulfanyl)-3H-purin-6-ylamine, 9-[2-(2, 3-difluoro-phenyl)-ethyl]-8-(2, 5-dimethoxy-phenylsulfanyl)-9H-purin-6-ylamine, 3-[2-(2, 3-difluoro-phenyl)-ethyl]-8-(2, 5-dimethoxy-phenylsulfanyl)-3H-purin-6-ylamine, 8-(6-Bromo-1,3-benzodioxol-5-ylsulfanyl)-9-[2-(2-fluoro-phenyl)-ethyl]-9H-purin-6-ylamine, 8-(6-bromo-benzo[1,3]dioxol-5-ylsulfanyl)-3-[2-(2-fluoro-phenyl)-ethyl]-3H-purin-6-ylamine, 8-(6-bromo-benzo[1,3]dioxol-5-ylsulfanyl)-9-[2-(2-bromo-phenyl)-ethyl]-9H-purin-6-ylamine, 8-(6-bromo-benzo[1,3]dioxol-5-ylsulfanyl)-3-[2-(2-bromo-phenyl)-ethyl]-3H-purin-6-ylamine, 8-(6-bromo-benzo[1,3]dioxol-5-ylsulfanyl)-9-(2-pyridin-3-yl-ethyl)-9H-purin-6-ylamine, 8-(6-bromo-benzo[1,3]dioxol-5-ylsulfanyl)-3-(2-pyridin-3-yl-ethyl)-3H-purin-6-ylamine, 8-(6-bromo-benzo[1,3]dioxol-5-ylsulfanyl)-9-[2-(3-iodo-phenyl)-ethyl]-9H-purin-6-ylamine, 8-(6-bromo-benzo[1,3]dioxol-5-ylsulfanyl)-3-[2-(3-iodo-phenyl)-ethyl]-3H-purin-6-ylamine, 8-(6-bromo-benzo[1,3]dioxol-5-ylsulfanyl)-9-(2-o-tolyl-ethyl)-9H-purin-6-ylamine, 8-(6-bromo-benzo[1,3]dioxol-5-ylsulfanyl)-3-(2-o-tolyl-ethyl)-3H-purin-6-ylamine, 8-(6-bromo-benzo[1,3]dioxol-5-ylsulfanyl)-9-(2-naphthalen-1-yl-ethyl)-9H-purin-6-ylamine, 8-(6-bromo-benzo[1,3]dioxol-5-ylsulfanyl)-3-(2-naphthalen-1-yl-ethyl)-3H-purin-6-ylamine, 1-(4-{2-[6-amino-8-(6-bromo-benzo[1,3]dioxol-5-ylsulfanyl)-purin-9-yl]-ethyl}-phenyl)-ethanone, 1-(4-{2-[6-amino-8-(6-bromo-benzo[1,3]dioxol-5-ylsulfanyl)-purin-3-yl]-ethyl}-phenyl)-ethanone, 8-(6-bromo-benzo[1,3]dioxol-5-ylsulfanyl)-9-[2-(2,3-difluoro-phenyl)-ethyl]-9H-purin-6-ylamine, 8-(6-bromo-1,3-benzo[1,3]dioxol-5-ylsulfanyl)-3-[2-(2,3-difluoro-phenyl)-ethyl]-3H-purin-6-ylamine, 8-(6-bromo-benzo[1,3]dioxol-5-ylsulfanyl)-9-(2-p-tolyl-ethyl)-9H-purin-6-ylamine, 8-(6-bromo-benzo[1,3]dioxol-5-ylsulfanyl)-3-(2-p-tolyl-ethyl)-3H-purin-6-ylamine, 8-(6-bromo-benzo[1,3]dioxol-5-ylsulfanyl)-9-[2-(3-trifluoromethyl-phenyl)-ethyl]-9H-purin-6-ylamine, 8-(6-bromo-benzo[1,3]dioxol-5-ylsulfanyl)-3-[2-(3-trifluoromethyl-phenyl)-ethyl]-3H-purin-6-ylamine, 9-(2-benzo[1,3]dioxol-5-yl-ethyl)-8-(2, 5-dimethoxy-phenylsulfanyl)-9H-purin-6-ylamine, 3-(2-benzo[1,3]dioxol-5-yl-ethyl)-8-(2, 5-dimethoxy-phenylsulfanyl)-3H-purin-6-ylamine, 9-(2-cyclohexyl-ethyl)-8-(2,5-dimethoxyphenyl-sulfanyl)-9H-purin-6-ylamine, 3-(2-cyclohexyl-ethyl)-8-(2,5-dimethoxy-phenylsulfanyl)-3H-purin-6-ylamine, 9-(2-biphenyl-4-yl-ethyl)-8-(6-bromo-benzo[1,3]dioxol-5-ylsulfanyl)-9H-purin-6-ylamine, 3-(2-biphenyl-4-yl-ethyl)-8-(6-bromo-benzo[1,3]dioxol-5-ylsulfanyl)-3H-purin-6-ylamine, 4-{2-[6-amino-8-(2, 5-dimethoxy-phenylsulfanyl)-purin-9-yl]-ethyl}-benzenesulfonic acid, 4-{2-[6-amino-8-(2, 5-dimethoxy-phenylsulfanyl)-purin-3-yl]-ethyl}-benzenesulfonic acid, 2-[6-Amino-8-(6-bromo-benzo[1,3]dioxol-5-ylsulfanyl)-purin-9-yl]-1-(2,4-dichloro-phenyl)-ethanol, 2-[6-amino-8-

(6-bromo-benzo[1,3]dioxol-5-ylsulfanyl)-purin-3-yl]-1-(2,4-dichloro-phenyl)-ethanol, 9-(2-Cyclohexyl-2-phenyl-ethyl)-8-(2, 5-dimethoxy-phenylsulfanyl)-9H-purin-6-ylamine, 3-(2-cyclohexyl-2-phenyl-ethyl)-8-(2 5-dimethoxy-phenylsulfanyl)-3H-purin-6-ylamine, 9-(2-biphenyl-4-yl-ethyl)-8-(2,5-dimethoxy-phenylsulfanyl)-9H-purin-6-ylamine, 3-(2-biphenyl-4-yl-ethyl)-8-(2,5-dimethoxy-phenylsulfanyl)-3H-purin-6-ylamine, 8-(2,5-dimethoxy-phenylsulfanyl)-9-[2-(2-trifluoromethyl-phenyl)-ethyl]-9H-purin-6-ylamine, 8-(2, 5-dimethoxy-phenylsulfanyl)-3-[2-(2-trifluoromethyl-phenyl)-ethyl]-3H-purin-6-ylamine, 8-(2, 5-dimethoxy-phenylsulfanyl)-9-[2-(4-dimethylamino-phenyl)-ethyl]-9H-purin-6-ylamine, 8-(2, 5-dimethoxy-phenylsulfanyl)-3-[2-(4-dimethylamino-phenyl)-ethyl]-3H-purin-6-ylamine, 8-(6-bromo-benzo[1,3]dioxol-5-ylsulfanyl)-9-[2-(4-dimethylamino-phenyl)-ethyl]-9H-purin-6-ylamine, 8-(6-bromo-benzo[1,3]dioxol-5-ylsulfanyl)-3-[2-(4-dimethylamino-phenyl)-ethyl]-3H-purin-6-ylamine, 8-(2, 5-diethoxy-phenylsulfanyl)-9-phenethyl-9H-purin-6-ylamine, 8-(2,5-diethoxy-phenylsulfanyl)-3-phenethyl-3H-purin-6-ylamine, 9-[2-(2-chloro-phenyl)-ethyl]-8-(2, 5-diethoxy-phenylsulfanyl)-9H-purin-6-ylamine, 3-[2-(2-chloro-phenyl)-ethyl]-8-(2,5-diethoxy-phenylsulfanyl)-3H-purin-6-ylamine, 9-[2-(3,5-dimethoxy-phenyl)-ethyl]-8-(2,5-dimethoxy-phenylsulfanyl)-9H-purin-6-ylamine, 3-[2-(3,5-dimethoxy-phenyl)-ethyl]-8-(2,5-dimethoxy-phenylsulfanyl)-3H-purin-6-ylamine, 8-(6-bromo-benzo[1,3]dioxol-5-ylsulfanyl)-9-[2-(3,5-dimethoxy-phenyl)-ethyl]-9H-purin-6-ylamine, 8-(6-bromo-benzo[1,3]dioxol-5-ylsulfanyl)-3-[2-(3,5-dimethoxy-phenyl)-ethyl]-3H-purin-6-ylamine, 8-(2,5-dimethoxy-phenylsulfanyl)-9-(2-thiophen-3-yl-ethyl)-9H-purin-6-ylamine, 8-(2, 5-dimethoxy-phenylsulfanyl)-3-(2-thiophen-3-yl-ethyl)-3H-purin-6-ylamine, 8-(2,5-dimethoxy-phenylsulfanyl)-9-2-thiophen-2-yl-ethyl)-9H-purin-6-ylamine, 8-(2,5-dimethoxy-phenylsulfanyl)-3-(2-thiophen-2-yl-ethyl)-3H-purin-6-ylamine, 8-(6-bromo-benzo[1,3]dioxol-5-ylsulfanyl)-9-(2-thiophen-3-yl-ethyl)-9H-purin-6-ylamine, 8-(6-bromo-benzo[1,3]dioxol-5-ylsulfanyl)-3-(2-thiophen-3-yl-ethyl)-3H-purin-6-ylamine, 8-(6-bromo-benzo[1,3]dioxol-5-ylsulfanyl)-9-(2-thiophen-2-yl-ethyl)-9H-purin-6-ylamine, 8-(6-bromo-benzo[1,3]dioxol-5-ylsulfanyl)-3-(2-thiophen-2-yl-ethyl)-3H-purin-6-ylamine, 8-(2,5-dimethoxy-phenylsulfanyl)-9-[2-(2-nitro-phenyl)-ethyl]-9H-purin-6-ylamine, 8-(2,5-dimethoxy-phenylsulfanyl)-3-[2-(2-nitro-phenyl)-ethyl]-3H-purin-6-ylamine, 8-(2, 5-dimethoxy-phenylsulfanyl)-9-[2-(2-nitro-phenyl)-ethyl]-9H-purin-6-ylamine, 8-(2,5-dimethoxy-phenylsulfanyl)-3-[2-(2-nitro-phenyl)-ethyl]-3H-purin-6-ylamine, 8-(6-bromo-benzo[1,3]dioxol-5-ylmethyl)-9-phenethyl-9H-purin-6-ylamine, 8-(6-bromo-benzo[1,3]dioxol-5-ylmethyl)-3-phenethyl-3H-purin-6-ylamine, (4-{2-[6-amino-8-(6-bromo-benzo[1,3]dioxol-5-ylsulfanyl)-purin-9-yl]-ethyl}-phenyl)carbamic acid tert-

butyl ester, (4-{2-[6-amino-8-(6-bromo-benzo[1,3]dioxol-5-ylsulfanyl)-purin-3-yl]-ethyl}-phenyl)carbamic acid tert-butyl ester, 9-[2-(4-amino-phenyl)-ethyl]-8-(6-bromo-benzo[1,3]dioxol-5-ylsulfanyl)-9H-purin-6-ylamine, (4-{2-[6-amino-8-(2, 5-dimethoxy-phenylsulfanyl)-purin-9-yl]-ethyl}-phenyl)-carbamic acid tert-butyl ester, (4-{2-[6-amino-8-(2, 5-dimethoxy-phenylsulfanyl)-purin-3-yl]-ethyl}-phenyl)-carbamic acid tert-butyl ester, 9-[2-(4-amino-phenyl)-ethyl]-8-(2,5-dimethoxy-phenylsulfanyl)-9H-purin-6-ylamine, 8-(2,5-dimethoxy-phenylsulfanyl)-9-[2-(3-trifluoromethoxy-phenyl)-ethyl]-9H-purin-6-ylamine, 8-(2,5-dimethoxy-phenylsulfanyl)-9-(2-pentafluorophenyl-ethyl)-9H-purin-6-ylamine, 9-[2-(3,5-bistrifluoromethy-phenyl)-ethyl]-8-(2,5-dimethoxy-phenylsulfanyl)-9H-purin-6-ylamine, 9-[2-(3, 5-Bistrifluoromethyl-phenyl)-ethyl]-8-(6-bromo-benzo[1,3]dioxol-5-ylsulfanyl)-9H-purin-6-ylamine, 8-(6-bromo-benzo[1,3]dioxol-5-ylsulfanyl)-9-[1-(4-chloro-phenyl)-cyclopropylmethyl]-9H-purin-6-ylamine, 8-(6-bromo-benzo[1,3]dioxol-5-ylsulfanyl)-3-[2-(3-nitro-phenyl)-ethyl]-3H-purin-6-ylamine, 8-(2, 5-dimethoxy-phenylsulfanyl)-9-[2-(3-nitro-phenyl)-ethyl]-9H-purin-6-ylamine, 8-(benzo[1,3]dioxol-5-ylsulfanyl)-9-phenethyl-1,9-dihydro-purin-6-one, and 8-(6-bromo-benzo[1,3]dioxol-5-ylsulfanyl)-9-phenethyl-1,9-dihydro-purin-6-one.

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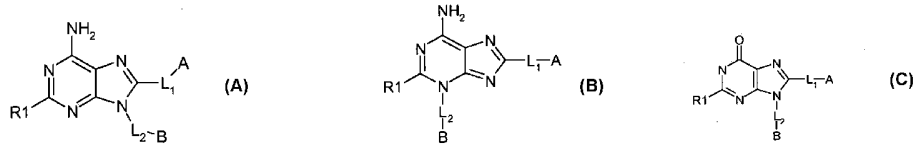

(57) Abstract: Compounds of the formula (I) (II) (III) in which A is chosen from a substituted or unsubstituted aryl, heteroaryl, heterocyclic, or carbocyclic group! B is chosen from a substituted or unsubstituted aryl, heteroaryl, heterocyclic, or carbocyclic group Rl is chosen from hydro, alkyl, aryl, heteroaryl, amino, halo, sulfur, and thioalkyl.

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B. FIELDS SEARCHED

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Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)
CAS Online

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X --- A	WO 2003037860A2 (CONFORMA THERAPEUTICS CORPORATION) 8 MAY 2003 (08.05.2003) See species 545, 549, 564, 569, 541, 560, 521, 529, 246, 254, 265, 269, 273, 447, 487, 495,227, 436, 443,360, 368, 379, 383, 387, 398, 406, 417, 421, 284, and others.	1-8, 33-35 --- 7-32, 36-37
X,P	WO 2006/084030A2 (SLOAN KETTERING INSTITUTE FOR CANCER RESEARCH) 10 August 2006 (10.08.2006) See Figure 3A.	1-8, 17-19, 21-24, 33-35
X	WO 03/104250 (KYLIX B.V.) 18 December 2003 (18.12.2003) See Table 1 compounds I-003, I-004, I-007, I-102 to I-112, I-115, I-119 to I-127, 130, 134, and 137-140.	1-8, 17-19, 33, 35

☒ Further documents are listed in the continuation of Box C. ☐ See patent family annex.

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C (Continuation). DOCUMENTS CONSIDERED TO BE RELEVANT

Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	JANEBA, Zlatko, "Transformation of 8-[(2-Hydroxyalkyl) sulfanyl] adenines to 6-Amino-7H-purin-8 (9H)-one Derivatives" Collection of Czechoslovak Chemical Communications 66(9), 1393-1406 (September 2001). See compound 15	1 and 35
X	CHIOSIS et al., "Development of a Purine-Scaffold Novel Class of Hsp90 Binders that Inhibit the Proliferation of Cancer Cells and Induce the Degradation of Her2 Tyrosine Kinase " Bioorganic and Medicinal Chemistry, November 2002, 10(11):3555-3564. See page 3557, species 17-20, 28-29, 33, 39-42, 46 .	1-8, 17-19, 34-35
X	Panouse et al., "Relations structures-activités des immunomodulateurs: Apport de la modélisation moléculaire" Ann. pharm. Fr. 2000, vol. 58, no5, pp. 291-302. See AS on page 298	1-8, 26-27, 33-35

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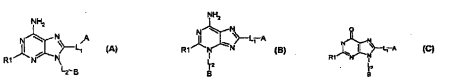
权利要求书 15 页 说明书 418 页

[54] 发明名称

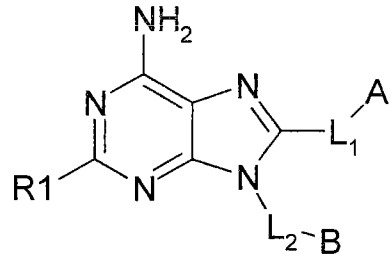
治疗性化合物及其在癌症中的用途

[57] 摘要

式(I)(II)(III)的化合物，其中 A 选自被取代的或未被取代的芳基、杂芳基、杂环或碳环基团；B 选自被取代的或未被取代的芳基、杂芳基、杂环或碳环基团；R1 选自氢、烷基、芳基、杂芳基、氨基、卤素、硫及硫代烷基。



1. 一种下式 I 的化合物或其可药用盐



式 I

其中：

A 选自被取代的或未被取代的芳基、杂芳基、杂环或碳环基团；

B 选自被取代的或未被取代的芳基、杂芳基、杂环或碳环基团；

R1 选自氢、烷基、芳基、杂芳基、氨基、卤素、硫及硫代烷基；

L_1 可以是饱和的、部分饱和的或不饱和的，并且选自 $-(CH_2)_n-(CH_2)_n-$、$-(CH_2)_nC(=O)(CH_2)_n-$、$-(CH_2)_nC(=O)N(CH_2)_n-$、$-(CH_2)_nNC(=O)O(CH_2)_n-$、$-(CH_2)_nNC(=O)N(CH_2)_n-$、$-(CH_2)_nNC(=S)S(CH_2)_n-$、$-(CH_2)_nOC(=O)S(CH_2)_n-$、$-(CH_2)_nNH(CH_2)_n-$、$-(CH_2)_nO(CH_2)_n-$、$-(CH_2)_nS(CH_2)_n-$ 及 $-(CH_2)_nNC(=S)N(CH_2)_n-$，其中各个 n 独立地选自 0、1、2、3、4、5、6、7 和 8，并且其中各个碳和/或氮可任选被一个或多个独立地选自羟基、卤素、烷氧基、烷基、氨基、环烷基、$-NR_2R_3$、$-NSO_2R_4$、$-NC(=O)NR_2R_3$、杂芳基、芳基、环烷基及杂环的取代基取代；其中 $-R_2$ 和 $-R_3$ 独立地选自 -H、烷基及 $-C(=O)OR_4$；并且其中 R_4 为烷基（例如甲基、乙基、丙基、异丙基、丁基、异丁基或叔丁基）；

L_2 可以是饱和的、部分饱和的或不饱和的，并且选自 $-(CH_2)_n-(CH_2)_n-$、$-(CH_2)_nC(=O)(CH_2)_n-$、$-(CH_2)_nC(=O)N(CH_2)_n-$、$-(CH_2)_nNC(=O)O(CH_2)_n-$、$-(CH_2)_nNC(=O)N(CH_2)_n-$、$-(CH_2)_nNC(=S)S(CH_2)_n-$、$-(CH_2)_nOC(=O)S(CH_2)_n-$、$-(CH_2)_nNH(CH_2)_n-$、$-(CH_2)_nO(CH_2)_n-$、$-(CH_2)_nS(CH_2)_n-$ 及 $-(CH_2)_nNC(=S)N(CH_2)_n-$，其中各个 n 独立地选自 0、1、2、3、4、5、6、7 和 8，并且其中各个碳和/或氮可任选被一个或多个独立地选自羟基、卤素、烷氧基、烷基、氨基、环烷基、$-NR_2R_3$、$-NSO_2R_4$、$-NC(=O)NR_2R_3$、杂芳基、芳基、环烷基及杂环的取代基取代；其中 $-R_2$ 和 $-R_3$ 独立地选自 -H、烷基及 $-C(=O)OR_4$；并且其中 R_4 为烷基（例如甲基、乙基、丙基、异丙基、丁基、异丁基或叔丁基）；以及

其可药用的盐。

2. 权利要求 1 的化合物，其中 A 为具有一个或多个选自卤素、烷基、烷氧基、卤代烷基、卤代烷氧基、硝基、-C(=O)烷基、羟基、-C≡N、$-SO_3$及 - COOH 的取代基的芳基。

3. 权利要求 1 的化合物，其中 A 为具有一个或多个选自卤素、烷基、烷氧基、卤代烷基、卤代烷氧基、硝基、-C(=O)烷基、羟基及 - COOH 的取代基的苯基。

4. 权利要求 1 的化合物，其中 A 为具有一个或多个选自羟基、卤素、烷基、烷氧基、卤代烷基、卤代烷氧基、$-N(C_{1-3}烷基)_2$、$-NH(C_{1-3}烷基)$、$-C(=O)NH_2$、$-C(=O)NH(C_{1-3}烷基)$、$-C(=O)N(C_{1-3}烷基)_2$、$-S(=O)_2(C_{1-3}烷基)$、$-S(=O)_2NH_2$、$-S(=O)_2N(C_{1-3}烷基)_2$、$-S(=O)_2NH(C_{1-3}烷基)$、$-CHF_2$、$-OCF_3$、$-OCHF_2$、$-SCF_3$、$-CF_3$、-CN、$-NH_2$及$-NO_2$的取代基的芳基。

5. 权利要求 1 的化合物，其中 A 为具有 1-5 个独立地选自酰氨基、酰氧基、烯基、烷氧基、烷基、烷硫基、炔基、氨基、芳基、芳烷基、芳烯基、芳炔基、芳烷氧基、芳氧基、芳硫基、碳环、氰基、氰氧基、卤素、卤代烷基、卤代苯基、羟基、杂芳基、杂芳氧基、杂环、杂芳烷氧基、异氰酸根合、异硫氰酸根合、硝基、亚硫酰基、磺酰基、氨磺酰基、硫代羰基、氰硫基、三卤代甲磺酰氨基、O-氨基甲酰基、N-氨基甲酰基、O-硫代氨基甲酰基、N-硫代氨基甲酰基及 C-酰氨基的取代基的苯基。

6. 权利要求 1 的化合物，其中 B 为具有一个或多个选自卤素、烷基、烷氧基、卤代烷基、卤代烷氧基、硝基、-C(=O)烷基、羟基、$-SO_3$及 - COOH 的取代基的芳基。

7. 权利要求 1 的化合物，其中 B 为具有一个或多个选自羟基、卤素、烷基、烷氧基、卤代烷基、卤代烷氧基、$-N(C_{1-3}烷基)_2$、$-NH(C_{1-3}烷基)$、$-C(=O)NH_2$、$-C(=O)NH(C_{1-3}烷基)$、$-C(=O)N(C_{1-3}烷基)_2$、$-S(=O)_2(C_{1-3}烷基)$、$-S(=O)_2NH_2$、$-S(=O)_2N(C_{1-3}烷基)_2$、$-S(=O)_2NH(C_{1-3}烷基)$、$-CHF_2$、$-OCF_3$、$-OCHF_2$、$-SCF_3$、$-CF_3$、-CN、$-NH_2$、$-SO_3$及$-NO_2$的取代基的芳基。

8. 权利要求 1 的化合物，其中 B 为具有 1-5 个独立地选自酰氨基、酰氧基、烯基、烷氧基、烷基、烷硫基、炔基、氨基、芳基、芳烷基、芳烯基、芳炔基、芳烷氧基、芳氧基、芳硫基、碳环、氰基、氰氧基、卤素、卤代烷基、卤代苯基、羟基、杂芳基、杂芳氧基、杂环、杂芳烷

氧基、异氰酸根合、异硫氰酸根合、硝基、亚硫酰基、磺酰基、氨磺酰基、硫代羰基、氰硫基、三卤代甲磺酰氨基、O-氨基甲酰基、N-氨基甲酰基、O-硫代氨基甲酰基、N-硫代氨基甲酰基及C-酰氨基的取代基的苯基。

9. 权利要求1的化合物，其中A为被取代的或未被取代的2，3-二氢-1-茚酮基团。

10. 权利要求9的化合物，其中A具有1-5个独立地选自酰氨基、酰氧基、烯基、烷氧基、烷基、烷硫基、炔基、氨基、芳基、芳烷基、芳烯基、芳炔基、芳烷氧基、芳氧基、芳硫基、碳环、氰基、氰氧基、卤素、卤代烷基、卤代苯基、羟基、杂芳基、杂芳氧基、杂环、杂芳烷氧基、异氰酸根合、异硫氰酸根合、硝基、亚硫酰基、磺酰基、氨磺酰基、硫代羰基、氰硫基、三卤代甲磺酰氨基、O-氨基甲酰基、N-氨基甲酰基、O-硫代氨基甲酰基、N-硫代氨基甲酰基及C-酰氨基的取代基。

11. 权利要求1的化合物，其中A为被取代的或未被取代的1，2-二氢化茚基团。

12. 权利要求11的化合物，其中A具有1-5个独立地选自酰氨基、酰氧基、烯基、烷氧基、烷基、烷硫基、炔基、氨基、芳基、芳烷基、芳烯基、芳炔基、芳烷氧基、芳氧基、芳硫基、碳环、氰基、氰氧基、卤素、卤代烷基、卤代苯基、羟基、杂芳基、杂芳氧基、杂环、杂芳烷氧基、异氰酸根合、异硫氰酸根合、硝基、亚硫酰基、磺酰基、氨磺酰基、硫代羰基、氰硫基、三卤代甲磺酰氨基、O-氨基甲酰基、N-氨基甲酰基、O-硫代氨基甲酰基、N-硫代氨基甲酰基及C-酰氨基的取代基。

13. 权利要求1的化合物，其中B为高哌啶基团。

14. 权利要求1的化合物，其中B为被一个或多个选自氢；卤素；烷基；烷氧基；卤代烷基；卤代烷氧基；硝基；$-CH_2-$芳基；-C(=O)烷基；-C(=O)环烷基；-C(=O)-NH-烷基；环烷基；羟基；$-SO_3$；-COOH（及其酯）；氨基酸（选自天然和非天然氨基酸）；具有1-5个氨基酸残基（选自天然和非天然氨基酸）的肽；-C(=O)烷基，其中所述烷基被一个或多个取代基（选自烷基、氨基、烷氧基、卤代烷基、卤代烷氧基、硝基、氰基、羟基、-COOH（及其酯）、磺酰基、氨磺酰基）取代；及磺酰基的取代基取代的高哌啶基团。

15. 权利要求1的化合物，其中B为具有一个或多个选自氢、卤素、

烷基、烷氧基、卤代烷基、卤代烷氧基、硝基、$-CH_2-$芳基、-C(=O)烷基、-C(=O)-NH-烷基、环烷基、羟基、$-SO_3$、-COOH（及其酯）及磺酰基的取代基的高哌啶基团。

16. 权利要求 1 的化合物，其中 B 为具有一个或多个选自 -C(=O)、-C(=O)CH_3、$-CH_3$、$-CH_2CH_3$、$-CH_2CH_2CH_3$、$-C(=O)OCH_2CH_3$、$-S(=O)_2CH_3$、$-S(=O)_2CF_3$、$-C(=O)OC(CH_3)_3$、-C(=O)OCH_2-苯基、$-CH_2$-苯基、$-CH(CH_3)_2$、$-C(=O)NHCH_2CH_3$、$-C(=O)NHCH(CH_3)_2$、$-C(=O)NHC(CH_3)_3$、$-C(=O)NHCH_2C(=O)OCH_2CH_3$、$-C(=O)C(CH_3)_3$、$-CH(CH_3)_2$、$-CH_2CH(CH_3)_2$、$-C(=O)CH_2C(CH_3)_3$及环戊基的取代基的高哌啶基团。

17. 权利要求 1 的化合物，其中 B 为哌啶基团。

18. 权利要求 1 的化合物，其中 B 为被一个或多个选自氢；卤素；烷基；烷氧基；卤代烷基；卤代烷氧基；硝基；$-CH_2-$芳基；-C(=O)烷基；-C(=O)环烷基；-C(=O)-NH-烷基；环烷基；羟基；$-SO_3$；-COOH（及其酯）；氨基酸（选自天然和非天然氨基酸）；具有 1-5 个氨基酸残基（选自天然和非天然氨基酸）的肽；-C(=O)烷基，其中所述烷基被一个或多个取代基（选自烷基、氨基、烷氧基、卤代烷基、卤代烷氧基、硝基、氰基、羟基、-COOH（及其酯）、磺酰基、氨磺酰基）取代；及磺酰基的取代基取代的哌啶基团。

19. 权利要求 1 的化合物，其中 B 为具有一个或多个选自氢、卤素、烷基、烷氧基、卤代烷基、卤代烷氧基、硝基、$-CH_2-$芳基、-C(=O)烷基、-C(=O)-NH-烷基、环烷基、羟基、$-SO_3$、-COOH（及其酯）及磺酰基的取代基的哌啶基团。

20. 权利要求 1 的化合物，其中 B 为具有一个或多个选自 -C(=O)、-C(=O)CH_3、$-CH_3$、$-CH_2CH_3$、$-CH_2CH_2CH_3$、$-C(=O)OCH_2CH_3$、$-S(=O)_2CH_3$、$-S(=O)_2CF_3$、$-C(=O)OC(CH_3)_3$、-C(=O)OCH_2-苯基、$-CH_2$-苯基、$-CH(CH_3)_2$、$-C(=O)NHCH_2CH_3$、$-C(=O)NHCH(CH_3)_2$、$-C(=O)NHC(CH_3)_3$、$-C(=O)NHCH_2C(=O)OCH_2CH_3$、$-C(=O)C(CH_3)_3$、$-CH(CH_3)_2$、$-CH_2CH(CH_3)_2$、$-C(=O)CH_2C(CH_3)_3$及环戊基的取代基的哌啶基团。

21. 权利要求 1 的化合物，其中 B 为哌嗪基团。

22. 权利要求 1 的化合物，其中 B 为被一个或多个选自氢；卤素；烷基；烷氧基；卤代烷基；卤代烷氧基；硝基；$-CH_2-$芳基；-C(=O)烷基；-C(=O)环烷基；-C(=O)-NH-烷基；环烷基；羟基；$-SO_3$；-COOH（及其

酯）；氨基酸（选自天然和非天然氨基酸）；具有 1-5 个氨基酸残基（选自天然和非天然氨基酸）的肽；-C(=O)烷基，其中所述烷基被一个或多个取代基（选自烷基、氨基、烷氧基、卤代烷基、卤代烷氧基、硝基、氰基、羟基、-COOH（及其酯）、磺酰基、氨磺酰基）取代；及磺酰基的取代基取代的哌嗪基团。

23. 权利要求 **1** 的化合物，其中 **B** 为具有一个或多个选自氢、卤素、烷基、烷氧基、卤代烷基、卤代烷氧基、硝基、$-CH_2-$芳基、-C(=O)烷基、-C(=O)-NH-烷基、环烷基、羟基、$-SO_3$、-COOH（及其酯）及磺酰基的取代基的哌嗪基团。

24. 权利要求 **1** 的化合物，其中 **B** 为具有一个或多个选自 -C(=O)、$-C(=O)CH_3$、$-CH_3$、$-CH_2CH_3$、$-CH_2CH_2CH_3$、$-C(=O)OCH_2CH_3$、$-S(=O)_2CH_3$、$-S(=O)_2CF_3$、$-C(=O)OC(CH_3)_3$、$-C(=O)OCH_2$-苯基、$-CH_2$-苯基、$-CH(CH_3)_2$、$-C(=O)NHCH_2CH_3$、$-C(=O)NHCH(CH_3)_2$、$-C(=O)NHC(CH_3)_3$、$-C(=O)NHCH_2C(=O)OCH_2CH_3$、$-C(=O)C(CH_3)_3$、$-CH(CH_3)_2$、$-CH_2CH(CH_3)_2$、$-C(=O)CH_2C(CH_3)_3$及环戊基的取代基的哌嗪基团。

25. 权利要求 **1** 的化合物，其中 **B** 为吡咯烷基团。

26. 权利要求 **1** 的化合物，其中 **B** 为被一个或多个选自氢；卤素；烷基；烷氧基；卤代烷基；卤代烷氧基；硝基；$-CH_2-$芳基；-C(=O)烷基；-C(=O)环烷基；-C(=O)-NH-烷基；环烷基；羟基；$-SO_3$；-COOH（及其酯）；氨基酸（选自天然和非天然氨基酸）；具有 1-5 个氨基酸残基（选自天然和非天然氨基酸）的肽；-C(=O)烷基，其中所述烷基被一个或多个取代基（选自烷基、氨基、烷氧基、卤代烷基、卤代烷氧基、硝基、氰基、羟基、-COOH（及其酯）、磺酰基、氨磺酰基）取代；及磺酰基的取代基取代的吡咯烷基团。

27. 权利要求 **1** 的化合物，其中 **B** 为具有一个或多个选自氢、卤素、烷基、烷氧基、卤代烷基、卤代烷氧基、硝基、$-CH_2-$芳基、-C(=O)烷基、-C(=O)-NH-烷基、环烷基、羟基、$-SO_3$、-COOH（及其酯）及磺酰基的取代基的吡咯烷基团。

28. 权利要求 **1** 的化合物，其中 **B** 为具有一个或多个选自 -C(=O)、$-C(=O)CH_3$、$-CH_3$、$-CH_2CH_3$、$-CH_2CH_2CH_3$、$-C(=O)OCH_2CH_3$、$-S(=O)_2CH_3$、$-S(=O)_2CF_3$、$-C(=O)OC(CH_3)_3$、$-C(=O)OCH_2$-苯基、$-CH_2$-苯基、$-CH(CH_3)_2$、$-C(=O)NHCH_2CH_3$、$-C(=O)NHCH(CH_3)_2$、$-C(=O)NHC(CH_3)_3$、

$-C(=O)NHCH_2C(=O)OCH_2CH_3$、$-C(=O)C(CH_3)_3$、$-CH(CH_3)_2$、$-CH_2CH(CH_3)_2$、$-C(=O)CH_2C(CH_3)_3$及环戊基的取代基的吡咯烷基团。

29. 权利要求 1 的化合物，其中 B 为吖丁啶基团。

30. 权利要求 1 的化合物，其中 B 为被一个或多个选自氢；卤素；烷基；烷氧基；卤代烷基；卤代烷氧基；硝基；$-CH_2-$芳基；$-C(=O)$烷基；$-C(=O)$环烷基；$-C(=O)-NH-$烷基；环烷基；羟基；$-SO_3$；－COOH（及其酯）；氨基酸（选自天然和非天然氨基酸）；具有 1-5 个氨基酸残基（选自天然和非天然氨基酸）的肽；$-C(=O)$烷基，其中所述烷基被一个或多个取代基（选自烷基、氨基、烷氧基、卤代烷基、卤代烷氧基、硝基、氰基、羟基、－COOH（及其酯）、磺酰基、氨磺酰基）取代；及磺酰基的取代基取代的吖丁啶基团。

31. 权利要求 1 的化合物，其中 B 为具有一个或多个选自氢、卤素、烷基、烷氧基、卤代烷基、卤代烷氧基、硝基、$-CH_2-$芳基、$-C(=O)$烷基、$-C(=O)-NH-$烷基、环烷基、羟基、$-SO_3$、－COOH（及其酯）及磺酰基的取代基的吖丁啶基团。

32. 权利要求 1 的化合物，其中 B 为具有一个或多个选自－$C(=O)$、－$C(=O)CH_3$、$-CH_3$、$-CH_2CH_3$、$-CH_2CH_2CH_3$、$-C(=O)OCH_2CH_3$、$-S(=O)_2CH_3$、$-S(=O)_2CF_3$、$-C(=O)OC(CH_3)_3$、－$C(=O)OCH_2-$苯基、$-CH_2-$苯基、$-CH(CH_3)_2$、$-C(=O)NHCH_2CH_3$、$-C(=O)NHCH(CH_3)_2$、$-C(=O)NHC(CH_3)_3$、$-C(=O)NHCH_2C(=O)OCH_2CH_3$、$-C(=O)C(CH_3)_3$、$-CH(CH_3)_2$、$-CH_2CH(CH_3)_2$、$-C(=O)CH_2C(CH_3)_3$及环戊基的取代基的吖丁啶基团。

33. 权利要求 1 的化合物，其中 L_1 为－S－。

34. 权利要求 1 的化合物，其中 L_2 为$-(CH_2)_n-(CH_2)_n-$，并且各个 n 独立地选自 0、1、2 和 3，且其中各个碳可任选被一个或多个独立地选自羟基、卤素、烷氧基、烷基、氨基、环烷基、$-NR_2R_3$、$-NSO_2R_4$、$-NC(=O)NR_2R_3$、杂芳基、芳基、环烷基及杂环的取代基取代；其中$-R_2$和$-R_3$独立地选自－H、烷基及$-C(=O)OR_4$；并且其中 R_4 为烷基（例如甲基、乙基、丙基、异丙基、丁基、异丁基或叔丁基）。

35. 权利要求 1 的化合物，其中 R1 为氢。

36. 一种化合物，所述化合物选自 9-[2-(1-乙酰基哌啶-4-基)乙基]-8-[(6-溴-1,3-苯并间二氧杂环戊烯-5-基)硫]-9H-嘌呤-6-胺、4-(2-{6-氨基-8-[(6-溴-1,3-苯并间二氧杂环戊烯-5-基)硫]-9H-嘌呤

-9-基}乙基)哌啶-1-甲醛、4-(2-{6-氨基-8-[(7-溴-2,3-二氢-1,4-苯并二噁烯-6-基)硫]-9H-嘌呤-9-基}乙基)哌啶-1-甲醛、9-(3-氨基-3-环丙基丙基)-8-[(6-溴-1,3-苯并间二氧杂环戊烯-5-基)硫]-9H-嘌呤-6-胺、9-(3-氨基-3-环己基丙基)-8-[(6-溴-1,3-苯并间二氧杂环戊烯-5-基)硫]-9H-嘌呤-6-胺、(2S)-1-[4-(2-{6-氨基-8-[(6-溴-1,3-苯并间二氧杂环戊烯-5-基)硫]-9H-嘌呤-9-基}乙基)哌啶-1-基]-1-氧代丙-2-醇、4-(2-{6-氨基-8-[(1-氧代-2,3-二氢-1H-茚-5-基)硫]-9H-嘌呤-9-基}乙基)哌啶-1-甲醛、2-[4-(2-{6-氨基-8-[(6-溴-1,3-苯并间二氧杂环戊烯-5-基)硫]-9H-嘌呤-9-基}乙基)哌啶-1-基]-2-氧代乙醇及6-({9-[2-(1-乙酰基哌啶-4-基)乙基]-6-氨基-9H-嘌呤-8-基}硫)-1,3-苯并间二氧杂环戊烯-5-甲腈。

37. 一种化合物，所述化合物选自8-(2,5-二甲氧基-苯基硫基)-9-苯乙基-9H-嘌呤-6-基胺、8-(2,5-二甲氧基-苯基硫基)-3-苯乙基-3H-嘌呤-6-基胺、8-(2,5-二甲氧基-苯基硫基)-9-(3-苯基-丙基)-9H-嘌呤-6-基胺、8-(苯并[1,3]间二氧杂环戊烯-5-基硫基)-9-苯乙基-9H-嘌呤-6-基胺、8-(苯并[1,3]间二氧杂环戊烯-5-基硫基)-3-苯乙基-3H-嘌呤-6-基胺、8-(苯并[1,3]间二氧杂环戊烯-5-基硫基)-9-(3-苯基-丙基)-9H-嘌呤-6-基胺、8-(苯并[1,3]间二氧杂环戊烯-5-基硫基)-9-[2-(4-硝基-苯基)-乙基]-9H-嘌呤-6-基胺、8-(2,5-二甲氧基-苯基硫基)-9-[2-(4-硝基-苯基)-乙基]-9H-嘌呤-6-基胺、8-(2,5-二甲氧基-苯基硫基)-9-[2-(4-氟-苯基)-乙基]-9H-嘌呤-6-基胺、8-(2,5-二甲氧基-苯基硫基)-3-[2-(4-氟-苯基)-乙基]-3H-嘌呤-6-基胺、8-(苯并[1,3]间二氧杂环戊烯-5-基硫基)-9-[2-(4-氟-苯基)-乙基]-9H-嘌呤-6-基胺、8-(苯并[1,3]间二氧杂环戊烯-5-基硫基)-3-[2-(4-氟-苯基)-乙基]-3H-嘌呤-6-基胺、8-(6-溴-苯并[1,3]间二氧杂环戊烯-5-基硫基)-9-苯乙基-9H-嘌呤-6-基胺、8-(6-溴-苯并[1,3]间二氧杂环戊烯-5-基硫基)-3-苯乙基-3H-嘌呤-6-基胺、8-(2,4-二甲氧基-苯基硫基)-9-苯乙基-9H-嘌呤-6-基胺、8-(2,4-二甲氧基-苯基硫基)-3-苯乙基-3H-嘌呤-6-基胺、8-(4-氯-苯磺酰基)-9-苯乙基-9H-嘌呤-6-基胺、8-(4-氯-苯基硫基)-3-苯乙基-3H-嘌呤-6-基胺、4-(6-氨基-9-苯乙基-9H-嘌呤-8-基硫基)-苯甲腈、4-(6-氨基-3-苯乙基-3H-嘌呤-8-基硫基)-苯甲腈、9-[2-(3,4-二甲氧基-苯基)-乙基]-8-(2,5-二甲氧基-苯基硫

基)-9H-嘌呤-6-基胺、3-[2-(3,4-二甲氧基-苯基)-乙基]-8-(2,5-二甲氧基-苯基硫基)-3H-嘌呤-6-基胺、8-(2,5-二甲氧基-苯基硫基)-9-(2-对甲苯基-乙基)-9H-嘌呤-6-基胺、8-(2,5-二甲氧基-苯基硫基)-3-(2-对甲苯基-乙基)-3H-嘌呤-6-基胺、9-[2-(2-氯-苯基)-乙基]-8-(2,5-二甲氧基-苯基硫基)-9H-嘌呤-6-基胺、3-[2-(2-氯-苯基)-乙基]-8-(2,5-二甲氧基-苯基硫基)-3H-嘌呤-6-基胺、9-[2-(2,4-二氯-苯基)-乙基]-8-(2,5-二甲氧基-苯基硫基)-9H-嘌呤-6-基胺、3-[2-(2,4-二氯-苯基)-乙基]-8-(2,5-二甲氧基-苯基-硫基)-3H-嘌呤-6-基胺、8-(2,5-二甲氧基-苯基硫基)-9-[2-(2-氟-苯基)-乙基]-9H-嘌呤-6-基胺、8-(2,5-二甲氧基-苯基硫基)-3-[2-(2-氟-苯基)-乙基]-3H-嘌呤-6-基胺、9-[2-(4-氯-苯基)-乙基]-8-(3,4,5-三甲氧基-苯基硫基)-9H-嘌呤-6-基胺、3-[2-(4-氯-苯基)-乙基]-8-(3,4,5-三甲氧基-苯基硫基)-3H-嘌呤-6-基胺、8-(-6-碘-苯并[1,3]间二氧杂环戊烯-5-基硫基)-9-苯乙基-9H-嘌呤-6-基胺、8-(6-碘-苯并[1,3]间二氧杂环戊烯-5-基硫基)-3-苯乙基-3H-嘌呤-6-基胺、8-(2,5-二甲氧基-苯基硫基)-9-[2-(3-甲氧基-苯基)-乙基]-9H-嘌呤-6-基胺、8-(2,5-二甲氧基-苯基硫基)-3-[2-(3-甲氧基-苯基)-乙基]-3H-嘌呤-6-基胺、8-(2,5-二甲氧基-苯基硫基)-9-[2-(3-氟-苯基)-乙基]-9H-嘌呤-6-基胺、8-(2,5-二甲氧基-苯基硫基)-3-[2-(3-氟-苯基)-乙基]-3H-嘌呤-6-基胺、8-(6-溴-苯并[1,3]间二氧杂环戊烯-5-基硫基)-9-[2-(4 氯-2-氟苯基)-乙基]-9H-嘌呤-6-基胺、8-(6-溴-苯并[1,3]间二氧杂环戊烯-5-基硫基)-3-[2-(4 氯-2-氟-苯基)-乙基]-3H-嘌呤-6-基胺、8-(6-溴-苯并[1,3]间二氧杂环戊烯-5-基硫基)-9-(2-五氟苯基-乙基)-9H-嘌呤-6-基胺、8-(6-溴-苯并[1,3]间二氧杂环戊烯-5-基硫基)-3-(2-五氟苯基-乙基)-3H-嘌呤-6-基胺、8-(6-溴-苯并[1,3]间二氧杂环戊烯-5-基硫基)-9-(3-苯基-丙基)-9H-嘌呤-6-基胺、8-(6-溴-苯并[1,3]间二氧杂环戊烯-5-基硫基)-3-(3-苯基-丙基)-3H-嘌呤-6-基胺、9-苯乙基-8-(3,4,5-三甲氧基-苯硫基)-9H-嘌呤-6-基胺、3-苯乙基-8-(3,4,5-三甲氧基-苯基硫基)-3H-嘌呤-6-基胺、9-(3-苯基-丙基)-8-(3,4,5-三甲氧基-苯基硫基)-9H-嘌呤-6-基胺、3-(3-苯基-丙基)-8-(3,4,5-三甲氧基-苯基硫基)-3H-嘌呤-6-基胺、8-(苯并[1,3]间二氧杂环戊烯-5-基硫基)-9-(2-吡咯-1-基-乙基)-9H-嘌呤-6-基胺、8-(苯并[1,3]间二氧杂

环戊烯-5-基硫基)-3-(2-吡咯-1-基-乙基)-3H-嘌呤-6-基胺、8-(苯并[1,3]间二氧杂环戊烯-5-基硫基)-9-(3-吡咯-1-基-丙基)-9H-嘌呤-6-基胺、8-(苯并[1,3]间二氧杂环戊烯-5-基硫基)-3-(3-吡咯-1-基-丙基)-3H-嘌呤-6-基胺、8-(6-溴-苯并[1,3]间二氧杂环戊烯-5-基硫基)-9-[2-(2-氯-苯基)-乙基]-9H-嘌呤-6-基胺、8-(6-溴-苯并[1,3]间二氧杂环戊烯-5-基硫基)-3-[2-(2-氯-苯基)-乙基]-3H-嘌呤-6-基胺、8-(2,5-二甲氧基-苯基硫基)-9-[2-(2,4,6-三甲基-苯基)-乙基]-9H-嘌呤-6-基胺、8-(2,5-二甲氧基-苯基硫基)-3-[2-(2,4,6-三甲基-苯基)-乙基]-3H-嘌呤-6-基胺、8-(6-溴-苯并[1,3]间二氧杂环戊烯-5-基硫基)-9-(2-苯基-丁基)-9H-嘌呤-6-基胺、8-(6-溴-苯并[1,3]间二氧杂环戊烯-5-基硫基)-3-(2-苯基-丁基)-3H-嘌呤-6-基胺、8-(6-溴-苯并[1,3]间二氧杂环戊烯-5-基硫基)-9-[1-(4-甲氧基-苯基)-环丙基甲基]-9H-嘌呤-6-基胺、8-(6-溴-苯并[1,3]间二氧杂环戊烯-5-基硫基)-3-[1-(4-甲氧基-苯基)-环丙基甲基]-3H-嘌呤-6-基胺、9-[1-(4-氯-苯基)-环丁基甲基]-8-(2,5-二甲氧基-苯基硫基)-9H-嘌呤-6-基胺、3-[1-(4-氯-苯基)-环丁基甲基]-8-(2,5-二甲氧基-苯基硫基)-3H-嘌呤-6-基胺、1-(4-{2-[6-氨基-8-(2,5-二甲氧基-苯基硫基)-嘌呤-9-基]-乙基}-苯基)-乙酮、1-(4-{2-[6-氨基-8-(2,5-二甲氧基-苯基硫基)-嘌呤-3-基]-乙基}-苯基)-乙酮、8-(2,5-二甲氧基-苯基硫基)-9-(2-吡咯-1-基-乙基)-9H-嘌呤-6-基胺、8-(2,5-二甲氧基-苯基硫基)-3-(2-吡咯-1-基-乙基)-3H-嘌呤-6-基胺、8-(2,5-二甲氧基-苯基硫基)-9-(2-萘-1-基-乙基)-9H-嘌呤-6-基胺、8-(2,5-二甲氧基-苯基硫基)-3-(2-萘-1-基-乙基)-3H-嘌呤-6-基胺、8-(2,5-二甲氧基-苯基硫基)-9-(2-邻甲苯基-乙基)-9H-嘌呤-6-基胺,8-(2,5-二甲氧基-苯基硫基)-3-(2-邻甲苯基-乙基)-3H-嘌呤-6-基胺、9-[2-(4-溴-苯基)-乙基]-8-(2,5-二甲氧基-苯基硫基)-9H-嘌呤-6-基胺、3-[2-(4-溴-苯基)-乙基]-8-(2,5-二甲氧基-苯基硫基)-3H-嘌呤-6-基胺、9-[2-(2,3-二氯-苯基)-乙基]-8-(2,5-二甲氧基-苯基硫基)-9H-嘌呤-6-基胺、3-[2-(2,3-二氯-苯基)-乙基]-8-(2,5-二甲氧基-苯基硫基)-3H-嘌呤-6-基胺、4-{2-[6-氨基-8-(2,5-二甲氧基-苯基硫基)-嘌呤-9-基]-乙基}-苯酚、4-{2-[6-氨基-8-(2,5-二甲氧基-苯基硫基)-嘌呤-9-基]-乙基}-苯酚、8-(2,5-二甲氧基-苯基硫基)-9-[2-(3-三氟甲基-苯基)-乙基]-9H-嘌呤-6-基

胺、8-(2,5-二甲氧基-苯基硫基)-3-[2-(3-三氟甲基-苯基)-乙基]-3H-嘌呤-6-基胺、4-{2-[6-氨基-8-(2,5-二甲氧基-苯基硫基)-嘌呤-9-基]-乙基}-苯甲酸、4-{2-[6-氨基-8-(2,5-二甲氧基-苯基硫基)-嘌呤-3-基]-乙基}-苯甲酸、8-(2,5-二甲氧基-苯基硫基)-3-(4-氟-苄基)-3H-嘌呤-6-基胺、8-(2,5-二甲氧基-苯基硫基)-9-(4-硝基-苄基)-9H-嘌呤-6-基胺、8-(2,5-二甲氧基-苯基硫基)-9-[2-(2-甲氧基-苯基)-乙基]-9H-嘌呤-6-基胺、8-(2,5-二甲氧基-苯基硫基)-3-[2-(2-甲氧基-苯基)-乙基]-3H-嘌呤-6-基胺、8-(2,5-二甲氧基-苯基硫基)-9-(2-苯基-丁基)-9H-嘌呤-6-基胺、8-(2,5-二甲氧基-苯基硫基)-3-(2-苯基)-丁基)-3H-嘌呤-6-基胺、8-(2,5-二甲氧基-苯基硫基)-9-[2-(3,4,5-三甲氧基-苯基)-乙基]-9H-嘌呤-6-基胺、8-(2,5-二甲氧基-苯基硫基)-3-[2-(3,4,5-三甲氧基-苯基)-乙基]-3H-嘌呤-6-基胺、8-(6-溴-苯并[1,3]间二氧杂环戊烯-5-基硫基)-9-[2-(3,4,5-三甲氧基-苯基)-乙基]-9H-嘌呤-6-基胺、8-(6-溴-苯并[1,3]间二氧杂环戊烯-5-基硫基)-3-[2-(3,4,5-三甲氧基-苯基)-乙基]-3H-嘌呤-6-基胺、8-(6-溴-苯并[1,3]间二氧杂环戊烯-5-基硫基)-9-[2-(2,4,6-三甲基-苯基)-乙基]-9H-嘌呤-6-基胺、8-(6-溴-苯并[1,3]间二氧杂环戊烯-5-基硫基)-3-[2-(2,4,6-三甲基-苯基)-乙基]-3H-嘌呤-6-基胺、8-(6-溴-苯并[1,3]间二氧杂环戊烯-5-基硫基)-9-[1-(4-氯-苯基)-环丁基甲基]-9H-嘌呤-6-基胺、8-(6-溴-苯并[1,3]间二氧杂环戊烯-5-基硫基)-3-[1-(4-氯-苯基)-环丁基甲基]-3H-嘌呤-6-基胺、9-[2-(4-氯-2-氟-苯基)-乙基]-8-(2,5-二甲氧基-苯基硫基)-9H-嘌呤-6-基胺、3-[2-(4-氯-2-氟-苯基)-乙基]-8-(2,5-二甲氧基-苯基硫基)-3H-嘌呤-6-基胺、8-(6-溴-苯并[1,3]间二氧杂环戊烯-5-基硫基)-9-(3-甲基-2-苯基-戊基)-9H-嘌呤-6-基胺、8-(6-溴-苯并[1,3]间二氧杂环戊烯-5-基硫基)-3-(3-甲基-2-苯基-戊基)-3H-嘌呤-6-基胺、8-(6-溴-苯并[1,3]间二氧杂环戊烯-5-基硫基)-9-(2-环戊基-2-苯基-乙基)-9H-嘌呤-6-基胺、8-(6-溴-苯并[1,3]间二氧杂环戊烯-5-基硫基)-3-(2-环戊基-2-苯基-乙基)-3H-嘌呤-6-基胺、9-(2-环戊基-2-苯基-乙基)-8-(2,5-二甲氧基-苯基硫基)-9H-嘌呤-6-基胺、3-(2-环戊基-2-苯基-乙基)-8-(2,5-二甲氧基-苯基硫基)-3H-嘌呤-6-基胺、8-(2,5-二甲氧基-苯基硫基)-9-(3-甲基-2-苯基-戊基)-9H-嘌呤-6-基胺、8-(2,5-二甲氧基-苯基

硫基)-3-(3-甲基-2-苯基-戊基)-3H-嘌呤-6-基胺、2-[6-氨基-8-(2,5-二甲氧基-苯基硫基)-嘌呤-9-基]-1-(2,4-二氯-苯基)乙醇、2-[6-氨基-8-(2,5-二甲氧基-苯基硫基)-嘌呤-3-基]-1-(2,4-二氯-苯基)乙醇、8-(6-溴-苯并[1,3]间二氧杂环戊烯-5-基硫基)-9-[2-(3-氟-苯基)-乙基]-9H-嘌呤-6-基胺、8-(6-溴-苯并[1,3]间二氧杂环戊烯-5-基硫基)-3-[2-(3-氟-苯基)-乙基]-3H-嘌呤-6-基胺、8-(2,5-二甲氧基-苯基硫基)-9-[2-(3-乙氧基-4-甲氧基-苯基)-乙基]-9H-嘌呤-6-基胺、8-(2,5-二甲氧基-苯基硫基)-3-[2-(3-乙氧基-4-甲氧基-苯基)-乙基]-3H-嘌呤-6-基胺、8-(2,5-二甲氧基-苯基硫基)-9-(3-甲基-2-苯基-丁基)-9H-嘌呤-6-基胺、8-(2,5-二甲氧基-苯基硫基)-3-(3-甲基-2-苯基-丁基)-3H-嘌呤-6-基胺、8-(2,5-二甲氧基-苯基硫基)-9-[2-(2,5-二甲基-苯基)-乙基]-9H-嘌呤-6-基胺、8-(2,5-二甲氧基-苯基硫基)-3-[2-(2,5-二甲基-苯基)-乙基]-3H-嘌呤-6-基胺、8-(6-溴-苯并[1,3]间二氧杂环戊烯-5-基硫基)-9-[2-(3-乙氧基-4-甲氧基-苯基)-乙基]-9H-嘌呤-6-基胺、8-(6-溴-苯并[1,3]间二氧杂环戊烯-5-基硫基)-3-[2-(3-乙氧基-4-甲氧基-苯基)-乙基]-3H-嘌呤-6-基胺、9-[2-(4-氯-苯基)-3-甲基-丁基]-8-(2,5-二甲氧基-苯基硫基)-9H-嘌呤-6-基胺、3-[2-(4-氯-苯基)-3-甲基-丁基]-8-(2,5-二甲氧基-苯基硫基)-3H-嘌呤-6-基胺、9-[2-(2,4-二氟-苯基)-乙基]-8-(2,5-二甲氧基-苯基硫基)-9H-嘌呤-6-基胺、9-[2-(2-氯-6-氟-苯基)-乙基]-8-(2,5-二甲氧基-苯基硫基)-9H-嘌呤-6-基胺、3-[2-(2-氯-6-氟-苯基)-乙基]-8-(2,5-二甲氧基-苯基硫基)-3H-嘌呤-6-基胺、8-(6-溴-苯并[1,3]间二氧杂环戊烯-5-基硫基)-9-[2-(2,5-二甲基-苯基)-乙基]-9H-嘌呤-6-基胺、8-(6-溴-苯并[1,3]间二氧杂环戊烯-5-基硫基)-3-[2-(2,5-二甲基-苯基)-乙基]-3H-嘌呤-6-基胺、8-(6-溴-苯并[1,3]间二氧杂环戊烯-5-基硫基)-9-(3-甲基-2-苯基-丁基)-9H-嘌呤-6-基胺、8-(6-溴-苯并[1,3]间二氧杂环戊烯-5-基硫基)-3-(3-甲基-2-苯基-丁基)-3H-嘌呤-6-基胺、8-(2,5-二甲氧基-苯基硫基)-9-[2-(3,5-二甲基-苯基)-乙基]-9H-嘌呤-6-基胺、8-(2,5-二甲氧基-苯基硫基)-3-[2-(3,5-二甲基-苯基)-乙基]-3H-嘌呤-6-基胺、8-(2,5-二甲氧基-苯基硫基)-9-(2-吡啶-4-基-乙基)-9H-嘌呤-6-基胺、8-(2,5-二甲氧基-苯基硫基)-9-(2-吡啶-2-基-乙基)-9H-嘌呤-6-基胺、8-(2,5-二甲氧基-苯基硫基)-3-(2-

吡啶-2-基-乙基)-3H-嘌呤-6-基胺、8-(2,5-二甲氧基-苯基硫基)-9-[2-(3-碘-苯基)-乙基]-9H-嘌呤-6-基胺、8-(2,5-二甲氧基-苯基硫基)-3-[2-(3-碘-苯基)-乙基]-3H-嘌呤-6-基胺、9-[2-(2-氯-4-氟-苯基)-乙基]-8-(2,5-二甲氧基-苯基硫基)-9H-嘌呤-6-基胺、3-[2-(2-氯-4-氟-苯基)-乙基]-8-(2,5-二甲氧基-苯基硫基)-3H-嘌呤-6-基胺、9-[2-(2-溴-苯基)-乙基]-8-(2,5-二甲氧基-苯基硫基)-9H-嘌呤-6-基胺、3-[2-(2-溴-苯基)-乙基]-8-(2,5-二甲氧基-苯基硫基)-3H-嘌呤-6-基胺、9-[2-(3,5-二氟-苯基)-乙基]-8-(2,5-二甲氧基-苯基硫基)-9H-嘌呤-6-基胺、3-[2-(3,5-二氟-苯基)-乙基]-8-(2,5-二甲氧基-苯基硫基)-3H-嘌呤-6-基胺、9-[2-(2,3-二氟-苯基)-乙基]-8-(2,5-二甲氧基-苯基硫基)-9H-嘌呤-6-基胺、3-[2-(2,3-二氟-苯基)-乙基]-8-(2,5-二甲氧基-苯基硫基)-3H-嘌呤-6-基胺、8-(6-溴-1,3-苯并间二氧杂环戊烯-5-基硫基)-9-[2-(2-氟-苯基)-乙基]-9H-嘌呤-6-基胺、8-(6-溴-苯并[1,3]间二氧杂环戊烯-5-基硫基)-3-[2-(2-氟-苯基)-乙基]-3H-嘌呤-6-基胺、8-(6-溴-苯并[1,3]间二氧杂环戊烯-5-基硫基)-9-[2-(2-溴-苯基)-乙基]-9H-嘌呤-6-基胺、8-(6-溴-苯并[1,3]间二氧杂环戊烯-5-基硫基)-3-[2-(2-溴-苯基)-乙基]-3H-嘌呤-6-基胺、8-(6-溴-苯并[1,3]间二氧杂环戊烯-5-基硫基)-9-(2-吡啶-3-基-乙基)-9H-嘌呤-6-基胺、8-(6-溴-苯并[1,3]间二氧杂环戊烯-5-基硫基)-3-(2-吡啶-3-基-乙基)-3H-嘌呤-6-基胺、8-(6-溴-苯并[1,3]间二氧杂环戊烯-5-基硫基)-9-[2-(3-碘-苯基)-乙基]-9H-嘌呤-6-基胺、8-(6-溴-苯并[1,3]间二氧杂环戊烯-5-基硫基)-3-[2-(3-碘-苯基)-乙基]-3H-嘌呤-6-基胺、8-(6-溴-苯并[1,3]间二氧杂环戊烯-5-基硫基)-9-(2-邻甲苯基-乙基)-9H-嘌呤-6-基胺、8-(6-溴-苯并[1,3]间二氧杂环戊烯-5-基硫基)-3-(2-邻甲苯基-乙基)-3H-嘌呤-6-基胺、8-(6-溴-苯并[1,3]间二氧杂环戊烯-5-基硫基)-9-(2-萘-1-基-乙基)-9H-嘌呤-6-基胺、8-(6-溴-苯并[1,3]间二氧杂环戊烯-5-基硫基)-3-(2-萘-1-基-乙基)-3H-嘌呤-6-基胺、1-(4-{2-[6-氨基-8-(6-溴-苯并[1,3]间二氧杂环戊烯-5-基硫基)-嘌呤-9-基]-乙基}-苯基)-乙酮、1-(4-{2-[6-氨基-8-(6-溴-苯并[1,3]间二氧杂环戊烯-5-基硫基)-嘌呤-3-基]-乙基}-苯基)-乙酮、8-(6-溴-苯并[1,3]间二氧杂环戊烯-5-基硫基)-9-[2-(2,3-二氟-苯基)-乙基]-9H-嘌呤-6-基胺、8-(6-溴-1,3-苯并[1,3]间二氧杂环戊烯

-5-基硫基)-3-[2-(2,3-二氟-苯基)-乙基]-3H-嘌呤-6-基胺、8-(6-溴-苯并[1,3]间二氧杂环戊烯-5-基硫基)-9-(2-对甲苯基-乙基)-9H-嘌呤-6-基胺、8-(6-溴-苯并[1,3]间二氧杂环戊烯-5-基硫基)-3-(2-对甲苯基-乙基)-3H-嘌呤-6-基胺、8-(6-溴-苯并[1,3]间二氧杂环戊烯-5-基硫基)-9-[2-(3-三氟甲基-苯基)-乙基]-9H-嘌呤-6-基胺、8-(6-溴-苯并[1,3]间二氧杂环戊烯-5-基硫基)-3-[2-(3-三氟甲基-苯基)-乙基]-3H-嘌呤-6-基胺、9-(2-苯并[1,3]间二氧杂环戊烯-5-基-乙基)-8-(2,5-二甲氧基-苯基硫基)-9H-嘌呤-6-基胺、3-(2-苯并[1,3]间二氧杂环戊烯-5-基-乙基)-8-(2,5-二甲氧基-苯基硫基)-3H-嘌呤-6-基胺、9-(2-环己基-乙基)-8-(2,5-二甲氧基苯基-硫基)-9H-嘌呤-6-基胺、3-(2-环己基-乙基)-8-(2,5-二甲氧基-苯基硫基)-3H-嘌呤-6-基胺、9-(2-联苯-4-基-乙基)-8-(6-溴-苯并[1,3]间二氧杂环戊烯-5-基硫基)-9H-嘌呤-6-基胺、3-(2-联苯-4-基-乙基)-8-(6-溴-苯并[1,3]间二氧杂环戊烯-5-基硫基)-3H-嘌呤-6-基胺、4-{2-[6-氨基-8-(2,5-二甲氧基-苯基硫基)-嘌呤-9-基]-乙基}-苯磺酸、4-{2-[6-氨基-8-(2,5-二甲氧基-苯基硫基)-嘌呤-3-基]-乙基}-苯磺酸、2-[6-氨基-8-(6-溴-苯并[1,3]间二氧杂环戊烯-5-基硫基)-嘌呤-9-基]-1-(2,4-二氯-苯基)-乙醇、2-[6-氨基-8-(6-溴-苯并[1,3]间二氧杂环戊烯-5-基硫基)-嘌呤-3-基]-1-(2,4-二氯-苯基)-乙醇、9-(2-环己基-2-苯基-乙基)-8-(2,5-二甲氧基-苯基硫基)-9H-嘌呤-6-基胺、3-(2-环己基-2-苯基-乙基)-8-(2 5-二甲氧基-苯基硫基)-3H-嘌呤-6-基胺、9-(2-联苯-4-基-乙基)-8-(2,5-二甲氧基-苯基硫基)-9H-嘌呤-6-基胺、3-(2-联苯-4-基-乙基)-8-(2,5-二甲氧基-苯基硫基)-3H-嘌呤-6-基胺、8-(2,5-二甲氧基-苯基硫基)-9-[2-(2-三氟甲基-苯基)-乙基]-9H-嘌呤-6-基胺、8-(2,5-二甲氧基-苯基硫基)-3-[2-(2-三氟甲基-苯基)-乙基]-3H-嘌呤-6-基胺、8-(2,5-二甲氧基-苯基硫基)-9-[2-(4-二甲基氨基-苯基)-乙基]-9H-嘌呤-6-基胺、8-(2,5-二甲氧基-苯基硫基)-3-[2-(4-二甲基氨基-苯基)-乙基]-3H-嘌呤-6-基胺、8-(6-溴-苯并[1,3]间二氧杂环戊烯-5-基硫基)-9-[2-(4-二甲基氨基-苯基)-乙基]-9H-嘌呤-6-基胺、8-(6-溴-苯并[1,3]间二氧杂环戊烯-5-基硫基)-3-[2-(4-二甲基氨基-苯基)-乙基]-3H-嘌呤-6-基胺、8-(2,5-二乙氧基-苯基硫基)-9-苯乙基-9H-嘌呤-6-基胺、8-(2,5-二乙氧基-苯基硫基)-3-苯乙基-3H-嘌呤-6-基胺、9-[2-(2-氯-苯基)-

乙基]-8-(2,5-二乙氧基-苯基硫基)-9H-嘌呤-6-基胺、3-[2-(2-氯-苯基)-乙基]-8-(2,5-二乙氧基-苯基硫基)-3H-嘌呤-6-基胺、9-[2-(3,5-二甲氧基-苯基)-乙基]-8-(2,5-二甲氧基-苯基硫基)-9H-嘌呤-6-基胺、3-[2-(3,5-二甲氧基-苯基)-乙基]-8-(2,5-二甲氧基-苯基硫基)-3H-嘌呤-6-基胺、8-(6-溴-苯并[1,3]间二氧杂环戊烯-5-基硫基)-9-[2-(3,5-二甲氧基-苯基)-乙基]-9H-嘌呤-6-基胺、8-(6-溴-苯并[1,3]间二氧杂环戊烯-5-基硫基)-3-[2-(3,5-二甲氧基-苯基)-乙基]-3H-嘌呤-6-基胺、8-(2,5-二甲氧基-苯基硫基)-9-(2-噻吩-3-基-乙基)-9H-嘌呤-6-基胺、8-(2,5-二甲氧基-苯基硫基)-3-(2-噻吩-3-基-乙基)-3H-嘌呤-6-基胺、8-(2,5-二甲氧基-苯基硫基)-9-2-噻吩-2-基-乙基)-9H-嘌呤-6-基胺、8-(2,5-二甲氧基-苯基硫基)-3-(2-噻吩-2-基-乙基)-3H-嘌呤-6-基胺、8-(6-溴-苯并[1,3]间二氧杂环戊烯-5-基硫基)-9-(2-噻吩-3-基-乙基)-9H-嘌呤-6-基胺、8-(6-溴-苯并[1,3]间二氧杂环戊烯-5-基硫基)-3-(2-噻吩-3-基-乙基)-3H-嘌呤-6-基胺、8-(6-溴-苯并[1,3]间二氧杂环戊烯-5-基硫基)-9-(2-噻吩-2-基-乙基)-9H-嘌呤-6-基胺、8-(6-溴-苯并[1,3]间二氧杂环戊烯-5-基硫基)-3-(2-噻吩-2-基-乙基)-3H-嘌呤-6-基胺、8-(2,5-二甲氧基-苯基硫基)-9-[2-(2-硝基-苯基)-乙基]-9H-嘌呤-6-基胺、8-(2,5-二甲氧基-苯基硫基)-3-[2-(2-硝基-苯基)-乙基]-3H-嘌呤-6-基胺、8-(2,5-二甲氧基-苯基硫基)-9-[2-(2-硝基-苯基)-乙基]-9H-嘌呤-6-基胺、8-(2,5-二甲氧基-苯基硫基)-3-[2-(2-硝基-苯基)-乙基]-3H-嘌呤-6-基胺、8-(6-溴-苯并[1,3]间二氧杂环戊烯-5-基甲基)-9-苯乙基-9H-嘌呤-6-基胺、8-(6-溴-苯并[1,3]间二氧杂环戊烯-5-基甲基)-3-苯乙基-3H-嘌呤-6-基胺、(4-{2-[6-氨基-8-(6-溴-苯并[1,3]间二氧杂环戊烯-5-基硫基)-嘌呤-9-基]-乙基}-苯基)氨基甲酸叔丁酯、(4-{2-[6-氨基-8-(6-溴-苯并[1,3]间二氧杂环戊烯-5-基硫基)-嘌呤-3-基]-乙基}-苯基)氨基甲酸叔丁酯、9-[2-(4-氨基-苯基)-乙基]-8-(6-溴-苯并[1,3]间二氧杂环戊烯-5-基硫基)-9H-嘌呤-6-基胺、(4-{2-[6-氨基-8-(2,5-二甲氧基-苯基硫基)-嘌呤-9-基]-乙基}-苯基)-氨基甲酸叔丁酯、(4-{2-[6-氨基-8-(2,5-二甲氧基-苯基硫基)-嘌呤-3-基]-乙基}-苯基)-氨基甲酸叔丁酯、9-[2-(4-氨基-苯基)-乙基]-8-(2,5-二甲氧基-苯基硫基)-9H-嘌呤-6-基胺、8-(2,5-二甲氧基-苯基硫基)-9-[2-(3-三氟甲氧基-苯基)-乙

基]-9H-嘌呤-6-基胺、8-(2,5-二甲氧基-苯基硫基)-9-(2-五氟苯基-乙基)-9H-嘌呤-6-基胺、9-[2-(3,5-双三氟甲基-苯基)-乙基]-8-(2,5-二甲氧基-苯基硫基)-9H-嘌呤-6-基胺、9-[2-(3,5-双三氟甲基-苯基)-乙基]-8-(6-溴-苯并[1,3]间二氧杂环戊烯-5-基硫基)-9H-嘌呤-6-基胺、8-(6-溴-苯并[1,3]间二氧杂环戊烯-5-基硫基)-9-[1-(4-氯-苯基)-环丙基甲基]-9H-嘌呤-6-基胺、8-(6-溴-苯并[1,3]间二氧杂环戊烯-5-基硫基)-3-[2-(3-硝基-苯基)-乙基]-3H-嘌呤-6-基胺、8-(2,5-二甲氧基-苯基硫基)-9-[2-(3-硝基-苯基)-乙基]-9H-嘌呤-6-基胺、8-(苯并[1,3]间二氧杂环戊烯-5-基硫基)-9-苯乙基-1,9-二氢-嘌呤-6-酮及 8-(6-溴-苯并[1,3]间二氧杂环戊烯-5-基硫基)-9-苯乙基-1,9-二氢-嘌呤-6-酮。

治疗性化合物及其在癌症中的用途

相关申请的相互参引

本申请要求2006年5月12日提交的申请号为60/799,874的美国临时申请、2006年8月11日提交的申请号为60/822,159的美国临时申请、2006年11月9日提交的申请号为60/865,140的美国临时申请及2007年1月5日提交的申请号为60/883,707的美国临时申请的优先权，其中每项申请的全部内容通过引证的方式纳入本说明书。

有关联邦政府资助的研究或开发的声明

无

技术领域

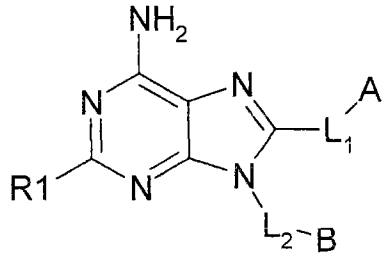
本发明涉及新的化合物及其治疗疾病的用途。

背景技术

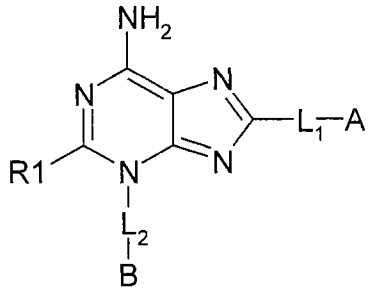
癌症是高发的：在美国活到70岁以上的老人中女性出现浸润癌的概率为38%，男性为46%。在2006年将新增约140万的癌症病例。虽然癌症五年存活率从19世纪70年代中期的约50%提高至现在的65%，但癌症仍是致死性的。预计在2006年将有565,000个美国人死于癌症。(American Cancer Society, Surveillance Research, 2006)。虽然对于各种癌症有多种疗法，但是实际情况仍然是多数癌症仍是无法治愈的、不能治疗的以及/或者对标准疗法变得耐受。因此，需要新的癌症疗法。

发明内容

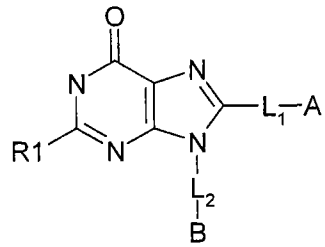
本发明涉及以下式I-Ⅲ的化合物。本发明还涉及含有一种或多种式I-Ⅲ的化合物及可药用的赋形剂的药物组合物。本发明人发现，式I-Ⅲ的化合物具有药理学活性。发现所述式I-Ⅲ的化合物的一种特定活性为抗癌活性。



式 I



式 II



式 III

本发明提供式 I 的化合物，其中：

A 选自被取代的或未被取代的芳基、杂芳基、杂环或碳环基团；

B 选自被取代的或未被取代的芳基、杂芳基、杂环或碳环基团；

R1 选自氢、烷基、芳基、杂芳基、氨基、卤素、硫及硫代烷基；

L_1 可以是饱和的、部分饱和的或不饱和的，并且选自 $-(CH_2)_n-(CH_2)_n-$、$-(CH_2)_nC(=O)(CH_2)_n-$、$-(CH_2)_nC(=O)N(CH_2)_n-$、$-(CH_2)_nNC(=O)O(CH_2)_n-$、$-(CH_2)_nNC(=O)N(CH_2)_n-$、$-(CH_2)_nNC(=S)S(CH_2)_n-$、$-(CH_2)_nOC(=O)S(CH_2)_n-$、$-(CH_2)_nNH(CH_2)_n-$、$-(CH_2)_nO(CH_2)_n-$、$-(CH_2)_nS(CH_2)_n-$ 及 $-(CH_2)_nNC(=S)N(CH_2)_n-$，其中各个 n 独立地选自 0、1、2、3、4、5、6、7 和 8，并且其中各个碳和/或氮可任选被一个或多个独立地选自羟基、卤素、烷氧基、烷基、氨基、环烷基、$-NR_2R_3$、$-NSO_2R_4$、$-NC(=O)NR_2R_3$、杂芳基、芳基、环烷基及杂环的取代基取代；其中 $-R_2$ 和 $-R_3$ 独立地选自

-H、烷基及-C(=O)OR_4；并且其中 R_4 为烷基（例如甲基、乙基、丙基、异丙基、丁基、异丁基或叔丁基）；

L_2 可以是饱和的、部分饱和的或不饱和的，并且选自$-(CH_2)_n-(CH_2)_n-$、$-(CH_2)_nC(=O)(CH_2)_n-$、$-(CH_2)_nC(=O)N(CH_2)_n-$、$-(CH_2)_nNC(=O)O(CH_2)_n-$、$-(CH_2)_nNC(=O)N(CH_2)_n-$、$-(CH_2)_nNC(=S)S(CH_2)_n-$、$-(CH_2)_nOC(=O)S(CH_2)_n-$、$-(CH_2)_nNH(CH_2)_n-$、$-(CH_2)_nO(CH_2)_n-$、$-(CH_2)_nS(CH_2)_n-$及$-(CH_2)_nNC(=S)N(CH_2)_n-$，其中各个 n 独立地选自 0、1、2、3、4、5、6、7 和 8，并且其中各个碳和/或氮可任选被一个或多个独立地选自羟基、卤素、烷氧基、烷基、氨基、环烷基、$-NR_2R_3$、$-NSO_2R_4$、$-NC(=O)NR_2R_3$、杂芳基、芳基、环烷基及杂环的取代基取代；其中$-R_2$和$-R_3$独立地选自-H、烷基及-C(=O)OR_4；并且其中 R_4 为烷基（例如甲基、乙基、丙基、异丙基、丁基、异丁基或叔丁基）。

除非另外指出，L_1 和 L_2 可以为两种取向中的任一种，例如，$-(CH_2)_nNC(=S)S(CH_2)_n-$指噁唑$-(CH_2)_nNC(=S)S(CH_2)_n-$苯基取向和噁唑$-(CH_2)_nSC(=S)N(CH_2)_n-$苯基取向。

根据一个方面，A 为具有一个或多个选自卤素、烷基、烷氧基、卤代烷基、卤代烷氧基、硝基、-C(=O)烷基、羟基、$-C\equiv N$、$-SO_3$及-COOH的取代基的芳基。在本发明的一个更具体的方面，A 为具有一个或多个选自卤素、烷基、烷氧基、卤代烷基、卤代烷氧基、硝基、-C(=O)烷基、羟基及-COOH 的取代基的苯基。在一个甚至更具体的方面，A 为具有一个或多个选自-F、-Cl、-Br、-I、$-OCH_3$、$-CF_3$、$-CH_3$、$-OCF_3$、$-C(=O)CH_3$、-COOH、$-C\equiv N$及$-NO_2$的取代基的苯基。

在本发明化合物的一个方面，A 为具有一个或多个选自羟基、卤素、烷基、烷氧基、卤代烷基、卤代烷氧基、$-N(C_{1-3}烷基)_2$、$-NH(C_{1-3}烷基)$、$-C(=O)NH_2$、$-C(=O)NH(C_{1-3}烷基)$、$-C(=O)N(C_{1-3}烷基)_2$、$-S(=O)_2(C_{1-3}烷基)$、$-S(=O)_2NH_2$、$-S(=O)_2N(C_{1-3}烷基)_2$、$-S(=O)_2NH(C_{1-3}烷基)$、$-CHF_2$、$-OCF_3$、$-OCHF_2$、$-SCF_3$、$-CF_3$、-CN、$-NH_2$及$-NO_2$的取代基的芳基。在一个具体的方面，A 为苯基。

在本发明化合物的一个方面，A 为具有 1-5 个独立地选自酰氨基、酰氧基、烯基、烷氧基、烷基、烷硫基、炔基、氨基、芳基、芳烷基、芳烯基、芳炔基、芳烷氧基、芳氧基、芳硫基、碳环、氰基、氰氧基、卤素、卤代烷基、卤代苯基、羟基、杂芳基、杂芳氧基、杂环、杂芳烷

氧基、异氰酸根合、异硫氰酸根合、硝基、亚硫酰基、磺酰基、氨磺酰基、硫代羰基、氰硫基、三卤代甲磺酰氨基(trihalomethanesulfonamido)、O-氨基甲酰基、N-氨基甲酰基、O-硫代氨基甲酰基、N-硫代氨基甲酰基及C-酰氨基的取代基的苯基。

根据本发明化合物的一个方面，B为具有一个或多个选自卤素、烷基、烷氧基、卤代烷基、卤代烷氧基、硝基、-C(=O)烷基、羟基、$-SO_3$及-COOH的取代基的芳基。在一个具体的方面，B为苯基。在一个更具体的方面，B为具有一个或多个选自卤素、烷基、烷氧基、卤代烷基、卤代烷氧基、硝基、-C(=O)烷基、羟基及-COOH的取代基的苯基。在一个甚至更具体的方面，B为具有一个或多个选自-F、-Cl、-Br、-I、$-CH_3$、$-OCH_3$、$-CF_3$、$-OCF_3$、$-C(=O)CH_3$、-COOH、-C≡N及$-NO_2$的取代基的苯基。

在本发明化合物的一个方面，B为具有一个或多个选自羟基、卤素、烷基、烷氧基、卤代烷基、卤代烷氧基、$-N(C_{1-3}烷基)_2$、$-NH(C_{1-3}烷基)$、$-C(=O)NH_2$、$-C(=O)NH(C_{1-3}烷基)$、$-C(=O)N(C_{1-3}烷基)_2$、$-S(=O)_2(C_{1-3}烷基)$、$-S(=O)_2NH_2$、$-S(=O)_2N(C_{1-3}烷基)_2$、$-S(=O)_2NH(C_{1-3}烷基)$、$-CHF_2$、$-OCF_3$、$-OCHF_2$、$-SCF_3$、$-CF_3$、-CN、$-NH_2$、$-SO_3$及$-NO_2$的取代基的芳基。

在本发明化合物的一个方面，B为具有1-5个独立地选自酰氨基、酰氧基、烯基、烷氧基、烷基、烷硫基、炔基、氨基、芳基、芳烷基、芳烯基、芳炔基、芳烷氧基、芳氧基、芳硫基、碳环、氰基、氰氧基、卤素、卤代烷基、卤代苯基、羟基、杂芳基、杂芳氧基、杂环、杂芳烷氧基、异氰酸根合、异硫氰酸根合、硝基、亚硫酰基、磺酰基、氨磺酰基、硫代羰基、氰硫基、三卤代甲磺酰氨基、O-氨基甲酰基、N-氨基甲酰基、O-硫代氨基甲酰基、N-硫代氨基甲酰基及C-酰氨基的取代基的苯基。

根据一个实施方案，A为被取代的或未被取代的苯并[1,3]间二氧杂环戊烯基团。在该实施方案的一个方面，A为6-溴-苯并[1,3]间二氧杂环戊烯-5-基。在该实施方案的一个方面，A为未被取代的苯并[1,3]间二氧杂环戊烯基团。在该实施方案的一个方面，A为6-碘-苯并[1,3]间二氧杂环戊烯-5-基。在该实施方案的一个方面，A为6-氯-苯并[1,3]间二氧杂环戊烯-5-基。在该实施方案的一个方面，A为6-氟-苯并[1,3]间二氧杂环戊烯-5-基。在该实施方案的一个方面，A具有1-5个独立地选自酰氨基、酰氧基、烯基、烷氧基、烷基、烷硫基、炔基、氨基、

芳基、芳烷基、芳烯基、芳炔基、芳烷氧基、芳氧基、芳硫基、碳环、氰基、氰氧基、卤素、卤代烷基、卤代苯基、羟基、杂芳基、杂芳氧基、杂环、杂芳烷氧基、异氰酸根合、异硫氰酸根合、硝基、亚硫酰基、磺酰基、氨磺酰基、硫代羰基、氰硫基、三卤代甲磺酰氨基、O-氨基甲酰基、N-氨基甲酰基、O-硫代氨基甲酰基、N-硫代氨基甲酰基及C-酰氨基的取代基。

根据一个实施方案，A为被取代的或未被取代的2，3-二氢-1-茚酮基团。在该实施方案的一个方面，A具有1-5个独立地选自酰氨基、酰氧基、烯基、烷氧基、烷基、烷硫基、炔基、氨基、芳基、芳烷基、芳烯基、芳炔基、芳烷氧基、芳氧基、芳硫基、碳环、氰基、氰氧基、卤素、卤代烷基、卤代苯基、羟基、杂芳基、杂芳氧基、杂环、杂芳烷氧基、异氰酸根合、异硫氰酸根合、硝基、亚硫酰基、磺酰基、氨磺酰基、硫代羰基、氰硫基、三卤代甲磺酰氨基、O-氨基甲酰基、N-氨基甲酰基、O-硫代氨硫代氨基甲酰基、N-硫代氨硫代氨基甲酰基及C-酰氨基的取代基。

根据一个实施方案，A为被取代的或未被取代的1，2-二氢化茚基团。在该实施方案的一个方面，A具有1-5个独立地选自酰氨基、酰氧基、烯基、烷氧基、烷基、烷硫基、炔基、氨基、芳基、芳烷基、芳烯基、芳炔基、芳烷氧基、芳氧基、芳硫基、碳环、氰基、氰氧基、卤素、卤代烷基、卤代苯基、羟基、杂芳基、杂芳氧基、杂环、杂芳烷氧基、异氰酸根合、异硫氰酸根合、硝基、亚硫酰基、磺酰基、氨磺酰基、硫代羰基、氰硫基、三卤代甲磺酰氨基、O-氨基甲酰基、N-氨基甲酰基、O-硫代氨基甲酰基、N-硫代氨基甲酰基及C-酰氨基的取代基。

根据一个实施方案，A为被取代的或未被取代的苯并[1,4]二噁烷基团。在该实施方案的一个方面，A具有1-5个独立地选自酰氨基、酰氧基、烯基、烷氧基、烷基、烷硫基、炔基、氨基、芳基、芳烷基、芳烯基、芳炔基、芳烷氧基、芳氧基、芳硫基、碳环、氰基、氰氧基、卤素、卤代烷基、卤代苯基、羟基、杂芳基、杂芳氧基、杂环、杂芳烷氧基、异氰酸根合、异硫氰酸根合、硝基、亚硫酰基、磺酰基、氨磺酰基、硫代羰基、氰硫基、三卤代甲磺酰氨基、O-氨基甲酰基、N-氨基甲酰基、O-硫代氨基甲酰基、N-硫代氨基甲酰基及C-酰氨基的取代基。

根据一个实施方案，A为被取代的或未被取代的苯并噁嗪酮基团。

在该实施方案的一个方面，A 具有 1-5 个独立地选自酰氨基、酰氧基、烯基、烷氧基、烷基、烷硫基、炔基、氨基、芳基、芳烷基、芳烯基、芳炔基、芳烷氧基、芳氧基、芳硫基、碳环、氰基、氰氧基、卤素、卤代烷基、卤代苯基、羟基、杂芳基、杂芳氧基、杂环、杂芳烷氧基、异氰酸根合、异硫氰酸根合、硝基、亚硫酰基、磺酰基、氨磺酰基、硫代羰基、氰硫基、三卤代甲磺酰氨基、O-氨基甲酰基、N-氨基甲酰基、O-硫代氨基甲酰基、N-硫代氨基甲酰基及 C-酰氨基的取代基。

根据一个实施方案，A 为被取代的或未被取代的苯并噁嗪基团。在该实施方案的一个方面，A 具有 1-5 个独立地选自酰氨基、酰氧基、烯基、烷氧基、烷基、烷硫基、炔基、氨基、芳基、芳烷基、芳烯基、芳炔基、芳烷氧基、芳氧基、芳硫基、碳环、氰基、氰氧基、卤素、卤代烷基、卤代苯基、羟基、杂芳基、杂芳氧基、杂环、杂芳烷氧基、异氰酸根合、异硫氰酸根合、硝基、亚硫酰基、磺酰基、氨磺酰基、硫代羰基、氰硫基、三卤代甲磺酰氨基、O-氨基甲酰基、N-氨基甲酰基、O-硫代氨基甲酰基、N-硫代氨基甲酰基及 C-酰氨基的取代基。

根据一个实施方案，A 为被取代的或未被取代的苯并二噁烯（benzodioxine）基团。在该实施方案的一个方面，A 具有 1-5 个独立地选自酰氨基、酰氧基、烯基、烷氧基、烷基、烷硫基、炔基、氨基、芳基、芳烷基、芳烯基、芳炔基、芳烷氧基、芳氧基、芳硫基、碳环、氰基、氰氧基、卤素、卤代烷基、卤代苯基、羟基、杂芳基、杂芳氧基、杂环、杂芳烷氧基、异氰酸根合、异硫氰酸根合、硝基、亚硫酰基、磺酰基、氨磺酰基、硫代羰基、氰硫基、三卤代甲磺酰氨基、O-氨基甲酰基、N-氨基甲酰基、O-硫代氨基甲酰基、N-硫代氨基甲酰基及 C-酰氨基的取代基。

根据一个实施方案，A 为被取代的或未被取代的萘基。在该实施方案的一个方面，A 具有 1-6 个独立地选自酰氨基、酰氧基、烯基、烷氧基、烷基、烷硫基、炔基、氨基、芳基、芳烷基、芳烯基、芳炔基、芳烷氧基、芳氧基、芳硫基、碳环、氰基、氰氧基、卤素、卤代烷基、卤代苯基、羟基、杂芳基、杂芳氧基、杂环、杂芳烷氧基、异氰酸根合、异硫氰酸根合、硝基、亚硫酰基、磺酰基、氨磺酰基、硫代羰基、氰硫基、三卤代甲磺酰氨基、O-氨基甲酰基、N-氨基甲酰基、O-硫代氨基甲酰基、N-硫代氨基甲酰基及 C-酰氨基的取代基。

根据一个实施方案，A 为被取代的或未被取代的吡咯基团。在该实施方案的一个方面，A 具有 1-3 个独立地选自酰氨基、酰氧基、烯基、烷氧基、烷基、烷硫基、炔基、氨基、芳基、芳烷基、芳烯基、芳炔基、芳烷氧基、芳氧基、芳硫基、碳环、氰基、氰氧基、卤素、卤代烷基、卤代苯基、羟基、杂芳基、杂芳氧基、杂环、杂芳烷氧基、异氰酸根合、异硫氰酸根合、硝基、亚硫酰基、磺酰基、氨磺酰基、硫代羰基、氰硫基、三卤代甲磺酰氨基、O-氨基甲酰基、N-氨基甲酰基、O-硫代氨基甲酰基、N-硫代氨基甲酰基及 C-酰氨基的取代基。根据一个方面，A 是未被取代的。

根据一个实施方案，A 为被取代的或未被取代的吡啶基团。在该实施方案的一个方面，A 具有 1-4 个独立地选自酰氨基、酰氧基、烯基、烷氧基、烷基、烷硫基、炔基、氨基、芳基、芳烷基、芳烯基、芳炔基、芳烷氧基、芳氧基、芳硫基、碳环、氰基、氰氧基、卤素、卤代烷基、卤代苯基、羟基、杂芳基、杂芳氧基、杂环、杂芳烷氧基、异氰酸根合、异硫氰酸根合、硝基、亚硫酰基、磺酰基、氨磺酰基、硫代羰基、氰硫基、三卤代甲磺酰氨基、O-氨基甲酰基、N-氨基甲酰基、O-硫代氨基甲酰基、N-硫代氨基甲酰基及 C-酰氨基的取代基。根据该实施方案的一个方面，A 是未被取代的。

根据一个实施方案，A 为被取代的或未被取代的环己基。在该实施方案的一个方面，A 具有 1-5 个独立地选自酰氨基、酰氧基、烯基、烷氧基、烷基、烷硫基、炔基、氨基、芳基、芳烷基、芳烯基、芳炔基、芳烷氧基、芳氧基、芳硫基、碳环、氰基、氰氧基、卤素、卤代烷基、卤代苯基、羟基、杂芳基、杂芳氧基、杂环、杂芳烷氧基、异氰酸根合、异硫氰酸根合、硝基、亚硫酰基、磺酰基、氨磺酰基、硫代羰基、氰硫基、三卤代甲磺酰氨基、O-氨基甲酰基、N-氨基甲酰基、O-硫代氨基甲酰基、N-硫代氨基甲酰基及 C-酰氨基的取代基。根据该实施方案的一个方面，A 是未被取代的。

根据一个实施方案，B 为被取代的或未被取代的苯并[1,3]间二氧杂环戊烯基团。在该实施方案的一个方面，B 为 6-溴-苯并[1,3]间二氧杂环戊烯-5-基。在该实施方案的一个方面，B 为未被取代的苯并[1,3]间二氧杂环戊烯基团。在该实施方案的一个方面，B 为 6-碘-苯并[1,3]间二氧杂环戊烯-5-基。在该实施方案的一个方面，B 为 6-氯-苯并[1,3]

间二氧杂环戊烯-5-基。在该实施方案的--个方面，B 为 6-氟-苯并[1,3]间二氧杂环戊烯-5-基。在该实施方案的一个方面，B 具有 1-4 个独立地选自酰氨基、酰氧基、烯基、烷氧基、烷基、烷硫基、炔基、氨基、芳基、芳烷基、芳烯基、芳炔基、芳烷氧基、芳氧基、芳硫基、碳环、氰基、氰氧基、卤素、卤代烷基、卤代苯基、羟基、杂芳基、杂芳氧基、杂环、杂芳烷氧基、异氰酸根合、异硫氰酸根合、硝基、亚硫酰基、磺酰基、氨磺酰基、硫代羰基、氰硫基、三卤代甲磺酰氨基、O-氨基甲酰基、N-氨基甲酰基、O-硫代氨基甲酰基、N-硫代氨基甲酰基及 C-酰氨基的取代基。

根据一个实施方案，B 为被取代的或未被取代的萘基。在该实施方案的一个方面，B 具有 1-6 个独立地选自酰氨基、酰氧基、烯基、烷氧基、烷基、烷硫基、炔基、氨基、芳基、芳烷基、芳烯基、芳炔基、芳烷氧基、芳氧基、芳硫基、碳环、氰基、氰氧基、卤素、卤代烷基、卤代苯基、羟基、杂芳基、杂芳氧基、杂环、杂芳烷氧基、异氰酸根合、异硫氰酸根合、硝基、亚硫酰基、磺酰基、氨磺酰基、硫代羰基、氰硫基、三卤代甲磺酰氨基、O-氨基甲酰基、N-氨基甲酰基、O-硫代氨基甲酰基、N-硫代氨基甲酰基及 C-酰氨基的取代基。根据该实施方案的一个方面，B 是未被取代的。

根据一个实施方案，B 为被取代的或未被取代的吡咯基团。在该实施方案的一个方面，B 具有 1-3 个独立地选自酰氨基、酰氧基、烯基、烷氧基、烷基、烷硫基、炔基、氨基、芳基、芳烷基、芳烯基、芳炔基、芳烷氧基、芳氧基、芳硫基、碳环、氰基、氰氧基、卤素、卤代烷基、卤代苯基、羟基、杂芳基、杂芳氧基、杂环、杂芳烷氧基、异氰酸根合、异硫氰酸根合、硝基、亚硫酰基、磺酰基、氨磺酰基、硫代羰基、氰硫基、三卤代甲磺酰氨基、O-氨基甲酰基、N-氨基甲酰基、O-硫代氨基甲酰基、N-硫代氨基甲酰基及 C-酰氨基的取代基。根据该实施方案的一个方面，B 是未被取代的。

根据一个实施方案，B 为被取代的或未被取代的吡啶基团。在该实施方案的一个方面，B 具有 1-4 个独立地选自酰氨基、酰氧基、烯基、烷氧基、烷基、烷硫基、炔基、氨基、芳基、芳烷基、芳烯基、芳炔基、芳烷氧基、芳氧基、芳硫基、碳环、氰基、氰氧基、卤素、卤代烷基、卤代苯基、羟基、杂芳基、杂芳氧基、杂环、杂芳烷氧基、异氰酸根合、

异硫氰酸根合、硝基、亚硫酰基、磺酰基、氨磺酰基、硫代羰基、氰硫基、三卤代甲磺酰氨基、O-氨基甲酰基、N-氨基甲酰基、O-硫代氨基甲酰基、N-硫代氨基甲酰基及C-酰氨基的取代基。根据该实施方案的一个方面，B是未被取代的。

根据一个实施方案，B为被取代的或未被取代的环己基。在该实施方案的一个方面，B具有1-5个独立地选自酰氨基、酰氧基、烯基、烷氧基、烷基、烷硫基、炔基、氨基、芳基、芳烷基、芳烯基、芳炔基、芳烷氧基、芳氧基、芳硫基、碳环、氰基、氰氧基、卤素、卤代烷基、卤代苯基、羟基、杂芳基、杂芳氧基、杂环、杂芳烷氧基、异氰酸根合、异硫氰酸根合、硝基、亚硫酰基、磺酰基、氨磺酰基、硫代羰基、氰硫基、三卤代甲磺酰氨基、O-氨基甲酰基、N-氨基甲酰基、O-硫代氨基甲酰基、N-硫代氨基甲酰基及C-酰氨基的取代基。根据该实施方案的一个方面，B是未被取代的。

根据本发明的一个方面，提供如下的式I化合物，其中：

A为被取代的或未被取代的芳基；

B为被取代的或未被取代的芳基；

R1选自氢、烷基、芳基、杂芳基、氨基、卤素、硫及硫代烷基；

L_1可以是饱和的、部分饱和的或不饱和的，并且选自：$-(CH_2)_n-(CH_2)_n-$、$-(CH_2)_nC(=O)(CH_2)_n-$、$-(CH_2)_nC(=O)N(CH_2)_n-$、$-(CH_2)_nNC(=O)O(CH_2)_n-$、$-(CH_2)_nNC(=O)N(CH_2)_n-$、$-(CH_2)_nNC(=S)S(CH_2)_n-$、$-(CH_2)nOC(=O)S(CH_2)_n-$、$-(CH_2)_nNH(CH_2)_n-$、$-(CH_2)_nO(CH_2)_n-$、$-(CH_2)_nS(CH_2)_n-$、$-(CH_2)_nNC(=S)N(CH_2)_n-$，其中各个n独立地选自0、1、2、3、4、5、6、7及8，并且其中各个碳和/或氮可以任选地被一个或多个独立地选自羟基、卤素、烷氧基、C_{1-3}烷基及C_{3-6}环烷基的取代基取代；

L_2可以是饱和的、部分饱和的或不饱和的，并且选自：$-(CH_2)_n-(CH_2)_n-$、$-(CH_2)_nC(=O)(CH_2)_n-$、$-(CH_2)_nC(=O)N(CH_2)_n-$、$-(CH_2)_nNC(=O)O(CH_2)_n-$、$-(CH_2)_nNC(=O)N(CH_2)_n-$、$-(CH_2)_nNC(=S)S(CH_2)_n-$、$-(CH_2)nOC(=O)S(CH_2)_n-$、$-(CH_2)_nNH(CH_2)_n-$、$-(CH_2)_nO(CH_2)_n-$、$-(CH_2)_nS(CH_2)_n-$、$-(CH_2)_nNC(=S)N(CH_2)_n-$，其中各个n独立地选自0、1、2、3、4、5、6、7及8，并且其中各个碳和/或氮可任选地被一个或多个独立地选自羟基、卤素、烷氧基、C_{1-3}烷基及C_{3-6}环烷基的取代基取代；

及其可药用的盐。

根据本发明的一个方面，提供如下的式 I 化合物，其中：

A 为被取代的或未被取代的杂芳基；

B 为被取代的或未被取代的芳基；

R1 选自氢、烷基、芳基、杂芳基、氨基、卤素、硫及硫代烷基；

L_1 可以是饱和的、部分饱和的或不饱和的，并且选自 $-(CH_2)_n-(CH_2)_n-$、$-(CH_2)_nC(=O)(CH_2)_n-$、$-(CH_2)_nC(=O)N(CH_2)_n-$、$-(CH_2)_nNC(=O)O(CH_2)_n-$、$-(CH_2)_nNC(=O)N(CH_2)_n-$、$-(CH_2)_nNC(=S)S(CH_2)_n-$、$-(CH_2)nOC(=O)S(CH_2)_n-$、$-(CH_2)_nNH(CH_2)_n-$、$-(CH_2)_nO(CH_2)_n-$、$-(CH_2)_nS(CH_2)_n-$、$-(CH_2)_nNC(=S)N(CH_2)_n-$，其中各个 n 独立地选自 0、1、2、3、4、5、6、7 及 8，并且其中各个碳和/或氮可任选地被一个或多个独立地选自羟基、卤素、烷氧基、C_{1-3} 烷基及 C_{3-6} 环烷基的取代基取代；

L_2 可以是饱和的、部分饱和的或不饱和的，并且选自 $-(CH_2)_n-(CH_2)_n-$、$-(CH_2)_nC(=O)(CH_2)_n-$、$-(CH_2)_nC(=O)N(CH_2)_n-$、$-(CH_2)_nNC(=O)O(CH_2)_n-$、$-(CH_2)_nNC(=O)N(CH_2)_n-$、$-(CH_2)_nNC(=S)S(CH_2)_n-$、$-(CH_2)nOC(=O)S(CH_2)_n-$、$-(CH_2)_nNH(CH_2)_n-$、$-(CH_2)_nO(CH_2)_n-$、$-(CH_2)_nS(CH_2)_n-$、$-(CH_2)_nNC(=S)N(CH_2)_n-$，其中各个 n 独立地选自 0、1、2、3、4、5、6、7 及 8，并且其中各个碳和/或氮可任选地被一个或多个独立地选自羟基、卤素、烷氧基、C_{1-3} 烷基及 C_{3-6} 环烷基的取代基取代；及其可药用的盐。

根据本发明的一个方面，提供如下的式 I 化合物，其中 A 为被取代的或未被取代的芳基；B 为被取代的或未被取代的杂芳基；R1 选自氢、烷基、芳基、杂芳基、氨基、卤素、硫及硫代烷基；及其可药用的盐。

根据本发明的一个方面，提供如下的式 I 化合物，其中 A 为被取代的或未被取代的杂环基；B 为被取代的或未被取代的芳基；且 R1 选自氢、烷基、芳基、杂芳基、烷基氨基、卤素、硫及硫代烷基。

根据本发明的一个方面，提供如下的式 I 化合物，其中 A 为被取代的或未被取代的芳基；B 为被取代的或未被取代的杂环基；R1 选自氢、烷基、芳基、杂芳基、氨基、卤素、硫及硫代烷基。

根据本发明的某些方面，在式 I 的化合物中，A 是被取代的或未被取代的，并且选自吲哚基、1H-吲哚基、苯并噻唑基、1H-苯并三唑基、苯并噁唑基、1H-苯并咪唑基（1H-benzoimadazolyl）、3H-苯并噁唑-2-

酮、4H-苯并[1,4]噁嗪-3-酮、1,3 二氢-苯并咪唑-2-酮、3H-苯并噻唑-2-酮（3H-benzothialo-2-one）、1H-吡唑并[3,4-b]吡啶、1H-喹噁啉-2-酮（1H-quinaxolin-2-one）、1H-喹噁啉-2-酮、4H-苯并[1,4]噁嗪-3-酮、异喹啉、二氢吲哚、1,3 二氢-吲哚-2-酮、2,3-二氢-苯并[1,4]二噁烯、噻吩基（thienyl，thiophenyl）、苯并[b]噻吩基、萘并[2,3-b]噻吩基、噻蒽基（thianthrenyl）、呋喃基（furyl，furanyl）、异苯并呋喃基、色烯基（chromenyl）、呫吨基（xanthenyl）、吩噁噻基（phenoxanthiinyl）、吡咯基、2H-吡咯基、咪唑基、吡唑基、吡啶基（pyridyl，pyridinyl）、2-吡啶基、3-吡啶基、4-吡啶基、吡嗪基、嘧啶基、哒嗪基、中氮茚基（indolizinyl）、异吲哚基、3H-吲哚基、吲哚基、嘌呤基（purinyl）、4H-喹嗪基（4H-quinolizinyl）、异喹啉基、喹啉基、2,3-二氮杂萘基（phthalzinyl）、1，5-二氮杂萘基（naphthyridinyl）、喹唑啉基、噌啉基（cinnolinyl）、蝶啶基（pteridinyl）、咔唑基、β-咔啉基、菲啶基、吖啶基（acridinyl）、萘嵌间二氮苯基（perimidinyl）、菲咯啉基（phenanthrolinyl）、吩嗪基、异噻唑基、吩噻嗪基、异噁唑基、呋咱基（furazanyl）、吩噁嗪基（phenoxazinyl）、1,4-二氢喹喔啉-2,3-二酮、7 氨基异香豆素（7 aminoisocoumarin）、吡啶并[1,2-a]嘧啶-4-酮、吡唑并[1,5-a]嘧啶基、吡唑并[1,5-a]嘧啶-3-基、1,2-苯并异噁唑-3-基、苯并咪唑基、2-羟吲哚基、2 氧代苯并咪唑基、四氢呋喃基、吡喃基、哌啶基、哌嗪基、吡咯烷基、咪唑烷基、咪唑啉基、二氢吲哚基、异二氢氮茚基(isoindolinyl)、奎宁环基、吗啉基、异色满基、色满基、吡唑烷基、吡唑啉基、特窗酰基及 tetramoyl。

根据本发明的某些方面，在式 I 的化合物中，B 是被取代的或未被取代的，并且选自吲唑基、1H-吲哚基、苯并噻唑基、1H-苯并三唑基、苯并噁唑基、1H-苯并咪唑基、3H-苯并噁唑-2-酮、4H-苯并[1,4]噁嗪-3-酮、1,3 二氢-苯并咪唑-2-酮、3H-苯并噻唑-2-酮、1H-吡唑并[3,4-b]吡啶、1H-喹噁啉-2-酮、1H-喹噁啉-2-酮、4H-苯并[1,4]噁嗪-3-酮、异喹啉、二氢吲哚、1,3 二氢-吲哚-2-酮、2,3-二氢-苯并[1,4]二噁烯、噻吩基(thienyl，thiophenyl)、苯并[b]噻吩基、萘并[2,3-b]噻吩基、噻嗯基、呋喃基(furyl，furanyl)、异苯并呋喃基、色烯基、呫吨基、吩噁噻基、吡咯基、2H-吡咯基、咪唑基、吡唑基、吡啶基(pyridyl，

pyridinyl)、2-吡啶基、3-吡啶基、4-吡啶基、吡嗪基、嘧啶基、哒嗪基、中氮茚基、异吲哚基、3H-吲哚基、吲哚基、嘌呤基、4H-喹嗪基、异喹啉基、喹啉基、2,3-二氮杂萘基、1，5-二氮杂萘基、喹唑啉基、噌啉基、蝶啶基、咔唑基、β-咔啉基、菲啶基、吖啶基、萘嵌间二氮苯基、菲咯啉基、吩嗪基、异噻唑基、吩噻嗪基、异噁唑基、呋咱基、吩噁嗪基、1,4-二氢喹喔啉-2,3-二酮、7 氨基异香豆素、吡啶并[1,2-a]嘧啶-4-酮、吡唑并[1,5-a]嘧啶基、吡唑并[1,5-a]嘧啶-3-基、1,2-苯并异噁唑-3-基、苯并咪唑基、2-羟吲哚基、2 氧代苯并咪唑基、四氢呋喃基、吡喃基、哌啶基、哌嗪基、吡咯烷基、咪唑烷基、咪唑啉基、二氢吲哚基、异二氢氮茚基、奎宁环基、吗啉基、异色满基、色满基、吡唑烷基、吡唑啉基、特窗酰基及 tetramoyl。

在本发明化合物的某些方面，A 环被一个或多个选自 $-L_1-C(=O)OH$、$-L_1-CH=CHC(=O)OH$、$-L_1-C(=O)NH_2$、$-L_1-C(=O)NH(C_{1-3}$ 烷基)、$-L_1-C(=O)N(C_{1-3}$ 烷基$)_2$、$-L_1-S(=O)_2(C_{1-3}$ 烷基)、$-L_1-S(=O)_2NH_2$、$-L_1-S(=O)_2N(C_{1-3}$ 烷基$)_2$、$-L_1-S(=O)_2NH(C_{1-3}$ 烷基)、$-L_1-C(=O)NHOH$、$-L_1-C(=O)CH_2NH_2$、$-L_1-C(=O)CH_2OH$、$-L_1-C(=O)CH_2SH$、$-L_1-C(=O)NHCN$、$-L_1-NHC(=O)OR_o$、$-L_1-C(=O)NHR_o$、$-L_1-NH(C=O)NHR_o$、$-L_1-C(=O)N(R_o)_2$、$-L_1-NH(C=O)N(R_o)_2$、$-L_1$-磺基的取代基取代；其中 R_o 选自烷基和卤代烷基，且 L_1 独立于该化合物中的任何其他 L_1 并如上文的定义。

在本发明化合物的某些方面，B 环被一个或多个选自 $-L_1-C(=O)OH$、$-L_1-CH=CHC(=O)OH$、$-L_1-C(=O)NH_2$、$-L_1-C(=O)NH(C_{1-3}$ 烷基)、$-L_1-C(=O)N(C_{1-3}$ 烷基$)_2$、$-L_1-S(=O)_2(C_{1-3}$ 烷基)、$-L_1-S(=O)_2NH_2$、$-L_1-S(=O)_2N(C_{1-3}$ 烷基$)_2$、$-L_1-S(=O)_2NH(C_{1-3}$ 烷基)、$-L_1-C(=O)NHOH$、$-L_1-C(=O)CH_2NH_2$、$-L_1-C(=O)CH_2OH$、$-L_1-C(=O)CH_2SH$、$-L_1-C(=O)NHCN$、$-L_1-NHC(=O)OR_o$、$-L_1-C(=O)NHR_o$、$-L_1-NH(C=O)NHR_o$、$-L_1-C(=O)N(R_o)_2$、$-L_1-NH(C=O)N(R_o)_2$、$-L_1$-磺基的取代基取代；其中 R_o 选自烷基和卤代烷基，且 L_1 独立于该化合物中的任何其他 L_1 并如上文的定义。

根据本发明化合物的一个方面，L_1 选自 $-CH_2-$、$-CH_2CH_2-$、$-CH_2CH_2CH_2-$、$-CH(CH_3)CH_2-$、$-CH(CH_2CH_3)CH_2-$、$-CH(CH(CH_3)_2)CH_2-$、$-C(CH_2CH_2)CH_2-$、$-C(CH_2CH_2CH_2)CH_2-$、$-CH(CH(CH_3)CH_2CH_3)CH_2-$、$-CH(CH(CH_2)_4)CH_2-$、$-CH(CH(CH_2)_5)CH_2-$、$-CH(OH)CH_2-$及$-CH(CH_2OH)CH_2-$。在一个更具体的方面，$L_1$ 选自 $-CH_2CH_2-$和$-CH_2CH_2CH_2-$。在一个甚至更具体的方面，L_1 为 -

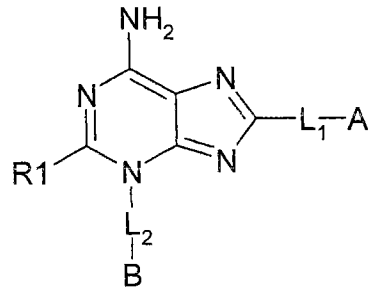
CH_2CH_2-。除非另外指出，否则 L_1 可以为两种取向中的任一种，例如，-CH (CH_2CH_2) CH_2-指嘌呤-CH (CH_2CH_2) CH_2-苯基取向和嘌呤 - CH_2CH (CH_2CH_2) -苯基取向。

根据本发明的一个方面，提供如下的式 I 化合物，其中 L_2 选自 - CH_2-、- CH_2CH_2- 、 -$CH_2CH_2CH_2$ 、 - CH (CH_3) CH_2- 、 - CH (CH_2CH_3) CH_2- 、 - CH (CH (CH_3) $_2$) CH_2- 、 -C (CH_2CH_2) CH_2- 、 -C ($CH_2CH_2CH_2$) CH_2- 、 -CH (CH (CH_3) CH_2CH_3) CH_2- 、 -CH (CH (CH_2) $_4$) CH_2- 、 -CH (CH (CH_2) $_5$) CH_2- 、 -CH (OH) CH_2-及-CH (CH_2OH) CH_2-。在一个更具体的方面，L_2 选自 - CH_2CH_2-和-$CH_2CH_2CH_2$-。在一个甚至更具体的方面，L_2 为 - CH_2CH_2-。除非另外指出，否则 L_2 可以为两种取向中的任一种，例如，-CH (CH_2CH_2) CH_2-指嘌呤-CH (CH_2CH_2) CH_2-苯基取向和嘌呤 - CH_2CH (CH_2CH_2) -苯基取向。

根据本发明化合物的一个方面，基团 A 选自 2, 5-二甲氧基苯基、2, 5-二乙氧基苯基、2, 4-二甲氧基苯基、3, 4, 5-三甲氧基苯基、4-氯苯基及 4-苯甲腈。在该方面，取代基的位置（编号）是相对于苯基与嘌呤核心的键。在该方面的一个具体实施方案中，L_1 为 - S-。

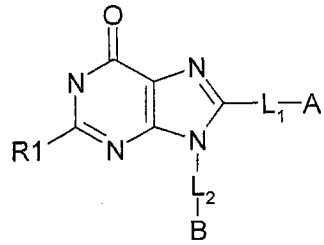
根据本发明化合物的一个方面，基团 B 选自 2-溴苯基、2-氟苯基、2-氯苯基、3-氟苯基、3-碘苯基、3-溴苯基、4-氟苯基、4-氯苯基、4-溴苯基、2, 3-二氯苯基、2, 4-二氯苯基、2, 6-二氯苯基、2, 3-二氟苯基、3, 5-二氟苯基、4-氯-2-氟苯基、2-氯-6-氟苯基、五氟苯基、2-硝基苯基、3-硝基苯基、4-硝基苯基、4-苯甲酸、2-三氟甲基苯基、3-三氟甲基苯基、3-甲氧基苯基、3-甲氧基苯基、3, 4-二甲氧基苯基、3, 5-二甲氧基苯基、3, 4, 5-三甲氧基苯基、3-乙氧基-4-甲氧基苯基、对甲苯基、邻甲苯基、2, 5-二甲基苯基、3, 5-二甲基苯基、2, 4, 6-三甲基苯基、4-苯乙酮乙酮、4-苯酚、4-苯磺酸、4-二甲基氨基苯基、4-氨基甲酸叔丁酯苯基、4-氨苯基、3-三氟甲氧基苯基及 3, 5 双三氟甲基苯基。在该方面，取代基的位置（编号）是相对于苯基与嘌呤核心的键。在该方面的一个具体实施方案中，L_2 选自 - CH_2-CH_2-及 - CH_2-CH_2-CH_2-。

本发明还提供式 II 的化合物，其中所述变量如本发明式 I 化合物的任何上述实施方案和方面。



式II

本发明还提供了式III的化合物，其中所述变量如本发明式 I 化合物的任何上述实施方案和方面。



式III

根据本发明的一个方面，提供如下的式 I 化合物，其中：

A 为被取代的或未被取代的杂环基；

B 为被取代的或未被取代的芳基；

R1 选自氢、烷基、芳基、杂芳基、氨基、卤素、硫及硫代烷基；

L_1 可以是饱和的、部分饱和的或非饱和的，并且选自 $-(CH_2)_n-(CH_2)_n-$、$-(CH_2)_nC(=O)(CH_2)_n-$、$-(CH_2)_nC(=O)N(CH_2)_n-$、$-(CH_2)_nNC(=O)O(CH_2)_n-$、$-(CH_2)_nNC(=O)N(CH_2)_n-$、$-(CH_2)_nNC(=S)S(CH_2)_n-$、$-(CH_2)_nOC(=O)S(CH_2)_n-$、$-(CH_2)_nNH(CH_2)_n-$、$-(CH_2)_nO(CH_2)_n-$、$-(CH_2)_nS(CH_2)_n-$及$-(CH_2)_nNC(=S)N(CH_2)_n-$，其中各个 n 独立地选自 0、1、2、3、4、5、6、7 及 8，且各个碳和/或氮可任选地被一个或多个独立地选自羟基、卤素、烷氧基、C_{1-3} 烷基及 C_{3-6} 环烷基的取代基取代；

L_2 可以是饱和的、部分饱和的或非饱和的，并且选自 $-(CH_2)_n-(CH_2)_n-$、$-(CH_2)_nC(=O)(CH_2)_n-$、$-(CH_2)_nC(=O)N(CH_2)_n-$、$-(CH_2)_nNC(=O)O(CH_2)_n-$、$-(CH_2)_nNC(=O)N(CH_2)_n-$、$-(CH_2)_nNC(=S)S(CH_2)_n-$、$-(CH_2)_nOC(=O)S(CH_2)_n-$、$-(CH_2)_nNH(CH_2)_n-$、$-(CH_2)_nO(CH_2)_n-$、$-(CH_2)_nS(CH_2)_n-$及$-(CH_2)_nNC(=S)N(CH_2)_n-$，其中各个 n 独立地选自 0、1、2、3、4、5、6、7 及 8，且各个碳和/或氮可任选地被一个或多个独立选自羟基、卤素、烷氧基、C_{1-3} 烷基及 C_{3-6} 环烷基的取代基取代；及其可药用的盐。

在本发明的一个方面，A 可以是被取代的或未被取代的，并且选自芳基或杂环基；

B 可以是被取代的或未被取代的，并且选自具有一个或多个选自 -N-、-O-、-S-和 -P-的杂原子的杂芳基或杂环基。

R1 选自氢、烷基、烷氧基、芳基、杂芳基、杂环、碳环、氨基、卤素、硫及硫代烷基；

L_1 和 L_2 如上文其最宽方面中定义；及其可药用的盐。

在本发明的另一个方面，A 可以是被取代的或未被取代的，并且选自苯并[1,3]间二氧杂环戊烯或苯基。

B 可以是被取代的或未被取代的、具有一个或多个选自 -N-、-O-、-S-和 -P-的杂原子的杂芳基或杂环基。

R1 选自氢、烷基、烷氧基、芳基、杂芳基、杂环、碳环、氨基、卤素、硫及硫代烷基；

L_1 和 L_2 如上文其最宽方面中定义；及其可药用的盐。

在本发明的一个方面，基团 A 可以是被取代的或未被取代的，并且选自 5-卤素-苯并[1,3]间二氧杂环戊烯（例如 5-溴-苯并[1,3]间二氧杂环戊烯）、二甲氧基苯（例如 1,4-二甲氧基苯、2,3-二甲氧基苯和 2,4-二甲氧基苯）及二乙氧基苯（例如 1,4-二乙氧基苯、2,3-二乙氧基苯和 2,4-二乙氧基苯）；

B 可以是被取代的或未被取代的，并且选自具有一个或多个选自 -N-、-O-、-S-和 -P-的杂原子的杂芳基或杂环基。

R1 选自氢、烷基、烷氧基、芳基、杂芳基、杂环、碳环、氨基、卤素、硫及硫代烷基；

L_1 和 L_2 如上文其最宽方面中定义；及其可药用的盐。

在本发明的一个方面，A 可以是被取代的或未被取代的，并且选自芳基、杂芳基、杂环及碳环基团；

B 可以是被取代的或未被取代的，且为选自哌啶、吡咯烷、吖丁啶（azetidine）、哌嗪、吗啉和四氢吡喃的杂环基。

R1 选自氢、烷基、烷氧基、芳基、杂芳基、杂环、碳环、氨基、卤素、硫及硫代烷基；

L_1 和 L_2 如上文定义；及其可药用的盐。

在本发明的一个方面，A 可以是被取代的或未被取代的，并且选

自芳基、杂芳基、杂环及碳环基团；

基团 B 选自哌啶、哌啶-1-羧酸乙酯、哌啶-1-羧酸叔丁酯、2,2,6,6-四甲基-哌啶、哌啶-2,6-二酮、哌啶-1-甲醛、1-甲基-吡咯烷、1-异丙基-哌嗪、四氢吡喃、金刚烷（admantane）、哌啶-1-甲醛、1-哌啶-1-基-乙酮乙酮、1-甲磺酰基-哌啶、1-丙基-哌啶、1-三氟甲磺酰基-哌啶、哌啶-1-羧酸叔丁酯、吡咯烷-1-羧酸叔丁酯、吗啉-4-羧酸叔丁酯、1-吡咯烷-1-基-乙酮、1-甲磺酰基-吡咯烷、吡咯烷-1-甲醛、吖丁啶-1-羧酸叔丁酯、1-甲基-吖丁啶、吖丁啶、吖丁啶-1-甲醛、1-吖丁啶-1-基-乙酮、1-甲磺酰基-吖丁啶，以及 1-三氟甲磺酰基-吖丁啶、环庚烷、咪唑、十一氟代环己烷、环己基氨基甲酸叔丁酯、1-哌嗪-1-基-乙酮、6,6-二甲基-双环[3.1.1]庚-2-烯、5-甲基 2,4-二氢-吡唑-3-酮、哌啶-1-羧酸苄酯、吗啉、吡咯烷-1-羧酸苄酯、哌啶-1,2-二羧酸 1-叔丁酯 2-乙酯、苄基-1,2,3,6-四氢吡啶、六氢化-4b-氮杂-环丙基[cd]并环戊二烯、2-异丙基-哌啶-1 羧酸叔丁酯、哌啶-1-羧酸乙酰胺、哌啶-1-羧酸异丙酰胺、哌啶-1-羧酸叔丁酰胺、[{哌啶-1-羰基}氨基]-乙酸乙酯、异丙基哌啶、异丁基哌啶、2,2-二甲基-1-哌啶-1-基-丙-1-酮、2,2-二甲基-1-哌啶-1-基-丁-1-酮、2-异丙基-哌啶、1-异丙基哌嗪及 1-环戊基-哌嗪。

R1 选自氢、烷基、烷氧基、芳基、杂芳基、杂环、碳环、氨基、卤素、硫及硫代烷基；

L_1和 L_2如上文其最宽方面中定义；及其可药用的盐。

在本发明的一个方面，A 可以是被取代的或未被取代的，并且选自苯并[1,3]间二氧杂环戊烯和苯基；

B 可以是被取代的或未被取代的，且为选自哌啶、吡咯烷、吖丁啶、哌嗪、吗啉及四氢吡喃的杂芳基或杂环基。

R1 选自氢、烷基、烷氧基、芳基、杂芳基、杂环、碳环、氨基、卤素、硫及硫代烷基；

L_1和 L_2如上文其最宽方面中定义；及其可药用的盐。

在本发明的一个方面，A 可以是被取代的或未被取代的，并且选自苯并[1,3]间二氧杂环戊烯和苯基；

基团 B 选自哌啶、哌啶-1-羧酸乙酯、哌啶-1-羧酸叔丁酯、2,2,6,6-四甲基-哌啶、哌啶-2,6-二酮、哌啶-1-甲醛、1-甲基-吡咯烷、1-异丙

基-哌嗪、四氢吡喃、金刚烷、哌啶-1-甲醛、1-哌啶-1-基-乙酮、1-甲磺酰基-哌啶、1-丙基-哌啶、1-三氟甲磺酰基-哌啶、哌啶-1-羧酸叔丁酯、吡咯烷-1-羧酸叔丁酯、吗啉-4-羧酸叔丁酯、1-吡咯烷-1-基-乙酮、1-甲磺酰基-吡咯烷、吡咯烷-1-甲醛、吖丁啶-1-羧酸叔丁酯、1-甲基-吖丁啶、吖丁啶、吖丁啶-1-甲醛、1-吖丁啶-1-基-乙酮、1-甲磺酰基-吖丁啶，以及 1-三氟甲磺酰基-吖丁啶、环庚烷、咪唑、十一氟代环己烷、环己基氨基甲酸叔丁酯、1-哌嗪-1-基-乙酮、6,6-二甲基-双环[3.1.1]庚-2-烯、5-甲基 2,4-二氢-吡唑-3-酮、哌啶-1-羧酸苄酯、吗啉、吡咯烷-1-羧酸苄酯、哌啶-1,2-二羧酸 1-叔丁酯 2-乙酯、苄基-1,2,3,6-四氢吡啶、六氢化-4b-氮杂-环丙基[cd]并环戊二烯、2-异丙基-哌啶-1 羧酸叔丁酯、哌啶-1-羧酸乙酰胺、哌啶-1-羧酸异丙酰胺、哌啶-1-羧酸叔丁酰胺、[{哌啶-1-羰基}氨基]-乙酸乙酯、异丙基哌啶、异丁基哌啶、2,2-二甲基-1-哌啶-1-基-丙-1-酮、2,2-二甲基-1-哌啶-1-基-丁-1-酮、2-异丙基-哌啶、1-异丙基哌嗪及 1-环戊基-哌嗪；

R1 选自氢、烷基、烷氧基、芳基、杂芳基、杂环、碳环、氨基、卤素、硫及硫代烷基；

L_1 和 L_2 如上文其最宽方面中定义；及其可药用的盐。

在本发明的一个方面，基团 A 选自 5-卤素-苯并[1,3]间二氧杂环戊烯、二甲氧基苯和二乙氧基苯；

基团 B 选自哌啶、哌啶-1-羧酸乙酯、哌啶-1-羧酸叔丁酯、2,2,6,6-四甲基-哌啶、哌啶-2,6-二酮、哌啶-1-甲醛、1-甲基-吡咯烷、1-异丙基-哌嗪、四氢吡喃、金刚烷、哌啶-1-甲醛、1-哌啶-1-基-乙酮、1-甲磺酰基-哌啶、1-丙基-哌啶、1-三氟甲磺酰基-哌啶、哌啶-1-羧酸叔丁酯、吡咯烷-1-羧酸叔丁酯、吗啉-4-羧酸叔丁酯、1-吡咯烷-1-基-乙酮、1-甲磺酰基-吡咯烷、吡咯烷-1-甲醛、吖丁啶-1-羧酸叔丁酯、1-甲基-吖丁啶、吖丁啶、吖丁啶-1-甲醛、1-吖丁啶-1-基-乙酮、1-甲磺酰基-吖丁啶及 1-三氟甲磺酰基-吖丁啶、环庚烷、咪唑、十一氟代环己烷、环己基氨基甲酸叔丁酯、1-哌嗪-1-基-乙酮、6,6-二甲基-双环[3.1.1]庚-2-烯、5-甲基 2,4-二氢-吡唑-3-酮、哌啶-1-羧酸苄酯、吗啉、吡咯烷-1-羧酸苄酯、哌啶-1,2-二羧酸 1-叔丁酯 2-乙酯、苄基-1,2,3,6-四氢吡啶、六氢化-4b-氮杂-环丙基[cd]并环戊二烯、2-异丙基-哌啶-1 羧酸叔丁酯、哌啶-1-羧酸乙酰胺、哌啶-1-羧酸异丙酰胺、哌啶-1-羧酸

叔丁酰胺、[{哌啶-1-羰基}氨基]-乙酸乙酯、异丙基哌啶、异丁基哌啶、2,2-二甲基-1-哌啶-1-基-丙-1-酮、2,2-二甲基-1-哌啶-1-基-丁-1-酮、2-异丙基-哌啶、1-异丙基哌嗪及1-环戊基-哌嗪;

R1选自氢、烷基、烷氧基、芳基、杂芳基、杂环、碳环、氨基、卤素、硫及硫代烷基;

L_1和L_2如上文其最宽方面中定义;及其可药用的盐。

根据本发明的一个方面,在式I的化合物中,A为具有一个或多个选自卤素、烷基、烷氧基、卤代烷基、卤代烷氧基、硝基、-C(=O)烷基、羟基、-C≡N、$-SO_3$及-COOH的取代基的芳基或杂环基。在一个更具体的方面,A为具有一个或多个选自卤素、烷基、烷氧基、卤代烷基、卤代烷氧基、硝基、-C(=O)烷基、羟基及-COOH的取代基的苯基。在另一个具体的方面,A为具有一个或多个选自-F、-Cl、-Br、-I、$-OCH_3$及$-OCH_2CH_3$的取代基的苯基。在另一个方面,A为具有一个或多个选自卤素、烷基、烷氧基、卤代烷基、卤代烷氧基、硝基、-C(=O)烷基、羟基及-COOH的取代基的苯并[1,3]间二氧杂环戊烯基团。在另一个具体方面,A为具有一个或多个选自-F、-Cl、-Br、-I、$-OCH_3$及$-OCH_2CH_3$的取代基的苯并[1,3]间二氧杂环戊烯基团。

在一个方面,在式I的化合物中,A为具有一个或多个选自羟基、卤素、烷基、烷氧基、卤代烷基、卤代烷氧基、$-N(C_{1-3}烷基)_2$、$-NH(C_{1-3}烷基)$、$-C(=O)NH_2$、$-C(=O)NH(C_{1-3}烷基)$、$-C(=O)N(C_{1-3}烷基)_2$、$-S(=O)_2(C_{1-3}烷基)$、$-S(=O)_2NH_2$、$-S(=O)_2N(C_{1-3}烷基)_2$、$-S(=O)_2NH(C_{1-3}烷基)$、$-CHF_2$、$-OCF_3$、$-OCHF_2$、$-SCF_3$、$-CF_3$、-CN、$-NH_2$及$-NO_2$的取代基的芳基或杂环的基团。在一个具体的方面,A为具有一个或多个选自羟基、卤素、烷基、烷氧基、卤代烷基、卤代烷氧基、$-N(C_{1-3}烷基)_2$、$-NH(C_{1-3}烷基)$、$-C(=O)NH_2$、$-C(=O)NH(C_{1-3}烷基)$、$-C(=O)N(C_{1-3}烷基)_2$、$-S(=O)_2(C_{1-3}烷基)$、$-S(=O)_2NH_2$、$-S(=O)_2N(C_{1-3}烷基)_2$、$-S(=O)_2NH(C_{1-3}烷基)$、$-CHF_2$、$-OCF_3$、$-OCHF_2$、$-SCF_3$、$-CF_3$、-CN、$-NH_2$及$-NO_2$的取代基的苯基。在另一个具体方面,A为具有一个或多个选自羟基、卤素、烷基、烷氧基、卤代烷基、卤代烷氧基、$-N(C_{1-3}烷基)_2$、$-NH(C_{1-3}烷基)$、$-C(=O)NH_2$、$-C(=O)NH(C_{1-3}烷基)$、$-C(=O)N(C_{1-3}烷基)_2$、$-S(=O)_2(C_{1-3}烷基)$、$-S(=O)_2NH_2$、$-S(=O)_2N(C_{1-3}烷基)_2$、$-S(=O)_2NH(C_{1-3}烷基)$、$-CHF_2$、$-OCF_3$、$-OCHF_2$、$-SCF_3$、$-CF_3$、-CN、$-NH_2$及$-NO_2$的取代基的苯并[1,3]间二氧杂环戊烯基团。

在一个方面，在式 I 的化合物中，A 为具有 1-5 个独立地选自酰氨基、酰氧基、烯基、烷氧基、烷基、烷硫基、炔基、氨基、芳基、芳烷基、芳烯基、芳炔基、芳烷氧基、芳氧基、芳硫基、碳环、氰基、氰氧基、卤素、卤代烷基、卤代苯基、羟基、杂芳基、杂芳氧基、杂环、杂芳烷氧基、异氰酸根合、异硫氰酸根合、硝基、亚硫酰基、磺酰基、氨磺酰基、硫代羰基、氰硫基、三卤代甲磺酰氨基、O-氨基甲酰基、N-氨基甲酰基、O-硫代氨基甲酰基、N-硫代氨基甲酰基及 C-酰氨基的取代基的苯基或苯并[1,3]间二氧杂环戊烯基团。

根据一个方面，在式 I 的化合物中，B 为具有一个或多个选自 -N- 和 -O- 的杂原子的杂环，其中所述杂环基可以具有一个或多个选自以下基团的取代基：氢；卤素；烷基；烷氧基；卤代烷基；卤代烷氧基；硝基；$-CH_2-$芳基；-C(=O)烷基；-C(=O)环烷基；-C(=O)-NH-烷基；环烷基；羟基；$-SO_3$；-COOH（及其酯）；氨基酸（选自天然和非天然氨基酸）；具有 1-5 个氨基酸残基（选自天然和非天然氨基酸）的肽；-C(=O)烷基，其中所述烷基被一个或多个取代基（选自烷基、氨基、烷氧基、卤代烷基、卤代烷氧基、硝基、氰基、羟基、-COOH（及其酯）、磺酰基、氨磺酰基）取代；及磺酰基。在一个具体方面，B 为哌啶(哌啶基)基团。在一个具体方面，B 为被一个或多个选自以下基团的取代基取代的哌啶基团：氢；卤素；烷基；烷氧基；卤代烷基；卤代烷氧基；硝基；$-CH_2-$芳基；-C(=O)烷基；-C(=O)环烷基；-C(=O)-NH-烷基；环烷基；羟基；$-SO_3$；-COOH（及其酯）；氨基酸（选自天然和非天然氨基酸）；具有 1-5 个氨基酸残基（选自天然和非天然氨基酸）的肽；-C(=O)烷基，其中所述烷基被一个或多个取代基（选自烷基、氨基、烷氧基、卤代烷基、卤代烷氧基、硝基、氰基、羟基、-COOH（及其酯）、磺酰基、氨磺酰基）取代；及磺酰基。在一个更具体的方面，B 为具有一个或多个选自氢、卤素、烷基、烷氧基、卤代烷基、卤代烷氧基、硝基、$-CH_2-$芳基、-C(=O)烷基、-C(=O)-NH-烷基、环烷基、羟基、$-SO_3$、-COOH（及其酯）及磺酰基的取代基的哌啶基团。在一个甚至更具体的方面，B 为具有一个或多个选自 -C(=O)、-C(=O)CH_3、$-CH_3$、$-CH_2CH_3$、$-CH_2CH_2CH_3$、-C(=O)OCH_2CH_3、$-S(=O)_2CH_3$、$-S(=O)_2CF_3$、-C(=O)$OC(CH_3)_3$、-C(=O)OCH_2-苯基、$-CH_2$-苯基、$-CH(CH_3)_2$、-C(=O)$NHCH_2CH_3$、-C(=O)$NHCH(CH_3)_2$、-C(=O)$NHC(CH_3)_3$、-C(=O)$NHCH_2C(=O)OCH_2CH_3$、-C(=O)$C(CH_3)_3$、$-CH(CH_3)_2$、$-CH_2CH(CH_3)_2$、

-C(=O)$CH_2C(CH_3)_3$及环戊基的取代基的哌啶基团。

在一个具体方面，B 为高哌啶（高哌啶基）基团。在一个更具体的方面，B 为具有一个或多个选自以下基团的取代基的高哌啶基团：氢；卤素；烷基；烷氧基；卤代烷基；卤代烷氧基；硝基；-CH_2-芳基；-C(=O)烷基；-C(=O)环烷基；-C(=O)-NH-烷基；环烷基；羟基；-SO_3；-COOH（及其酯）；氨基酸（选自天然和非天然氨基酸）；具有 1-5 个氨基酸残基（选自天然和非天然氨基酸）的肽；-C(=O)烷基，其中所述烷基被一个或多个取代基（选自烷基、氨基、烷氧基、卤代烷基、卤代烷氧基、硝基、氰基、羟基、-COOH（及其酯）、磺酰基、氨磺酰基）取代；及磺酰基。在一个甚至更具体的方面，B 为具有一个或多个选自-C(=O)、-C(=O)CH_3、-CH_3、-CH_2CH_3、-$CH_2CH_2CH_3$、-C(=O)OCH_2CH_3、-S(=O)$_2CH_3$、-S(=O)$_2CF_3$、-C(=O)$OC(CH_3)_3$、-C(=O)OCH_2-苯基、-CH_2-苯基、-$CH(CH_3)_2$、-C(=O)$NHCH_2CH_3$、-C(=O)$NHCH(CH_3)_2$、-C(=O)$NHC(CH_3)_3$、-C(=O)$NHCH_2C(=O)OCH_2CH_3$、-C(=O)$C(CH_3)_3$、-$CH(CH_3)_2$、-$CH_2CH(CH_3)_2$、-C(=O)$CH_2C(CH_3)_3$及环戊基的取代基的高哌啶基团。

在一个具体方面，B 为哌嗪（哌嗪基）基团。在一个更具体的方面，B 为具有一个或多个选自以下基团的取代基的哌嗪基团：氢；卤素；烷基；烷氧基；卤代烷基；卤代烷氧基；硝基；-CH_2-芳基；-C(=O)烷基；-C(=O)环烷基；-C(=O)-NH-烷基；环烷基；羟基；-SO_3；-COOH（及其酯）；氨基酸（选自天然和非天然氨基酸）；具有 1-5 个氨基酸残基（选自天然和非天然氨基酸）的肽；-C(=O)烷基，其中所述烷基被一个或多个取代基（选自烷基、氨基、烷氧基、卤代烷基、卤代烷氧基、硝基、氰基、羟基、-COOH（及其酯）、磺酰基、氨磺酰基）取代；及磺酰基。在一个甚至更具体的方面，B 为具有一个或多个选自-C(=O)、-C(=O)CH_3、-CH_3、-CH_2CH_3、-$CH_2CH_2CH_3$、-C(=O)OCH_2CH_3、-S(=O)$_2CH_3$、-S(=O)$_2CF_3$、-C(=O)$OC(CH_3)_3$、-C(=O)OCH_2-苯基、-CH_2-苯基、-$CH(CH_3)_2$、-C(=O)$NHCH_2CH_3$、-C(=O)$NHCH(CH_3)_2$、-C(=O)$NHC(CH_3)_3$、-C(=O)$NHCH_2C(=O)OCH_2CH_3$、-C(=O)$C(CH_3)_3$、-$CH(CH_3)_2$、-$CH_2CH(CH_3)_2$、-C(=O)$CH_2C(CH_3)_3$及环戊基的取代基的哌嗪基团。

在一个具体方面，B 为吡咯烷（吡咯烷基）基团。在一个更具体的方面，B 为具有一个或多个选自以下基团的取代基的吡咯烷基团：氢；卤素；烷基；烷氧基；卤代烷基；卤代烷氧基；硝基；-CH_2-芳基；-C(=O)

烷基；-C(=O)环烷基；-C(=O)-NH-烷基；环烷基；羟基；$-SO_3$；-COOH（及其酯）；氨基酸（选自天然和非天然氨基酸）；具有1-5个氨基酸残基（选自天然和非天然氨基酸）的肽；-C(=O)烷基，其中所述烷基被一个或多个取代基（选自烷基、氨基、烷氧基、卤代烷基、卤代烷氧基、硝基、氰基、羟基、-COOH（及其酯）、磺酰基、氨磺酰基）取代；及磺酰基。在一个甚至更具体的方面，B为具有一个或多个选自-C(=O)、-C(=O)CH_3、$-CH_3$、$-CH_2CH_3$、$-CH_2CH_2CH_3$、$-C(=O)OCH_2CH_3$、$-S(=O)_2CH_3$、$-S(=O)_2CF_3$、$-C(=O)OC(CH_3)_3$、-C(=O)OCH_2-苯基、$-CH_2$-苯基、$-CH(CH_3)_2$、$-C(=O)NHCH_2CH_3$、$-C(=O)NHCH(CH_3)_2$、$-C(=O)NHC(CH_3)_3$、$-C(=O)NHCH_2C(=O)OCH_2CH_3$、$-C(=O)C(CH_3)_3$、$-CH(CH_3)_2$、$-CH_2CH(CH_3)_2$、$-C(=O)CH_2C(CH_3)_3$及环戊基的取代基的吡咯烷基团。

在一个具体方面，B为吖丁啶（吖丁啶基）基团。在一个更具体的方面，B为具有一个或多个选自以下基团的取代基的吖丁啶基团：氢；卤素；烷基；烷氧基；卤代烷基；卤代烷氧基；硝基；$-CH_2$-芳基；-C(=O)烷基；-C(=O)环烷基；-C(=O)-NH-烷基；环烷基；羟基；$-SO_3$；-COOH（及其酯）；氨基酸（选自天然和非天然氨基酸）；具有1-5个氨基酸残基（选自天然和非天然氨基酸）的肽；-C(=O)烷基，其中所述烷基被一个或多个取代基（选自烷基、氨基、烷氧基、卤代烷基、卤代烷氧基、硝基、氰基、羟基、-COOH（及其酯）、磺酰基、氨磺酰基）取代；及磺酰基。在一个甚至更具体的方面，B为具有一个或多个选自-C(=O)、-C(=O)CH_3、$-CH_3$、$-CH_2CH_3$、$-CH_2CH_2CH_3$、$-C(=O)OCH_2CH_3$、$-S(=O)_2CH_3$、$-S(=O)_2CF_3$、$-C(=O)OC(CH_3)_3$、-C(=O)OCH_2-苯基、$-CH_2$-苯基、$-CH(CH_3)_2$、$-C(=O)NHCH_2CH_3$、$-C(=O)NHCH(CH_3)_2$、$-C(=O)NHC(CH_3)_3$、$-C(=O)NHCH_2C(=O)OCH_2CH_3$、$-C(=O)C(CH_3)_3$、$-CH(CH_3)_2$、$-CH_2CH(CH_3)_2$、$-C(=O)CH_2C(CH_3)_3$及环戊基的取代基的吖丁啶基团。

在式I的化合物的一个方面，B为具有一个或多个选自羟基、卤素、烷基、烷氧基、卤代烷基、卤代烷氧基、$-N(C_{1-3}烷基)_2$、$-NH(C_{1-3}烷基)$、$-C(=O)NH_2$、$-C(=O)NH(C_{1-3}烷基)$、$-C(=O)N(C_{1-3}烷基)_2$、$-S(=O)_2(C_{1-3}烷基)$、$-S(=O)_2NH_2$、$-S(=O)_2N(C_{1-3}烷基)_2$、$-S(=O)_2NH(C_{1-3}烷基)$、$-CHF_2$、$-OCF_3$、$-OCHF_2$、$-SCF_3$、$-CF_3$、-CN、$-NH_2$、$-SO_3$及$-NO_2$的取代基的杂环基。在一个具体的方面，基团B选自哌啶、哌嗪、吡咯烷、吖丁啶、四氢吡喃及吗啉基团，每个基团具有一个或多个取代基。在一个更具体的方面，B为

具有一个或多个取代基的哌啶基团。

在一个方面，基团 B 选自哌啶、哌嗪、吡咯烷、吖丁啶、四氢吡喃和吗啉，其中所述基团 B 可以具有 1-5 个独立地选自酰氨基、酰氧基、烯基、烷氧基、烷基、烷硫基、炔基、氨基、芳基、芳烷基、芳烯基、芳炔基、芳烷氧基、芳氧基、芳硫基、碳环、氰基、氰氧基、卤素、卤代烷基、卤代苯基、羟基、杂芳基、杂芳氧基、杂环、杂芳烷氧基、异氰酸根合、异硫氰酸根合、硝基、亚硫酰基、磺酰基、氨磺酰基、硫代羰基、氰硫基、三卤代甲磺酰氨基、O-氨基甲酰基、N-氨基甲酰基、O-硫代氨基甲酰基、N-硫代氨基甲酰基及 C-酰氨基的取代基。在一个更具体的方面，B 为具有一个或多个取代基的哌啶基团。

根据一个实施方案，A 为被取代的或未被取代的苯并[1,3]间二氧杂环戊烯基团。在该实施方案的一个方面，A 为 5-溴-苯并[1,3]间二氧杂环戊烯基团。在该实施方案的一个方面，A 为未被取代的苯并[1,3]间二氧杂环戊烯基团。在该实施方案的一个方面，A 为 5-碘-苯并[1,3]间二氧杂环戊烯基团。在该实施方案的一个方面，A 为 5-氯-苯并[1,3]间二氧杂环戊烯基团。在该实施方案的一个方面，A 为 5-氟-苯并[1,3]间二氧杂环戊烯基团。在该实施方案的一个方面，A 具有 1-5 个独立地选自酰氨基、酰氧基、烯基、烷氧基、烷基、烷硫基、炔基、氨基、芳基、芳烷基、芳烯基、芳炔基、芳烷氧基、芳氧基、芳硫基、碳环、氰基、氰氧基、卤素、卤代烷基、卤代苯基、羟基、杂芳基、杂芳氧基、杂环、杂芳烷氧基、异氰酸根合、异硫氰酸根合、硝基、亚硫酰基、磺酰基、氨磺酰基、硫代羰基、氰硫基、三卤代甲磺酰氨基、O-氨基甲酰基、N-氨基甲酰基、O-硫代氨基甲酰基、N-硫代氨基甲酰基及 C-酰氨基的取代基。

在本发明的一个方面，基团 A 是被一个或多个取代基取代的，并且选自苯基、苯并[1,3]间二氧杂环戊烯、2，3-二氢-1-茚酮；基团 B 是被一个或多个取代基取代的，并且选自哌啶、哌嗪、吡咯烷、吖丁啶、四氢吡喃及吗啉；R_1 为氢；L_1 为 -S-；L_2 为 $-CH_2CH_2-$，及其可药用的盐。根据本发明的该方面，所述基团 A 取代基选自卤素、-CN、烷氧基，且所述基团 B 取代基选自 $-C(=O)$、$-C(=O)CH_3$、$-CH_3$、$-CH_2CH_3$、$-CH_2CH_2CH_3$、$-C(=O)OCH_2CH_3$、$-S(=O)_2CH_3$、$-S(=O)_2CF_3$、$-C(=O)OC(CH_3)_3$、$-C(=O)OCH_2-$苯基、$-CH_2-$苯基、$-CH(CH_3)_2$、$-C(=O)NHCH_2CH_3$、$-C(=O)NHCH(CH_3)_2$、

$-C(=O)NHC(CH_3)_3$、$-C(=O)NHCH_2C(=O)OCH_2CH_3$、$-C(=O)C(CH_3)_3$、$-CH(CH_3)_2$、$-CH_2CH(CH_3)_2$、$-C(=O)CH_2C(CH_3)_3$及环戊基。

在本发明的一个方面，A 可以是被取代的或未被取代的，并且选自芳基和杂环基；

B 可以是被取代的或未被取代的，并且选自环烷基和杂环基；

R1 选自氢、烷基、烷氧基、芳基、杂芳基、杂环、碳环、氨基、卤素、硫及硫代烷基。

L_1和L_2如上文其最宽方面中定义；及其可药用的盐。

在本发明的另一个方面，A 可以是被取代的或未被取代的，并且选自苯并[1,3]间二氧杂环戊烯和苯基；

B 可以是被取代的或未被取代的，并且选自杂芳基、杂环及环烷基；

R1 选自氢、烷基、烷氧基、芳基、杂芳基、杂环、碳环、氨基、卤素、硫及硫代烷基；

L_1和L_2如上文其最宽方面中定义；及其可药用的盐。

在本发明的一个方面，基团 A 可以是被取代的或未被取代的，并且选自 5-卤素-苯并[1,3]间二氧杂环戊烯(例如 5-溴-苯并[1,3]间二氧杂环戊烯)、二甲氧基苯（例如 1,4-二甲氧基苯、2,3-二甲氧基苯和 2,4-二甲氧基苯）及二乙氧基苯（例如 1,4-二乙氧基苯、2,3-二乙氧基苯和 2,4-二乙氧基苯）；

B 可以是被取代的或未被取代的，并且选自环烷基、杂芳基及杂环基；

R1 选自氢、烷基、烷氧基、芳基、杂芳基、杂环、碳环、氨基、卤素、硫及硫代烷基；

L_1和L_2如上文其最宽方面中定义；及其可药用的盐。

在本发明的一个方面，A 可以是被取代的或未被取代的，并且选自芳基、杂芳基、杂环及碳环基团；

基团 B 可以是被取代的或未被取代的，并且选自环丙基、环丁基、环戊基、环己基、四氢呋喃基、oxepanyl（oxepane）、四氢噻吩基（四氢噻吩）、噻喃基（thiopyranyl）、thiepanyl（thiepane）及四氢吡喃基；

R1 选自氢、烷基、烷氧基、芳基、杂芳基、杂环、碳环、氨基、卤素、硫及硫代烷基；

L_1和L_2如上文定义；及其可药用的盐。

在本发明的一个方面，A 可以是被取代的或未被取代的，并且选自芳基、杂芳基、杂环及碳环基团；

基团-L_2-B 选自(1-环丙基-丙基)-氨基甲酸叔丁酯、[1-(四氢噻喃-4-基)-丙基]-氨基甲酸叔丁酯、(1-环己基-丙基)-氨基甲酸叔丁酯、(1-环丁基-丙基)-氨基甲酸叔丁酯、N-(1-环丙基-丙基)-甲磺酰胺、1-(1-环丙基-丙基)-3-异丙基-脲、(1-环戊基-丙基)-氨基甲酸叔丁酯、[1-(四氢吡喃-4-基)-丙基]-氨基甲酸叔丁酯、1-环丙基-丙胺、1-环己基-丙胺、1-环丁基-丙胺、1-环戊基-丙胺、1-(四氢吡喃-4-基)-丙胺、1-(四氢噻喃-4-基)-丙基胺及 1-(1-环己基-丙基)-1H-吡咯；

R1 选自氢、烷基、烷氧基、芳基、杂芳基、杂环、碳环、氨基、卤素、硫及硫代烷基；

L_1如上文定义；及其可药用的盐。

在本发明的某些具体的方面，L_2 如上文定义，且具有一个或多个选自羟基、卤素、烷氧基、氨基、C_{1-3}烷基、C_{3-7}环烷基、-N-C(=O)OC$(CH_3)_3$、-NSO_2CH_3、-NC(=O)NC$(CH_3)_2$及吡咯基的取代基。

在本发明的一个方面，A 可以是被取代的或未被取代的，并且选自苯并[1,3]间二氧杂环戊烯和苯基；

B 可以是被取代的或未被取代的，并且为选自环丙基、环丁基、环戊基、环己基、四氢呋喃基、oxepanyl (oxepane)、四氢噻吩基 (四氢噻吩)、噻喃基、thiepanyl (thiepane)及四氢吡喃基的杂芳基或杂环基；

R1 选自氢、烷基、烷氧基、芳基、杂芳基、杂环、碳环、氨基、卤素、硫及硫代烷基；

L_1和L_2如上文其最宽方面中定义；及其可药用的盐。

在本发明的一个方面，A 可以是被取代的或未被取代的，并且选自苯并[1,3]间二氧杂环戊烯和苯基；

基团 B 选自环丙基、环丁基、环戊基、环己基、四氢呋喃基、oxepanyl (oxepane)、四氢噻吩基 (四氢噻吩)、噻喃基、thiepanyl (thiepane)及四氢吡喃基；

R1 选自氢、烷基、烷氧基、芳基、杂芳基、杂环、碳环、氨基、卤素、硫及硫代烷基；

L_1和L_2如上文其最宽方面中定义；及其可药用的盐。

在本发明的一个方面，基团 A 选自 5-卤素-苯并[1,3]间二氧杂环戊烯、二甲氧基苯和二乙氧基苯；

基团 B 选自环丙基、环丁基、环戊基、环己基、四氢呋喃基、oxepanyl (oxepane)、四氢噻吩基 (四氢噻吩)、噻喃基、thiepanyl (thiepane) 及四氢吡喃基；

R1 选自氢、烷基、烷氧基、芳基、杂芳基、杂环、碳环、氨基、卤素、硫及硫代烷基；

L_1 和 L_2 如上文其最宽方面中定义；及其可药用的盐。

根据本发明的一个方面，在式 I 的化合物中，A 为具有一个或多个选自卤素、烷基、烷氧基、卤代烷基、卤代烷氧基、硝基、-C(=O)烷基、羟基、-C≡N、$-SO_3$ 及 -COOH 的取代基的芳基或杂环基。在另一个具体的方面，A 为具有一个或多个选自卤素、烷基、烷氧基、卤代烷基、卤代烷氧基、硝基、-C(=O)烷基、羟基及 -COOH 的取代基的苯基。在另一个具体的方面，A 为具有一个或多个选自 -F、-Cl、-Br、-I、$-OCH_3$ 及 $-OCH_2CH_3$ 的取代基的苯基。在另一个方面，A 为具有一个或多个选自卤素、烷基、烷氧基、卤代烷基、卤代烷氧基、硝基、-C(=O)烷基、羟基及 -COOH 的取代基的苯并[1,3]间二氧杂环戊烯基团。在另一个具体的方面，A 为具有一个或多个选自 -F、-Cl、-Br、-I、$-OCH_3$ 及 $-OCH_2CH_3$ 的取代基的苯并[1,3]间二氧杂环戊烯基团。

在一个方面，在式 I 的化合物中，A 为具有一个或多个选自羟基、卤素、烷基、烷氧基、卤代烷基、卤代烷氧基、$-N(C_{1-3}烷基)_2$、$-NH(C_{1-3}烷基)$、$-C(=O)NH_2$、$-C(=O)NH(C_{1-3}烷基)$、$-C(=O)N(C_{1-3}烷基)_2$、$-S(=O)_2(C_{1-3}烷基)$、$-S(=O)_2NH_2$、$-S(=O)_2N(C_{1-3}烷基)_2$、$-S(=O)_2NH(C_{1-3}烷基)$、$-CHF_2$、$-OCF_3$、$-OCHF_2$、$-SCF_3$、$-CF_3$、-CN、$-NH_2$ 及 $-NO_2$ 的取代基的芳基或杂环基。在一个具体方面，A 为具有一个或多个选自羟基、卤素、烷基、烷氧基、卤代烷基、卤代烷氧基、$-N(C_{1-3}烷基)_2$、$-NH(C_{1-3}烷基)$、$-C(=O)NH_2$、$-C(=O)NH(C_{1-3}烷基)$、$-C(=O)N(C_{1-3}烷基)_2$、$-S(=O)_2(C_{1-3}烷基)$、$-S(=O)_2NH_2$、$-S(=O)_2N(C_{1-3}烷基)_2$、$-S(=O)_2NH(C_{1-3}烷基)$、$-CHF_2$、$-OCF_3$、$-OCHF_2$、$-SCF_3$、$-CF_3$、-CN、$-NH_2$ 及 $-NO_2$ 的取代基的苯基。在另一个具体的方面，A 为具有一个或多个选自羟基、卤素、烷基、烷氧基、卤代烷基、卤代烷氧基、$-N(C_{1-3}烷基)_2$、$-NH(C_{1-3}烷基)$、$-C(=O)NH_2$、$-C(=O)NH(C_{1-3}烷基)$、$-C(=O)N(C_{1-3}烷基)_2$、$-S(=O)_2(C_{1-3}烷基)$、$-S(=O)_2NH_2$、$-S(=O)_2N(C_{1-3}烷基)_2$、

-S(=O)$_2$NH(C_{1-3}烷基)、-CHF_2、-OCF_3、-$OCHF_2$、-SCF_3、-CF_3、-CN、-NH_2及-NO_2的取代基的苯并[1,3]间二氧杂环戊烯基团。

在本发明化合物的一个具体方面，B为环烷基（例如环丙基、环丁基、环己基或环庚基）。在另一个具体的方面，B为具有一个或多个选自氢、卤素、烷基、烷氧基、卤代烷基、卤代烷氧基、硝基、-CH_2-芳基、-C(=O)烷基、-C(=O)-NH-烷基、环烷基、羟基、-SO_3、-COOH（及其酯）及磺酰基的取代基的环烷基。在另一个具体的方面，B为具有一个或多个选自-C(=O)、-C(=O)CH_3、-CH_3、-CH_2CH_3、-$CH_2CH_2CH_3$、-C(=O)OCH_2CH_3、-S(=O)$_2CH_3$、-S(=O)$_2CF_3$、-C(=O)$OC(CH_3)_3$、-C(=O)OCH_2-苯基、-CH_2-苯基、-$CH(CH_3)_2$、-C(=O)$NHCH_2CH_3$、-C(=O)$NHCH(CH_3)_2$、-C(=O)$NHC(CH_3)_3$、-C(=O)$NHCH_2C(=O)OCH_2CH_3$、-C(=O)$C(CH_3)_3$、-$CH(CH_3)_2$、-$CH_2CH(CH_3)_2$、-C(=O)$CH_2C(CH_3)_3$、环丙基、环丁基、环戊基及环己基的取代基的环烷基。

在本发明化合物的一个具体方面，B为噻喃基。在另一个具体的方面，B为具有一个或多个选自氢、卤素、烷基、烷氧基、卤代烷基、卤代烷氧基、硝基、-CH_2-芳基、-C(=O)烷基、-C(=O)-NH-烷基、环烷基、羟基、-SO_3、-COOH（及其酯）及磺酰基的取代基的噻喃基。在另一个具体的方面，B为具有一个或多个选自-C(=O)、-C(=O)CH_3、-CH_3、-CH_2CH_3、-$CH_2CH_2CH_3$、-C(=O)OCH_2CH_3、-S(=O)$_2CH_3$、-S(=O)$_2CF_3$、-C(=O)$OC(CH_3)_3$、-C(=O)OCH_2-苯基、-CH_2-苯基、-$CH(CH_3)_2$、-C(=O)$NHCH_2CH_3$、-C(=O)$NHCH(CH_3)_2$、-C(=O)$NHC(CH_3)_3$、-C(=O)$NHCH_2C(=O)OCH_2CH_3$、-C(=O)$C(CH_3)_3$、-$CH(CH_3)_2$、-$CH_2CH(CH_3)_2$、-C(=O)$CH_2C(CH_3)_3$、环丙基、环丁基、环戊基及环己基的取代基的噻喃基。

在本发明化合物的一个具体方面，B为四氢吡喃基。在另一个具体的方面，B为具有一个或多个选自氢、卤素、烷基、烷氧基、卤代烷基、卤代烷氧基、硝基、-CH_2-芳基、-C(=O)烷基、-C(=O)-NH-烷基、环烷基、羟基、-SO_3、-COOH（及其酯）及磺酰基的取代基的四氢吡喃基。在另一个具体的方面，B为具有一个或多个选自-C(=O)、-C(=O)CH_3、-CH_3、-CH_2CH_3、-$CH_2CH_2CH_3$、-C(=O)OCH_2CH_3、-S(=O)$_2CH_3$、-S(=O)$_2CF_3$、-C(=O)$OC(CH_3)_3$、-C(=O)OCH_2-苯基、-CH_2-苯基、-$CH(CH_3)_2$、-C(=O)$NHCH_2CH_3$、-C(=O)$NHCH(CH_3)_2$、-C(=O)$NHC(CH_3)_3$、-C(=O)$NHCH_2C(=O)OCH_2CH_3$、-C(=O)$C(CH_3)_3$、-$CH(CH_3)_2$、-$CH_2CH(CH_3)_2$、-C(=O)$CH_2C(CH_3)_3$、环丙基、环丁基、环戊基及环己基的取代基的四氢吡

喃基。

在一方面，基团 B 选自环丙基、环丁基、环戊基、环己基、四氢呋喃基、oxepanyl (oxepane)、四氢噻吩基 (四氢噻吩)、噻喃基、thiepanyl (thiepane)及四氢吡喃基，其中所述基团 B 可以具有 1-5 个独立地选自酰氨基、酰氧基、烯基、烷氧基、烷基、烷硫基、炔基、氨基、芳基、芳烷基、芳烯基、芳炔基、芳烷氧基、芳氧基、芳硫基、碳环、氰基、氰氧基、卤素、卤代烷基、卤代苯基、羟基、杂芳基、杂芳氧基、杂环、杂芳烷氧基、异氰酸根合、异硫氰酸根合、硝基、亚硫酰基、磺酰基、氨磺酰基、硫代羰基、氰硫基、三卤代甲磺酰氨基、O-氨基甲酰基、N-氨基甲酰基、O-硫代氨基甲酰基、N-硫代氨基甲酰基及 C-酰氨基的取代基。

在本发明的一个方面，基团 A 是被一个或多个取代基取代的，并且选自苯基或苯并[1,3]间二氧杂环戊烯基团；基团 B 是被一个或多个取代基取代的，并且选自环丙基、环丁基、环戊基、环己基、吡咯基、噻喃基及四氢吡喃基；R_1为氢；L_1为 - S-；L_2为 - CH_2CH_2-，及其可药用的盐。根据本发明的该方面，所述基团 A 取代基选自卤素和烷氧基，且所述基团 B 取代基选自 - C(=O)、 - C(=O)CH_3、-CH_3、-CH_2CH_3、-$CH_2CH_2CH_3$、-C(=O)OCH_2CH_3、-S(=O)$_2CH_3$、-S(=O)$_2CF_3$、-C(=O)OC$(CH_3)_3$、 - C(=O)OCH_2-苯基、 -CH_2-苯基、 -CH$(CH_3)_2$、 -C(=O)$NHCH_2CH_3$、 -C(=O)NHCH$(CH_3)_2$、-C(=O)NHC$(CH_3)_3$、-C(=O)$NHCH_2$C(=O)OCH_2CH_3、-C(=O)C$(CH_3)_3$、-CH$(CH_3)_2$、-CH_2CH$(CH_3)_2$、-C(=O)CH_2C$(CH_3)_3$、环丙基、环丁基、环戊基及环己基。

在一方面，本发明提供其中 R1 为氢的式 I 的化合物。

在一方面，本发明提供其中 L_1为 - S-式 I 的化合物。

在一方面，本发明提供其中 L_2为 - CH_2CH_2-的式 I 的化合物。

在一方面，本发明提供其中 B 环为任选被取代的金刚烷环的式 I 的化合物。

在一方面，本发明提供如下的式 I 化合物，其中 L_2为-$(CH_2)_n$-$(CH_2)_n$-，并且各个 n 独立地选自 0、1、2 和 3，且各个碳可任选被一个或多个独立地选自羟基、卤素、烷氧基、烷基、氨基、环烷基、-NR_2R_3、-NSO_2R_4、-NC(=O)NR_2R_3、杂芳基、芳基、环烷基及杂环的取代基取代；其中-R_2和-R_3独立地选自 - H、烷基及-C(=O)OR_4；并且其中 R_4为烷基（例如甲基、乙基、丙基、异丙基、丁基、异丁基或叔丁基）。

除非另外定义，本文使用的所有科技术语具有与本发明所属领域的普通技术人员所理解的相同的意义。虽然那些类似于或等同于本文所述的方法和材料可以用于实施或测试本发明，但是合适的方法和材料如下文描述。在出现不一致的情况下，以本说明书（包括定义）为准。另外，所述材料、方法和实施例仅仅是示例性的，不是意在限制。

通过下文的详细描述以及权利要求书，本发明的其他特征和优点将是显而易见的。

具体实施方式

1. 定义

本文使用的“酰氨基（acylamino）”（或“酰胺基（acylamido）”）是与氨基氮连接的本文定义的任何 C1-6 酰基（烷酰基），例如乙酰氨基、氯乙酰氨基、丙酰氨基、丁酰氨基、戊酰氨基及己酰氨基，以及芳基取代的 C1-6 酰氨基，例如苯甲酰氨基和五氟苯甲酰氨基。

本文使用的“酰氧基”是与氧基（-O-）连接的本文定义的任何 C1-6 酰基（烷酰基），例如甲酰氧基、乙酰氧基、丙酰氧基、丁酰氧基、戊酰氧基及己酰氧基。

除非对链长另有限定，本文使用的术语“烯基”本身或作为其他基团的部分时是指 2-10 个碳原子的直链或支链基团，在所述链的两个碳原子之间包含至少一个双键。烯基的非限制性实例通常包括乙烯基、1-丙烯基、2-丙烯基、2-甲基-1-丙烯基、1-丁烯基及 2-丁烯基。

本文使用的术语“烷氧基”是指本文定义的-O-烷基及-O-环烷基。低级烷氧基是指-O-低级烷基。非限制性烷氧基包括被上述 C1-10 烷基之一取代的氧，所述烷基可任选被取代。非限制性的烷氧基取代基包括卤素、吗啉代、氨基，包括烷基氨基和二烷基氨基，以及羧基包括其酯。

本文使用的术语“烷基”是指饱和的脂族烃，包括直链和支链基团。在一方面，所述烷基具有 1-20 个碳原子（在本文中其出现的任何地方，数值范围例如“1-20”指的是给定范围内的每一个整数；例如“1-20 个碳原子”意指该烷基可以由 1 个碳原子、2 个碳原子、3 个碳原子等，最高达 20 个碳原子并包括 20 个碳原子组成）。在另一个方面，它是具有 1-10 个碳原子的中等大小的烷基。还在另一个方面，它为具有 1-6 个碳原子的低级烷基，并且进一步更优选 1-4 个碳原子。该烷基可以是被取

代的或未被取代的。当它被取代时，所述取代基是一个或多个并独立地选自环烷基、芳基、杂芳基、杂环、羟基、烷氧基、芳氧基、巯基、烷硫基、芳硫基、氰基、卤素、羰基、硫代羰基、O-氨基甲酰基、N-氨基甲酰基、O-硫代氨基甲酰基、N-硫代氨基甲酰基、C-酰氨基、N-酰氨基、C-羧基、O-羧基、氰氧基、异氰酸根合、氰硫基、异硫氰酸根合、硝基、甲硅烷基及氨基。C1-10 烷基的非限制性实例通常包括甲基、乙基、丙基、异丙基、丁基、仲丁基、叔丁基、戊基、己基及辛基，它可以是任选被取代的。

本文使用的术语“烷硫基”是指如本文定义的 S-烷基和-S-环烷基两种基团。非限制性的烷硫基包括上述 C1-10 烷基之一取代的硫，所述烷基可以是任选被取代的。还包括该烷硫基的亚砜和砜。

除非文中对链长另有限定，本文使用的术语“炔基”是指 2-10 个碳原子的直链或支链基团，其中在所述链的两个碳原子之间有至少一个三键。炔基通常包括乙炔基、1-丙炔基、1-甲基-2-丙炔基、2-丙炔基、1-丁炔基及 2-丁炔基。

本文使用的术语“氨基”是指 $-NR_{17}R_{18}$ 基团，R_{17} 和 R_{18} 为氢时即为 $-NH_2$ 基团。R_{17} 和 R_{18} 还可独立地为氢、C1-10 烷基或环烷基；或者 R_{17} 和 R_{17} 结合 N 形成例如哌啶的环结构；或者 R_{17} 和 R_{18} 结合 N 形成例如哌嗪的环。R_{17} 和 R_{18} 的中一个可以为氢且另一个为烷基或环烷基。所述烷基或环烷基可以是任选被取代的。

本文使用的术语“氨基酸”是指天然氨基酸和非天然氨基酸。天然氨基酸的实例包括但不限于丙氨酸、精氨酸、天冬酰胺、门冬氨酸、半胱氨酸、谷氨酸、谷酰胺、甘氨酸、组氨酸、异亮氨酸、亮氨酸、赖氨酸、蛋氨酸、苯丙氨酸、脯氨酸、丝氨酸、苏氨酸、色氨酸、酪氨酸、缬氨酸及其被保护的形式(例如 boc)。非天然氨基酸的实例包括但不限于 O-甲基-L-酪氨酸、L-3-(2-萘基)丙氨酸、3-甲基-苯丙氨酸、O-4-烯丙基-L-酪氨酸、4-丙基-L-酪氨酸、三-O-乙基-G1cNAcβ-丝氨酸、L-多巴、氟化苯丙氨酸、异丙基-L-苯丙氨酸、对叠氮基-L-苯丙氨酸、对酰基-L-苯丙氨酸、对苯甲酰基-L-苯丙氨酸、L-磷酸丝氨酸、膦酰基丝氨酸、膦酰基酪氨酸、对碘-苯丙氨酸、对溴代苯丙氨酸、对氨基-L-苯丙氨酸及异丙基-L-苯丙氨酸。

本文使用的术语“芳基”其本身或作为其他基团的部分是指环部分

含 6-14 个碳的单环、双环或三环的芳香族基团。非限制性的芳基包括 C6-14 芳基，优选 C6-10 芳基。C6-14 芳基通常包括苯基、萘基、菲基、蒽基、茚基、奥基（azulenyl）、联苯基、联二亚苯基及芴基。

本文使用的术语“芳烷基”是指被任何上述如本文定义的 C6-14 芳基取代的任何 C1-10 烷基。芳烷基的非限制性实例包括苄基、苯乙基及萘甲基。

本文使用的术语“芳烯基”的意思是被任何上述的 C6-14 芳基取代的任何上述的 C2-10 烯基。

本文使用的术语“芳炔基”是指被任何上述如本文定义的 C6-14 芳基取代的 C2-10 炔基。

本文使用的术语“芳烷氧基”是指被任何如本文定义的芳基取代的 C1-10 烷氧基，所述芳基可以是任选被取代的。芳烷氧基的实例包括苯甲氧基和苯乙氧基。

本文使用的术语“芳氧基”是指被任何本文定义的 C6-14 芳基取代的氧，所述芳基可以是任选被取代的。芳氧基的实例包括苯氧基和 4-甲基苯氧基。

本文使用的术语“芳硫基”基团是指本文定义的-S-芳基和-S-杂芳基的两种基团。

本文使用的术语“碳环”或“碳环的”是指环烷基及部分饱和的碳环基团。非限制性的碳环基团为 C3-8 环烷基和环烯基。环烷基通常包括环丙基、环丁基、环戊基、环己基、环己烯基及环庚基。

本文使用的术语“氰基”是指-C≡ N 基团。

本文使用的术语“氰氧基”是指-CNO 基团。

本文使用的术语“卤素”或“卤素基团”是指氟、氯、溴及碘基团。

本文使用的术语“卤代烷基”是指被一个或多个氟、氯、溴或碘基团取代的 C1-10 烷基，例如氟甲基、二氟甲基、三氟甲基、五氟乙基、1,1-二氟乙基、氯甲基、氯氟甲基及三氯甲基。所述卤素基团可独立选择。

本文使用的术语“卤代苯基”是指被一个或多个氟、氯、溴或碘基团取代的苯基。所述卤素基团可独立选择，例如双-卤素取代的苯基可以具有氟和氯取代基。

本文使用的术语“氢”是指 - H 基团。

本文使用的术语“羟基”是指-OH基团。

本文使用的术语“杂芳基”是指这样的基团，其具有5-14个环原子；在环阵列上共享6、10或14个π电子；并含有碳原子及1、2或3个氧、氮或硫杂原子。非限制性的杂芳基包括:噻吩基(thienyl, thiophenyl);苯并[b]噻吩基;萘并[2,3-b]噻吩基;噻蒽基;呋喃基(furyl, furanyl);异苯并呋喃基;色烯基;呫吨基;吩噁噻基;吡咯基，包括但不限于2H-吡咯基;咪唑基;吡唑基;吡啶基(pyridyl, pyridinyl)，包括但不限于2-吡啶基、3-吡啶基和4-吡啶基;吡嗪基;嘧啶基;哒嗪基;中氮茚基;异吲哚基;3H-吲哚基;吲哚基;吲唑基;嘌呤基;4H-喹嗪基;异喹啉基;喹啉基;2,3-二氮杂萘基;1,5-二氮杂萘基;喹唑啉基;噌啉基;蝶啶基;咔唑基;β-咔啉基;菲啶基;吖啶基;萘嵌间二氮苯基;菲咯啉基;吩嗪基;异噻唑基;吩噻嗪基;异噁唑基;呋咱基;吩噁嗪基;1,4-二氢喹喔啉-2,3-二酮;7-氨基异香豆素;吡啶并[1,2-a]嘧啶-4-酮;吡唑并[1,5-a]嘧啶基，包括但不限于吡唑并[1,5-a]嘧啶-3-基;1,2-苯并异噁唑-3-基;苯并咪唑基;2-羟吲哚基及2-氧代苯并咪唑基。如果所述杂芳基在环上含有氮原子，那么该氮原子可以为N-氧化物的形式，例如吡啶基N-氧化物、吡嗪基N-氧化物和嘧啶基N-氧化物。杂芳基可以是单环的、双环的、三环的和/或多环的。

本文使用的术语“杂芳氧基”是指被本文定义的杂芳基取代的氧，所述杂芳基可以是任选被取代的。非限制性的杂芳氧基包括吡啶氧基、吡嗪氧基、吡咯氧基、吡唑氧基、咪唑氧基及噻吩氧基。

本文使用的术语“杂环”或“杂环的”是指饱和的或部分饱和的3-7元单环、7-10元双环环系或7-14元多环环系，所述环由碳原子及1-5个独立地选自O、N和S的杂原子组成，其中所述氮和硫杂原子可以是任选被氧化的，所述氮可以是任选被季铵化的；并且包括任何双环，其中任何上述定义的杂环与苯环稠合，且其中所述杂环可以在碳原子上或在氮原子上被取代，条件是产生的化合物是稳定的(这是本领域技术人员容易识别的)。非限制性的饱和的或部分饱和的杂环基包括四氢呋喃基、吡喃基、哌啶基、哌嗪基、吡咯烷基、咪唑烷基、咪唑啉基、二氢吲哚基、异二氢氮茚基、奎宁环基、吗啉基、异色满基、色满基、吡唑烷基、吡唑啉基、特窗酰基及tetramoyl基团。

本文使用的术语“杂芳烷氧基”是指被如本文定义的杂芳基取代的

C1-10 烷氧基，所述杂芳基可以是任选被取代的。

本文使用的术语“异氰酸根合”是指-NCO 基团。

本文使用的术语“异硫氰酸根合”是指-NCS 基团。

本文使用的术语“硝基”是指-NO_2基团。

本文使用的术语“亚硫酰基”是指-S(=O)R"基团。R"可以为环烷基或烷基。所述烷基或环烷基可以是任选被取代的。

本文使用的术语“磺酰基”是指-$S(=O)_2R$"基团。R"可以为环烷基或烷基。所述烷基或环烷基可以是任选被取代的。

本文使用的术语“氨磺酰基”是指-$S(=O)_2NR_{17}R_{18}$。R_{17}和 R_{18}可独立地为氢、C1-10 烷基或环烷基；或者 R_{17}和 R_{18}结合 N 形成例如哌啶的环结构；或者 R_{17}和 R_{18}结合 N 以形成例如哌嗪的环。R_{17}和 R_{18}的一个可以为氢且另一个为环烷基或烷基。所述烷基或环烷基可以是任选被取代的。

本文使用的术语“硫代羰基”基团是指-C(=S)R"基团。R"可以为环烷基或烷基。所述烷基或环烷基可以是任选被取代的。

本文使用的术语“氰硫基”是指-CNS 基团。

本文使用的术语“三卤代甲磺酰氨基”是指 $X_3CS(=O)_2NR_{17}$-基团，其中 X 独立地选自-Br、-Cl、-F 及-I 基团，且 R_{17}如本文中的定义。

本文使用的术语“O-氨基甲酰基”是指-$OC(=O)NR_{17}R_{18}$基团。R_{17}和 R_{18}可以为氢、C1-10 烷基或环烷基；或者 R_{17}和 R_{18}结合 N 形成例如哌啶的环结构；或者 R_{17}和 R_{18}结合 N 以形成例如哌嗪的环。R_{17}和 R_{18}的一个可以为氢且另一个为烷基或环烷基。所述烷基或环烷基可以是任选被取代的。

本文使用的术语“N-氨基甲酰基”是指 $R_{18}OC(=O)NR_{17}$-基团。R_{18}可以为氢；R_{17}和 R_{18}可以为 C1-10 烷基或环烷基；或者 R_{17}和 R_{18}结合 N 形成例如哌啶的环结构；或者 R_{17}和 R_{18}结合 N 以形成例如哌嗪的环。R_{17}和 R_{18}的一个可以为氢且另一个为烷基或环烷基。所述烷基或环烷基可以是任选被取代的。

本文使用的术语“O-硫代氨基甲酰基”是指-$OC(=S)NR_{17}R_{18}$基团。R_{17}和 R_{18}可以为氢、C1-10 烷基或环烷基；或者 R_{17}和 R_{18}结合 N 形成例如哌啶的环结构；或者 R_{17}和 R_{18}结合 N 以形成例如哌嗪的环。R_{17}和 R_{18}的一个可以为氢且另一个为环烷基或烷基。所述烷基或环烷基可以是任选被取代的。

本文使用的术语“N-硫代氨基甲酰基”是指 $R_{17}OC(=S)NR_{18}$-基团。R_{17}

可以为氢；R_{17}和R_{18}可以为 C1-10 烷基或环烷基。所述烷基或环烷基可以是任选被取代的。

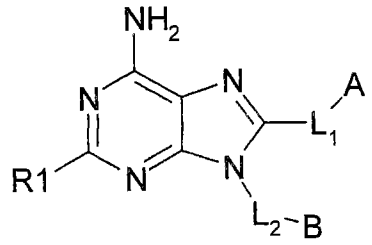
本文所用的术语“C-酰氨基”是指-C(=O)$NR_{17}R_{18}$基团。“N-酰氨基”是指$R_{17}C(=O)NR_{18}$-基团（R_{18}不为氢）。R_{17}和R_{18}可以为氢、C1-10 烷基或环烷基；或者R_{17}和R_{18}结合 N 形成例如哌啶的环结构；或者R_{17}和R_{18}结合 N 以形成例如哌嗪的环。R_{17}和R_{18}的一个可以为氢且另一个为烷基或环烷基。所述烷基或环烷基可以是任选被取代的。

在某些方面，除非另外指出，所述烷基、烯基、炔基、芳基、杂芳基、环烷基、碳环和杂环基包括一个或多个卤素、羟基、羧基、氨基、硝基、氰基、C1-C6 酰氨基、C1-C6 酰氧基、C1-C6 烷氧基、芳氧基、烷硫基、C6-C10 芳基、C4-C7 环烷基、C2-C6 烯基、C2 C6 炔基、C6-C10 芳基(C2-C6)烯基、C6-C10 芳基(C2-C6)炔基、杂环及杂芳基。

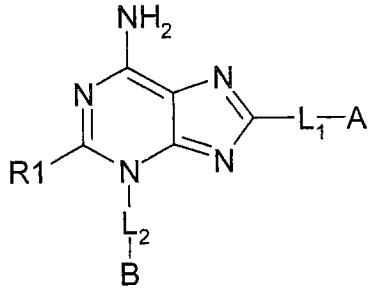
在某些方面，除非另外指出，所述芳基、芳烷基、芳烯基、芳炔基以及杂芳基和杂芳基烷基可任选地被一个或多个卤素、C1-C6 卤代烷基、C6-C10 芳基、C4-C7 环烷基、C1-C6 烷基、C2-C6 烯基、C2-C6 炔基、C6 C10 芳基(C1 C6)烷基、C6-C10 芳基(C2-C6)烯基、C6-C10 芳基(C2-C6)炔基、C1-C6 羟烷基、硝基、氨基、脲基、氰基、C1-C6 酰氨基、羟基、硫醇、C1-C6 酰氧基、叠氮基、C1-C6 烷氧基、羧基或 C1-2 亚烷基二氧基（例如亚甲基二氧基）取代。

2. 本发明的化合物和组合物

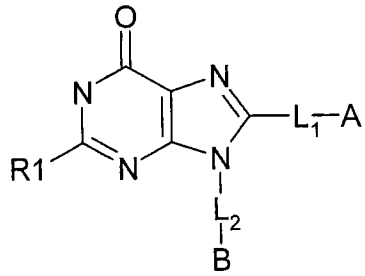
本发明涉及式 I-Ⅲ的化合物。本发明还涉及含有一种或多种式 I-Ⅲ的化合物及可药用的载体（赋形剂）的药物组合物。本发明人发现，式 I-Ⅲ的化合物具有药理学活性。式 I-Ⅲ的化合物被证明具有的一种特定活性为抗癌活性。本发明涉及以下式 I-Ⅲ的化合物。本发明还涉及含有一种或多种式 I-Ⅲ的化合物及可药用的赋形剂的药物组合物。本发明人发现，式 I-Ⅲ的化合物具有药理学活性。式 I-Ⅲ的化合物被证明具有的一种特定活性为抗癌活性。本发明涉及以下式 I-Ⅲ的化合物。本发明还涉及含有一种或多种式 I-Ⅲ的化合物及可药用的赋形剂的药物组合物。本发明人发现，式 I-Ⅲ的化合物具有药理学活性。式 I-Ⅲ的化合物被证明具有的一种特定活性为抗癌活性。



式 I



式 II



式 III

本发明提供如下的式 I 化合物，其中：

A 选自被取代的或未被取代的芳基、杂芳基、杂环或碳环基团；

B 选自被取代的或未被取代的芳基、杂芳基、杂环或碳环基团；

R1 选自氢、烷基、芳基、杂芳基、氨基、卤素、硫及硫代烷基；

L_1 可以是饱和的、部分饱和的或不饱和的，并且选自 $-(CH_2)_n-(CH_2)_n-$、$-(CH_2)_nC(=O)(CH_2)_n-$、$-(CH_2)_nC(=O)N(CH_2)_n-$、$-(CH_2)_nNC(=O)O(CH_2)_n-$、$-(CH_2)_nNC(=O)N(CH_2)_n-$、$-(CH_2)_nNC(=S)S(CH_2)_n-$、$-(CH_2)_nOC(=O)S(CH_2)_n-$、$-(CH_2)_nNH(CH_2)_n-$、$-(CH_2)_nO(CH_2)_n-$、$-(CH_2)_nS(CH_2)_n-$ 及 $-(CH_2)_nNC(=S)N(CH_2)_n-$，其中各个 n 独立地选自 0、1、2、3、4、5、6、7 和 8，并且其中各个碳和/或氮可任选被一个或多个独立地选自羟基、卤素、烷氧基、烷基、氨基、环烷基、$-NR_2R_3$、$-NSO_2R_4$、$-NC(=O)NR_2R_3$、杂芳基、芳基、环烷基及杂环的取代基取代；其中 $-R_2$ 和 $-R_3$ 独立地选自

-H、烷基及-C(=O)OR_4；并且其中 R_4 为烷基（例如甲基、乙基、丙基、异丙基、丁基、异丁基或叔丁基）；

L_2 可以是饱和的、部分饱和的或不饱和的，并且选自$-(CH_2)_n-(CH_2)_n-$、$-(CH_2)_nC(=O)(CH_2)_n-$、$-(CH_2)_nC(=O)N(CH_2)_n-$、$-(CH_2)_nNC(=O)O(CH_2)_n-$、$-(CH_2)_nNC(=O)N(CH_2)_n-$、$-(CH_2)_nNC(=S)S(CH_2)_n-$、$-(CH_2)_nOC(=O)S(CH_2)_n-$、$-(CH_2)_nNH(CH_2)_n-$、$-(CH_2)_nO(CH_2)_n-$、$-(CH_2)_nS(CH_2)_n-$ 及 $-(CH_2)_nNC(=S)N(CH_2)_n-$，其中各个 n 独立地选自 0、1、2、3、4、5、6、7 和 8，并且其中各个碳和/或氮可任选被一个或多个独立地选自羟基、卤素、烷氧基、烷基、氨基、环烷基、$-NR_2R_3$、$-NSO_2R_4$、$-NC(=O)NR_2R_3$、杂芳基、芳基、环烷基及杂环的取代基取代；其中$-R_2$ 和$-R_3$ 独立地选自-H、烷基及-C(=O)OR_4；并且其中 R_4 为烷基（例如甲基、乙基、丙基、异丙基、丁基、异丁基或叔丁基）。

除非另外指出，L_1 和 L_2 可以是两种取向中的任一种，例如，$-(CH_2)_nNC(=S)S(CH_2)_n-$指噁吟$-(CH_2)_nNC(=S)S(CH_2)_n-$苯基取向和噁吟$-(CH_2)_nSC(=S)N(CH_2)_n-$苯基取向。

根据一个方面，A 为具有一个或多个选自卤素、烷基、烷氧基、卤代烷基、卤代烷氧基、硝基、-C(=O)烷基、羟基、$-C\equiv N$、$-SO_3$及-COOH的取代基的芳基。在本发明的一个更具体的方面，A 为具有一个或多个选自卤素、烷基、烷氧基、卤代烷基、卤代烷氧基、硝基、-C(=O)烷基、羟基及-COOH 的取代基的苯基。在本发明的一个甚至更具体的方面，A 为具有一个或多个选自-F、-Cl、-Br、-I、$-OCH_3$、$-CF_3$、$-CH_3$、$-OCF_3$、-C(=O)CH_3、-COOH、$-C\equiv N$及$-NO_2$的取代基的苯基。

在本发明化合物的一个方面，A 为具有一个或多个选自羟基、卤素、烷基、烷氧基、卤代烷基、卤代烷氧基、$-N(C_{1-3}$烷基$)_2$、$-NH(C_{1-3}$烷基$)$、-C(=O)NH_2、-C(=O)$NH(C_{1-3}$烷基$)$、$-C(=O)N(C_{1-3}$烷基$)_2$、$-S(=O)_2(C_{1-3}$烷基$)$、$-S(=O)_2NH_2$、$-S(=O)_2N(C_{1-3}$烷基$)_2$、$-S(=O)_2NH(C_{1-3}$烷基$)$、$-CHF_2$、$-OCF_3$、$-OCHF_2$、$-SCF_3$、$-CF_3$、-CN、$-NH_2$及$-NO_2$的取代基的芳基。在一个具体的方面，A 为苯基。

在本发明化合物的一个方面，A 为具有 1-5 个独立地选自酰氨基、酰氧基、烯基、烷氧基、烷基、烷硫基、炔基、氨基、芳基、芳烷基、芳烯基、芳炔基、芳烷氧基、芳氧基、芳硫基、碳环、氰基、氰氧基、卤素、卤代烷基、卤代苯基、羟基、杂芳基、杂芳氧基、杂环、杂芳烷

氧基、异氰酸根合、异硫氰酸根合、硝基、亚硫酰基、磺酰基、氨磺酰基、硫代羰基、氰硫基、三卤代甲磺酰氨基、O-氨基甲酰基、N-氨基甲酰基、O-硫代氨基甲酰基、N-硫代氨基甲酰基及C-酰氨基的取代基的苯基。

根据本发明化合物的一个方面，B为具有一个或多个选自卤素、烷基、烷氧基、卤代烷基、卤代烷氧基、硝基、-C(=O)烷基、羟基、$-SO_3$及-COOH的取代基的芳基。在一个具体的方面，B为苯基。在一个更具体的方面，B为具有一个或多个选自卤素、烷基、烷氧基、卤代烷基、卤代烷氧基、硝基、-C(=O)烷基、羟基及-COOH的取代基的苯基。在一个甚至更具体的方面，B为具有一个或多个选自-F、-Cl、-Br、-I、$-CH_3$、$-OCH_3$、$-CF_3$、$-OCF_3$、$-C(=O)CH_3$、-COOH、-C≡N及$-NO_2$的取代基的苯基。

在本发明化合物的一个方面，B为具有一个或多个选自羟基、卤素、烷基、烷氧基、卤代烷基、卤代烷氧基、$-N(C_{1-3}烷基)_2$、$-NH(C_{1-3}烷基)$、$-C(=O)NH_2$、$-C(=O)NH(C_{1-3}烷基)$、$-C(=O)N(C_{1-3}烷基)_2$、$-S(=O)_2(C_{1-3}烷基)$、$-S(=O)_2NH_2$、$-S(=O)_2N(C_{1-3}烷基)_2$、$-S(=O)_2NH(C_{1-3}烷基)$、$-CHF_2$、$-OCF_3$、$-OCHF_2$、$-SCF_3$、$-CF_3$、-CN、$-NH_2$、$-SO_3$及$-NO_2$的取代基的芳基。

在本发明化合物的一个方面，B为具有1-5个独立地选自酰氨基、酰氧基、烯基、烷氧基、烷基、烷硫基、炔基、氨基、芳基、芳烷基、芳烯基、芳炔基、芳烷氧基、芳氧基、芳硫基、碳环、氰基、氰氧基、卤素、卤代烷基、卤代苯基、羟基、杂芳基、杂芳氧基、杂环、杂芳烷氧基、异氰酸根合、异硫氰酸根合、硝基、亚硫酰基、磺酰基、氨磺酰基、硫代羰基、氰硫基、三卤代甲磺酰氨基、O-氨基甲酰基、N-氨基甲酰基、O-硫代氨基甲酰基、N-硫代氨基甲酰基及C-酰氨基的取代基的苯基。

根据一个实施方案，A为被取代的或未被取代的苯并[1,3]间二氧杂环戊烯基团。在该实施方案的一个方面，A为6-溴-苯并[1,3]间二氧杂环戊烯-5-基。在该实施方案的一个方面，A为未被取代的苯并[1,3]间二氧杂环戊烯基团。在该实施方案的一个方面，A为6-碘-苯并[1,3]间二氧杂环戊烯-5-基。在该实施方案的一个方面，A为6-氯-苯并[1,3]间二氧杂环戊烯-5-基。在该实施方案的一个方面，A为6-氟-苯并[1,3]间二氧杂环戊烯-5-基。在该实施方案的一个方面，A具有1-5个独立地选自酰氨基、酰氧基、烯基、烷氧基、烷基、烷硫基、炔基、氨基、

芳基、芳烷基、芳烯基、芳炔基、芳烷氧基、芳氧基、芳硫基、碳环、氰基、氰氧基、卤素、卤代烷基、卤代苯基、羟基、杂芳基、杂芳氧基、杂环、杂芳烷氧基、异氰酸根合、异硫氰酸根合、硝基、亚硫酰基、磺酰基、氨磺酰基、硫代羰基、氰硫基、三卤代甲磺酰氨基、O-氨基甲酰基、N-氨基甲酰基、O-硫代氨基甲酰基、N-硫代氨基甲酰基及C-酰氨基的取代基。

根据一个实施方案，A为被取代的或未被取代的2，3-二氢-1-茚酮基团。在该实施方案的一个方面，A具有1-5个独立地选自酰氨基、酰氧基、烯基、烷氧基、烷基、烷硫基、炔基、氨基、芳基、芳烷基、芳烯基、芳炔基、芳烷氧基、芳氧基、芳硫基、碳环、氰基、氰氧基、卤素、卤代烷基、卤代苯基、羟基、杂芳基、杂芳氧基、杂环、杂芳烷氧基、异氰酸根合、异硫氰酸根合、硝基、亚硫酰基、磺酰基、氨磺酰基、硫代羰基、氰硫基、三卤代甲磺酰氨基、O-氨基甲酰基、N-氨基甲酰基、O-硫代氨基甲酰基、N-硫代氨基甲酰基及C-酰氨基的取代基。

根据一个实施方案，A为被取代的或未被取代的1，2-二氢化茚基团。在该实施方案的一个方面，A具有1-5个独立地选自酰氨基、酰氧基、烯基、烷氧基、烷基、烷硫基、炔基、氨基、芳基、芳烷基、芳烯基、芳炔基、芳烷氧基、芳氧基、芳硫基、碳环、氰基、氰氧基、卤素、卤代烷基、卤代苯基、羟基、杂芳基、杂芳氧基、杂环、杂芳烷氧基、异氰酸根合、异硫氰酸根合、硝基、亚硫酰基、磺酰基、氨磺酰基、硫代羰基、氰硫基、三卤代甲磺酰氨基、O-氨基甲酰基、N-氨基甲酰基、O-硫代氨基甲酰基、N-硫代氨基甲酰基及C-酰氨基的取代基。

根据一个实施方案，A为被取代的或未被取代的苯并[1,4]二噁烷基团。在该实施方案的一个方面，A具有1-5个独立地选自酰氨基、酰氧基、烯基、烷氧基、烷基、烷硫基、炔基、氨基、芳基、芳烷基、芳烯基、芳炔基、芳烷氧基、芳氧基、芳硫基、碳环、氰基、氰氧基、卤素、卤代烷基、卤代苯基、羟基、杂芳基、杂芳氧基、杂环、杂芳烷氧基、异氰酸根合、异硫氰酸根合、硝基、亚硫酰基、磺酰基、氨磺酰基、硫代羰基、氰硫基、三卤代甲磺酰氨基、O-氨基甲酰基、N-氨基甲酰基、O-硫代氨基甲酰基、N-硫代氨基甲酰基及C-酰氨基的取代基。

根据一个实施方案，A为被取代的或未被取代的苯并噁嗪酮基团。在该实施方案的一个方面，A具有1-5个独立地选自酰氨基、酰氧基、

烯基、烷氧基、烷基、烷硫基、炔基、氨基、芳基、芳烷基、芳烯基、芳炔基、芳烷氧基、芳氧基、芳硫基、碳环、氰基、氰氧基、卤素、卤代烷基、卤代苯基、羟基、杂芳基、杂芳氧基、杂环、杂芳烷氧基、异氰酸根合、异硫氰酸根合、硝基、亚硫酰基、磺酰基、氨磺酰基、硫代羰基、氰硫基、三卤代甲磺酰氨基、O-氨基甲酰基、N-氨基甲酰基、O-硫代氨基甲酰基、N-硫代氨基甲酰基及C-酰氨基的取代基。

根据一个实施方案，A 为被取代的或未被取代的苯并噁嗪基团。在该实施方案的一个方面，A 具有 1-5 个独立地选自酰氨基、酰氧基、烯基、烷氧基、烷基、烷硫基、炔基、氨基、芳基、芳烷基、芳烯基、芳炔基、芳烷氧基、芳氧基、芳硫基、碳环、氰基、氰氧基、卤素、卤代烷基、卤代苯基、羟基、杂芳基、杂芳氧基、杂环、杂芳烷氧基、异氰酸根合、异硫氰酸根合、硝基、亚硫酰基、磺酰基、氨磺酰基、硫代羰基、氰硫基、三卤代甲磺酰氨基、O-氨基甲酰基、N-氨基甲酰基、O-硫代氨基甲酰基、N-硫代氨基甲酰基及C-酰氨基的取代基。

根据一个实施方案，A 为被取代的或未被取代的苯并二噁烯基团。在该实施方案的一个方面，A 具有 1-5 个独立地选自酰氨基、酰氧基、烯基、烷氧基、烷基、烷硫基、炔基、氨基、芳基、芳烷基、芳烯基、芳炔基、芳烷氧基、芳氧基、芳硫基、碳环、氰基、氰氧基、卤素、卤代烷基、卤代苯基、羟基、杂芳基、杂芳氧基、杂环、杂芳烷氧基、异氰酸根合、异硫氰酸根合、硝基、亚硫酰基、磺酰基、氨磺酰基、硫代羰基、氰硫基、三卤代甲磺酰氨基、O-氨基甲酰基、N-氨基甲酰基、O-硫代氨基甲酰基、N-硫代氨基甲酰基及C-酰氨基的取代基。

根据一个实施方案，A 为被取代的或未被取代的萘基。在该实施方案的一个方面，A 具有 1-6 个独立地选自酰氨基、酰氧基、烯基、烷氧基、烷基、烷硫基、炔基、氨基、芳基、芳烷基、芳烯基、芳炔基、芳烷氧基、芳氧基、芳硫基、碳环、氰基、氰氧基、卤素、卤代烷基、卤代苯基、羟基、杂芳基、杂芳氧基、杂环、杂芳烷氧基、异氰酸根合、异硫氰酸根合、硝基、亚硫酰基、磺酰基、氨磺酰基、硫代羰基、氰硫基、三卤代甲磺酰氨基、O-氨基甲酰基、N-氨基甲酰基、O-硫代氨基甲酰基、N-硫代氨基甲酰基及C-酰氨基的取代基。

根据一个实施方案，A 为被取代的或未被取代的吡咯基团。在该实施方案的一个方面，A 具有 1-3 个独立地选自酰氨基、酰氧基、烯基、

烷氧基、烷基、烷硫基、炔基、氨基、芳基、芳烷基、芳烯基、芳炔基、芳烷氧基、芳氧基、芳硫基、碳环、氰基、氰氧基、卤素、卤代烷基、卤代苯基、羟基、杂芳基、杂芳氧基、杂环、杂芳烷氧基、异氰酸根合、异硫氰酸根合、硝基、亚硫酰基、磺酰基、氨磺酰基、硫代羰基、氰硫基、三卤代甲磺酰氨基、O-氨基甲酰基、N-氨基甲酰基、O-硫代氨基甲酰基、N-硫代氨基甲酰基及C-酰氨基的取代基。根据一个方面，A是未被取代的。

根据一个实施方案，A为被取代的或未被取代的吡啶基团。在该实施方案的一个方面，A具有1-4个独立地选自酰氨基、酰氧基、烯基、烷氧基、烷基、烷硫基、炔基、氨基、芳基、芳烷基、芳烯基、芳炔基、芳烷氧基、芳氧基、芳硫基、碳环、氰基、氰氧基、卤素、卤代烷基、卤代苯基、羟基、杂芳基、杂芳氧基、杂环、杂芳烷氧基、异氰酸根合、异硫氰酸根合、硝基、亚硫酰基、磺酰基、氨磺酰基、硫代羰基、氰硫基、三卤代甲磺酰氨基、O-氨基甲酰基、N-氨基甲酰基、O-硫代氨基甲酰基、N-硫代氨基甲酰基及C-酰氨基的取代基。根据该实施方案的一个方面，A是未被取代的。

根据一个实施方案，A为被取代的或未被取代的环己基。在该实施方案的一个方面，A具有1-5个独立地选自酰氨基、酰氧基、烯基、烷氧基、烷基、烷硫基、炔基、氨基、芳基、芳烷基、芳烯基、芳炔基、芳烷氧基、芳氧基、芳硫基、碳环、氰基、氰氧基、卤素、卤代烷基、卤代苯基、羟基、杂芳基、杂芳氧基、杂环、杂芳烷氧基、异氰酸根合、异硫氰酸根合、硝基、亚硫酰基、磺酰基、氨磺酰基、硫代羰基、氰硫基、三卤代甲磺酰氨基、O-氨基甲酰基、N-氨基甲酰基、O-硫代氨基甲酰基、N-硫代氨基甲酰基及C-酰氨基的取代基。根据该实施方案的一个方面，A是未被取代的。

根据一个实施方案，B为被取代的或未被取代的苯并[1,3]间二氧杂环戊烯基团。在该实施方案的一个方面，B为6-溴-苯并[1,3]间二氧杂环戊烯-5-基。在该实施方案的一个方面，B为未被取代的苯并[1,3]间二氧杂环戊烯基团。在该实施方案的一个方面，B为6-碘-苯并[1,3]间二氧杂环戊烯-5-基。在该实施方案的一个方面，B为6-氯-苯并[1,3]间二氧杂环戊烯-5-基。在该实施方案的一个方面，B为6-氟-苯并[1,3]间二氧杂环戊烯-5-基。在该实施方案的一个方面，B具有1-4个独立

地选自酰氨基、酰氧基、烯基、烷氧基、烷基、烷硫基、炔基、氨基、芳基、芳烷基、芳烯基、芳炔基、芳烷氧基、芳氧基、芳硫基、碳环、氰基、氰氧基、卤素、卤代烷基、卤代苯基、羟基、杂芳基、杂芳氧基、杂环、杂芳烷氧基、异氰酸根合、异硫氰酸根合、硝基、亚硫酰基、磺酰基、氨磺酰基、硫代羰基、氰硫基、三卤代甲磺酰氨基、O-氨基甲酰基、N-氨基甲酰基、O-硫代氨基甲酰基、N-硫代氨基甲酰基及C-酰氨基的取代基。

根据一个实施方案，B 为被取代的或未被取代的萘基。在该实施方案的一个方面，B 具有 1-6 个独立地选自酰氨基、酰氧基、烯基、烷氧基、烷基、烷硫基、炔基、氨基、芳基、芳烷基、芳烯基、芳炔基、芳烷氧基、芳氧基、芳硫基、碳环、氰基、氰氧基、卤素、卤代烷基、卤代苯基、羟基、杂芳基、杂芳氧基、杂环、杂芳烷氧基、异氰酸根合、异硫氰酸根合、硝基、亚硫酰基、磺酰基、氨磺酰基、硫代羰基、氰硫基、三卤代甲磺酰氨基、O-氨基甲酰基、N-氨基甲酰基、O-硫代氨基甲酰基、N-硫代氨基甲酰基及C-酰氨基的取代基。根据该实施方案的一个方面，B 是未被取代的。

根据一个实施方案，B 为被取代的或未被取代的吡咯基团。在该实施方案的一个方面，B 具有 1-3 个独立地选自酰氨基、酰氧基、烯基、烷氧基、烷基、烷硫基、炔基、氨基、芳基、芳烷基、芳烯基、芳炔基、芳烷氧基、芳氧基、芳硫基、碳环、氰基、氰氧基、卤素、卤代烷基、卤代苯基、羟基、杂芳基、杂芳氧基、杂环、杂芳烷氧基、异氰酸根合、异硫氰酸根合、硝基、亚硫酰基、磺酰基、氨磺酰基、硫代羰基、氰硫基、三卤代甲磺酰氨基、O-氨基甲酰基、N-氨基甲酰基、O-硫代氨基甲酰基、N-硫代氨基甲酰基及C-酰氨基的取代基。根据该实施方案的一个方面，B 是未被取代的。

根据一个实施方案，B 为被取代的或未被取代的吡啶基团。在该实施方案的一个方面，B 具有 1-4 个独立地选自酰氨基、酰氧基、烯基、烷氧基、烷基、烷硫基、炔基、氨基、芳基、芳烷基、芳烯基、芳炔基、芳烷氧基、芳氧基、芳硫基、碳环、氰基、氰氧基、卤素、卤代烷基、卤代苯基、羟基、杂芳基、杂芳氧基、杂环、杂芳烷氧基、异氰酸根合、异硫氰酸根合、硝基、亚硫酰基、磺酰基、氨磺酰基、硫代羰基、氰硫基、三卤代甲磺酰氨基、O-氨基甲酰基、N-氨基甲酰基、O-硫代氨基甲

酰基、N-硫代氨基甲酰基及C-酰氨基的取代基。根据该实施方案的一个方面，B是未被取代的。

根据一个实施方案，B为被取代的或未被取代的环己基。在该实施方案的一个方面，B具有1-5个独立地选自酰氨基、酰氧基、烯基、烷氧基、烷基、烷硫基、炔基、氨基、芳基、芳烷基、芳烯基、芳炔基、芳烷氧基、芳氧基、芳硫基、碳环、氰基、氰氧基、卤素、卤代烷基、卤代苯基、羟基、杂芳基、杂芳氧基、杂环、杂芳烷氧基、异氰酸根合、异硫氰酸根合、硝基、亚硫酰基、磺酰基、氨磺酰基、硫代羰基、氰硫基、三卤代甲磺酰氨基、O-氨基甲酰基、N-氨基甲酰基、O-硫代氨基甲酰基、N-硫代氨基甲酰基及C-酰氨基的取代基。根据该实施方案的一个方面，B是未被取代的。

根据本发明的一个方面，提供如下的式I化合物，其中：

A为被取代的或未被取代的芳基；

B为被取代的或未被取代的芳基；

R1选自氢、烷基、芳基、杂芳基、氨基、卤素、硫及硫代烷基；

L_1可以是饱和的、部分饱和的或不饱和的，并且选自：$-(CH_2)_n-(CH_2)_n-$、$-(CH_2)_nC(=O)(CH_2)_n-$、$-(CH_2)_nC(=O)N(CH_2)_n-$、$-(CH_2)_nNC(=O)O(CH_2)_n-$、$-(CH_2)_nNC(=O)N(CH_2)_n-$、$-(CH_2)_nNC(=S)S(CH_2)_n-$、$-(CH_2)nOC(=O)S(CH_2)_n-$、$-(CH_2)_nNH(CH_2)_n-$、$-(CH_2)_nO(CH_2)_n-$、$-(CH_2)_nS(CH_2)_n-$、$-(CH_2)_nNC(=S)N(CH_2)_n-$，其中各个n独立地选自0、1、2、3、4、5、6、7及8，并且其中各个碳和/或氮可任选地被一个或多个独立地选自羟基、卤素、烷氧基、C_{1-3}烷基及C_{3-6}环烷基的取代基取代；

L_2可以是饱和的、部分饱和的或不饱和的，并且选自：$-(CH_2)_n-(CH_2)_n-$、$-(CH_2)_nC(=O)(CH_2)_n-$、$-(CH_2)_nC(=O)N(CH_2)_n-$、$-(CH_2)_nNC(=O)O(CH_2)_n-$、$-(CH_2)_nNC(=O)N(CH_2)_n-$、$-(CH_2)_nNC(=S)S(CH_2)_n-$、$-(CH_2)nOC(=O)S(CH_2)_n-$、$-(CH_2)_nNH(CH_2)_n-$、$-(CH_2)_nO(CH_2)_n-$、$-(CH_2)_nS(CH_2)_n-$、$-(CH_2)_nNC(=S)N(CH_2)_n-$，其中各个n独立地选自0、1、2、3、4、5、6、7及8，并且其中各个碳和/或氮可任选地被一个或多个独立地选自羟基、卤素、烷氧基、C_{1-3}烷基及C_{3-6}环烷基的取代基取代；及其可药用的盐。

根据本发明的一个方面，提供如下的式I化合物，其中：

A为被取代的或未被取代的杂芳基；

B 为被取代的或未被取代的芳基;

R1 选自氢、烷基、芳基、杂芳基、氨基、卤素、硫及硫代烷基;

L_1 可以是饱和的、部分饱和的或不饱和的，并且选自 $-(CH_2)_n-(CH_2)_n-$、$-(CH_2)_nC(=O)(CH_2)_n-$、$-(CH_2)_nC(=O)N(CH_2)_n-$、$-(CH_2)_nNC(=O)O(CH_2)_n-$、$-(CH_2)_nNC(=O)N(CH_2)_n-$、$-(CH_2)_nNC(=S)S(CH_2)_n-$、$-(CH_2)nOC(=O)S(CH_2)_n-$、$-(CH_2)_nNH(CH_2)_n-$、$-(CH_2)_nO(CH_2)_n-$、$-(CH_2)_nS(CH_2)_n-$、$-(CH_2)_nNC(=S)N(CH_2)_n-$，其中各个 n 独立地选自 0、1、2、3、4、5、6、7 及 8，并且其中各个碳和/或氮可任选地被一个或多个独立地选自羟基、卤素、烷氧基、C_{1-3} 烷基及 C_{3-6} 环烷基的取代基取代;

L_2 可以是饱和的、部分饱和的或不饱和的，并且选自 $-(CH_2)_n-(CH_2)_n-$、$-(CH_2)_nC(=O)(CH_2)_n-$、$-(CH_2)_nC(=O)N(CH_2)_n-$、$-(CH_2)_nNC(=O)O(CH_2)_n-$、$-(CH_2)_nNC(=O)N(CH_2)_n-$、$-(CH_2)_nNC(=S)S(CH_2)_n-$、$-(CH_2)nOC(=O)S(CH_2)_n-$、$-(CH_2)_nNH(CH_2)_n-$、$-(CH_2)_nO(CH_2)_n-$、$-(CH_2)_nS(CH_2)_n-$、$-(CH_2)_nNC(=S)N(CH_2)_n-$，其中各个 n 独立地选自 0、1、2、3、4、5、6、7 及 8，并且其中各个碳和/或氮可任选地被一个或多个独立地选自羟基、卤素、烷氧基、C_{1-3} 烷基及 C_{3-6} 环烷基的取代基取代; 及其可药用的盐。

根据本发明的一个方面，提供如下的式 I 化合物，其中 A 为被取代的或未被取代的芳基; B 为被取代的或未被取代的杂芳基; R1 选自氢、烷基、芳基、杂芳基、氨基、卤素、硫及硫代烷基; 及其可药用的盐。

根据本发明的一个方面，提供如下的式 I 化合物，其中 A 为被取代的或未被取代的杂环基; B 为被取代的或未被取代的芳基; 且 R1 选自氢、烷基、芳基、杂芳基、氨基、卤素、硫及硫代烷基。

根据本发明的一个方面，提供如下的式 I 化合物，其中 A 为被取代的或未被取代的芳基; B 为被取代的或未被取代的杂环基; R1 选自氢、烷基、芳基、杂芳基、氨基、卤素、硫及硫代烷基。

根据本发明的某些方面，在式 I 的化合物中，A 是被取代的或未被取代的，并且选自吲唑基、1H-吲哚基、苯并噻唑基、1H-苯并三唑基、苯并噁唑基、1H-咪唑基、3H-苯并噁唑-2-酮、4H-苯并[1,4]噁嗪-3-酮、1,3 二氢-苯并咪唑-2-酮、3H-苯并噻唑-2-酮、1H-吡唑并[3,4-b]吡啶、1H-喹噁啉-2-酮、1H-喹噁啉-2-酮、4H-苯并[1,4]噁嗪-3-酮、异喹啉、二氢吲哚、1,3 二氢-吲哚-2-酮、2,3-二氢-苯并[1,4]二噁烯、噻吩基

(thienyl, thiophenyl)、苯并[b]噻吩基、萘并[2,3-b]噻吩基、噻蒽基、呋喃基(furyl, furanyl)、异苯并呋喃基、色烯基、呫吨基、吩噁噻基、吡咯基、2H-吡咯基、咪唑基、吡唑基、吡啶基 (pyridyl, pyridinyl)、2-吡啶基、3-吡啶基、4-吡啶基、吡嗪基、嘧啶基、哒嗪基、中氮茚基、异吲哚基、3H-吲哚基、吲哚基、嘌呤基、4H-喹嗪基、异喹啉基、喹啉基、2, 3-二氮杂萘基、1, 5-二氮杂萘基、喹唑啉基、噌啉基、蝶啶基、吓唑基、β-咔啉基、菲啶基、吖啶基、萘嵌间二氮苯基、菲咯啉基、吩嗪基、异噻唑基、吩噻嗪基、异噁唑基、呋咱基、吩噁嗪基、1,4-二氢喹喔啉-2,3-二酮、7 氨基异香豆素、吡啶并[1,2-a]嘧啶-4-酮、吡唑并[1,5-a]嘧啶基、吡唑并[1,5-a]嘧啶-3-基、1,2-苯并异噁唑-3-基、苯并咪唑基、2-羟吲哚基、2 氧代苯并咪唑基、四氢呋喃基、吡喃基、哌啶基、哌嗪基、吡咯烷基、咪唑烷基、咪唑啉基、二氢吲哚基、异二氢氮茚基、奎宁环基、吗啉基、异色满基、色满基、吡唑烷基、吡唑啉基、特窗酰基及 tetramoyl。

根据本发明的某些方面，在式 I 的化合物中，B 是被取代的或未被取代的，并且选自吲唑基、1H-吲哚基、苯并噻唑基、1H-苯并三唑基、苯并噁唑基、1H-苯并咪唑基、3H-苯并噁唑-2-酮、4H-苯并[1,4]噁嗪-3-酮、1,3 二氢-苯并咪唑-2-酮、3H-苯并噻唑-2-酮、1H-吡唑并[3,4-b]吡啶、1H-喹噁啉-2-酮、1H-喹噁啉-2-酮、4H-苯并[1,4]噁嗪-3-酮、异喹啉、二氢吲哚、1,3 二氢-吲哚-2-酮、2,3-二氢-苯并[1,4]二噁烯、噻吩基(thienyl, thiophenyl)、苯并[b]噻吩基、萘并[2,3-b]噻吩基、噻嗯基、呋喃基(furyl, furanyl)、异苯并呋喃基、色烯基、呫吨基、吩噁噻基、吡咯基、2H-吡咯基、咪唑基、吡唑基、吡啶基(pyridyl, pyridinyl)、2-吡啶基、3-吡啶基、4-吡啶基、吡嗪基、嘧啶基、哒嗪基、中氮茚基、异吲哚基、3H-吲哚基、吲哚基、嘌呤基、4H-喹嗪基、异喹啉基、喹啉基、2, 3-二氮杂萘基、1, 5-二氮杂萘基、喹唑啉基、噌啉基、蝶啶基、吓唑基、β-咔啉基、菲啶基、吖啶基、萘嵌间二氮苯基、菲咯啉基、吩嗪基、异噻唑基、吩噻嗪基、异噁唑基、呋咱基、吩噁嗪基、1,4-二氢喹喔啉-2,3-二酮、7 氨基异香豆素、吡啶并[1,2-a]嘧啶-4-酮、吡唑并[1,5-a]嘧啶基、吡唑并[1,5-a]嘧啶-3-基、1,2-苯并异噁唑-3-基、苯并咪唑基、2-羟吲哚基、2 氧代苯并咪唑基、四氢呋喃基、吡喃基、哌啶基、哌嗪基、吡咯烷基、咪唑烷基、咪唑啉基、二

氢吲哚基、异二氢氮茚基、奎宁环基、吗啉基、异色满基、色满基、吡唑烷基、吡唑啉基、特窗酰基及 tetramoyl。

在本发明化合物的某些方面，A 环被一个或多个选自 $-L_1-C(=O)OH$、$-L_1-CH=CHC(=O)OH$、$-L_1-C(=O)NH_2$、$-L_1-C(=O)NH(C_{1-3}$ 烷基)、$-L_1-C(=O)N(C_{1-3}$ 烷基$)_2$、$-L_1-S(=O)_2(C_{1-3}$ 烷基)、$-L_1-S(=O)_2NH_2$、$-L_1-S(=O)_2N(C_{1-3}$ 烷基$)_2$、$-L_1-S(=O)_2NH(C_{1-3}$ 烷基)、$-L_1-C(=O)NHOH$、$-L_1-C(=O)CH_2NH_2$、$-L_1-C(=O)CH_2OH$、$-L_1-C(=O)CH_2SH$、$-L_1-C(=O)NHCN$、$-L_1-NHC(=O)OR_o$、$-L_1-C(=O)NHR_o$、$-L_1-NH(C=O)NHR_o$、$-L_1-C(=O)N(R_o)_2$、$-L_1-NH(C=O)N(R_o)_2$、$-L_1-$磺基的取代基取代；其中 R_o 选自烷基和卤代烷基，且 L_1 独立于该化合物中的任何其他 L_1 并如上文的定义。

在本发明化合物的某些方面，B 环被一个或多个选自 $-L_1-C(=O)OH$、$-L_1-CH=CHC(=O)OH$、$-L_1-C(=O)NH_2$、$-L_1-C(=O)NH(C_{1-3}$ 烷基)、$-L_1-C(=O)N(C_{1-3}$ 烷基$)_2$、$-L_1-S(=O)_2(C_{1-3}$ 烷基)、$-L_1-S(=O)_2NH_2$、$-L_1-S(=O)_2N(C_{1-3}$ 烷基$)_2$、$-L_1-S(=O)_2NH(C_{1-3}$ 烷基)、$-L_1-C(=O)NHOH$、$-L_1-C(=O)CH_2NH_2$、$-L_1-C(=O)CH_2OH$、$-L_1-C(=O)CH_2SH$、$-L_1-C(=O)NHCN$、$-L_1-NHC(=O)OR_o$、$-L_1-C(=O)NHR_o$、$-L_1-NH(C=O)NHR_o$、$-L_1-C(=O)N(R_o)_2$、$-L_1-NH(C=O)N(R_o)_2$、$-L_1-$磺基的取代基取代；其中 R_o 选自烷基和卤代烷基，且 L_1 独立于该化合物中的任何其他 L_1 并如上文的定义。

根据本发明化合物的一个方面，L_1 选自 $-CH_2-$、$-CH_2CH_2-$、$-CH_2CH_2CH_2$、$-CH(CH_3)CH_2-$、$-CH(CH_2CH_3)CH_2-$、$-CH(CH(CH_3)_2)CH_2-$、$-C(CH_2CH_2)CH_2-$、$-C(CH_2CH_2CH_2)CH_2-$、$-CH(CH(CH_3)CH_2CH_3)CH_2-$、$-CH(CH(CH_2)_4)CH_2-$、$-CH(CH(CH_2)_5)CH_2-$、$-CH(OH)CH_2-$及$-CH(CH_2OH)CH_2-$。在一个更具体的方面，$L_1$ 选自 $-CH_2CH_2-$和$-CH_2CH_2CH_2$。在一个甚至更具体的方面，L_1 为 $-CH_2CH_2-$。除非另外指出，否则 L_1 可以为两种取向中的任一种，例如，$-CH(CH_2CH_2)CH_2-$ 是指嘌呤 $-CH(CH_2CH_2)CH_2-$ 苯基取向和嘌呤 $-CH_2CH(CH_2CH_2)-$苯基取向。

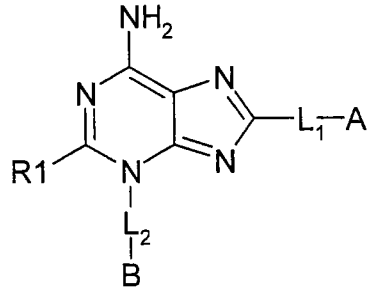
根据本发明的一个方面，提供如下的式 I 化合物，其中 L_2 选自 $-CH_2-$、$-CH_2CH_2-$、$-CH_2CH_2CH_2$、$-CH(CH_3)CH_2-$、$-CH(CH_2CH_3)CH_2-$、$-CH(CH(CH_3)_2)CH_2-$、$-C(CH_2CH_2)CH_2-$、$-C(CH_2CH_2CH_2)CH_2-$、$-CH(CH(CH_3)CH_2CH_3)CH_2-$、$-CH(CH(CH_2)_4)CH_2-$、$-CH(CH(CH_2)_5)CH_2-$、$-CH(OH)CH_2-$及$-CH(CH_2OH)CH_2-$。在一个更具体的方面，$L_2$ 选自 $-CH_2CH_2-$和$-CH_2CH_2CH_2$。在一个甚至更具体的方面，L_2 为 $-CH_2CH_2-$。除非另外指出，

否则 L_2 可以为两种取向中的任一种，例如，$-CH(CH_2CH_2)CH_2-$指嘌呤$-CH(CH_2CH_2)CH_2-$苯基取向及嘌呤$-CH_2CH(CH_2CH_2)-$苯基取向。

根据本发明化合物的一个方面，基团 A 选自 2,5-二甲氧基苯基、2,5-二乙氧基苯基、2,4-二甲氧基苯基、3,4,5-三甲氧基苯基、4-氯苯基及 4-苯甲腈。在该方面，取代基的位置（编号）是相对于苯基与嘌呤核心的键。在该方面的一个具体实施方案中，L_1 为 -S-。

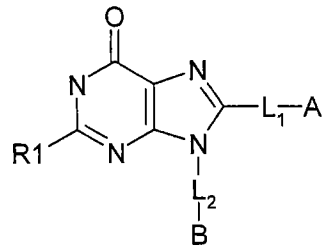
根据本发明化合物的一个方面，基团 B 选自 2-溴苯基、2-氟苯基、2-氯苯基、3-氟苯基、3-碘苯基、3-溴苯基、4-氟苯基、4-氯苯基、4-溴苯基、2,3-二氯苯基、2,4-二氯苯基、2,6-二氯苯基、2,3-二氟苯基、3,5-二氟苯基、4-氯-2-氟苯基、2-氯-6-氟苯基、五氟苯基、2-硝基苯基、3-硝基苯基、4-硝基苯基、4-苯甲酸、2-三氟甲基苯基、3-三氟甲基苯基、3-甲氧基苯基、3-甲氧基苯基、3,4-二甲氧基苯基、3,5-二甲氧基苯基、3,4,5-三甲氧基苯基、3-乙氧基-4-甲氧基苯基、对甲苯基、邻甲苯基、2,5-二甲基苯基、3,5-二甲基苯基、2,4,6-三甲基苯基、4-苯乙酮、4-苯酚、4-苯磺酸、4-二甲基氨基苯基、4-氨基甲酸叔丁酯苯基、4-氨苯基、3-三氟甲氧基苯基及 3,5 双三氟甲基苯基。在该方面，取代基的位置（编号）是相对于苯基与嘌呤核心的键。在该方面的一个具体实施方案中，L_2 选自 $-CH_2-CH_2-$和 $-CH_2-CH_2-CH_2-$。

本发明还提供式 II 的化合物，其中所述变量如本发明式 I 化合物的任何上述实施方案和方面。



式 II

本发明还提供了式III的化合物，其中所述变量如本发明式 I 化合物的任何上述实施方案和方面。



式III

根据本发明的一个方面，提供如下的式I化合物，其中：

A为被取代的或未被取代的杂环基；

B为被取代的或未被取代的芳基；

R1选自氢、烷基、芳基、杂芳基、氨基、卤素、硫及硫代烷基；

L_1可以是饱和的、部分饱和的或非饱和的，并且选自$-(CH_2)_n-(CH_2)_n-$、$-(CH_2)_nC(=O)(CH_2)_n-$、$-(CH_2)_nC(=O)N(CH_2)_n-$、$-(CH_2)_nNC(=O)O(CH_2)_n-$、$-(CH_2)_nNC(=O)N(CH_2)_n-$、$-(CH_2)_nNC(=S)S(CH_2)_n-$、$-(CH_2)_nOC(=O)S(CH_2)_n-$、$-(CH_2)_nNH(CH_2)_n-$、$-(CH_2)_nO(CH_2)_n-$、$-(CH_2)_nS(CH_2)_n-$及$-(CH_2)_nNC(=S)N(CH_2)_n-$，其中各个n独立地选自0、1、2、3、4、5、6、7及8，且各个碳和/或氮可任选地被一个或多个独立选自羟基、卤素、烷氧基、C_{1-3}烷基及C_{3-6}环烷基的取代基取代；

L_2可以是饱和的、部分饱和的或非饱和的，并且选自$-(CH_2)_n-(CH_2)_n-$、$-(CH_2)_nC(=O)(CH_2)_n-$、$-(CH_2)_nC(=O)N(CH_2)_n-$、$-(CH_2)_nNC(=O)O(CH_2)_n-$、$-(CH_2)_nNC(=O)N(CH_2)_n-$、$-(CH_2)_nNC(=S)S(CH_2)_n-$、$-(CH_2)_nOC(=O)S(CH_2)_n-$、$-(CH_2)_nNH(CH_2)_n-$、$-(CH_2)_nO(CH_2)_n-$、$-(CH_2)_nS(CH_2)_n-$及$-(CH_2)_nNC(=S)N(CH_2)_n-$，其中各个n独立地选自0、1、2、3、4、5、6、7及8，且各个碳和/或氮可任选地被一个或多个独立选自羟基、卤素、烷氧基、C_{1-3}烷基及C_{3-6}环烷基的取代基取代；及其可药用的盐。

在本发明的一个方面，A可以是被取代的或未被取代的，并且选自芳基或杂环基；

B可以是被取代的或未被取代的，并且选自具有一个或多个选自-N-、-O-、-S-和-P-的杂原子的杂芳基或杂环基。

R1选自氢、烷基、烷氧基、芳基、杂芳基、杂环、碳环、氨基、卤素、硫及硫代烷基；

L_1和L_2如上文其最宽方面中定义；及其可药用的盐。

在本发明的另一个方面，A可以是被取代的或未被取代的，并且选自苯并[1,3]间二氧杂环戊烯或苯基。

B可以是被取代的或未被取代的、具有一个或多个选自-N-、-O-、-S-和-P-的杂原子的杂芳基或杂环基。

R1选自氢、烷基、烷氧基、芳基、杂芳基、杂环、碳环、氨基、卤

素、硫及硫代烷基;

L_1和L_2如上文其最宽方面中定义;及其可药用的盐。

在本发明的一个方面,基团 A 可以是被取代的或未被取代的,并且选自 5-卤素-苯并[1,3]间二氧杂环戊烯(例如 5-溴-苯并[1,3]间二氧杂环戊烯)、二甲氧基苯(例如 1,4-二甲氧基苯、2,3-二甲氧基苯和 2,4-二甲氧基苯)及二乙氧基苯(例如 1,4-二乙氧基苯、2,3-二乙氧基苯和 2,4-二乙氧基苯);

B 可以是被取代的或未被取代的,并且选自具有一个或多个选自-N-、-O-、-S-和-P-的杂原子的杂芳基或杂环基。

R1 选自氢、烷基、烷氧基、芳基、杂芳基、杂环、碳环、氨基、卤素、硫及硫代烷基;

L_1和L_2如上文其最宽方面中定义;及其可药用的盐。

在本发明的一个方面,A 可以是被取代的或未被取代的,并且选自芳基、杂芳基、杂环及碳环基团;

B 可以是被取代的或未被取代的,且为选自哌啶、吡咯烷、吖丁啶、哌嗪、吗啉和四氢吡喃的杂环基。

R1 选自氢、烷基、烷氧基、芳基、杂芳基、杂环、碳环、氨基、卤素、硫及硫代烷基;

L_1和L_2如上文定义;及其可药用的盐。

在本发明的一个方面,A 可以是被取代的或未被取代的,并且选自芳基、杂芳基、杂环及碳环基团;

基团 B 选自哌啶、哌啶-1-羧酸乙酯、哌啶-1-羧酸叔丁酯、2,2,6,6-四甲基-哌啶、哌啶-2,6-二酮、哌啶-1-甲醛、1-甲基-吡咯烷、1-异丙基-哌嗪、四氢吡喃、金刚烷、哌啶-1-甲醛、1-哌啶-1-基-乙酮、1-甲磺酰基-哌啶、1-丙基-哌啶、1-三氟甲磺酰基-哌啶、哌啶-1-羧酸叔丁酯、吡咯烷-1-羧酸叔丁酯、吗啉-4-羧酸叔丁酯、1-吡咯烷-1-基-乙酮、1-甲磺酰基-吡咯烷、吡咯烷-1-甲醛、吖丁啶-1-羧酸叔丁酯、1-甲基-吖丁啶、吖丁啶、吖丁啶-1-甲醛、1-吖丁啶-1-基-乙酮、1-甲磺酰基-吖丁啶,以及 1-三氟甲磺酰基-吖丁啶、环庚烷、咪唑、十一氟代环己烷、环己基氨基甲酸叔丁酯、1-哌嗪-1-基-乙酮、6,6-二甲基-双环[3.1.1]庚-2-烯、5-甲基 2,4-二氢-吡唑-3-酮、哌啶-1-羧酸苄酯、吗啉、吡咯烷-1-羧酸苄酯、哌啶-1,2-二羧酸 1-叔丁酯 2-乙酯、苄基-1,2,3,6-四

氢吡啶、六氢化-4b-氮杂-环丙基[cd]并环戊二烯、2-异丙基-哌啶-1 羧酸叔丁酯、哌啶-1-羧酸乙酰胺、哌啶-1-羧酸异丙酰胺、哌啶-1-羧酸叔丁酰胺、[{哌啶-1-羰基}氨基]-乙酸乙酯、异丙基哌啶、异丁基哌啶、2,2-二甲基-1-哌啶-1-基-丙-1-酮、2,2-二甲基-1-哌啶-1-基-丁-1-酮、2-异丙基-哌啶、1-异丙基哌嗪及 1-环戊基-哌嗪。

R1 选自氢、烷基、烷氧基、芳基、杂芳基、杂环、碳环、氨基、卤素、硫及硫代烷基;

L_1和 L_2如上文其最宽方面中定义;及其可药用的盐。

在本发明的一个方面,A 可以是被取代的或未被取代的,并且选自苯并[1,3]间二氧杂环戊烯和苯基;

B 可以是被取代的或未被取代的,且为选自哌啶、吡咯烷、吖丁啶、哌嗪、吗啉及四氢吡喃的杂芳基或杂环基。

R1 选自氢、烷基、烷氧基、芳基、杂芳基、杂环、碳环、氨基、卤素、硫及硫代烷基;

L_1和 L_2如上文其最宽方面中定义;及其可药用的盐。

在本发明的一个方面,A 可以是被取代的或未被取代的,并且选自苯并[1,3]间二氧杂环戊烯和苯基;

基团 B 选自哌啶、哌啶-1-羧酸乙酯、哌啶-1-羧酸叔丁酯、2,2,6,6-四甲基-哌啶、哌啶-2,6-二酮、哌啶-1-甲醛、1-甲基-吡咯烷、1-异丙基-哌嗪、四氢吡喃、金刚烷、哌啶-1-甲醛、1-哌啶-1-基-乙酮、1-甲磺酰基-哌啶、1-丙基-哌啶、1-三氟甲磺酰基-哌啶、哌啶-1-羧酸叔丁酯、吡咯烷-1-羧酸叔丁酯、吗啉-4-羧酸叔丁酯、1-吡咯烷-1-基-乙酮、1-甲磺酰基-吡咯烷、吡咯烷-1-甲醛、吖丁啶-1-羧酸叔丁酯、1-甲基-吖丁啶、吖丁啶、吖丁啶-1-甲醛、1-吖丁啶-1-基-乙酮、1-甲磺酰基-吖丁啶,以及 1-三氟甲磺酰基-吖丁啶、环庚烷、咪唑、十一氟代环己烷、环己基氨基甲酸叔丁酯、1-哌嗪-1-基-乙酮、6,6-二甲基-双环[3.1.1]庚-2-烯、5-甲基 2,4-二氢-吡唑-3-酮、哌啶-1-羧酸苄酯、吗啉、吡咯烷-1-羧酸苄酯、哌啶-1,2-二羧酸 1-叔丁酯 2-乙酯、苄基-1,2,3,6-四氢吡啶、六氢化-4b-氮杂-环丙基[cd]并环戊二烯、2-异丙基-哌啶-1 羧酸叔丁酯、哌啶-1-羧酸乙酰胺、哌啶-1-羧酸异丙酰胺、哌啶-1-羧酸叔丁酰胺、[{哌啶-1-羰基}氨基]-乙酸乙酯、异丙基哌啶、异丁基哌啶、2,2-二甲基-1-哌啶-1-基-丙-1-酮、2,2-二甲基-1-哌啶-1-基-丁-1-酮、

2-异丙基-哌啶、1-异丙基哌嗪及1-环戊基-哌嗪;

R1选自氢、烷基、烷氧基、芳基、杂芳基、杂环、碳环、氨基、卤素、硫及硫代烷基;

L_1和L_2如上文其最宽方面中定义;及其可药用的盐。

在本发明的一个方面,基团A选自5-卤素-苯并[1,3]间二氧杂环戊烯、二甲氧基苯和二乙氧基苯;

基团B选自哌啶、哌啶-1-羧酸乙酯、哌啶-1-羧酸叔丁酯、2,2,6,6-四甲基-哌啶、哌啶-2,6-二酮、哌啶-1-甲醛、1-甲基-吡咯烷、1-异丙基-哌嗪、四氢吡喃、金刚烷、哌啶-1-甲醛、1-哌啶-1-基-乙酮、1-甲磺酰基-哌啶、1-丙基-哌啶、1-三氟甲磺酰基-哌啶、哌啶-1-羧酸叔丁酯、吡咯烷-1-羧酸叔丁酯、吗啉-4-羧酸叔丁酯、1-吡咯烷-1-基-乙酮、1-甲磺酰基-吡咯烷、吡咯烷-1-甲醛、吖丁啶-1-羧酸叔丁酯、1-甲基-吖丁啶、吖丁啶、吖丁啶-1-甲醛、1-吖丁啶-1-基-乙酮、1-甲磺酰基-吖丁啶及1-三氟甲磺酰基-吖丁啶、环庚烷、咪唑、十一氟代环己烷、环己基氨基甲酸叔丁酯、1-哌嗪-1-基-乙酮、6,6-二甲基-双环[3.1.1]庚-2-烯、5-甲基 2,4-二氢-吡唑-3-酮、哌啶-1-羧酸苄酯、吗啉、吡咯烷-1-羧酸苄酯、哌啶-1,2-二羧酸 1-叔丁酯 2-乙酯 、苄基-1,2,3,6-四氢吡啶、六氢化-4b-氮杂-环丙基[cd]并环戊二烯、2-异丙基-哌啶-1羧酸叔丁酯、哌啶-1-羧酸乙酰胺、哌啶-1-羧酸异丙酰胺、哌啶-1-羧酸叔丁酰胺、[{哌啶-1-羰基}氨基]-乙酸乙酯、异丙基哌啶、异丁基哌啶、2,2-二甲基-1-哌啶-1-基-丙-1-酮、2,2-二甲基-1-哌啶-1-基-丁-1-酮、2-异丙基-哌啶、1-异丙基哌嗪及1-环戊基-哌嗪;

R1选自氢、烷基、烷氧基、芳基、杂芳基、杂环、碳环、氨基、卤素、硫及硫代烷基;

L_1和L_2如上文其最宽方面中定义;及其可药用的盐。

根据本发明的一个方面,在式I的化合物中,A为具有一个或多个选自卤素、烷基、烷氧基、卤代烷基、卤代烷氧基、硝基、-C(=O)烷基、羟基、-C≡N、$-SO_3$及-COOH的取代基的芳基或杂环基。在一个更具体的方面,A为具有一个或多个选自卤素、烷基、烷氧基、卤代烷基、卤代烷氧基、硝基、-C(=O)烷基、羟基及-COOH的取代基的苯基。在另一个具体的方面,A为具有一个或多个选自-F、-Cl、-Br、-I、$-OCH_3$及$-OCH_2CH_3$的取代基的苯基。在另一个方面,A为具有一个或多个选自

卤素、烷基、烷氧基、卤代烷基、卤代烷氧基、硝基、-C(=O)烷基、羟基及-COOH的取代基的苯并[1,3]间二氧杂环戊烯基团。在另一个具体方面，A为具有一个或多个选自-F、-Cl、-Br、-I、$-OCH_3$及$-OCH_2CH_3$的取代基的苯并[1,3]间二氧杂环戊烯基团。

在一个方面，在式I的化合物中，A为具有一个或多个选自羟基、卤素、烷基、烷氧基、卤代烷基、卤代烷氧基、$-N(C_{1-3}烷基)_2$、$-NH(C_{1-3}烷基)$、$-C(=O)NH_2$、$-C(=O)NH(C_{1-3}烷基)$、$-C(=O)N(C_{1-3}烷基)_2$、$-S(=O)_2(C_{1-3}烷基)$、$-S(=O)_2NH_2$、$-S(=O)_2N(C_{1-3}烷基)_2$、$-S(=O)_2NH(C_{1-3}烷基)$、$-CHF_2$、$-OCF_3$、$-OCHF_2$、$-SCF_3$、$-CF_3$、-CN、$-NH_2$及$-NO_2$的取代基的芳基或杂环的基团。在一个具体的方面，A为具有一个或多个选自羟基、卤素、烷基、烷氧基、卤代烷基、卤代烷氧基、$-N(C_{1-3}烷基)_2$、$-NH(C_{1-3}烷基)$、$-C(=O)NH_2$、$-C(=O)NH(C_{1-3}烷基)$、$-C(=O)N(C_{1-3}烷基)_2$、$-S(=O)_2(C_{1-3}烷基)$、$-S(=O)_2NH_2$、$-S(=O)_2N(C_{1-3}烷基)_2$、$-S(=O)_2NH(C_{1-3}烷基)$、$-CHF_2$、$-OCF_3$、$-OCHF_2$、$-SCF_3$、$-CF_3$、-CN、$-NH_2$及$-NO_2$的取代基的苯基。在另一个具体方面，A为具有一个或多个选自羟基、卤素、烷基、烷氧基、卤代烷基、卤代烷氧基、$-N(C_{1-3}烷基)_2$、$-NH(C_{1-3}烷基)$、$-C(=O)NH_2$、$-C(=O)NH(C_{1-3}烷基)$、$-C(=O)N(C_{1-3}烷基)_2$、$-S(=O)_2(C_{1-3}烷基)$、$-S(=O)_2NH_2$、$-S(=O)_2N(C_{1-3}烷基)_2$、$-S(=O)_2NH(C_{1-3}烷基)$、$-CHF_2$、$-OCF_3$、$-OCHF_2$、$-SCF_3$、$-CF_3$、-CN、$-NH_2$及$-NO_2$的取代基的苯并[1,3]间二氧杂环戊烯基团。

在一个方面，在式I的化合物中，A为具有1-5个独立地选自酰氨基、酰氧基、烯基、烷氧基、烷基、烷硫基、炔基、氨基、芳基、芳烷基、芳烯基、芳炔基、芳烷氧基、芳氧基、芳硫基、碳环、氰基、氰氧基、卤素、卤代烷基、卤代苯基、羟基、杂芳基、杂芳氧基、杂环、杂芳烷氧基、异氰酸根合、异硫氰酸根合、硝基、亚硫酰基、磺酰基、氨磺酰基、硫代羰基、氰硫基、三卤代甲磺酰氨基、O-氨基甲酰基、N-氨基甲酰基、O-硫代氨基甲酰基、N-硫代氨基甲酰基及C-酰氨基的取代基的苯基或苯并[1,3]间二氧杂环戊烯基团。

根据一个方面，在式I的化合物中，B为具有一个或多个选自-N-和-O-的杂原子的杂环，其中所述杂环基可以具有一个或多个选自以下基团的取代基：氢；卤素；烷基；烷氧基；卤代烷基；卤代烷氧基；硝基；$-CH_2-$芳基；-C(=O)烷基；-C(=O)环烷基；-C(=O)-NH-烷基；环烷基；羟基；$-SO_3$；-COOH（及其酯）；氨基酸（选自天然和非天然氨基酸）；

具有 1-5 个氨基酸残基（选自天然和非天然氨基酸）的肽；-C(=O)烷基，其中所述烷基被一个或多个取代基（选自烷基、氨基、烷氧基、卤代烷基、卤代烷氧基、硝基、氰基、羟基、-COOH（及其酯）、磺酰基、氨磺酰基）取代；及磺酰基。在一个具体方面，B 为哌啶（哌啶基）基团。在一个具体方面，B 为被一个或多个选自以下基团的取代基取代的哌啶基团：氢；卤素；烷基；烷氧基；卤代烷基；卤代烷氧基；硝基；$-CH_2-$芳基；-C(=O)烷基；-C(=O)环烷基；-C(=O)-NH-烷基；环烷基；羟基；$-SO_3$；-COOH（及其酯）；氨基酸（选自天然和非天然氨基酸）；具有 1-5 个氨基酸残基（选自天然和非天然氨基酸）的肽；-C(=O)烷基，其中所述烷基被一个或多个取代基（选自烷基、氨基、烷氧基、卤代烷基、卤代烷氧基、硝基、氰基、羟基、-COOH（及其酯）、磺酰基、氨磺酰基）取代；及磺酰基。在一个更具体的方面，B 为具有一个或多个选自氢、卤素、烷基、烷氧基、卤代烷基、卤代烷氧基、硝基、$-CH_2-$芳基、-C(=O)烷基、-C(=O)-NH-烷基、环烷基、羟基、$-SO_3$、-COOH（及其酯）及磺酰基的取代基的哌啶基团。在一个甚至更具体的方面，B 为具有一个或多个选自-C(=O)、-C(=O)CH_3、$-CH_3$、$-CH_2CH_3$、$-CH_2CH_2CH_3$、-C(=O)OCH_2CH_3、$-S(=O)_2CH_3$、$-S(=O)_2CF_3$、-C(=O)$OC(CH_3)_3$、-C(=O)OCH_2-苯基、$-CH_2-$苯基、$-CH(CH_3)_2$、-C(=O)$NHCH_2CH_3$、-C(=O)$NHCH(CH_3)_2$、-C(=O)$NHC(CH_3)_3$、-C(=O)$NHCH_2C(=O)OCH_2CH_3$、-C(=O)$C(CH_3)_3$、$-CH(CH_3)_2$、$-CH_2CH(CH_3)_2$、-C(=O)$CH_2C(CH_3)_3$及环戊基的取代基的哌啶基团。

在一个具体方面，B 为高哌啶（高哌啶基）基团。在一个更具体的方面，B 为具有一个或多个选自以下基团的取代基的高哌啶基团：氢；卤素；烷基；烷氧基；卤代烷基；卤代烷氧基；硝基；$-CH_2-$芳基；-C(=O)烷基；-C(=O)环烷基；-C(=O)-NH-烷基；环烷基；羟基；$-SO_3$；-COOH（及其酯）；氨基酸（选自天然和非天然氨基酸）；具有 1-5 个氨基酸残基（选自天然和非天然氨基酸）的肽；-C(=O)烷基，其中所述烷基被一个或多个取代基（选自烷基、氨基、烷氧基、卤代烷基、卤代烷氧基、硝基、氰基、羟基、-COOH（及其酯）、磺酰基、氨磺酰基）取代；及磺酰基。还在一个更具体的方面，B 为具有一个或多个选自-C(=O)、-C(=O)CH_3、$-CH_3$、$-CH_2CH_3$、$-CH_2CH_2CH_3$、-C(=O)OCH_2CH_3、$-S(=O)_2CH_3$、$-S(=O)_2CF_3$、-C(=O)$OC(CH_3)_3$、-C(=O)OCH_2-苯基、$-CH_2-$苯基、$-CH(CH_3)_2$、-C(=O)$NHCH_2CH_3$、-C(=O)$NHCH(CH_3)_2$、-C(=O)$NHC(CH_3)_3$、

-C(=O)$NHCH_2C$(=O)OCH_2CH_3、-C(=O)$C(CH_3)_3$、-$CH(CH_3)_2$、-$CH_2CH(CH_3)_2$、-C(=O)$CH_2C(CH_3)_3$及环戊基的取代基的高哌啶基团。

在一个具体方面，B为哌嗪（哌嗪基）基团。在一个更具体的方面，B为具有一个或多个选自以下基团的取代基的哌嗪基团：氢；卤素；烷基；烷氧基；卤代烷基；卤代烷氧基；硝基；-CH_2-芳基；-C(=O)烷基；-C(=O)环烷基；-C(=O)-NH-烷基；环烷基；羟基；-SO_3；-COOH（及其酯）；氨基酸（选自天然和非天然氨基酸）；具有1-5个氨基酸残基（选自天然和非天然氨基酸）的肽；-C(=O)烷基，其中所述烷基被一个或多个取代基（选自烷基、氨基、烷氧基、卤代烷基、卤代烷氧基、硝基、氰基、羟基、-COOH（及其酯）、磺酰基、氨磺酰基）取代；及磺酰基。在一个甚至更具体的方面，B为具有一个或多个选自-C(=O)、-C(=O)CH_3、-CH_3、-CH_2CH_3、-$CH_2CH_2CH_3$、-C(=O)OCH_2CH_3、-S(=O)$_2CH_3$、-S(=O)$_2CF_3$、-C(=O)$OC(CH_3)_3$、-C(=O)OCH_2-苯基、-CH_2-苯基、-$CH(CH_3)_2$、-C(=O)$NHCH_2CH_3$、-C(=O)$NHCH(CH_3)_2$、-C(=O)$NHC(CH_3)_3$、-C(=O)$NHCH_2C$(=O)OCH_2CH_3、-C(=O)$C(CH_3)_3$、-$CH(CH_3)_2$、-$CH_2CH(CH_3)_2$、-C(=O)$CH_2C(CH_3)_3$及环戊基的取代基的哌嗪基团。

在一个具体方面，B为吡咯烷（吡咯烷基）基团。在一个更具体的方面，B为具有一个或多个选自以下基团的取代基的吡咯烷基团：氢；卤素；烷基；烷氧基；卤代烷基；卤代烷氧基；硝基；-CH_2-芳基；-C(=O)烷基；-C(=O)环烷基；-C(=O)-NH-烷基；环烷基；羟基；-SO_3；-COOH（及其酯）；氨基酸（选自天然和非天然氨基酸）；具有1-5个氨基酸残基（选自天然和非天然氨基酸）的肽；-C(=O)烷基，其中所述烷基被一个或多个取代基（选自烷基、氨基、烷氧基、卤代烷基、卤代烷氧基、硝基、氰基、羟基、-COOH（及其酯）、磺酰基、氨磺酰基）取代；及磺酰基。在一个甚至更具体的方面，B为具有一个或多个选自-C(=O)、-C(=O)CH_3、-CH_3、-CH_2CH_3、-$CH_2CH_2CH_3$、-C(=O)OCH_2CH_3、-S(=O)$_2CH_3$、-S(=O)$_2CF_3$、-C(=O)$OC(CH_3)_3$、-C(=O)OCH_2-苯基、-CH_2-苯基、-$CH(CH_3)_2$、-C(=O)$NHCH_2CH_3$、-C(=O)$NHCH(CH_3)_2$、-C(=O)$NHC(CH_3)_3$、-C(=O)$NHCH_2C$(=O)OCH_2CH_3、-C(=O)$C(CH_3)_3$、-$CH(CH_3)_2$、-$CH_2CH(CH_3)_2$、-C(=O)$CH_2C(CH_3)_3$及环戊基的取代基的吡咯烷基团。

在一个具体方面，B为吖丁啶（吖丁啶基）基团。在一个更具体的方面，B为具有一个或多个选自以下基团的取代基的吖丁啶基团：氢；

卤素；烷基；烷氧基；卤代烷基；卤代烷氧基；硝基；-CH2-芳基；-C(=O)烷基；-C(=O)环烷基；-C(=O)-NH-烷基；环烷基；羟基；-SO3；-COOH（及其酯）；氨基酸（选自天然和非天然氨基酸）；具有1-5个氨基酸残基（选自天然和非天然氨基酸）的肽；-C(=O)烷基，其中所述烷基被一个或多个取代基（选自烷基、氨基、烷氧基、卤代烷基、卤代烷氧基、硝基、氰基、羟基、-COOH（及其酯）、磺酰基、氨磺酰基）取代；及磺酰基。还在一个甚至更具体的方面，B为具有一个或多个选自-C(=O)、-C(=O)CH_3、$-CH_3$、$-CH_2CH_3$、$-CH_2CH_2CH_3$、-C(=O)OCH_2CH_3、$-S(=O)_2CH_3$、$-S(=O)_2CF_3$、-C(=O)$OC(CH_3)_3$、-C(=O)OCH_2-苯基、$-CH_2$-苯基、$-CH(CH_3)_2$、-C(=O)$NHCH_2CH_3$、-C(=O)$NHCH(CH_3)_2$、-C(=O)$NHC(CH_3)_3$、-C(=O)$NHCH_2C(=O)OCH_2CH_3$、-C(=O)$C(CH_3)_3$、$-CH(CH_3)_2$、$-CH_2CH(CH_3)_2$、-C(=O)$CH_2C(CH_3)_3$及环戊基的取代基的吖丁啶基团。

在式I的化合物的一个方面，B为具有一个或多个选自羟基、卤素、烷基、烷氧基、卤代烷基、卤代烷氧基、$-N(C_{1-3}烷基)_2$、$-NH(C_{1-3}烷基)$、-C(=O)NH_2、-C(=O)$NH(C_{1-3}烷基)$、$-C(=O)N(C_{1-3}烷基)_2$、$-S(=O)_2(C_{1-3}烷基)$、$-S(=O)_2NH_2$、$-S(=O)_2N(C_{1-3}烷基)_2$、$-S(=O)_2NH(C_{1-3}烷基)$、$-CHF_2$、$-OCF_3$、$-OCHF_2$、$-SCF_3$、$-CF_3$、-CN、$-NH_2$、$-SO_3$及$-NO_2$的取代基的杂环基。在一个具体的方面，基团B选自哌啶、哌嗪、吡咯烷、吖丁啶、四氢吡喃及吗啉基团，每个基团具有一个或多个取代基。在一个更具体的方面，B为具有一个或多个取代基的哌啶基团。

在一个方面，基团B选自哌啶、哌嗪、吡咯烷、吖丁啶、四氢吡喃和吗啉，其中所述基团B可以具有1-5个独立地选自酰氨基、酰氧基、烯基、烷氧基、烷基、烷硫基、炔基、氨基、芳基、芳烷基、芳烯基、芳炔基、芳烷氧基、芳氧基、芳硫基、碳环、氰基、氰氧基、卤素、卤代烷基、卤代苯基、羟基、杂芳基、杂芳氧基、杂环、杂芳烷氧基、异氰酸根合、异硫氰酸根合、硝基、亚硫酰基、磺酰基、氨磺酰基、硫代羰基、氰硫基、三卤代甲磺酰氨基、O-氨基甲酰基、N-氨基甲酰基、O-硫代氨基甲酰基、N-硫代氨基甲酰基及C-酰氨基的取代基。在一个更具体的方面，B为具有一个或多个取代基的哌啶基团。

根据一个实施方案，A为被取代的或未被取代的苯并[1,3]间二氧杂环戊烯基团。在该实施方案的一个方面，A为5-溴-苯并[1,3]间二氧杂环戊烯基团。在该实施方案的一个方面，A为未被取代的苯并[1,3]间二

氧杂环戊烯基团。在该实施方案的一个方面，A 为 5-碘-苯并[1,3]间二氧杂环戊烯基团。在该实施方案的一个方面，A 为 5-氯-苯并[1,3]间二氧杂环戊烯基团。在该实施方案的一个方面，A 为 5-氟-苯并[1,3]间二氧杂环戊烯基团。在该实施方案的一个方面，A 具有 1-5 个独立地选自酰氨基、酰氧基、烯基、烷氧基、烷基、烷硫基、炔基、氨基、芳基、芳烷基、芳烯基、芳炔基、芳烷氧基、芳氧基、芳硫基、碳环、氰基、氰氧基、卤素、卤代烷基、卤代苯基、羟基、杂芳基、杂芳氧基、杂环、杂芳烷氧基、异氰酸根合、异硫氰酸根合、硝基、亚硫酰基、磺酰基、氨磺酰基、硫代羰基、氰硫基、三卤代甲磺酰氨基、O-氨基甲酰基、N-氨基甲酰基、O-硫代氨基甲酰基、N-硫代氨基甲酰基及 C-酰氨基的取代基。

在本发明的一个方面，基团 A 是被一个或多个取代基取代的，并且选自苯基、苯并[1,3]间二氧杂环戊烯、2，3-二氢-1-茚酮；基团 B 是被一个或多个取代基取代的，并且选自哌啶、哌嗪、吡咯烷、吖丁啶、四氢吡喃及吗啉；R_1 为氢；L_1 为 -S-；L_2 为 $-CH_2CH_2-$，及其可药用的盐。根据本发明的该方面，所述基团 A 取代基选自卤素、-CN、烷氧基，且所述基团 B 取代基选自 -C(=O)、-C(=O)CH_3、$-CH_3$、$-CH_2CH_3$、$-CH_2CH_2CH_3$、-C(=O)OCH_2CH_3、-S(=O)$_2CH_3$、-S(=O)$_2CF_3$、-C(=O)OC$(CH_3)_3$、-C(=O)OCH_2-苯基、$-CH_2$-苯基、-CH$(CH_3)_2$、-C(=O)$NHCH_2CH_3$、-C(=O)NHC$(CH_3)_2$、-C(=O)$NHC(CH_3)_3$、-C(=O)$NHCH_2C$(=O)OCH_2CH_3、-C(=O)C$(CH_3)_3$、-CH$(CH_3)_2$、$-CH_2CH(CH_3)_2$、-C(=O)$CH_2C(CH_3)_3$及环戊基。

在本发明的一个方面，A 可以是被取代的或未被取代的，并且选自芳基和杂环基；

B 可以是被取代的或未被取代的，并且选自环烷基和杂环基；

R1 选自氢、烷基、烷氧基、芳基、杂芳基、杂环、碳环、氨基、卤素、硫及硫代烷基。

L_1 和 L_2 如上文其最宽方面中定义；及其可药用的盐。

在本发明的另一个方面，A 可以是被取代的或未被取代的，并且选自苯并[1,3]间二氧杂环戊烯和苯基；

B 可以是被取代的或未被取代的，并且选自杂芳基、杂环及环烷基；

R1 选自氢、烷基、烷氧基、芳基、杂芳基、杂环、碳环、氨基、卤素、硫及硫代烷基；

L_1和L_2如上文其最宽方面中定义；及其可药用的盐。

在本发明的一个方面，基团 A 可以是被取代的或未被取代的，并且选自 5-卤素-苯并[1,3]间二氧杂环戊烯(例如 5-溴-苯并[1,3]间二氧杂环戊烯)、二甲氧基苯（例如 1,4-二甲氧基苯、2,3-二甲氧基苯和 2,4-二甲氧基苯）及二乙氧基苯（例如 1,4-二乙氧基苯、2,3-二乙氧基苯和 2,4-二乙氧基苯）；

B 可以是被取代的或未被取代的，并且选自环烷基、杂芳基及杂环基；

R1 选自氢、烷基、烷氧基、芳基、杂芳基、杂环、碳环、氨基、卤素、硫及硫代烷基；

L_1和L_2如上文其最宽方面中定义；及其可药用的盐。

在本发明的一个方面，A 可以是被取代的或未被取代的，并且选自芳基、杂芳基、杂环及碳环基团；

基团 B 可以是被取代的或未被取代的，并且选自环丙基、环丁基、环戊基、环己基、四氢呋喃基、oxepanyl（oxepane）、四氢噻吩基（四氢噻吩）、噻喃基、thiepanyl（thiepane）及四氢吡喃基；

R1 选自氢、烷基、烷氧基、芳基、杂芳基、杂环、碳环、氨基、卤素、硫及硫代烷基；

L_1和L_2如上文定义；及其可药用的盐。

在本发明的一个方面，A 可以是被取代的或未被取代的，并且选自芳基、杂芳基、杂环及碳环基团；

基团-L_2-B 选自(1-环丙基-丙基)-氨基甲酸叔丁酯、[1-(四氢噻喃-4-基)-丙基]-氨基甲酸叔丁酯、(1-环己基-丙基)-氨基甲酸叔丁酯、(1-环丁基-丙基)-氨基甲酸叔丁酯、N-(1-环丙基-丙基)-甲磺酰胺、1-(1-环丙基-丙基)-3-异丙基-脲、(1-环戊基-丙基)-氨基甲酸叔丁酯、[1-(四氢吡喃-4-基)-丙基]-氨基甲酸叔丁酯、1-环丙基-丙胺、1-环己基-丙胺、1-环丁基-丙胺、1-环戊基-丙胺、1-(四氢吡喃-4-基)-丙胺、1-(四氢噻喃-4-基)-丙基胺及 1-(1-环己基-丙基)-1H-吡咯；

R1 选自氢、烷基、烷氧基、芳基、杂芳基、杂环、碳环、氨基、卤素、硫及硫代烷基；

L_1如上文定义；及其可药用的盐。

在本发明的某些具体的方面，L_2如上文定义，且具有一个或多个选

自羟基、卤素、烷氧基、氨基、C_{1-3}烷基、C_{3-7}环烷基、-N-C(=O)OC$(CH_3)_3$、$-NSO_2CH_3$、-NC(=O)NC$(CH_3)_2$及吡咯基的取代基。

在本发明的一个方面，A 可以是被取代的或未被取代的，并且选自苯并[1,3]间二氧杂环戊烯和苯基；

B 可以是被取代的或未被取代的，并且为选自环丙基、环丁基、环戊基、环己基、四氢呋喃基、oxepanyl (oxepane)、四氢噻吩基 (四氢噻吩)、噻喃基、thiepanyl (thiepane)及四氢吡喃基的杂芳基或杂环基；

R1 选自氢、烷基、烷氧基、芳基、杂芳基、杂环、碳环、氨基、卤素、硫及硫代烷基；

L_1和L_2如上文其最宽方面中定义；及其可药用的盐。

在本发明的一个方面，A 可以是被取代的或未被取代的，并且选自苯并[1,3]间二氧杂环戊烯和苯基；

基团 B 选自环丙基、环丁基、环戊基、环己基、四氢呋喃基、oxepanyl (oxepane)、四氢噻吩基 (四氢噻吩)、噻喃基、thiepanyl (thiepane)及四氢吡喃基；

R1 选自氢、烷基、烷氧基、芳基、杂芳基、杂环、碳环、氨基、卤素、硫及硫代烷基；

L_1和L_2如上文其最宽方面中定义；及其可药用的盐。

在本发明的一个方面，基团 A 选自 5-卤素-苯并[1,3]间二氧杂环戊烯、二甲氧基苯和二乙氧基苯；

基团 B 选自环丙基、环丁基、环戊基、环己基、四氢呋喃基、oxepanyl (oxepane)、四氢噻吩基 (四氢噻吩)、噻喃基、thiepanyl (thiepane)及四氢吡喃基；

R1 选自氢、烷基、烷氧基、芳基、杂芳基、杂环、碳环、氨基、卤素、硫及硫代烷基；

L_1和L_2如上文其最宽方面中定义；及其可药用的盐。

根据本发明的一个方面，在式 I 的化合物中，A 为具有一个或多个选自卤素、烷基、烷氧基、卤代烷基、卤代烷氧基、硝基、-C(=O)烷基、羟基、-C≡N、$-SO_3$及 - COOH 的取代基的芳基或杂环基。在另一个具体的方面，A 为具有一个或多个选自卤素、烷基、烷氧基、卤代烷基、卤代烷氧基、硝基、-C(=O)烷基、羟基及 - COOH 的取代基的苯基。在另一个具体的方面，A 为具有一个或多个选自 - F、-Cl、-Br、-I、$-OCH_3$及

-OCH_2CH_3的取代基的苯基。在另一个方面，A为具有一个或多个选自卤素、烷基、烷氧基、卤代烷基、卤代烷氧基、硝基、-C(=O)烷基、羟基及-COOH的取代基的苯并[1,3]间二氧杂环戊烯基团。在另一个具体的方面，A为具有一个或多个选自-F、-Cl、-Br、-I、-OCH_3及-OCH_2CH_3的取代基的苯并[1,3]间二氧杂环戊烯基团。

在一个方面，在式I的化合物中，A为具有一个或多个选自羟基、卤素、烷基、烷氧基、卤代烷基、卤代烷氧基、-N(C_{1-3}烷基)$_2$、-NH(C_{1-3}烷基)、-C(=O)NH_2、-C(=O)NH(C_{1-3}烷基)、-C(=O)N(C_{1-3}烷基)$_2$、-S(=O)$_2$(C_{1-3}烷基)、-S(=O)$_2NH_2$、-S(=O)$_2$N(C_{1-3}烷基)$_2$、-S(=O)$_2$NH(C_{1-3}烷基)、-CHF_2、-OCF_3、-$OCHF_2$、-SCF_3、-CF_3、-CN、-NH_2及-NO_2的取代基的芳基或杂环基。在一个具体方面，A为具有一个或多个选自羟基、卤素、烷基、烷氧基、卤代烷基、卤代烷氧基、-N(C_{1-3}烷基)$_2$、-NH(C_{1-3}烷基)、-C(=O)NH_2、-C(=O)NH(C_{1-3}烷基)、-C(=O)N(C_{1-3}烷基)$_2$、-S(=O)$_2$(C_{1-3}烷基)、-S(=O)$_2NH_2$、-S(=O)$_2$N(C_{1-3}烷基)$_2$、-S(=O)$_2$NH(C_{1-3}烷基)、-CHF_2、-OCF_3、-$OCHF_2$、-SCF_3、-CF_3、-CN、-NH_2及-NO_2的取代基的苯基。在另一个具体的方面，A为具有一个或多个选自羟基、卤素、烷基、烷氧基、卤代烷基、卤代烷氧基、-N(C_{1-3}烷基)$_2$、-NH(C_{1-3}烷基)、-C(=O)NH_2、-C(=O)NH(C_{1-3}烷基)、-C(=O)N(C_{1-3}烷基)$_2$、-S(=O)$_2$(C_{1-3}烷基)、-S(=O)$_2NH_2$、-S(=O)$_2$N(C_{1-3}烷基)$_2$、-S(=O)$_2$NH(C_{1-3}烷基)、-CHF_2、-OCF_3、-$OCHF_2$、-SCF_3、-CF_3、-CN、-NH_2及-NO_2的取代基的苯并[1,3]间二氧杂环戊烯基团。

在本发明化合物的一个具体方面，B为环烷基（例如环丙基、环丁基、环己基或环庚基）。在另一个具体的方面，B为具有一个或多个选自氢、卤素、烷基、烷氧基、卤代烷基、卤代烷氧基、硝基、-CH_2-芳基、-C(=O)烷基、-C(=O)-NH-烷基、环烷基、羟基、-SO_3、-COOH（及其酯）及磺酰基的取代基的环烷基。在另一个具体的方面，B为具有一个或多个选自-C(=O)、-C(=O)CH_3、-CH_3、-CH_2CH_3、-$CH_2CH_2CH_3$、-C(=O)OCH_2CH_3、-S(=O)$_2CH_3$、-S(=O)$_2CF_3$、-C(=O)OC(CH_3)$_3$、-C(=O)OCH_2-苯基、-CH_2-苯基、-CH(CH_3)$_2$、-C(=O)$NHCH_2CH_3$、-C(=O)NHCH(CH_3)$_2$、-C(=O)NHC(CH_3)$_3$、-C(=O)$NHCH_2$C(=O)OCH_2CH_3、-C(=O)C(CH_3)$_3$、-CH(CH_3)$_2$、-CH_2CH(CH_3)$_2$、-C(=O)CH_2C(CH_3)$_3$、环丙基、环丁基、环戊基及环己基的取代基的环烷基。

在本发明化合物的一个具体方面，B为噻喃基。在另一个具体的方面，B为具有一个或多个选自氢、卤素、烷基、烷氧基、卤代烷基、卤

代烷氧基、硝基、$-CH_2-$芳基、-C(=O)烷基、-C(=O)-NH-烷基、环烷基、羟基、$-SO_3$、-COOH（及其酯）及磺酰基的取代基的噻喃基。在另一个具体的方面，B 为具有一个或多个选自 -C(=O)、-C(=O)CH_3、$-CH_3$、$-CH_2CH_3$、$-CH_2CH_2CH_3$、$-C(=O)OCH_2CH_3$、$-S(=O)_2CH_3$、$-S(=O)_2CF_3$、$-C(=O)OC(CH_3)_3$、-C(=O)OCH_2-苯基、$-CH_2$-苯基、$-CH(CH_3)_2$、$-C(=O)NHCH_2CH_3$、$-C(=O)NHCH(CH_3)_2$、$-C(=O)NHC(CH_3)_3$、$-C(=O)NHCH_2C(=O)OCH_2CH_3$、$-C(=O)C(CH_3)_3$、$-CH(CH_3)_2$、$-CH_2CH(CH_3)_2$、$-C(=O)CH_2C(CH_3)_3$、环丙基、环丁基、环戊基及环己基的取代基的噻喃基。

在本发明化合物的一个具体方面，B 为四氢吡喃基。在另一个具体的方面，B 为具有一个或多个选自氢、卤素、烷基、烷氧基、卤代烷基、卤代烷氧基、硝基、$-CH_2-$芳基、-C(=O)烷基、-C(=O)-NH-烷基、环烷基、羟基、$-SO_3$、-COOH（及其酯）及磺酰基的取代基的四氢吡喃基。在另一个具体的方面，B 为具有一个或多个选自 -C(=O)、-C(=O)CH_3、$-CH_3$、$-CH_2CH_3$、$-CH_2CH_2CH_3$、$-C(=O)OCH_2CH_3$、$-S(=O)_2CH_3$、$-S(=O)_2CF_3$、$-C(=O)OC(CH_3)_3$、-C(=O)OCH_2-苯基、$-CH_2$-苯基、$-CH(CH_3)_2$、$-C(=O)NHCH_2CH_3$、$-C(=O)NHCH(CH_3)_2$、$-C(=O)NHC(CH_3)_3$、$-C(=O)NHCH_2C(=O)OCH_2CH_3$、$-C(=O)C(CH_3)_3$、$-CH(CH_3)_2$、$-CH_2CH(CH_3)_2$、$-C(=O)CH_2C(CH_3)_3$、环丙基、环丁基、环戊基及环己基的取代基的四氢吡喃基。

在一方面，基团 B 选自环丙基、环丁基、环戊基、环己基、四氢呋喃基、oxepanyl (oxepane)、四氢噻吩基 (四氢噻吩)、噻喃基、thiepanyl (thiepane)及四氢吡喃基，其中所述基团 B 可以具有 1-5 个独立地选自酰氨基、酰氧基、烯基、烷氧基、烷基、烷硫基、炔基、氨基、芳基、芳烷基、芳烯基、芳炔基、芳烷氧基、芳氧基、芳硫基、碳环、氰基、氰氧基、卤素、卤代烷基、卤代苯基、羟基、杂芳基、杂芳氧基、杂环、杂芳烷氧基、异氰酸根合、异硫氰酸根合、硝基、亚硫酰基、磺酰基、氨磺酰基、硫代羰基、氰硫基、三卤代甲磺酰氨基、O-氨基甲酰基、N-氨基甲酰基、O-硫代氨基甲酰基、N-硫代氨基甲酰基及 C-酰氨基的取代基。

在本发明的一个方面，基团 A 是被一个或多个取代基取代的，并且选自苯基或苯并[1,3]间二氧杂环戊烯基团；基团 B 是被一个或多个取代基取代的，并且选自环丙基、环丁基、环戊基、环己基、吡咯基、噻喃

基及四氢吡喃基；R_1为氢；L_1为－S－；L_2为－CH_2CH_2－，及其可药用的盐。根据本发明的该方面，所述基团 A 取代基选自卤素和烷氧基，且所述基团 B 取代基选自－C(=O)、－C(=O)CH_3、$-CH_3$、$-CH_2CH_3$、$-CH_2CH_2CH_3$、$-C(=O)OCH_2CH_3$、$-S(=O)_2CH_3$、$-S(=O)_2CF_3$、$-C(=O)OC(CH_3)_3$、－C(=O)OCH_2－苯基、$-CH_2$－苯基、$-CH(CH_3)_2$、$-C(=O)NHCH_2CH_3$、$-C(=O)NHCH(CH_3)_2$、$-C(=O)NHC(CH_3)_3$、$-C(=O)NHCH_2C(=O)OCH_2CH_3$、$-C(=O)C(CH_3)_3$、$-CH(CH_3)_2$、$-CH_2CH(CH_3)_2$、$-C(=O)CH_2C(CH_3)_3$、环丙基、环丁基、环戊基及环己基。

在一方面，本发明提供其中 R1 为氢的式 I 化合物。

在一方面，本发明提供其中 L_1为－S－的式 I 化合物。

在一方面，本发明提供其中 L_2为－CH_2CH_2－的式 I 化合物。

在一方面，本发明提供如下的式 I 化合物，其中 L_2为$-(CH_2)_n-(CH_2)_n-$，并且各个 n 独立地选自 0、1、2 和 3，且各个碳可任选被一个或多个独立地选自羟基、卤素、烷氧基、烷基、氨基、环烷基、$-NR_2R_3$、$-NSO_2R_4$、$-NC(=O)NR_2R_3$、杂芳基、芳基、环烷基及杂环的取代基取代；其中$-R_2$和$-R_3$独立地选自－H、烷基及$-C(=O)OR_4$；并且其中 R_4为烷基（例如甲基、乙基、丙基、异丙基、丁基、异丁基或叔丁基）。

本发明化合物的实例见实施例。在一些方面，本发明的化合物包括实施例中那些具有等于或小于 10 μM 的 IC50 的化合物。在一些方面，本发明的化合物包括实施例中那些具有等于或小于 5 μM 的 IC50 的化合物。在一些方面，本发明的化合物包括实施例中那些具有等于或小于 1 μM 的 IC50 的化合物。在一些方面，本发明的化合物包括实施例中那些具有等于或小于 0.5 μM 的 IC50 的化合物。

在一些方面，本发明的化合物包括在本发明实施方案的任何方面中并具有等于或小于 10 μM 的 IC50 的那些化合物。在一些方面，本发明的化合物包括在本发明实施方案的任何方面中并具有等于或小于 5 μM 的 IC50 的那些化合物。在一些方面，本发明的化合物包括在本发明实施方案的任何方面中并具有等于或小于 1 μM 的 IC50 的那些化合物。在一些方面，本发明的化合物包括在本发明实施方案的任何方面中并具有等于或小于 0.5 μM 的 IC50 的那些化合物。

在一些方面，本发明涉及连接于树脂的本发明化合物。在一个具体的方面，所述树脂选自葡聚糖凝胶（sephadex）、tentagel 及 affigel。

如本领域技术人员可以理解的，取代基列表中的某些项与该列表中

的其他术语重复(相同取代基的不同名称)、或者被其他术语涵盖，并且/或者与其他术语的含义部分地重合。本领技术人员应了解，在本发明的化合物中，取代基可以通过多个位置结合于所述分子的剩余部分上，在实施例中示例了优选的位置。

另外，式I-Ⅲ的化合物可以含有不对称碳原子，从而可以外消旋的形式和旋光活性的形式存在。因此，旋光异构体或者对映异构体、外消旋体、互变异构体及非对映异构体也涵盖在式I-Ⅲ的化合物中。本发明的方法包括使用所有这些异构体及其混合物。分离对映异构体和非对映异构体混合物的方法是本领域技术人员公知的。本发明涵盖任何分离的外消旋形式的或旋光活性形式的所述式I的化合物，或者其任意的混合物。

在一个实施方案中，本发明提供一种化合物或含有该化合物的药物组合物，其中所述化合物选自 8-(2,5-二甲氧基-苯基硫基)-9-苯乙基-9H-嘌呤-6-基胺、8-(2,5-二甲氧基-苯基硫基)-3-苯乙基-3H-嘌呤-6-基胺、8-(2,5-二甲氧基-苯基硫基)-9-(3-苯基-丙基)-9H-嘌呤-6-基胺、8-(苯并[1,3]间二氧杂环戊烯-5-基硫基)-9-苯乙基-9H-嘌呤-6-基胺、8-(苯并[1,3]间二氧杂环戊烯-5-基硫基)-3-苯乙基-3H-嘌呤-6-基胺、8-(苯并[1,3]间二氧杂环戊烯-5-基硫基)-9-(3-苯基-丙基)-9H-嘌呤-6-基胺、8-(苯并[1,3]间二氧杂环戊烯-5-基硫基)-9-[2-(4-硝基-苯基)-乙基]-9H-嘌呤-6-基胺、8-(2,5-二甲氧基-苯基硫基)-9-[2-(4-硝基-苯基)-乙基]-9H-嘌呤-6-基胺、8-(2,5-二甲氧基-苯基硫基)-9-[2-(4-氟-苯基)-乙基]-9H-嘌呤-6-基胺、8-(2,5-二甲氧基-苯基硫基)-3-[2-(4-氟-苯基)-乙基]-3H-嘌呤-6-基胺、8-(苯并[1,3]间二氧杂环戊烯-5-基硫基)-9-[2-(4-氟-苯基)-乙基]-9H-嘌呤-6-基胺、8-(苯并[1,3]间二氧杂环戊烯-5-基硫基)-3-[2-(4-氟-苯基)-乙基]-3H-嘌呤-6-基胺、8-(6-溴-苯并[1,3]间二氧杂环戊烯-5-基硫基)-9-苯乙基-9H-嘌呤-6-基胺、8-(6-溴-苯并[1,3]间二氧杂环戊烯-5-基硫基)-3-苯乙基-3H-嘌呤-6-基胺、8-(2,4-二甲氧基-苯基硫基)-9-苯乙基-9H-嘌呤-6-基胺、8-(2,4-二甲氧基-苯基硫基)-3-苯乙基-3H-嘌呤-6-基胺、8-(4-氯-苯磺酰基)-9-苯乙基-9H-嘌呤-6-基胺、8-(4-氯-苯基硫基)-3-苯乙基-3H-嘌呤-6-基胺、4-(6-氨基-9-苯乙基-9H-嘌呤-8-基硫基)-苯甲腈、4-(6-氨基-3-苯乙基-3H-嘌呤-8-基硫基)-苯甲

腈、9-[2-(3,4-二甲氧基-苯基)-乙基]-8-(2,5-二甲氧基-苯基硫基)-9H-嘌呤-6-基胺、3-[2-(3,4-二甲氧基-苯基)-乙基]-8-(2,5-二甲氧基-苯基硫基)-3H-嘌呤-6-基胺、8-(2,5-二甲氧基-苯基硫基)-9-(2-对甲苯基-乙基)-9H-嘌呤-6-基胺、8-(2,5-二甲氧基-苯基硫基)-3-(2-对甲苯基-乙基)-3H-嘌呤-6-基胺、9-[2-(2-氯-苯基)-乙基]-8-(2,5-二甲氧基-苯基硫基)-9H-嘌呤-6-基胺、3-[2-(2-氯-苯基)-乙基]-8-(2,5-二甲氧基-苯基硫基)-3H-嘌呤-6-基胺、9-[2-(2,4-二氯-苯基)-乙基]-8-(2,5-二甲氧基-苯基硫基)-9H-嘌呤-6-基胺、3-[2-(2,4-二氯-苯基)-乙基]-8-(2,5-二甲氧基-苯基-硫基)-3H-嘌呤-6-基胺、8-(2,5-二甲氧基-苯基硫基)-9-[2-(2-氟-苯基)-乙基]-9H-嘌呤-6-基胺、8-(2,5-二甲氧基-苯基硫基)-3-[2-(2-氟-苯基)-乙基]-3H-嘌呤-6-基胺、9-[2-(4-氯-苯基)-乙基]-8-(3,4,5-三甲氧基-苯基硫基)-9H-嘌呤-6-基胺、3-[2-(4-氯-苯基)-乙基]-8-(3,4,5-三甲氧基-苯基硫基)-3H-嘌呤-6-基胺、8-(-6-碘-苯并[1,3]间二氧杂环戊烯-5-基硫基)-9-苯乙基-9H-嘌呤-6-基胺、8-(6-碘-苯并[1,3]间二氧杂环戊烯-5-基硫基)-3-苯乙基-3H-嘌呤-6-基胺、8-(2,5-二甲氧基-苯基硫基)-9-[2-(3-甲氧基-苯基)-乙基]-9H-嘌呤-6-基胺、8-(2,5-二甲氧基-苯基硫基)-3-[2-(3-甲氧基-苯基)-乙基]-3H-嘌呤-6-基胺、8-(2,5-二甲氧基-苯基硫基)-9-[2-(3-氟-苯基)-乙基]-9H-嘌呤-6-基胺、8-(2,5-二甲氧基-苯基硫基)-3-[2-(3-氟-苯基)-乙基]-3H-嘌呤-6-基胺、8-(6-溴-苯并[1,3]间二氧杂环戊烯-5-基硫基)-9-[2-(4 氯-2-氟苯基)-乙基]-9H-嘌呤-6-基胺、8-(6-溴-苯并[1,3]间二氧杂环戊烯-5-基硫基)-3-[2-(4 氯-2-氟-苯基)-乙基]-3H-嘌呤-6-基胺、8-(6-溴-苯并[1,3]间二氧杂环戊烯-5-基硫基)-9-(2-五氟苯基-乙基)-9H-嘌呤-6-基胺、8-(6-溴-苯并[1,3]间二氧杂环戊烯-5-基硫基)-3-(2-五氟苯基-乙基)-3H-嘌呤-6-基胺、8-(6-溴-苯并[1,3]间二氧杂环戊烯-5-基硫基)-9-(3-苯基-丙基)-9H-嘌呤-6-基胺、8-(6-溴-苯并[1,3]间二氧杂环戊烯-5-基硫基)-3-(3-苯基-丙基)-3H-嘌呤-6-基胺、9-苯乙基-8-(3,4,5-三甲氧基-苯硫基)-9H-嘌呤-6-基胺、3-苯乙基-8-(3,4,5-三甲氧基-苯基硫基)-3H-嘌呤-6-基胺、9-(3-苯基-丙基)-8-(3,4,5-三甲氧基-苯基硫基)-9H-嘌呤-6-基胺、3-(3-苯基-丙基)-8-(3,4,5-三甲氧基-苯基硫基)-3H-嘌呤-6-基胺、8-(苯并[1,3]间二氧杂环戊烯-5-基

硫基)-9-(2-吡咯-1-基-乙基)-9H-嘌呤-6-基胺、8-(苯并[1,3]间二氧杂环戊烯-5-基硫基)-3-(2-吡咯-1-基-乙基)-3H-嘌呤-6-基胺、8-(苯并[1,3]间二氧杂环戊烯-5-基硫基)-9-(3-吡咯-1-基-丙基)-9H-嘌呤-6-基胺、8-(苯并[1,3]间二氧杂环戊烯-5-基硫基)-3-(3-吡咯-1-基-丙基)-3H-嘌呤-6-基胺、8-(6-溴-苯并[1,3]间二氧杂环戊烯-5-基硫基)-9-[2-(2-氯-苯基)-乙基]-9H-嘌呤-6-基胺、8-(6-溴-苯并[1,3]间二氧杂环戊烯-5-基硫基)-3-[2-(2-氯-苯基)-乙基]-3H-嘌呤-6-基胺、8-(2,5-二甲氧基-苯基硫基)-9-[2-(2,4,6-三甲基-苯基)-乙基]-9H-嘌呤-6-基胺、8-(2,5-二甲氧基-苯基硫基)-3-[2-(2,4,6-三甲基-苯基)-乙基]-3H-嘌呤-6-基胺、8-(6-溴-苯并[1,3]间二氧杂环戊烯-5-基硫基)-9-(2-苯基-丁基)-9H-嘌呤-6-基胺、8-(6-溴-苯并[1,3]间二氧杂环戊烯-5-基硫基)-3-(2-苯基-丁基)-3H-嘌呤-6-基胺、8-(6-溴-苯并[1,3]间二氧杂环戊烯-5-基硫基)-9-[1-(4-甲氧基-苯基)-环丙基甲基]-9H-嘌呤-6-基胺、8-(6-溴-苯并[1,3]间二氧杂环戊烯-5-基硫基)-3-[1-(4-甲氧基-苯基)-环丙基甲基]-3H-嘌呤-6-基胺、9-[1-(4-氯-苯基)-环丁基甲基]-8-(2,5-二甲氧基-苯基硫基)-9H-嘌呤-6-基胺、3-[1-(4-氯-苯基)-环丁基甲基]-8-(2,5-二甲氧基-苯基硫基)-3H-嘌呤-6-基胺、1-(4-{2-[6-氨基-8-(2,5-二甲氧基-苯基硫基)-嘌呤-9-基]-乙基}-苯基)-乙酮、1-(4-{2-[6-氨基-8-(2,5-二甲氧基-苯基硫基)-嘌呤-3-基]-乙基}-苯基)-乙酮、8-(2,5-二甲氧基-苯基硫基)-9-(2-吡咯-1-基-乙基)-9H-嘌呤-6-基胺、8-(2,5-二甲氧基-苯基硫基)-3-(2-吡咯-1-基-乙基)-3H-嘌呤-6-基胺、8-(2,5-二甲氧基-苯基硫基)-9-(2-萘-1-基-乙基)-9H-嘌呤-6-基胺、8-(2,5-二甲氧基-苯基硫基)-3-(2-萘-1-基-乙基)-3H-嘌呤-6-基胺、8-(2,5-二甲氧基-苯基硫基)-9-(2-邻甲苯基-乙基)-9H-嘌呤-6-基胺、8-(2,5-二甲氧基-苯基硫基)-3-(2-邻甲苯基-乙基)-3H-嘌呤-6-基胺、9-[2-(4-溴-苯基)-乙基]-8-(2,5-二甲氧基-苯基硫基)-9H-嘌呤-6-基胺、3-[2-(4-溴-苯基)-乙基]-8-(2,5-二甲氧基-苯基硫基)-3H-嘌呤-6-基胺、9-[2-(2,3-二氯-苯基)-乙基]-8-(2,5-二甲氧基-苯基硫基)-9H-嘌呤-6-基胺、3-[2-(2,3-二氯-苯基)-乙基]-8-(2,5-二甲氧基-苯基硫基)-3H-嘌呤-6-基胺、4-{2-[6-氨基-8-(2,5-二甲氧基-苯基硫基)-嘌呤-9-基]-乙基}-苯酚、4-{2-[6-氨基-8-(2,5-二甲氧基-苯基硫基)-嘌呤-9-基]-乙基}-苯酚、8-(2,5-

二甲氧基-苯基硫基)-9-[2-(3-三氟甲基-苯基)-乙基]-9H-嘌呤-6-基胺、8-(2,5-二甲氧基-苯基硫基)-3-[2-(3-三氟甲基-苯基)-乙基]-3H-嘌呤-6-基胺、4-{2-[6-氨基-8-(2,5-二甲氧基-苯基硫基)-嘌呤-9-基]-乙基}-苯甲酸、4-{2-[6-氨基-8-(2,5-二甲氧基-苯基硫基)-嘌呤-3-基]-乙基}-苯甲酸、8-(2,5-二甲氧基-苯基硫基)-3-(4-氟-苄基)-3H-嘌呤-6-基胺、8-(2,5-二甲氧基-苯基硫基)-9-(4-硝基-苄基)-9H-嘌呤-6-基胺、8-(2,5-二甲氧基-苯基硫基)-9-[2-(2-甲氧基-苯基)-乙基]-9H-嘌呤-6-基胺、8-(2,5-二甲氧基-苯基硫基)-3-[2-(2-甲氧基-苯基)-乙基]-3H-嘌呤-6-基胺、8-(2,5-二甲氧基-苯基硫基)-9-(2-苯基-丁基)-9H-嘌呤-6-基胺、8-(2,5-二甲氧基-苯基硫基)-3-(2-苯基-丁基)-3H-嘌呤-6-基胺、8-(2,5-二甲氧基-苯基硫基)-9-[2-(3,4,5-三甲氧基-苯基)-乙基]-9H-嘌呤-6-基胺、8-(2,5-二甲氧基-苯基硫基)-3-[2-(3,4,5-三甲氧基-苯基)-乙基]-3H-嘌呤-6-基胺、8-(6-溴-苯并[1,3]间二氧杂环戊烯-5-基硫基)-9-[2-(3,4,5-三甲氧基-苯基)-乙基]-9H-嘌呤-6-基胺、8-(6-溴-苯并[1,3]间二氧杂环戊烯-5-基硫基)-3-[2-(3,4,5-三甲氧基-苯基)-乙基]-3H-嘌呤-6-基胺、8-(6-溴-苯并[1,3]间二氧杂环戊烯-5-基硫基)-9-[2-(2,4,6-三甲基-苯基)-乙基]-9H-嘌呤-6-基胺、8-(6-溴-苯并[1,3]间二氧杂环戊烯-5-基硫基)-3-[2-(2,4,6-三甲基-苯基)-乙基]-3H-嘌呤-6-基胺、8-(6-溴-苯并[1,3]间二氧杂环戊烯-5-基硫基)-9-[1-(4-氯-苯基)-环丁基甲基]-9H-嘌呤-6-基胺、8-(6-溴-苯并[1,3]间二氧杂环戊烯-5-基硫基)-3-[1-(4-氯-苯基)-环丁基甲基]-3H-嘌呤-6-基胺、9-[2-(4-氯-2-氟-苯基)-乙基]-8-(2,5-二甲氧基-苯基硫基)-9H-嘌呤-6-基胺、3-[2-(4-氯-2-氟-苯基)-乙基]-8-(2,5-二甲氧基-苯基硫基)-3H-嘌呤-6-基胺、8-(6-溴-苯并[1,3]间二氧杂环戊烯-5-基硫基)-9-(3-甲基-2-苯基-戊基)-9H-嘌呤-6-基胺、8-(6-溴-苯并[1,3]间二氧杂环戊烯-5-基硫基)-3-(3-甲基-2-苯基-戊基)-3H-嘌呤-6-基胺、8-(6-溴-苯并[1,3]间二氧杂环戊烯-5-基硫基)-9-(2-环戊基-2-苯基-乙基)-9H-嘌呤-6-基胺、8-(6-溴-苯并[1,3]间二氧杂环戊烯-5-基硫基)-3-(2-环戊基-2-苯基-乙基)-3H-嘌呤-6-基胺、9-(2-环戊基-2-苯基-乙基)-8-(2,5-二甲氧基-苯基硫基)-9H-嘌呤-6-基胺、3-(2-环戊基-2-苯基-乙基)-8-(2,5-二甲氧基-苯基硫基)-3H-嘌呤-6-基胺、8-(2,5-二甲氧基-苯基硫

基)-9-(3-甲基-2-苯基-戊基)-9H-嘌呤-6-基胺、8-(2,5-二甲氧基-苯基硫基)-3-(3-甲基-2-苯基-戊基)-3H-嘌呤-6-基胺、2-[6-氨基-8-(2,5-二甲氧基-苯基硫基)-嘌呤-9-基]-1-(2,4-二氯-苯基)乙醇、2-[6-氨基-8-(2,5-二甲氧基-苯基硫基)-嘌呤-3-基]-1-(2,4-二氯-苯基)乙醇、8-(6-溴-苯并[1,3]间二氧杂环戊烯-5-基硫基)-9-[2-(3-氟-苯基)-乙基]-9H-嘌呤-6-基胺、8-(6-溴-苯并[1,3]间二氧杂环戊烯-5-基硫基)-3-[2-(3-氟-苯基)-乙基]-3H-嘌呤-6-基胺、8-(2,5-二甲氧基-苯基硫基)-9-[2-(3-乙氧基-4-甲氧基-苯基)-乙基]-9H-嘌呤-6-基胺、8-(2,5-二甲氧基-苯基硫基)-3-[2-(3-乙氧基-4-甲氧基-苯基)-乙基]-3H-嘌呤-6-基胺、8-(2,5-二甲氧基-苯基硫基)-9-(3-甲基-2-苯基-丁基)-9H-嘌呤-6-基胺、8-(2,5-二甲氧基-苯基硫基)-3-(3-甲基-2-苯基-丁基)-3H-嘌呤-6-基胺、8-(2,5-二甲氧基-苯基硫基)-9-[2-(2,5-二甲基-苯基)-乙基]-9H-嘌呤-6-基胺、8-(2,5-二甲氧基-苯基硫基)-3-[2-(2,5-二甲基-苯基)-乙基]-3H-嘌呤-6-基胺、8-(6-溴-苯并[1,3]间二氧杂环戊烯-5-基硫基)-9-[2-(3-乙氧基-4-甲氧基-苯基)-乙基]-9H-嘌呤-6-基胺、8-(6-溴-苯并[1,3]间二氧杂环戊烯-5-基硫基)-3-[2-(3-乙氧基-4-甲氧基-苯基)-乙基]-3H-嘌呤-6-基胺、9-[2-(4-氯-苯基)-3-甲基-丁基]-8-(2,5-二甲氧基-苯基硫基)-9H-嘌呤-6-基胺、3-[2-(4-氯-苯基)-3-甲基-丁基]-8-(2,5-二甲氧基-苯基硫基)-3H-嘌呤-6-基胺、9-[2-(2,4-二氟-苯基)-乙基]-8-(2,5-二甲氧基-苯基硫基)-9H-嘌呤-6-基胺、9-[2-(2-氯-6-氟-苯基)-乙基]-8-(2,5-二甲氧基-苯基硫基)-9H-嘌呤-6-基胺、3-[2-(2-氯-6-氟-苯基)-乙基]-8-(2,5-二甲氧基-苯基硫基)-3H-嘌呤-6-基胺、8-(6-溴-苯并[1,3]间二氧杂环戊烯-5-基硫基)-9-[2-(2,5-二甲基-苯基)-乙基]-9H-嘌呤-6-基胺、8-(6-溴-苯并[1,3]间二氧杂环戊烯-5-基硫基)-3-[2-(2,5-二甲基-苯基)-乙基]-3H-嘌呤-6-基胺、8-(6-溴-苯并[1,3]间二氧杂环戊烯-5-基硫基)-9-(3-甲基-2-苯基-丁基)-9H-嘌呤-6-基胺、8-(6-溴-苯并[1,3]间二氧杂环戊烯-5-基硫基)-3-(3-甲基-2-苯基-丁基)-3H-嘌呤-6-基胺、8-(2,5-二甲氧基-苯基硫基)-9-[2-(3,5-二甲基-苯基)-乙基]-9H-嘌呤-6-基胺、8-(2,5-二甲氧基-苯基硫基)-3-[2-(3,5-二甲基-苯基)-乙基]-3H-嘌呤-6-基胺、8-(2,5-二甲氧基-苯基硫基)-9-(2-吡啶-4-基-乙基)-9H-嘌呤-6-基胺、8-(2,5-二甲氧基-苯基硫基)-9-(2-

吡啶-2-基-乙基)-9H-嘌呤-6-基胺、8-(2,5-二甲氧基-苯基硫基)-3-(2-吡啶-2-基-乙基)-3H-嘌呤-6-基胺、8-(2,5-二甲氧基-苯基硫基)-9-[2-(3-碘-苯基)-乙基]-9H-嘌呤-6-基胺、8-(2,5-二甲氧基-苯基硫基)-3-[2-(3-碘-苯基)-乙基]-3H-嘌呤-6-基胺、9-[2-(2-氯-4-氟-苯基)-乙基]-8-(2,5-二甲氧基-苯基硫基)-9H-嘌呤-6-基胺、3-[2-(2-氯-4-氟-苯基)-乙基]-8-(2,5-二甲氧基-苯基硫基)-3H-嘌呤-6-基胺、9-[2-(2-溴-苯基)-乙基]-8-(2,5-二甲氧基-苯基硫基)-9H-嘌呤-6-基胺、3-[2-(2-溴-苯基)-乙基]-8-(2,5-二甲氧基-苯基硫基)-3H-嘌呤-6-基胺、9-[2-(3,5-二氟-苯基)-乙基]-8-(2,5-二甲氧基-苯基硫基)-9H-嘌呤-6-基胺、3-[2-(3,5-二氟-苯基)-乙基]-8-(2,5-二甲氧基-苯基硫基)-3H-嘌呤-6-基胺、9-[2-(2,3-二氟-苯基)-乙基]-8-(2,5-二甲氧基-苯基硫基)-9H-嘌呤-6-基胺、3-[2-(2,3-二氟-苯基)-乙基]-8-(2,5-二甲氧基-苯基硫基)-3H-嘌呤-6-基胺、8-(6-溴-1,3-苯并间二氧杂环戊烯-5-基硫基)-9-[2-(2-氟-苯基)-乙基]-9H-嘌呤-6-基胺、8-(6-溴-苯并[1,3]间二氧杂环戊烯-5-基硫基)-3-[2-(2-氟-苯基)-乙基]-3H-嘌呤-6-基胺、8-(6-溴-苯并[1,3]间二氧杂环戊烯-5-基硫基)-9-[2-(2-溴-苯基)-乙基]-9H-嘌呤-6-基胺、8-(6-溴-苯并[1,3]间二氧杂环戊烯-5-基硫基)-3-[2-(2-溴-苯基)-乙基]-3H-嘌呤-6-基胺、8-(6-溴-苯并[1,3]间二氧杂环戊烯-5-基硫基)-9-(2-吡啶-3-基-乙基)-9H-嘌呤-6-基胺、8-(6-溴-苯并[1,3]间二氧杂环戊烯-5-基硫基)-3-(2-吡啶-3-基-乙基)-3H-嘌呤-6-基胺、8-(6-溴-苯并[1,3]间二氧杂环戊烯-5-基硫基)-9-[2-(3-碘-苯基)-乙基]-9H-嘌呤-6-基胺、8-(6-溴-苯并[1,3]间二氧杂环戊烯-5-基硫基)-3-[2-(3-碘-苯基)-乙基]-3H-嘌呤-6-基胺、8-(6-溴-苯并[1,3]间二氧杂环戊烯-5-基硫基)-9-(2-邻甲苯基-乙基)-9H-嘌呤-6-基胺、8-(6-溴-苯并[1,3]间二氧杂环戊烯-5-基硫基)-3-(2-邻甲苯基-乙基)-3H-嘌呤-6-基胺、8-(6-溴-苯并[1,3]间二氧杂环戊烯-5-基硫基)-9-(2-萘-1-基-乙基)-9H-嘌呤-6-基胺、8-(6-溴-苯并[1,3]间二氧杂环戊烯-5-基硫基)-3-(2-萘-1-基-乙基)-3H-嘌呤-6-基胺、1-(4-{2-[6-氨基-8-(6-溴-苯并[1,3]间二氧杂环戊烯-5-基硫基)-嘌呤-9-基]-乙基}-苯基)-乙酮、1-(4-{2-[6-氨基-8-(6-溴-苯并[1,3]间二氧杂环戊烯-5-基硫基)-嘌呤-3-基]-乙基}-苯基)-乙酮、8-(6-溴-苯并[1,3]间二氧杂环戊烯-5-基硫基)-9-[2-(2,3-二氟-苯

基)-乙基]-9H-嘌呤-6-基胺、8-(6-溴-1,3-苯并[1,3]间二氧杂环戊烯-5-基硫基)-3-[2-(2,3-二氟-苯基)-乙基]-3H-嘌呤-6-基胺、8-(6-溴-苯并[1,3]间二氧杂环戊烯-5-基硫基)-9-(2-对甲苯基-乙基)-9H-嘌呤-6-基胺、8-(6-溴-苯并[1,3]间二氧杂环戊烯-5-基硫基)-3-(2-对甲苯基-乙基)-3H-嘌呤-6-基胺、8-(6-溴-苯并[1,3]间二氧杂环戊烯-5-基硫基)-9-[2-(3-三氟甲基-苯基)-乙基]-9H-嘌呤-6-基胺、8-(6-溴-苯并[1,3]间二氧杂环戊烯-5-基硫基)-3-[2-(3-三氟甲基-苯基)-乙基]-3H-嘌呤-6-基胺、 9-(2-苯并[1,3]间二氧杂环戊烯-5-基-乙基)-8-(2,5-二甲氧基-苯基硫基)-9H-嘌呤-6-基胺、3-(2-苯并[1,3]间二氧杂环戊烯-5-基-乙基)-8-(2,5-二甲氧基-苯基硫基)-3H-嘌呤-6-基胺、9-(2-环己基-乙基)-8-(2,5-二甲氧基苯基-硫基)-9H-嘌呤-6-基胺、3-(2-环己基-乙基)-8-(2,5-二甲氧基-苯基硫基)-3H-嘌呤-6-基胺、9-(2-联苯基-4-基-乙基)-8-(6-溴-苯并[1,3]间二氧杂环戊烯-5-基硫基)-9H-嘌呤-6-基胺、3-(2-联苯基-4-基-乙基)-8-(6-溴-苯并[1,3]间二氧杂环戊烯-5-基硫基)-3H-嘌呤-6-基胺、4-{2-[6-氨基-8-(2,5-二甲氧基-苯基硫基)-嘌呤-9-基]-乙基}-苯磺酸、 4-{2-[6-氨基-8-(2,5-二甲氧基-苯基硫基)-嘌呤-3-基]-乙基}-苯磺酸、2-[6-氨基-8-(6-溴-苯并[1,3]间二氧杂环戊烯-5-基硫基)-嘌呤-9-基]-1-(2,4-二氯-苯基)-乙醇、2-[6-氨基-8-(6-溴-苯并[1,3]间二氧杂环戊烯-5-基硫基)-嘌呤-3-基]-1-(2,4-二氯-苯基)-乙醇、 9-(2-环己基-2-苯基-乙基)-8-(2,5-二甲氧基-苯基硫基)-9H-嘌呤-6-基胺、3-(2-环己基-2-苯基-乙基)-8-(2 5-二甲氧基-苯基硫基)-3H-嘌呤-6-基胺、 9-(2-联苯基-4-基-乙基)-8-(2,5-二甲氧基-苯基硫基)-9H-嘌呤-6-基胺、3-(2-联苯基-4-基-乙基)-8-(2,5-二甲氧基-苯基硫基)-3H-嘌呤-6-基胺、 8-(2,5-二甲氧基-苯基硫基)-9-[2-(2-三氟甲基-苯基)-乙基]-9H-嘌呤-6-基胺、8-(2,5-二甲氧基-苯基硫基)-3-[2-(2-三氟甲基-苯基)-乙基]-3H-嘌呤-6-基胺、8-(2,5-二甲氧基-苯基硫基)-9-[2-(4-二甲基氨基-苯基)-乙基]-9H-嘌呤-6-基胺、 8-(2,5-二甲氧基-苯基硫基)-3-[2-(4-二甲基氨基-苯基)-乙基]-3H-嘌呤-6-基胺、 8-(6-溴-苯并[1,3]间二氧杂环戊烯-5-基硫基)-9-[2-(4-二甲基氨基-苯基)-乙基]-9H-嘌呤-6-基胺、8-(6-溴-苯并[1,3]间二氧杂环戊烯-5-基硫基)-3-[2-(4-二甲基氨基-苯基)-乙基]-3H-嘌呤-6-基胺、 8-(2,5-二乙氧基-苯基硫基)-9-苯乙基-9H-嘌呤

-6-基胺、8-(2,5-二乙氧基-苯基硫基)-3-苯乙基-3H-嘌呤-6-基胺、9-[2-(2-氯-苯基)-乙基]-8-(2,5-二乙氧基-苯基硫基)-9H-嘌呤-6-基胺、3-[2-(2-氯-苯基)-乙基]-8-(2,5-二乙氧基-苯基硫基)-3H-嘌呤-6-基胺、9-[2-(3,5-二甲氧基-苯基)-乙基]-8-(2,5-二甲氧基-苯基硫基)-9H-嘌呤-6-基胺、3-[2-(3,5-二甲氧基-苯基)-乙基]-8-(2,5-二甲氧基-苯基硫基)-3H-嘌呤-6-基胺、8-(6-溴-苯并[1,3]间二氧杂环戊烯-5-基硫基)-9-[2-(3,5-二甲氧基-苯基)-乙基]-9H-嘌呤-6-基胺、8-(6-溴-苯并[1,3]间二氧杂环戊烯-5-基硫基)-3-[2-(3,5-二甲氧基-苯基)-乙基]-3H-嘌呤-6-基胺、8-(2,5-二甲氧基-苯基硫基)-9-(2-噻吩-3-基-乙基)-9H-嘌呤-6-基胺、8-(2,5-二甲氧基-苯基硫基)-3-(2-噻吩-3-基-乙基)-3H-嘌呤-6-基胺、8-(2,5-二甲氧基-苯基硫基)-9-2-噻吩-2-基-乙基)-9H-嘌呤-6-基胺、8-(2,5-二甲氧基-苯基硫基)-3-(2-噻吩-2-基-乙基)-3H-嘌呤-6-基胺、8-(6-溴-苯并[1,3]间二氧杂环戊烯-5-基硫基)-9-(2-噻吩-3-基-乙基)-9H-嘌呤-6-基胺、8-(6-溴-苯并[1,3]间二氧杂环戊烯-5-基硫基)-3-(2-噻吩-3-基-乙基)-3H-嘌呤-6-基胺、8-(6-溴-苯并[1,3]间二氧杂环戊烯-5-基硫基)-9-(2-噻吩-2-基-乙基)-9H-嘌呤-6-基胺、8-(6-溴-苯并[1,3]间二氧杂环戊烯-5-基硫基)-3-(2-噻吩-2-基-乙基)-3H-嘌呤-6-基胺、8-(2,5-二甲氧基-苯基硫基)-9-[2-(2-硝基-苯基)-乙基]-9H-嘌呤-6-基胺、8-(2,5-二甲氧基-苯基硫基)-3-[2-(2-硝基-苯基)-乙基]-3H-嘌呤-6-基胺、8-(2,5-二甲氧基-苯基硫基)-9-[2-(2-硝基-苯基)-乙基]-9H-嘌呤-6-基胺、8-(2,5-二甲氧基-苯基硫基)-3-[2-(2-硝基-苯基)-乙基]-3H-嘌呤-6-基胺、8-(6-溴-苯并[1,3]间二氧杂环戊烯-5-基甲基)-9-苯乙基-9H-嘌呤-6-基胺、8-(6-溴-苯并[1,3]间二氧杂环戊烯-5-基甲基)-3-苯乙基-3H-嘌呤-6-基胺、(4-{2-[6-氨基-8-(6-溴-苯并[1,3]间二氧杂环戊烯-5-基硫基)-嘌呤-9-基]-乙基}-苯基)氨基甲酸叔丁酯、(4-{2-[6-氨基-8-(6-溴-苯并[1,3]间二氧杂环戊烯-5-基硫基)-嘌呤-3-基]-乙基}-苯基)氨基甲酸叔丁酯、9-[2-(4-氨基-苯基)-乙基]-8-(6-溴-苯并[1,3]间二氧杂环戊烯-5-基硫基)-9H-嘌呤-6-基胺、(4-{2-[6-氨基-8-(2,5-二甲氧基-苯基硫基)-嘌呤-9-基]-乙基}-苯基)-氨基甲酸叔丁酯、(4-{2-[6-氨基-8-(2,5-二甲氧基-苯基硫基)-嘌呤-3-基]-乙基}-苯基)-氨基甲酸叔丁酯、9-[2-(4-氨基-苯基)-乙基]-8-(2,5-二甲氧基-苯基硫基)-9H-

嘌呤-6-基胺、8-(2,5-二甲氧基-苯基硫基)-9-[2-(3-三氟甲氧基-苯基)-乙基]-9H-嘌呤-6-基胺、8-(2,5-二甲氧基-苯基硫基)-9-(2-五氟苯基-乙基)-9H-嘌呤-6-基胺、9-[2-(3,5-双三氟甲基-苯基)-乙基]-8-(2,5-二甲氧基-苯基硫基)-9H-嘌呤-6-基胺、9-[2-(3,5-双三氟甲基-苯基)-乙基]-8-(6-溴-苯并[1,3]间二氧杂环戊烯-5-基硫基)-9H-嘌呤-6-基胺、8-(6-溴-苯并[1,3]间二氧杂环戊烯-5-基硫基)-9-[1-(4-氯-苯基)-环丙基甲基]-9H-嘌呤-6-基胺、8-(6-溴-苯并[1,3]间二氧杂环戊烯-5-基硫基)-3-[2-(3-硝基-苯基)-乙基]-3H-嘌呤-6-基胺、8-(2,5-二甲氧基-苯基硫基)-9-[2-(3-硝基-苯基)-乙基]-9H-嘌呤-6-基胺、8-(苯并[1,3]间二氧杂环戊烯-5-基硫基)-9-苯乙基-1,9-二氢-嘌呤-6-酮及 8-(6-溴-苯并[1,3]间二氧杂环戊烯-5-基硫基)-9-苯乙基-1,9-二氢-嘌呤-6-酮。

在一个实施方案中，本发明提供一种化合物和含有该化合物的药物组合物，其中所述化合物选自 8-(2,5-二甲氧基-苯基硫基)-9-苯乙基-9H-嘌呤-6-基胺、8-(2,5-二甲氧基-苯基硫基)-9-(3-苯基-丙基)-9H-嘌呤-6-基胺、8-(苯并[1,3]间二氧杂环戊烯-5-基硫基)-9-苯乙基-9H-嘌呤-6-基胺、8-(苯并[1,3]间二氧杂环戊烯-5-基硫基)-9-(3-苯基-丙基)-9H-嘌呤-6-基胺、8-(苯并[1,3]间二氧杂环戊烯-5-基硫基)-9-[2-(4-硝基-苯基)-乙基]-9H-嘌呤-6-基胺、8-(2,5-二甲氧基-苯基硫基)-9-[2-(4-硝基-苯基)-乙基]-9H-嘌呤-6-基胺、8-(2,5-二甲氧基-苯基硫基)-9-[2-(4-氟-苯基)-乙基]-9H-嘌呤-6-基胺、8-(苯并[1,3]间二氧杂环戊烯-5-基硫基)-9-[2-(4-氟-苯基)-乙基]-9H-嘌呤-6-基胺、8-(6-溴-苯并[1,3]间二氧杂环戊烯-5-基硫基)-9-苯乙基-9H-嘌呤-6-基胺、8-(2,4-二甲氧基-苯基硫基)-9-苯乙基-9H-嘌呤-6-基胺、8-(4-氯-苯磺酰基)-9-苯乙基-9H-嘌呤-6-基胺、4-(6-氨基-9-苯乙基-9H-嘌呤-8-基硫基)-苯甲腈 9-[2-(3,4-二甲氧基-苯基)-乙基]-8-(2,5-二甲氧基-苯基硫基)-9H-嘌呤-6-基胺、8-(2,5-二甲氧基-苯基硫基)-9-(2-对甲苯基-乙基)-9H-嘌呤-6-基氨基 9-[2-(2-氯-苯基)-乙基]-8-(2,5-二甲氧基-苯基硫基)-9H-嘌呤-6-基胺、9-[2-(2,4-二氯-苯基)-乙基]-8-(2,5-二甲氧基-苯基硫基)-9H-嘌呤-6-基胺、8-(2,5-二甲氧基-苯基硫基)-9-[2-(2-氟-苯基)-乙基]-9H-嘌呤-6-基胺、9-[2-(4-氯-苯基)-乙基]-8-(3,4,5-三甲氧基-苯基硫基)-9H-嘌呤

-6-基胺、8-(-6-碘-苯并[1,3]间二氧杂环戊烯-5-基硫基)-9-苯乙基-9H-嘌呤-6-基胺、8-(2,5-二甲氧基-苯基硫基)-9-[2-(3-甲氧基-苯基)-乙基]-9H-嘌呤-6-基胺、8-(2,5-二甲氧基-苯基硫基)-9-[2-(3-氟-苯基)-乙基]-9H-嘌呤-6-基氨基 8-(6-溴-苯并[1,3]间二氧杂环戊烯-5-基硫基)-9-[2-(4 氯-2-氟苯基)-乙基]-9H-嘌呤-6-基胺、8-(6-溴-苯并[1,3]间二氧杂环戊烯-5-基硫基)-9-(2-五氟苯基-乙基)-9H-嘌呤-6-基胺、8-(6-溴-苯并[1,3]间二氧杂环戊烯-5-基硫基)-9-(3-苯基-丙基)-9H-嘌呤-6-基胺、9-苯乙基-8-(3,4,5-三甲氧基-苯硫基)-9H-嘌呤-6-基胺、9-(3-苯基-丙基)-8-(3,4,5-三甲氧基-苯基硫基)-9H-嘌呤-6-基胺、 8-(苯并[1,3]间二氧杂环戊烯-5-基硫基)-9-(2-吡咯-1-基-乙基)-9H-嘌呤-6-基胺、8-(苯并[1,3]间二氧杂环戊烯-5-基硫基)-9-(3-吡咯-1-基-丙基)-9H-嘌呤-6-基胺、8-(6-溴-苯并[1,3]间二氧杂环戊烯-5-基硫基)-9-[2-(2-氯-苯基)-乙基]-9H-嘌呤-6-基胺、8-(2,5-二甲氧基-苯基硫基)-9-[2-(2,4,6-三甲基-苯基)-乙基]-9H-嘌呤-6-基胺、8-(6-溴-苯并[1,3]间二氧杂环戊烯-5-基硫基)-9-(2-苯基-丁基)-9H-嘌呤-6-基胺、8-(6-溴-苯并[1,3]间二氧杂环戊烯-5-基硫基)-9-[1-(4-甲氧基-苯基)-环丙基甲基]-9H-嘌呤-6-基胺、9-[1-(4-氯-苯基)-环丁基甲基]-8-(2,5-二甲氧基-苯基硫基)-9H-嘌呤-6-基胺、1-(4-{2-[6-氨基-8-(2,5-二甲氧基-苯基硫基)-嘌呤-9-基]-乙基}-苯基)-乙酮、1-(4-{2-[6-氨基-8-(2,5-二甲氧基-苯基硫基)-嘌呤-3-基]-乙基}-苯基)-乙酮、8-(2,5-二甲氧基-苯基硫基)-9-(2-吡咯-1-基-乙基)-9H-嘌呤-6-基胺、8-(2,5-二甲氧基-苯基硫基)-9-(2-萘-1-基-乙基)-9H-嘌呤-6-基胺、8-(2,5-二甲氧基-苯基硫基)-9-(2-邻甲苯基-乙基)-9H-嘌呤-6-基胺、9-[2-(4-溴-苯基)-乙基]-8-(2,5-二甲氧基-苯基硫基)-9H-嘌呤-6-基胺、9-[2-(2,3-二氯-苯基)-乙基]-8-(2,5-二甲氧基-苯基硫基)-9H-嘌呤-6-基胺、4-{2-[6-氨基-8-(2,5-二甲氧基-苯基硫基)-嘌呤-9-基]-乙基}-酚、4-{2-[6-氨基-8-(2,5-二甲氧基-苯基硫基)-嘌呤-9-基]-乙基}-酚、8-(2,5-二甲氧基-苯基硫基)-9-[2-(3-三氟甲基-苯基)-乙基]-9H-嘌呤-6-基胺、4-{2-[6-氨基-8-(2,5-二甲氧基-苯基硫基)-嘌呤-9-基]-乙基}-苯甲酸、4-{2-[6-氨基-8-(2,5-二甲氧基-苯基硫基)-嘌呤-3-基]-乙基}-苯甲酸、8-(2,5-二甲氧基-苯基硫基)-9-(4-硝基-苄基)-9H-嘌呤-6-基胺、8-(2,5-二甲氧基-苯基硫

基)-9-[2-(2-甲氧基-苯基)-乙基]-9H-嘌呤-6-基胺、8-(2,5-二甲氧基-苯基硫基)-9-(2-苯基-丁基)-9H-嘌呤-6-基胺、8-(2,5-二甲氧基-苯基硫基)-9-[2-(3,4,5-三甲氧基-苯基)-乙基]-9H-嘌呤-6-基胺、8-(6-溴-苯并[1,3]间二氧杂环戊烯-5-基硫基)-9-[2-(3,4,5-三甲氧基-苯基)-乙基]-9H-嘌呤-6-基胺、8-(6-溴-苯并[1,3]间二氧杂环戊烯-5-基硫基)-9-[2-(2,4,6-三甲基-苯基)-乙基]-9H-嘌呤-6-基胺、8-(6-溴-苯并[1,3]间二氧杂环戊烯-5-基硫基)-9-[1-(4-氯-苯基)-环丁基甲基]-9H-嘌呤-6-基胺、9-[2-(4-氯-2-氟-苯基)-乙基]-8-(2,5-二甲氧基-苯基硫基)-9H-嘌呤-6-基胺、8-(6-溴-苯并[1,3]间二氧杂环戊烯-5-基硫基)-9-(3-甲基-2-苯基-戊基)-9H-嘌呤-6-基胺、8-(6-溴-苯并[1,3]间二氧杂环戊烯-5-基硫基)-9-(2-环戊基-2-苯基-乙基)-9H-嘌呤-6-基胺、9-(2-环戊基-2-苯基-乙基)-8-(2,5-二甲氧基-苯基硫基)-9H-嘌呤-6-基胺、8-(2,5-二甲氧基-苯基硫基)-9-(3-甲基-2-苯基-戊基)-9H-嘌呤-6-基胺、2-[6-氨基-8-(2,5-二甲氧基-苯基硫基)-嘌呤-9-基]-1-(2,4-二氯-苯基)乙醇、2-[6-氨基-8-(2,5-二甲氧基-苯基硫基)-嘌呤-3-基]-1-(2,4-二氯-苯基)乙醇、8-(6-溴-苯并[1,3]间二氧杂环戊烯-5-基硫基)-9-[2-(3-氟-苯基)-乙基]-9H-嘌呤-6-基胺、8-(2,5-二甲氧基-苯基硫基)-9-[2-(3-乙氧基-4-甲氧基-苯基)-乙基]-9H-嘌呤-6-基胺、8-(2,5-二甲氧基-苯基硫基)-9-(3-甲基-2-苯基-丁基)-9H-嘌呤-6-基胺、8-(2,5-二甲氧基-苯基硫基)-9-[2-(2,5-二甲基-苯基)-乙基]-9H-嘌呤-6-基胺、8-(6-溴-苯并[1,3]间二氧杂环戊烯-5-基硫基)-9-[2-(3-乙氧基-4-甲氧基-苯基)-乙基]-9H-嘌呤-6-基胺、9-[2-(4-氯-苯基)-3-甲基-丁基]-8-(2,5-二甲氧基-苯基硫基)-9H-嘌呤-6-基胺、9-[2-(2,4-二氟-苯基)-乙基]-8-(2,5-二甲氧基-苯基硫基)-9H-嘌呤-6-基胺、9-[2-(2-氯-6-氟-苯基)-乙基]-8-(2,5-二甲氧基-苯基硫基)-9H-嘌呤-6-基胺、8-(6-溴-苯并[1,3]间二氧杂环戊烯-5-基硫基)-9-[2-(2,5-二甲基-苯基)-乙基]-9H-嘌呤-6-基胺、8-(6-溴-苯并[1,3]间二氧杂环戊烯-5-基硫基)-9-(3-甲基-2-苯基-丁基)-9H-嘌呤-6-基胺、8-(2,5-二甲氧基-苯基硫基)-9-[2-(3,5-二甲基-苯基)-乙基]-9H-嘌呤-6-基胺、8-(2,5-二甲氧基-苯基硫基)-9-(2-吡啶-4-基-乙基)-9H-嘌呤-6-基胺、8-(2,5-二甲氧基-苯基硫基)-9-(2-吡啶-2-基-乙基)-9H-嘌呤-6-基胺、8-(2,5-二甲氧基-苯基硫基)-9-[2-(3-碘-苯

基)-乙基]-9H-嘌呤-6-基胺、9-[2-(2-氯-4-氟-苯基)-乙基]-8-(2,5-二甲氧基-苯基硫基)-9H-嘌呤-6-基胺、9-[2-(2-溴-苯基)-乙基]-8-(2,5-二甲氧基-苯基硫基)-9H-嘌呤-6-基胺、9-[2-(3,5-二氟-苯基)-乙基]-8-(2,5-二甲氧基-苯基硫基)-9H-嘌呤-6-基胺、9-[2-(2,3-二氟-苯基)-乙基]-8-(2,5-二甲氧基-苯基硫基)-9H-嘌呤-6-基胺、8-(6-溴-1,3-苯并间二氧杂环戊烯-5-基硫基)-9-[2-(2-氟-苯基)-乙基]-9H-嘌呤-6-基胺、8-(6-溴-苯并[1,3]间二氧杂环戊烯-5-基硫基)-9-[2-(2-溴-苯基)-乙基]-9H-嘌呤-6-基胺、8-(6-溴-苯并[1,3]间二氧杂环戊烯-5-基硫基)-9-(2-吡啶-3-基-乙基)-9H-嘌呤-6-基胺、8-(6-溴-苯并[1,3]间二氧杂环戊烯-5-基硫基)-9-[2-(3-碘-苯基)-乙基]-9H-嘌呤-6-基胺、8-(6-溴-苯并[1,3]间二氧杂环戊烯-5-基硫基)-9-(2-邻甲苯基-乙基)-9H-嘌呤-6-基胺、8-(6-溴-苯并[1,3]间二氧杂环戊烯-5-基硫基)-9-(2-萘-1-基-乙基)-9H-嘌呤-6-基胺、1-(4-{2-[6-氨基-8-(6-溴-苯并[1,3]间二氧杂环戊烯-5-基硫基)-嘌呤-9-基]-乙基}-苯基)-乙酮、1-(4-{2-[6-氨基-8-(6-溴-苯并[1,3]间二氧杂环戊烯-5-基硫基)-嘌呤-3-基]-乙基}-苯基)-乙酮、8-(6-溴-苯并[1,3]间二氧杂环戊烯-5-基硫基)-9-[2-(2,3-二氟-苯基)-乙基]-9H-嘌呤-6-基胺、8-(6-溴-苯并[1,3]间二氧杂环戊烯-5-基硫基)-9-(2-对甲苯基-乙基)-9H-嘌呤-6-基胺、8-(6-溴-苯并[1,3]间二氧杂环戊烯-5-基硫基)-9-[2-(3-三氟甲基-苯基)-乙基]-9H-嘌呤-6-基胺、9-(2-苯并[1,3]间二氧杂环戊烯-5-基-乙基)-8-(2,5-二甲氧基-苯基硫基)-9H-嘌呤-6-基胺、9-(2-环己基-乙基)-8-(2,5-二甲氧基苯基-硫基)-9H-嘌呤-6-基胺、9-(2-联苯基-4-基-乙基)-8-(6-溴-苯并[1,3]间二氧杂环戊烯-5-基硫基)-9H-嘌呤-6-基胺、4-{2-[6-氨基-8-(2,5-二甲氧基-苯基硫基)-嘌呤-9-基]-乙基}-苯磺酸、4-{2-[6-氨基-8-(2,5-二甲氧基-苯基硫基)-嘌呤-3-基]-乙基}-苯磺酸、2-[6-氨基-8-(6-溴-苯并[1,3]间二氧杂环戊烯-5-基硫基)-嘌呤-9-基]-1-(2,4-二氯-苯基)-乙醇、2-[6-氨基-8-(6-溴-苯并[1,3]间二氧杂环戊烯-5-基硫基)-嘌呤-3-基]-1-(2,4-二氯-苯基)-乙醇、9-(2-环己基-2-苯基-乙基)-8-(2,5-二甲氧基-苯基硫基)-9H-嘌呤-6-基胺、9-(2-联苯基-4-基-乙基)-8-(2,5-二甲氧基-苯基硫基)-9H-嘌呤-6-基胺、8-(2,5-二甲氧基-苯基硫基)-9-[2-(2-三氟甲基-苯基)-乙基]-9H-嘌呤-6-基胺、8-(2,5-二甲氧

基-苯基硫基)-9-[2-(4-二甲基氨基-苯基)-乙基]-9H-嘌呤-6-基胺、8-(6-溴-苯并[1,3]间二氧杂环戊烯-5-基硫基)-9-[2-(4-二甲基氨基-苯基)-乙基]-9H-嘌呤-6-基胺、8-(2,5-二乙氧基-苯基硫基)-9-苯乙基-9H-嘌呤-6-基胺、9-[2-(2-氯-苯基)-乙基]-8-(2,5-二乙氧基-苯基硫基)-9H-嘌呤-6-基胺、9-[2-(3,5-二甲氧基-苯基)-乙基]-8-(2,5-二甲氧基-苯基硫基)-9H-嘌呤-6-基胺、8-(6-溴-苯并[1,3]间二氧杂环戊烯-5-基硫基)-9-[2-(3,5-二甲氧基-苯基)-乙基]-9H-嘌呤-6-基胺、8-(2,5-二甲氧基-苯基硫基)-9-(2-噻吩-3-基-乙基)-9H-嘌呤-6-基胺、8-(2,5-二甲氧基-苯基硫基)-9-2-噻吩-2-基-乙基)-9H-嘌呤-6-基胺、8-(6-溴-苯并[1,3]间二氧杂环戊烯-5-基硫基)-9-(2-噻吩-3-基-乙基)-9H-嘌呤-6-基胺、8-(6-溴-苯并[1,3]间二氧杂环戊烯-5-基硫基)-9-(2-噻吩-2-基-乙基)-9H-嘌呤-6-基胺、8-(2,5-二甲氧基-苯基硫基)-9-[2-(2-硝基-苯基)-乙基]-9H-嘌呤-6-基胺、8-(2,5-二甲氧基-苯基硫基)-9-[2-(2-硝基-苯基)-乙基]-9H-嘌呤-6-基胺、8-(6-溴-苯并[1,3]间二氧杂环戊烯-5-基甲基)-9-苯乙基-9H-嘌呤-6-基胺、(4-{2-[6-氨基-8-(6-溴-苯并[1,3]间二氧杂环戊烯-5-基硫基)-嘌呤-9-基]-乙基}-苯基)氨基甲酸叔丁酯、(4-{2-[6-氨基-8-(6-溴-苯并[1,3]间二氧杂环戊烯-5-基硫基)-嘌呤-3-基]-乙基}-苯基)氨基甲酸叔丁酯、9-[2-(4-氨基-苯基)-乙基]-8-(6-溴-苯并[1,3]间二氧杂环戊烯-5-基硫基)-9H-嘌呤-6-基胺、(4-{2-[6-氨基-8-(2,5-二甲氧基-苯基硫基)-嘌呤-9-基]-乙基}-苯基)-氨基甲酸叔丁酯、(4-{2-[6-氨基-8-(2,5-二甲氧基-苯基硫基)-嘌呤-3-基]-乙基}-苯基)-氨基甲酸叔丁酯、9-[2-(4-氨基-苯基)-乙基]-8-(2,5-二甲氧基-苯基硫基)-9H-嘌呤-6-基胺、8-(2,5-二甲氧基-苯基硫基)-9-[2-(3-三氟甲氧基-苯基)-乙基]-9H-嘌呤-6-基胺、8-(2,5-二甲氧基-苯基硫基)-9-(2-五氟苯基-乙基)-9H-嘌呤-6-基胺、9-[2-(3,5-双三氟甲基-苯基)-乙基]-8-(2,5-二甲氧基-苯基硫基)-9H-嘌呤-6-基胺、9-[2-(3,5-双三氟甲基-苯基)-乙基]-8-(6-溴-苯并[1,3]间二氧杂环戊烯-5-基硫基)-9H-嘌呤-6-基胺、8-(6-溴-苯并[1,3]间二氧杂环戊烯-5-基硫基)-9-[1-(4-氯-苯基)-环丙基甲基]-9H-嘌呤-6-基胺、8-(2,5-二甲氧基-苯基硫基)-9-[2-(3-硝基-苯基)-乙基]-9H-嘌呤-6-基胺、8-(苯并[1,3]间二氧杂环戊烯-5-基硫基)-9-苯乙基-1,9-二氢-嘌呤-6-酮及 8-(6-溴-苯并[1,3]间二氧杂

环戊烯-5-基硫基)-9-苯乙基-1,9-二氢-嘌呤-6-酮。

在一个方面，本发明还提供如下式 I 和 II 的化合物，其中所述化合物选自 2-{2-[6-氨基-8-(2,5-二甲氧基-苯基硫基)-嘌呤-9-基]-乙基}-哌啶-1-羧酸乙酯；2-{2-[6-氨基-8-(2,5-二甲氧基-苯基硫基)-嘌呤-3-基]-乙基}-哌啶-1-羧酸乙酯；2-(2-{6-氨基-8-[(6-溴-1,3-苯并间二氧杂环戊烯-5-基)硫]-9H-嘌呤-9-基}乙基)哌啶-1-羧酸乙酯；2-(2-{6-氨基-8-[(6-溴-1,3-苯并间二氧杂环戊烯-5-基)硫]-3H-嘌呤-3-基}乙基)哌啶-1-羧酸乙酯；4-(2-{6-氨基-8-[(6-溴-1,3-苯并间二氧杂环戊烯-5-基)硫]-9H-嘌呤-9-基}乙基)哌啶-1-羧酸叔丁酯；4-(2-{6-氨基-8-[(2,5-二甲氧基苯基)硫]-9H-嘌呤-9-基}乙基)哌啶-1-羧酸叔丁酯；4-(2-{6-氨基-8-[(2,5-二甲氧基苯基)硫]-3H-嘌呤-3-基}乙基)哌啶-1-羧酸叔丁酯；4-(2-{6-氨基-8-[(6-溴-1,3-苯并间二氧杂环戊烯-5-基)硫]-3H-嘌呤-3-基}乙基)哌啶-1-羧酸叔丁酯；3-(2-{6-氨基-8-[(6-溴-1,3-苯并间二氧杂环戊烯-5-基)硫]-3H-嘌呤-3-基}乙基)哌啶-1-羧酸叔丁酯；3-(2-{6-氨基-8-[(6-溴-1,3-苯并间二氧杂环戊烯-5-基)硫]-9H-嘌呤-9-基}乙基)哌啶-1-羧酸叔丁酯；3-(2-{6-氨基-8-[(2,5-二甲氧基苯基)硫]-9H-嘌呤-9-基}乙基)哌啶-1-羧酸叔丁酯；8-[(2,5-二甲氧基苯基)硫]-9-[2-(四氢-2H-吡喃-4-基)乙基]-9H-嘌呤-6-胺；8-[(2,5-二甲氧基苯基)硫]-3-[2-(四氢-2H-吡喃-4-基)乙基]-3H-嘌呤-6-胺；8-[(6-溴-1,3-苯并间二氧杂环戊烯-5-基)硫]-3-[2-(四氢-2H-吡喃-4-基)乙基]-3H-嘌呤-6-胺；8-[(6-溴-1,3-苯并间二氧杂环戊烯-5-基)硫]-3-[2-(2,2,6,6-四甲基哌啶-4-基)乙基]-3H-嘌呤-6-胺；8-[(6-溴-1,3-苯并间二氧杂环戊烯-5-基)硫]-3-[2-(1-甲基吡咯烷-2-基)乙基]-3H-嘌呤-6-胺；8-[(6-溴-1,3-苯并间二氧杂环戊烯-5-基)硫]-9-[2-(四氢-2H-吡喃-4-基)乙基]-9H-嘌呤-6-胺；8-[(6-溴-1,3-苯并间二氧杂环戊烯-5-基)硫]-9-[2-(2,2,6,6-四甲基哌啶-4-基)乙基]-9H-嘌呤-6-胺；8-[(6-溴-1,3-苯并间二氧杂环戊烯-5-基)硫]-9-[2-(1-甲基吡咯烷-2-基)乙基]-9H-嘌呤-6-胺；9-[2-(1-金刚烷)乙基]-8-[(6-溴-1,3-苯并间二氧杂环戊烯-5-基)硫]-9H-嘌呤-6-胺；3-[2-(1-金刚烷)乙基]-8-[(6-溴-1,3-苯并间二氧杂环戊烯-5-基)硫]-3H-嘌呤-6-胺；4-(2-{6-氨基-8-[(2,5-二甲氧基苯基)硫]-9H-嘌呤-9-基}乙基)哌啶-1-甲醛；

4-(2-{6-氨基-8-[(2,5-二甲氧基苯基)硫]-3H-嘌呤-3-基}乙基)哌啶-1-甲醛；8-[(2,5-二甲氧基苯基)硫]-3-[2-(2,2,6,6-四甲基哌啶-4-基)乙基]-3H-嘌呤-6-胺；8-[(2,5-二甲氧基苯基)硫]-9-[2-(2,2,6,6-四甲基哌啶-4-基)乙基]-9H-嘌呤-6-胺；4-(2-{6-氨基-8-[(2,5-二乙氧基苯基)硫]-9H-嘌呤-9-基}乙基)哌啶-1-羧酸叔丁酯；4-(2-{6-氨基-8-[(6-溴-1,3-苯并间二氧杂环戊烯-5-基)硫]-9H-嘌呤-9-基}乙基)哌啶-1-甲醛；9-[2-(1-乙酰基哌啶-4-基)乙基]-8-[(6-溴-1,3-苯并间二氧杂环戊烯-5-基)硫]-9H-嘌呤-6-胺；3-[2-(1-乙酰基哌啶-4-基)乙基]-8-[(6-溴-1,3-苯并间二氧杂环戊烯-5-基)硫]-3H-嘌呤-6-胺；8-[(6-溴-1,3-苯并间二氧杂环戊烯-5-基)硫]-3-{2-[1-(甲磺酰)哌啶-4-基]乙基}-3H-嘌呤-6-胺；2-(2-{6-氨基-8-[(6-溴-1,3-苯并间二氧杂环戊烯-5-基)硫]-9H-嘌呤-9-基}乙基)吗啉-4-羧酸叔丁酯；2-(2-{6-氨基-8-[(6-溴-1,3-苯并间二氧杂环戊烯-5-基)硫]-3H-嘌呤-3-基}乙基)吗啉-4-羧酸叔丁酯；8-[(6-溴-1,3-苯并间二氧杂环戊烯-5-基)硫]-9-{2-[1-(甲磺酰)哌啶-3-基]乙基}-9H-嘌呤-6-胺；8-[(6-溴-1,3-苯并间二氧杂环戊烯-5-基)硫]-3-{2-[1-(甲磺酰)哌啶-3-基]乙基}-3H-嘌呤-6-胺；8-[(2,5-二甲氧基苯基)硫]-9-{2-[1-(甲磺酰)哌啶-2-基]乙基}-9H-嘌呤-6-胺；8-[(6-溴-1,3-苯并间二氧杂环戊烯-5-基)硫]-9-{2-[1-(甲磺酰)哌啶-2-基]乙基}-9H-嘌呤-6-胺；8-[(6-溴-1,3-苯并间二氧杂环戊烯-5-基)硫]-3-{2-[1-(甲磺酰)哌啶-2-基]乙基}-3H-嘌呤-6-胺；9-(2-环庚基乙基)-8-[(2,5-二甲氧基苯基)硫]-9H-嘌呤-6-胺；8-[(6-溴-1,3-苯并间二氧杂环戊烯-5-基)硫]-9-[2-(十一氟环己基)乙基]-9H-嘌呤-6-胺；3-(2-环庚基乙基)-8-[(2,5-二甲氧基苯基)硫]-3H-嘌呤-6-胺；8-[(6-溴-1,3-苯并间二氧杂环戊烯-5-基)硫]-3-[2-(十一氟环己基)乙基]-3H-嘌呤-6-胺；8-[(6-溴-1,3-苯并间二氧杂环戊烯-5-基)硫]-9-{2-[1-(甲磺酰)哌啶-4-基]乙基}-9H-嘌呤-6-胺；8-(1,3-苯并间二氧杂环戊烯-5-基硫)-9-{2-[1-(甲磺酰)哌啶-4-基]乙基}-9H-嘌呤-6-胺；8-[(6-溴-1,3-苯并间二氧杂环戊烯-5-基)硫]-3-[2-(1H-咪唑-1-基)乙基]-3H-嘌呤-6-胺；8-[(6-溴-1,3-苯并间二氧杂环戊烯-5-基)硫]-9-[2-(1H-咪唑-1-基)乙基]-9H-嘌呤-6-胺；9-[2-(4-乙酰基哌嗪-1-基)乙基]-8-[(6-溴-1,3-苯并间二氧杂环戊烯-5-基)硫]-9H-嘌呤-6-胺；

3-[2-(4-乙酰基哌嗪-1-基)乙基]-8-[(6-溴-1,3-苯并间二氧杂环戊烯-5-基)硫]-3H-嘌呤-6-胺; 8-[(2,5-二甲氧基苯基)硫]-9-[2-(十一氟环己基)乙基]-9H-嘌呤-6-胺; 8-[(2,5-二甲氧基苯基)硫]-3-[2-(十一氟环己基)乙基]-3H-嘌呤-6-胺;8-[(6-溴-1,3-苯并间二氧杂环戊烯-5-基)硫]-9-[2-(1-丙基哌啶-2-基)乙基]-9H-嘌呤-6-胺; 8-[(6-溴-1,3-苯并间二氧杂环戊烯-5-基)硫]-9-(2-{1-[(三氟甲基)磺酰基]哌啶-4-基}乙基)-9H-嘌呤-6-胺; 8-[(6-溴-1,3-苯并间二氧杂环戊烯-5-基)硫]-3-(2-{1-[(三氟甲基)磺酰基]哌啶-4-基}乙基)-3H-嘌呤-6-胺; 4-(2-{6-氨基-8-[(6-溴-1,3-苯并间二氧杂环戊烯-5-基)硫]-3H-嘌呤-3-基}亚乙基)哌啶-1-羧酸叔丁酯; 4-(2-{6-氨基-8-[(6-溴-1,3-苯并间二氧杂环戊烯-5-基)硫]-9H-嘌呤-9-基}亚乙基)哌啶-1-羧酸叔丁酯; (3S)-3-(2-{6-氨基-8-[(6-溴-1,3-苯并间二氧杂环戊烯-5-基)硫]-9H-嘌呤-9-基}乙基)哌啶-1-羧酸叔丁酯; (3R)-3-(2-{6-氨基-8-[(6-溴-1,3-苯并间二氧杂环戊烯-5-基)硫]-9H-嘌呤-9-基}乙基)哌啶-1-羧酸叔丁酯; (3R)-3-(2-{6-氨基-8-[(6-溴-1,3-苯并间二氧杂环戊烯-5-基)硫]-3H-嘌呤-3-基}乙基)哌啶-1-羧酸叔丁酯; (2R)-2-(2-{6-氨基-8-[(6-溴-1,3-苯并间二氧杂环戊烯-5-基)硫]-9H-嘌呤-9-基}乙基)哌啶-1-羧酸叔丁酯; (2R)-2-(2-{6-氨基-8-[(6-溴-1,3-苯并间二氧杂环戊烯-5-基)硫]-3H-嘌呤-3-基}乙基)哌啶-1-羧酸叔丁酯; 8-[(6-溴-1,3-苯并间二氧杂环戊烯-5-基)硫]-9-(2-{1-[(三氟甲基)磺酰基]哌啶-2-基}乙基)-9H-嘌呤-6-胺; 8-[(6-溴-1,3-苯并间二氧杂环戊烯-5-基)硫]-3-(2-{1-[(三氟甲基)磺酰基]哌啶-2-基}乙基)-3H-嘌呤-6-胺; [顺-4-(2-{6-氨基-8-[(6-溴-1,3-苯并间二氧杂环戊烯-5-基)硫]-9H-嘌呤-9-基}乙基)环己基]氨基甲酸叔丁酯;[顺-4-(2-{6-氨基-8-[(6-溴-1,3-苯并间二氧杂环戊烯-5-基)硫]-3H-嘌呤-3-基}乙基)环己基]氨基甲酸叔丁酯; 9-[2-(1-乙酰基哌啶-3-基)乙基]-8-[(6-溴-1,3-苯并间二氧杂环戊烯-5-基)硫]-9H-嘌呤-6-胺; 3-[2-(1-乙酰基哌啶-3-基)乙基]-8-[(6-溴-1,3-苯并间二氧杂环戊烯-5-基)硫]-3H-嘌呤-6-胺;8-[(6-溴-1,3-苯并间二氧杂环戊烯-5-基)硫]-9-(2-{1-[(三氟甲基)磺酰基]哌啶-3-基}乙基)-9H-嘌呤-6-胺; 8-[(6-溴-1, 3-苯并间二氧杂环戊烯-5-基)硫]-3-(2-{1-[(三氟甲基)磺酰基]哌啶-3-基}乙基)-3H-嘌呤-6-胺; 8-[(6-溴代 1,3-苯并

间二氧杂环戊烯-5-基)硫]-3-[2-(6,6-二甲基双环[3.1.1]庚-2-烯-3-基)乙基]-3H-嘌呤-6-胺; 8-[(2,5-二甲氧基苯基)硫]-9-[2-(6,6-二甲基双环[3.1.1]庚-2-烯-3-基)乙基]-9H-嘌呤-6-胺; 4-(2-{6-氨基-8-[(6-溴-1,3-苯并间二氧杂环戊烯-5-基)硫]-9H-嘌呤-9-基}乙基)-5-甲基-2,4-二氢-3H-吡唑-3-酮; 4-(2-{6-氨基-8-[(2,5-二甲氧基苯基)硫]-9H-嘌呤-9-基}乙基)-5-甲基-2,4-二氢-3H-吡唑-3-酮; 4-(2-{6-氨基-8-[(2,5-二甲氧基苯基)硫]-3H-嘌呤-3-基}乙基)-5-甲基-2,4-二氢-3H-吡唑-3-酮; 4-(2-{6-氨基-8-[(6-溴-1,3-苯并间二氧杂环戊烯-5-基)硫]-9H-嘌呤-9-基}乙基)哌啶-1-羧酸苯甲酯; 4-(2-{6-氨基-8-[(6-溴-1,3-苯并间二氧杂环戊烯-5-基)硫]-3H-嘌呤-3-基}乙基)哌啶-1-羧酸苯甲酯; 8-[(6-溴-1,3-苯并间二氧杂环戊烯-5-基)硫]-9-(2-吗啉-4-基乙基)-9H-嘌呤-6-胺; 2-(2-{6-氨基-8-[(6-溴-1,3-苯并间二氧杂环戊烯-5-基)硫]-3H-嘌呤-3-基}乙基)吡咯烷-1-羧酸叔丁酯; 3-(2-{6-氨基-8-[(6-溴-1,3-苯并间二氧杂环戊烯-5-基)硫]-3H-嘌呤-3-基}乙基)吡咯烷-1-羧酸叔丁酯; 2-(2-{6-氨基-8-[(6-溴-1,3-苯并间二氧杂环戊烯-5-基)硫]-9H-嘌呤-9-基}乙基)吡咯烷-1-羧酸叔丁酯; 3-(2-{6-氨基-8-[(6-溴-1,3-苯并间二氧杂环戊烯-5-基)硫]-9H-嘌呤-9-基}乙基)吡咯烷-1-羧酸叔丁酯; (2S)-2-(2-{6-氨基-8-[(6-溴-1,3-苯并间二氧杂环戊烯-5-基)硫]-9H-嘌呤-9-基}乙基)哌啶-1-羧酸叔丁酯; (2S)-2-(2-{6-氨基-8-[(6-溴-1,3-苯并间二氧杂环戊烯-5-基)硫]-3H-嘌呤-3-基}乙基)哌啶-1-羧酸叔丁酯; (3R)-3-(2-{6-氨基-8-[(6-溴-1,3-苯并间二氧杂环戊烯-5-基)硫]-9H-嘌呤-9-基}乙基)吡咯烷-1-羧酸叔丁酯; 2-(2-{6-氨基-8-[(6-溴-1,3-苯并间二氧杂环戊烯-5-基)硫]-9H-嘌呤-9-基}乙基)吡咯烷-1-羧酸苯甲酯; (3S)-3-(2-{6-氨基-8-[(6-溴-1,3-苯并间二氧杂环戊烯-5-基)硫]-3H-嘌呤-3-基}乙基)吡咯烷-1-羧酸叔丁酯; 2-(2-{6-氨基-8-[(6-溴-1,3-苯并间二氧杂环戊烯-5-基)硫]-3H-嘌呤-3-基}乙基)吡咯烷-1-羧酸苯甲酯; 1-叔丁基 2-乙基 (2S,4S)-4-(2-{6-氨基-8-[(6-溴-1,3-苯并间二氧杂环戊烯-5-基)硫]-9H-嘌呤-9-基}乙基)哌啶-1,2-二羧酸酯; 1-叔丁基 2-乙基 (2S,4R)-4-(2-{6-氨基-8-[(6-溴-1,3-苯并间二氧杂环戊烯-5-基)硫]-3H-嘌呤-3-基}乙基)哌啶-1,2-二羧酸酯; 9-[2-(1-苄基-1,2,3,6-四氢吡啶-4-基)乙基]-8-[(6-溴-1,3-苯并间

二氧杂环戊烯-5-基)硫]-9H-嘌呤-6-胺; 3-[2-(1-苄基-1,2,3,6-四氢吡啶-4-基)乙基]-8-[(6-溴-1,3-苯并间二氧杂环戊烯-5-基)硫]-3H-嘌呤-6-胺; 8-[(6-溴-1,3-苯并间二氧杂环戊烯-5-基)硫]-9-{2-[(3-内式)-8-甲基-8-氮杂双环[3.2.1]辛-3-基]乙基}-9H-嘌呤-6-胺; 8-[(6-溴-1,3-苯并间二氧杂环戊烯-5-基)硫]-3-{2-[(3-内式)-8-甲基-8-氮杂双环[3.2.1]辛-3-基]乙基}-3H-嘌呤-6-胺; (2R,4S)-4-(2-{6-氨基-8-[(6-溴-1,3-苯并间二氧杂环戊烯-5-基)硫]-9H-嘌呤-9-基}乙基)-2-异丙基哌啶-1-羧酸叔丁酯; (2S,4S)-4-(2-{6-氨基-8-[(6-溴-1,3-苯并间二氧杂环戊烯-5-基)硫]-9H-嘌呤-9-基}乙基)-2-异丙基哌啶-1-羧酸叔丁酯; (2S,4R)-4-(2-{6-氨基-8-[(6-溴-1,3-苯并间二氧杂环戊烯-5-基)硫]-3H-嘌呤-3-基}乙基)-2-异丙基哌啶-1-羧酸叔丁酯; 4-(2-{6-氨基-8-[(6-溴-1,3-苯并间二氧杂环戊烯-5-基)硫]-9H-嘌呤-9-基}乙基)-N-乙基哌啶-1-甲酰胺; 4-(2-{6-氨基-8-[(6-溴-1,3-苯并间二氧杂环戊烯-5-基)硫]-9H-嘌呤-9-基}乙基)-N-异丙基哌啶-1-甲酰胺; 4-(2-{6-氨基-8-[(6-溴-1,3-苯并间二氧杂环戊烯-5-基)硫]-9H-嘌呤-9-基}乙基)-N-(叔丁基)哌啶-1-甲酰胺; N-{[4-(2-{6-氨基-8-[(6-溴-1,3-苯并间二氧杂环戊烯-5-基)硫]-9H-嘌呤-9-基}乙基)哌啶-1-基]羰基}氨基乙酸乙酯; 3-(2-{6-氨基-8-[(6-溴-1,3-苯并间二氧杂环戊烯-5-基)硫]-9H-嘌呤-9-基}乙基)-N-乙基哌啶-1-甲酰胺; 3-(2-{6-氨基-8-[(6-溴-1,3-苯并间二氧杂环戊烯-5-基)硫]-9H-嘌呤-9-基}乙基)-N-异丙基哌啶-1-甲酰胺; 3-(2-{6-氨基-8-[(6-溴-1,3-苯并间二氧杂环戊烯-5-基)硫]-9H-嘌呤-9-基}乙基)-N-(叔丁基)哌啶-1-甲酰胺; 4-(2-{6-氨基-8-[(6-溴-1,3-苯并间二氧杂环戊烯-5-基)硫]-3H-嘌呤-3-基}乙基)-N-乙基哌啶-1-甲酰胺; 4-(2-{6-氨基-8-[(6-溴-1,3-苯并间二氧杂环戊烯-5-基)硫]-3H-嘌呤-3-基}乙基)-N-异丙基哌啶-1-甲酰胺; 3-(2-{6-氨基-8-[(6-溴-1,3-苯并间二氧杂环戊烯-5-基)硫]-3H-嘌呤-3-基}乙基)-N-乙基哌啶-1-甲酰胺; 3-(2-{6-氨基-8-[(6-溴-1,3-苯并间二氧杂环戊烯-5-基)硫]-3H-嘌呤-3-基}乙基)-N-异丙基哌啶-1-甲酰胺; 3-(2-{6-氨基-8-[(6-溴-1,3-苯并间二氧杂环戊烯-5-基)硫]-3H-嘌呤-3-基}乙基)-N-(叔丁基)哌啶-1-甲酰胺; N-{[4-(2-{6-氨基-8-[(6-溴-1,3-苯并间二氧杂环戊烯-5-基)硫]-3H-嘌呤-3-基}乙基)哌啶-1-基]羰基}氨基乙酸乙酯; 8-[(2,5-

二甲氧基苯基)硫]-9-{2-[4-(2,2-二甲基丙酰基)哌嗪-1-基]乙基}-9H-嘌呤-6-胺; 8-[(6-溴-1,3-苯并间二氧杂环戊烯-5-基)硫]-9-[2-(1-异丙基哌啶-2-基)乙基]-9H-嘌呤-6-胺;8-[(6-溴-1,3-苯并间二氧杂环戊烯-5-基)硫]-3-[2-(1-异丙基哌啶-2-基)乙基]-3H-嘌呤-6-胺; 8-[(6-溴-1,3-苯并间二氧杂环戊烯-5-基)硫]-9-[2-(1-异丁基哌啶-2-基)乙基]-9H-嘌呤-6-胺; 8-[(6-溴-1,3-苯并间二氧杂环戊烯-5-基)硫]-3-[2-(1-异丁基哌啶-2-基)乙基]-3H-嘌呤-6-胺; 8-[(6-溴-1,3-苯并间二氧杂环戊烯-5-基)硫]-9-{2-[1-(2,2-二甲基丙酰基)哌啶-3-基]乙基}-9H-嘌呤-6-胺; 8-[(6-溴-1,3-苯并间二氧杂环戊烯-5-基)硫]-3-{2-[1-(2,2-二甲基丙酰基)哌啶-3-基]乙基}-3H-嘌呤-6-胺; 8-[(6-溴-1,3-苯并间二氧杂环戊烯-5-基)硫]-9-{2-[1-(2,2-二甲基丙酰基)哌啶-4-基]乙基}-9H-嘌呤-6-胺; 8-[(6-溴-1,3-苯并间二氧杂环戊烯-5-基)硫]-3-{2-[1-(2,2-二甲基丙酰基)哌啶-4-基]乙基}-3H-嘌呤-6-胺; 8-[(6-溴-1,3-苯并间二氧杂环戊烯-5-基)硫]-9-[2-(1-异丁基哌啶-4-基)乙基]-9H-嘌呤-6-胺;8-[(6-溴-1,3-苯并间二氧杂环戊烯-5-基)硫]-9-{2-[1-(3,3-二甲基丁酰基)哌啶-3-基]乙基}-9H-嘌呤-6-胺; 8-[(6-溴-1,3-苯并间二氧杂环戊烯-5-基)硫]-9-(2-哌啶-4-基乙基)-9H-嘌呤-6-胺; 8-[(2,5-二甲氧基苯基)硫]-3-(2-哌啶-4-基乙基)-3H-嘌呤-6-胺; 8-[(6-溴-1,3-苯并间二氧杂环戊烯-5-基)硫]-3-(2-哌啶-4-基乙基)-3H-嘌呤-6-胺; 8-[(2,5-二甲氧基苯基)硫]-9-(2-哌啶-4-基乙基)-9H-嘌呤-6-胺; 8-[(6-溴-1,3-苯并间二氧杂环戊烯-5-基)硫]-9-(2-哌啶-3-基乙基)-9H-嘌呤-6-胺; 8-[(2,5-二甲氧基苯基)硫]-9-(2-哌啶-3-基乙基)-9H-嘌呤-6-胺; 8-[(6-溴-1,3-苯并间二氧杂环戊烯-5-基)硫]-9-(2-哌啶-4-亚基乙基)-9H-嘌呤-6-胺; 8-[(6-溴-1,3-苯并间二氧杂环戊烯-5-基)硫]-9-{2-[(3R)-哌啶-3-基]乙基}-9H-嘌呤-6-胺;8-[(6-溴-1,3-苯并间二氧杂环戊烯-5-基)硫]-9-{2-[(3S)-哌啶-3-基]乙基}-9H-嘌呤-6-胺; 8-[(6-溴-1,3-苯并间二氧杂环戊烯-5-基)硫]-9-{2-[(2R)-哌啶-2-基]乙基}-9H-嘌呤-6-胺;8-[(6-溴-1,3-苯并间二氧杂环戊烯-5-基)硫]-9-(2-吡咯烷-3-基乙基)-9H-嘌呤-6-胺; 8-[(6-溴-1,3-苯并间二氧杂环戊烯-5-基)硫]-9-{2-[(2S)-哌啶-2-基]乙基}-9H-嘌呤-6-胺; 8-[(6-溴-1,3-苯并间二氧杂环戊烯-5-基)硫]-9-{2-[(3R)-吡咯烷-3-基]乙基}-9H-嘌呤

-6-胺；8-[(6-溴-1,3-苯并间二氧杂环戊烯-5-基)硫]-9-{2-[(2R,4S)-2-异丙基哌啶-4-基]乙基}-9H-嘌呤-6-胺；8-[(6-溴-1,3-苯并间二氧杂环戊烯-5-基)硫]-9-{2-[(2S)-2-异丙基哌啶-4-基]乙基}-9H-嘌呤-6-胺；8-(2,5-二甲氧基-苯基硫基)-9-(2-哌啶-1-基-乙基)-9H-嘌呤-6-基胺；8-(2,5-二甲氧基-苯基硫基)-3-(2-哌啶-1-基-乙基)-3H-嘌呤-6-基胺；8-[(6-溴-1,3-苯并间二氧杂环戊烯-5-基)硫]-9-[2-(4-异丙基哌嗪-1-基)乙基]-9H-嘌呤-6-胺；8-[(6-溴-1,3-苯并间二氧杂环戊烯-5-基)硫]-3-[2-(4-异丙基哌嗪-1-基)乙基]-3H-嘌呤-6-胺；8-[(2,5-二甲氧基苯基)硫]-9-(2-哌啶-1-基乙基)-9H-嘌呤-6-胺；8-[(2,5-二甲氧基苯基)硫]-3-(2-哌啶-1-基乙基)-3H-嘌呤-6-胺；8-[(6-溴-1,3-苯并间二氧杂环戊烯-5-基)硫]-9-(2-哌啶-1-基乙基)-9H-嘌呤-6-胺；8-[(6-溴-1,3-苯并间二氧杂环戊烯-5-基)硫]-3-(2-哌啶-1-基乙基)-3H-嘌呤-6-胺；8-[(2,5-二甲氧基苯基)硫]-9-[2-(4-异丙基哌嗪-1-基)乙基]-9H-嘌呤-6-胺；9-[2-(4-环戊基哌嗪-1-基)乙基]-8-[(2,5-二甲氧基苯基)硫]-9H-嘌呤-6-胺；3-[2-(4-环戊基哌嗪-1-基)乙基]-8-[(2,5-二甲氧基苯基)硫]-3H-嘌呤-6-胺；1-(2-{6-氨基-8-[(6-溴-1,3-苯并间二氧杂环戊烯-5-基)硫]-9H-嘌呤-9-基}乙基)哌啶-2,6-二酮；1-(2-{6-氨基-8-[(6-溴-1,3-苯并间二氧杂环戊烯-5-基)硫]-3H-嘌呤-3-基}乙基)哌啶-2,6-二酮；及其可药用的盐。

在一个方面，本发明还提供如下式I和II的化合物，其中所述化合物选自(3-{6-氨基-8-[(6-溴-1,3-苯并间二氧杂环戊烯-5-基)硫]-9H-嘌呤-9-基}-1-环丙基丙基)氨基甲酸叔丁酯；(3-{6-氨基-8-[(6-溴-1,3-苯并间二氧杂环戊烯-5-基)硫]-3H-嘌呤-3-基}-1-环丙基丙基)氨基甲酸叔丁酯；(3-{6-氨基-8-[(2,5-二甲氧基苯基)硫]-9H-嘌呤-9-基}-1-环丙基丙基)氨基甲酸叔丁酯；(3-{6-氨基-8-[(2,5-二甲氧基苯基)硫]-3H-嘌呤-3-基}-1-环丙基丙基)氨基甲酸叔丁酯；[3-{6-氨基-8-[(6-溴-1,3-苯并间二氧杂环戊烯-5-基)硫]-9H-嘌呤-9-基}-1-(四氢-2H-噻喃-4-基)丙基]氨基甲酸叔丁酯；[3-{6-氨基-8-[(6-溴-1,3-苯并间二氧杂环戊烯-5-基)硫]-3H-嘌呤-3-基}-1-(四氢-2H-噻喃-4-基)丙基]氨基甲酸叔丁酯；[3-{6-氨基-8-[(2,5-二甲氧基苯基)硫]-9H-嘌呤-9-基}-1-(四氢-2H-噻喃-4-基)丙基]氨基甲酸叔丁酯；[3-{6-氨基

-8-[(2,5-二甲氧基苯基)硫]-3H-嘌呤-3-基}-1-(四氢-2H-噻喃-4-基)丙基]氨基甲酸叔丁酯;(3-{6-氨基-8-[(6-溴-1,3-苯并间二氧杂环戊烯-5-基)硫]-9H-嘌呤-9-基}-1-环己基丙基)氨基甲酸叔丁酯; (3-{6-氨基-8-[(6-溴-1,3-苯并间二氧杂环戊烯-5-基)硫]-3H-嘌呤-3-基}-1-环己基丙基)氨基甲酸叔丁酯;(3-{6-氨基-8-[(6-溴-1,3-苯并间二氧杂环戊烯-5-基)硫]-9H-嘌呤-9-基}-1-环丁基丙基)氨基甲酸叔丁酯;(3-{6-氨基-8-[(6-溴-1,3-苯并间二氧杂环戊烯-5-基)硫]-3H-嘌呤-3-基}-1-环丁基丙基)氨基甲酸叔丁酯;N-(3-{6-氨基-8-[(6-溴-1,3-苯并间二氧杂环戊烯-5-基)硫]-9H-嘌呤-9-基}-1-环丙基丙基)甲磺酰胺;N-(3-{6-氨基-8-[(6-溴-1,3-苯并间二氧杂环戊烯-5-基)硫]-3H-嘌呤-3-基}-1-环丙基丙基)甲磺酰胺; N-(3-{6-氨基-8-[(2,5-二甲氧基苯基)硫]-9H-嘌呤-9-基}-1-环丙基丙基)甲磺酰胺;N-(3-{6-氨基-8-[(2,5-二甲氧基苯基)硫]-3H-嘌呤-3-基}-1-环丙基丙基)甲磺酰胺; N-(3-{6-氨基-8-[(6-溴-1,3-苯并间二氧杂环戊烯-5-基)硫]-9H-嘌呤-9-基}-1-环丙基丙基)-N′-异丙脲;N-(3-{6-氨基-8-[(6-溴-1,3-苯并间二氧杂环戊烯-5-基)硫]-3H-嘌呤-3-基}-1-环丙基丙基)-N′-异丙脲; {3-[6-氨基-8-(6-溴-苯并[1,3]间二氧杂环戊烯-5-基硫基)-嘌呤-3-基]-1-环戊基-丙基}-氨基甲酸叔丁酯;{3-[6-氨基-8-(6-溴-苯并[1,3]间二氧杂环戊烯-5-基硫基)-嘌呤-9-基]-1-环戊基-丙基}-氨基甲酸叔丁酯; [3-[6-氨基-8-(6-溴-苯并[1,3]间二氧杂环戊烯-5-基硫基)-嘌呤-9-基]-1-(四氢吡喃-4-基)-丙基]-氨基甲酸叔丁酯;[3-[6-氨基-8-(6-溴-苯并[1,3]间二氧杂环戊烯-5-基硫基)-9H-嘌呤-3-基]-1-(四氢吡喃-4-基)-丙基]-氨基甲酸叔丁酯; [3-[6-氨基-8-(6-溴-苯并[1,3]间二氧杂环戊烯-5-基硫基)-9H-嘌呤-3-基]-1-(四氢吡喃-4-基)-丙基]-氨基甲酸叔丁酯; 8-[(6-溴-1,3-苯并间二氧杂环戊烯-5-基)硫]-3-[3-环己基-3-(1*H*-吡咯-1-基)丙基]-3*H*-嘌呤-6-胺; 9-(3-氨基-3-环丁基丙基)-8-[(6-溴-1,3-苯并间二氧杂环戊烯-5-基)硫]-9H-嘌呤-6-胺;9-(3-氨基-3-环丙基丙基)-8-[(6-溴-1,3-苯并间二氧杂环戊烯-5-基)硫]-9H-嘌呤-6-胺; 3-(3-氨基-3-环丙基丙基)-8-[(6-溴-1,3-苯并间二氧杂环戊烯-5-基)硫]-3H-嘌呤-6-胺; 9-[3-氨基-3-(四氢-2H-噻喃-4-基)丙基]-8-[(6-溴-1,3-苯并间二氧杂环戊烯-5-基)硫]-9H-嘌呤-6-胺; 9-(3-氨基-3-环己基丙基)-8-[(6-溴-1,3-苯并间二氧杂环戊烯

-5-基)硫]-9H-嘌呤-6-胺; 9-(3-氨基-3-环戊基-丙基)-8-(6-溴-苯并[1,3]间二氧杂环戊烯-5-基硫基)-9H-嘌呤-6-基胺;9-[3-氨基-3-(四氢吡喃-4-基)-丙基]-8-(6-溴-苯并[1,3]间二氧杂环戊烯-5-基硫基)-9H-嘌呤-6-基胺; 及其可药用的盐。

在另一个方面，本发明涉及这样一种用于治疗或预防 HSP90 依赖性疾病的药物组合物，该组合物包含本发明的化合物——具体而言为一种或多种式 I-Ⅲ的化合物——和一种或多种药物赋形剂。

在另一个方面，本发明描述一种通过以下途径治疗患有 HSP90 介导障碍的个体的方法：给予所述个体含有药学有效量的一种或多种式 I-Ⅲ的化合物及/或其可药用的盐的药物组合物。

在一方面，本发明提供一种用于治疗患有选自以下障碍的个体的方法：炎性疾病、感染、自身免疫性疾病、中风、缺血、心脏疾患、神经障碍、纤维生成障碍（fibrogenetic disorder）、增生性病变、肿瘤、白血球过多症、肿瘤（neoplasm）、癌症、癌（carcinoma）、代谢性疾病及恶性病。在一个具体的方面，所述方法涉及鉴定需要进行治疗的患者并对其给药。

还在另一个方面，本发明提供一种用于治疗患有纤维生成障碍例如硬皮病、多肌炎、全身性红斑狼疮、类风湿性关节炎、肝硬化、瘢痕疙瘩形成、间质性肾炎和肺纤维化的个体的方法。

本发明还包括这样的一种治疗方法，即包括对动物（例如需要治疗的患者）给予治疗有效量的一种或多种式 I-Ⅲ的化合物及/或其可药用的盐。所述治疗方法可用于治疗癌症，这是一类以异常细胞的失控生长和扩散为特征的疾病。这类疾病包括但不限于何杰金氏病、非何杰金氏淋巴瘤、急性淋巴细胞性白血病、慢性淋巴细胞性白血病、多发性骨髓瘤、成神经细胞瘤、乳腺癌、卵巢癌、肺癌、维尔姆斯氏肿瘤、宫颈癌、睾丸癌、软组织肉瘤、原发性巨球蛋白血症、膀胱癌、慢性粒细胞性白血病、原发性脑癌、恶性黑素瘤、小细胞性肺癌、胃癌、结肠癌、恶性胰岛素瘤、恶性类癌性癌、绒毛膜癌、蕈样肉芽肿病、头颈癌、骨源性肉瘤、胰腺癌、急性粒细胞性白血病、毛细胞性白血病、成神经细胞瘤、横纹肌肉瘤、卡波济氏肉瘤、泌尿生殖器癌、甲状腺癌、食道癌、恶性高钙血症、宫颈增生、肾细胞癌、子宫内膜癌、真性红细胞增多症、特发性血小板增多症、肾上腺皮质癌、皮肤癌及前列腺癌。

通常，基于总体重计以每天约 0.01μg/kg 到约 100mg/kg 量的式Ⅰ-Ⅲ的化合物给药可能是有效的。所述活性成分可一次给予，或可被分成一些较小剂量以预定时间间隔给予。每次给药的合适剂量单位可以是例如约 1μg-约 2000mg，优选约 5μg-约 1000mg。

应该理解，上面给出的剂量范围只作为示例而不欲限制本发明范围。每种活性化合物的治疗有效量会随多种因素而变化；所述因素包括但不限于所用化合物的活性，所述活性化合物在患者体内的稳定性，所要减轻的症状的严重性，所治疗患者的总重，给药途径，活性化合物被身体吸收、分布和排泄的难易，所要治疗的患者的年龄和敏感性等；这些对本领域技术人员来说将是显而易见的。给药量可根据各种因素随时间变化而进行调整。

在药物组合物中，所述活性剂可以是任何可药用的盐的形式。本文所用的术语“可药用的盐”指的是所述活性化合物的相对无毒的有机或无机盐，包括该化合物的无机酸或有机酸加成盐。碱性活性成分化合物盐的实例包括但不限于盐酸盐、氢溴酸盐、硫酸盐、硫酸氢盐、硝酸盐、乙酸盐、磷酸盐、草酸盐、戊酸盐、油酸盐、硼酸盐、苯甲酸盐、月桂酸盐、硬脂酸盐、棕榈酸盐、乳酸盐、甲苯磺酸盐、柠檬酸盐、马来酸盐、琥珀酸盐、酒石酸盐、萘酸盐(napththylate salt)、富马酸盐、甲磺酸盐、月桂基磺酸盐、葡庚糖酸盐等。参见例如，Berge, et al. J.Pharm. Sci., 66:1-19 (1997)。酸性活性成分化合物盐的实例包括例如碱金属盐、碱土金属盐和铵盐。因此，合适的盐可为铝盐、钙盐、锂盐、镁盐、钾盐、钠盐和锌盐。此外，也可使用有机盐，包括例如赖氨酸、N,N′-二苄基乙二胺、氯普鲁卡因、胆碱、二乙醇胺、乙二胺、葡甲胺（N-甲基还原葡糖胺）、普鲁卡因和三羟甲基氨基甲烷的盐。

对于口服，所述活性化合物可被纳入包括可药用载体的制剂中，所述载体例如粘合剂(例如明胶、纤维素、黄蓍胶(gum tragacanth))、赋形剂（例如淀粉、乳糖）、润滑剂（例如硬脂酸镁、二氧化硅）、崩解剂（例如藻酸盐、原生胶（Primogel）和玉米淀粉）以及甜味剂或调味剂（例如葡萄糖、蔗糖、糖精、水杨酸甲酯和薄荷）。可以包封的明胶胶囊或压制片剂的形式口服所述制剂。胶囊和片剂可用任何

常规方法制备。还可在所述胶囊和片剂上涂覆各种本领域已知的包衣以改进该胶囊和片剂的气味、味道、颜色和形状。此外，液态载体例如脂肪油也可包括在胶囊中。

适宜的口服剂还可以是悬浮液、糖浆、口香糖、圆片、酏剂等形式。如需要，还可包括用于改变特定剂型的气味、味道、颜色和形状的常规试剂。此外，为了方便通过肠内营养管(enteral feeding tube)对不能吞咽的患者给药，可将所述活性化合物溶解在一种可接受的亲脂性植物油载体例如橄榄油、玉米油和红花油中。

所述活性化合物还可以溶液或悬液的形式或能够在使用前转化为溶液或悬液的冻干形式进行肠胃外给药。在这类制剂中，可以使用稀释剂或可药用的载体例如无菌水和生理盐水缓冲液。其他常规的溶剂、pH缓冲剂、稳定剂、抗细菌剂、表面活性剂和抗氧化剂都可包括在所述制剂中。例如，可用的成分包括氯化钠、乙酸盐、柠檬酸盐或磷酸盐缓冲液、丙三醇、葡萄糖、不挥发油类、对羟基苯甲酸甲酯、聚乙二醇、丙二醇、硫酸氢钠、苯甲醇、抗坏血酸等。所述肠胃外制剂可储存在任何常规容器例如小瓶和安瓿中。

局部给药途径包括鼻腔给药、口腔含化给药、粘膜给药、直肠给药或阴道给药。对于局部给药，可将所述活性化合物配制成洗液、乳膏、油膏、凝胶、粉末、糊剂、喷雾剂、悬液、滴剂和气溶胶。因此，所述制剂中可包括一种或多种增稠剂、保湿剂和稳定剂。这类试剂的实例包括但不限于聚乙二醇、山梨糖醇、黄原酸胶、矿脂、蜂蜡或矿物油、羊毛脂、角鲨烯等。局部给药的一个具体形式是由透皮贴剂送递。制备透皮贴剂的方法公开在例如Brown,et al., Annual Review of Medicine, 39:221-229(1988)中，其内容通过引证的方式纳入本文。

用于使所述活性化合物持续释放的皮下植入也可作为一种适宜的给药途径。将一种任意合适剂型的活性化合物植入到皮下空间内例如前腹壁下，需要外科手术操作。参见例如，Wilson et al., J.Clin. Psych.45:242-247(1984)。水凝胶可用作持续释放所述活性化合物的载体。水凝胶为本领域所公知。它们通常是通过将高分子量的生物相容性聚合物交联成网状物而制备的，该网状物在水中膨胀形成一种类

凝胶物质。优选水凝胶是生物可降解的或生物可吸收的。对本发明来说，由聚乙二醇、胶原或聚（乙醇酸-共-L-乳酸）制成的水凝胶可能是有用的。参见例如，Phillips et al., J. Pharmaceut. Sci., 73:1718-1720(1984)。

所述活性化合物还可结合到一种水溶的非免疫原性的非肽类的高分子量聚合物上，以形成一种聚合物的缀合物。例如，活性化合物共价连接到聚乙二醇上形成缀合物。通常，这类缀合物显示出提高的溶解性、稳定性和降低的毒性及免疫原性。因此，当给予至患者时，该缀合物中的活性化合物在体内可具有更长的半衰期并显示出更好的疗效。通常可参见Burnham, Am. J. Hosp. Pharm., 15:210-218(1994)。聚乙二醇化蛋白目前被用在蛋白置换疗法中并被用作其他治疗用途。例如，聚乙二醇化干扰素（PEG-INTRON A®）临床上用于治疗乙型肝炎。聚乙二醇化腺苷脱氨酶（ADAGEN®）用于治疗严重联合免疫缺陷病（SCIDS）。聚乙二醇化左旋天冬酰胺酶（ONCAPSPAR®）用于治疗急性淋巴细胞性白血病（ALL）。优选聚合物和活性化合物之间的共价键以及/或者聚合物本身在生理条件下可水解降解。上述缀合物被称为“药物前体”，它能很容易地在体内释放活性化合物。也可通过将活性成分加入本领域公知的微胶囊中、纳米胶囊中或水凝胶中从而达到活性化合物的可控释放。本发明化合物的其他可药用的药物前体包括但不限于酯、碳酸盐、硫代碳酸盐、N-酰基衍生物、N-酰氧基烷基衍生物、叔胺的季铵盐衍生物、N-曼尼希碱、希夫碱、氨基酸缀合物、磷酸酯、金属盐及磺酸酯。

脂质体也可用作本发明活性化合物的载体。脂质体是由各种脂质——例如胆固醇、磷脂、脂肪酸及其衍生物——构成的微粒。也可使用各种改性脂质。脂质体能够降低活性化合物的毒性并增加它们的稳定性。制备其中包括活性成分的脂质体悬液的方法通常为本领域所公知。参见例如，美国专利No.4,522,811; Prescott, Ed., Methods in Cell Biology, Volume XIV, Academic Press, New York, N.Y.(1976)。

还可将所述活性化合物与另一协同治疗或预防同一症状或者对被治疗的患者的另一疾病或症状有效的活性剂联合给予，只要该另一

活性剂不干涉或不良地影响本发明活性化合物的效果。这种其他活性剂包括但不限于抗炎症药、抗病毒剂、抗生素、抗真菌剂、抗凝血剂、心血管药、降胆固醇药、抗癌药、高血压药等。

可与本发明的化合物和方法结合使用的抗肿瘤剂的合适的实例通常包括烷基化剂、抗代谢药、表叶毒素（epidophyllotoxin）、抗肿瘤酶、拓扑异构酶抑制剂、甲基苄肼、米托蒽醌（mitoxantrones）、铂配位络合物、生物反应修饰剂及生长抑制剂、激素/抗激素治疗药和造血生长因子。抗肿瘤药种类的实例包括蒽环类抗生素、长春类药（vinca drug）、丝裂霉素类、博来霉素类、细胞毒性核苷类、埃博霉素（epothilone）类、discodermolide、蝶啶类、烯二炔（diynene）、鬼臼毒素（podophyllotoxin）。这些类中特别有用的成员包括例如洋红霉素、柔红霉素（daunorubicin）、氨基蝶呤、氨甲喋呤（methotrexate）、甲氨喋呤（methopterin）、二氯氨甲喋呤、丝裂霉素C、泊非霉素、5-氟尿嘧啶、6-巯基嘌呤、吉西他滨（gemcitabine）、阿糖胞苷（cytosine arabinoside）、鬼臼毒素或鬼臼毒素衍生物（例如依托泊苷（etoposide）、磷酸依托泊苷或鬼臼噻吩甙（teniposide））、美法仑（melphalan）、长春碱（vinblastine）、长春新碱（vincristine）、异长春碱、长春地辛（vindesine）、环氧长春碱（leurosine）、紫杉醇（paclitaxel）等。其他有用的抗肿瘤剂包括雌氮芥（estramustine）、卡铂（carboplatin）、环磷酰胺、博来霉素、吉姆赛它宾（gemcitibine）、异环磷酰胺（ifosamide）、美法仑、六甲基三聚氰胺、硫替派（thiotepa）、阿糖胞苷（cytarabin）、idatrexate、三甲曲沙（trimetrexate）、氮烯唑胺、L-门冬酰胺酶、喜树碱、CPT-11、托泊替康、ara-C、比卡鲁胺、氟他胺（flutamide）、亮丙瑞林（leuprolide）、吡啶并苯并吲哚（pyridobenzoindole）衍生物、干扰素类及白介素类。

实施例

除非另外指出，化学试剂为标准的市售试剂并使用其原品。或者它们的制备是容易的且是本领域普通技术人员已知的，或者在本文中

有引证或描述。

缩写与 ACS Style Guide 中的一致。“干的”玻璃器皿是指烘箱/干燥器干燥的。除非另外指出，溶剂为 ACS 级的。将分析型 TLC 板（TLC plate）（Silica Gel 60 F254, EM Science, Gibbstown, NJ, 或 Merck # 5715）用于跟踪反应过程，并通过来自 Isco 的 MPLC 系统（Foxy Jr 流分收集器，UA-6 检测器）使用 Isco 硅胶闪式柱（10 或 40 g）进行纯化。在 Varian Mercury 400 MHz 设备上记录 ^{1}H NMR 光谱，且化学位移表示为相对于内标 TMS 的百万分率（ppm，δ）。在 Thermo Finnigan LCQ-Deca（注射体积 5 uL，XTerra MS-C_{18} 3.5 μm 2.1 × 50mm 柱，XTerra MS-C_{18} 5 μm 2.1 × 20mm 保护柱）、电喷射离子化源（ESI source）上获得质谱；分析型 HPLC 在 HP1050（注射体积 5 μl，XTerra RP-C_{18} 5 μm 4.6 × 250 mm 柱，具有 XTerra MS-C_{18} 5 μm 2.1 × 20mm 的保护柱）上进行；且制备型 HPLC 在 Agilent 1100 Prep-LC 上进行，这里根据化合物选用不同的柱和条件。GCMS 在 Agilent Technology 6890N 或 Shimadzu QP5000/17A 设备上进行。

除非另外指出，所有反应在烤干或烘干的玻璃器皿中在正压的干燥氮气或干燥氩气下进行，并且用磁力进行搅拌。除非另外指出，化学试剂为标准的市售试剂并使用其原品。或者它们的制备是容易的且是本领域普通技术人员已知的，或者在本文中有引证或描述。产率并不是最优的。化学名由 ISIS AutoNom 和 ACD 实验室软件生成。

缩写

如果以下的缩写出现在本文中，它们具有以下的含义：

Ac_2O	乙酸酐
anhy	无水的
n-BuOH	正丁醇
t-BuOH	叔丁醇
CD_3OD	甲醇-d_4
Celite®	硅藻土滤器试剂，® Celite Corp.
CH_2Cl_2	二氯甲烷（methylene chloride）
DCM	二氯甲烷（Dichloromethane）
CI-MS	化学电离质谱
conc	浓缩的
dec	分解
bs	宽单峰
br	宽峰

DME	二甲氧基乙烷
DMF	*N,N*-二甲基甲酰胺
DMSO	二甲基亚砜
DMSO-d_6	二甲基亚砜-d_6
ELSD	蒸发光散射装置
EtOAc	乙酸乙酯
EtOH	乙醇（100%）
Et_2O	乙醚
Et_3N	三乙胺
HPLC ESI-MS	高效液相色谱-电喷射质谱
MPLC	中压液相层析
NMR	核磁共振波谱
TOF-MS	飞行时间质谱
NMM	4-甲基吗啉
Ph_3P	三苯膦
$Pd(dppf)Cl_2$	[1,1'-双(二苯膦基)二茂铁]二氯化钯(II)
$Pd(PPh_3)_4$	四(三苯基膦)钯(0)
$Pd(OAc)_2$	乙酸钯(II)
$P(O)Cl_3$	三氯氧化磷
R_f	TLC保留因子
RT	保留时间（HPLC）
rt	室温
THF	四氢呋喃
TFA	三氟乙酸
TLC	薄层色谱
LC-MS (ESI)	液相色谱-质谱（电喷射离子化）
DIEA	二异丙基乙胺
TFAA	三氟乙酸酐
MsCl	甲磺酰氯
AcOH	乙酸
HCl	氢氯酸
H_2SO_4	硫酸
HNO_3	硝酸
HBr	氢溴酸
$CDCl_3$	氯仿-d_3
$CHCl_3$	氯仿
H_2O	水
NaOAc	乙酸钠
KOH	氢氧化钾
NaOH	氢氧化钠
NaCl	氯化钠
$NaHCO_3$	碳酸氢钠
Na_2CO_3	碳酸钠
K_2CO_3	碳酸钾

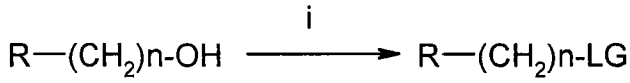
Na_2SO_4	硫酸钠
$MgSO_4$	硫酸镁
MeOH	甲醇
SiO_2	硅胶
K_3PO_4	磷酸钾
NH_4Cl	氯化铵
AIBN	2,2'-偶氮二异丁腈（axo bisisobutyronitrile）
Barton 碱	2-叔丁基-1,1,3,3-四甲基胍
DMAP	N,N-二甲基氨基吡啶
LG	离去基团
MsCl	甲磺酰氯
TsCl	对甲苯磺酰氯
PG	保护基团
Xantphos	4,5-双(二苯膦基)-9,9-二甲基苍耳烷

一般步骤

制备中间体的一般方法

被取代的醇可商购获得或者依照已知的文献步骤制备。根据本领域技术人员已知的合成方法将这些被取代的醇转换成相应的离去基团（Cl、Br、OM 或 OT）。用于制备所述化合物的一般方法如下给出，并且代表性化合物的制备在实验部分中具体说明。

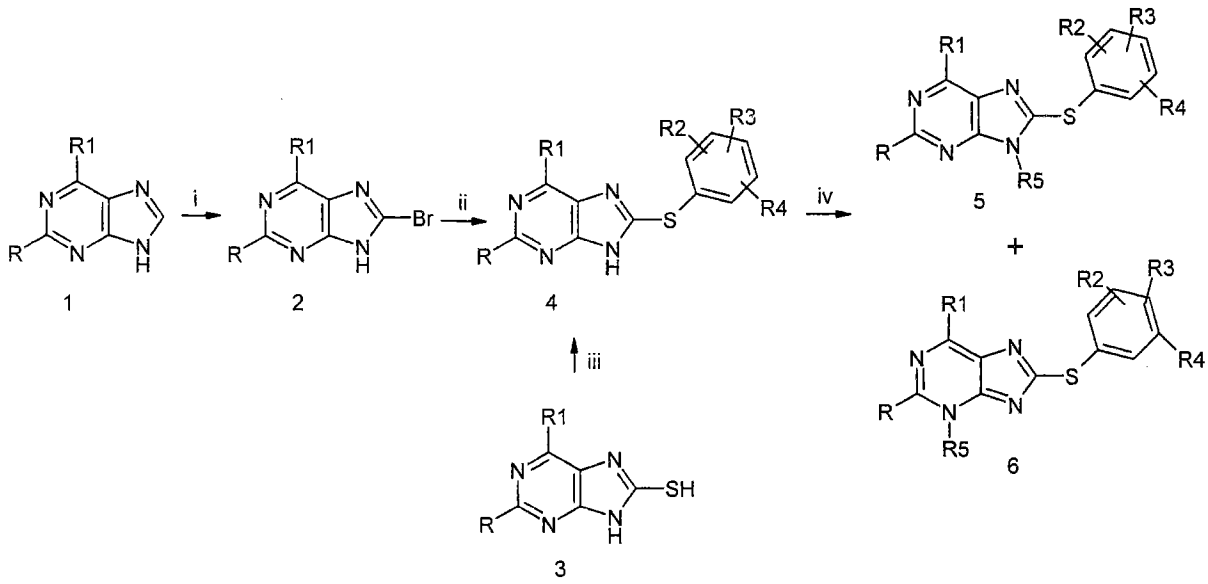
图 1



LG = Cl、Br、OM、OT

试剂：i)$SOCl_2$，$CHCl_3$或 CBr_4，PPh_3 / PPh_3-聚合物，DCM 或 CH_3SO_2Cl，NEt_3，DCM 或 pTsCl，NEt_3，DMAP，DCM

图 2



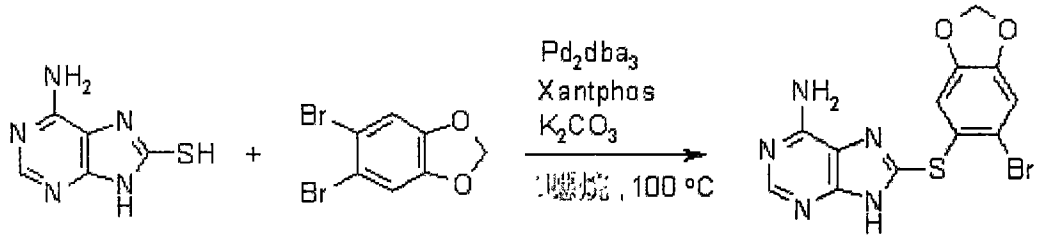
试剂：i）$CHCl_3$，Br_2，rt；ii）NaH，被取代的苯硫醇，DMF，60℃；iii）Ar-X，CuI，新亚铜试剂，t-BuONa，DMF，60-110℃；或Pd_2dba_3，Xanthpos，K_2CO_3或Cs_2CO_3，二噁烷，100 ℃；iv）R5-LG，Barton碱，DMF，60 - 110 ℃。

通过已知方法（US 2005/0049263）制备8-溴代腺嘌呤2。通过芳基硫醇盐（arylthiolate）阴离子对溴代腺嘌呤的亲核攻击（US 2005/0049263），或者通过铜催化的芳基碘化物与巯基腺嘌呤3的偶联可以得到化合物4；所述偶联反应在60-110 ℃下使用CuI/新亚铜试剂作为催化剂且t-BuONa/DMF作为碱/溶剂结合物实现（J. Med. Chem, 2005, 48, 2892）。或者，可以通过钯催化的芳基卤化物与巯基腺嘌呤3的偶联制备4。在存在碱的情况下于30-110 ℃，在DMF中使用多种烷化剂将8-芳基硫基腺嘌呤（8-arylsulfanyl adenine）4的衍生物烷基化1-18小时。通过HPLC和LC-MS分析观测区域异构体（regioisomer）5和6混合物的形成。在该阶段的末期蒸发溶剂；或者在水相和有机相后处理后，收集有机层并使之经Na_2SO_4干燥。在除去有机溶剂并经制备型HPLC[X-Terra prep-RP18 10 um，19×250 mm（水），流动相：溶剂A：含有0.01% TFA的HPLC级水，和溶剂B：含有0.01% TFA的乙腈，一般洗脱梯度 – 在15-25分钟的洗脱时间内溶剂B从15%至80%]纯化后，分离作为三氟乙酸盐的N-3和N-9烷基化产物。

制备中间体的一般方法

中间体 1

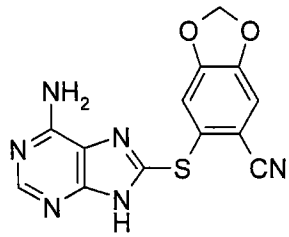
8-(6-溴-苯并[1,3]间二氧杂环戊烯-5-基硫基)-9H-嘌呤-6-基胺

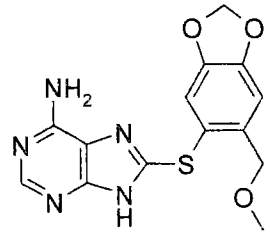
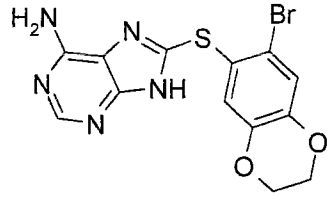
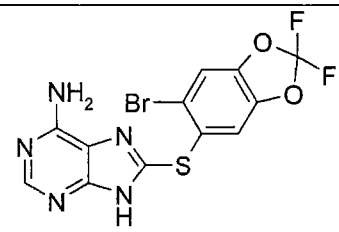
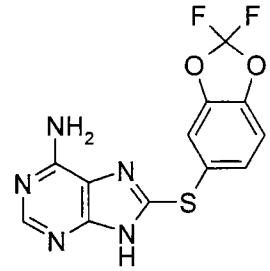
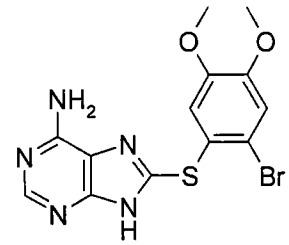
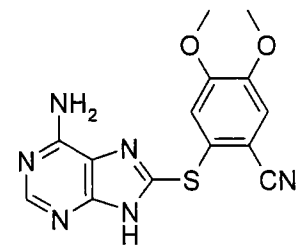
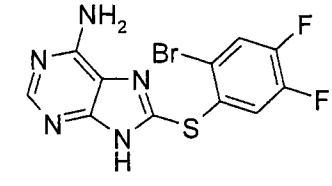


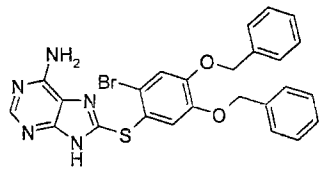
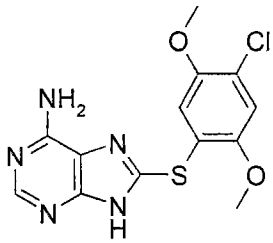
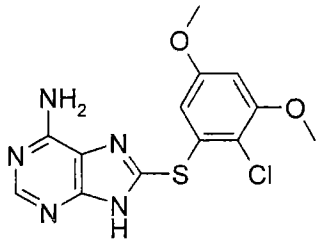
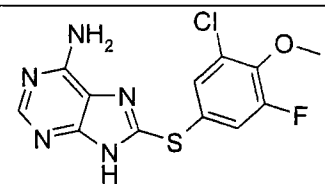
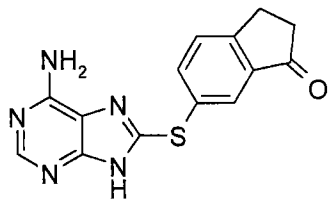
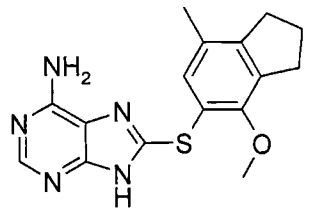
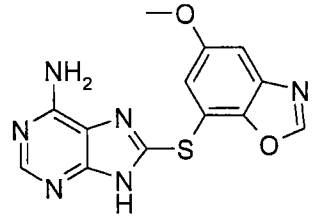
向 250 mL 烧瓶中装入 8-巯基腺嘌呤（2.00 g，11.98 mmol）、5，6-二溴-苯并-[1,3]二氧杂环戊烯（6.07 g，24.0 mmol）、Pd_2dba_3（0.548 g，0.599 mmol）、Xantphos（0.693 g，1.20 mmol）、K_2CO_3（3.31 g，23.95 mmol）和无水二噁烷（25 mL）。将所形成的混合物在氮气气氛下于 100 ℃加热 16 h。所述反应混合物冷却后经过滤并用 2/2/0.5 的 CH_2Cl_2、EtOAc 和 MeOH 的混合物洗涤。在真空中浓缩合并的滤液。在 SiO_2 上通过色谱纯化（CH_2Cl_2/EtOAc/MeOH，2/2/0/5）暗褐色的剩余物，然后用 MeOH 重结晶得到题述化合物（1.4 g，32%）。^{1}H NMR (DMSO-d_6) δ 8.08 (s, 1H), 7.38 (s, 1H), 7.23 (s, 1H), 6.12 (s, 2H)。

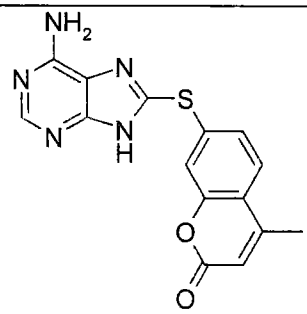
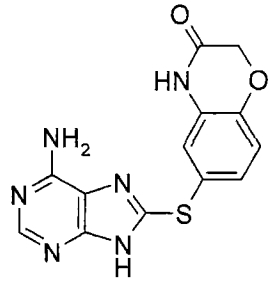
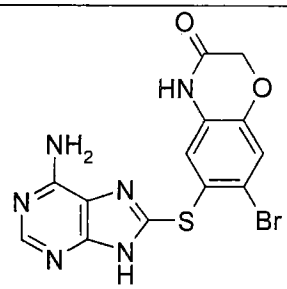
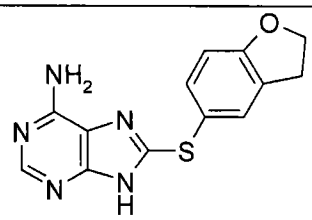
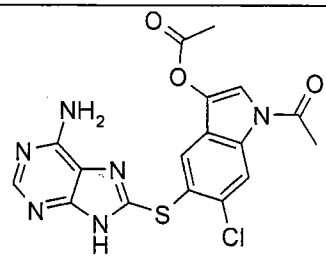
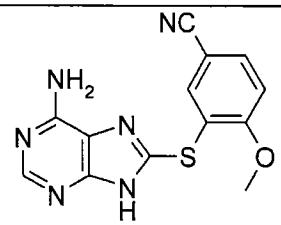
依照所述制备中间体 1 的步骤制备中间体 2-36。

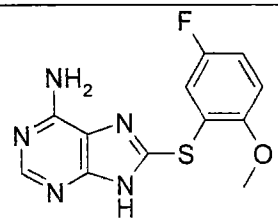
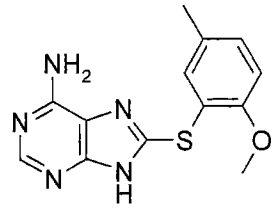
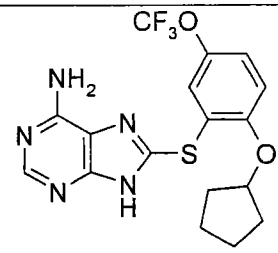
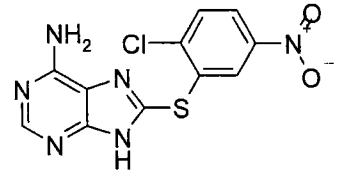
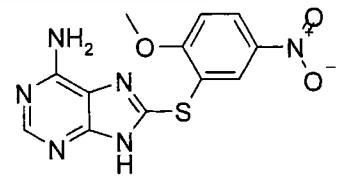
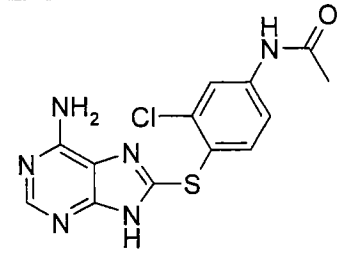
表 1

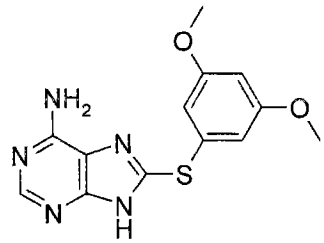
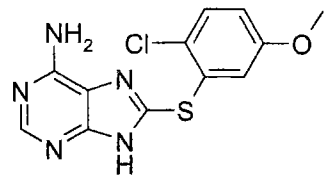
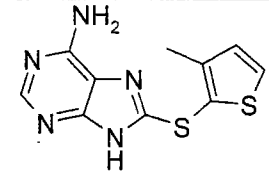
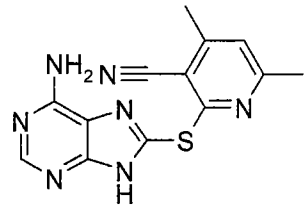
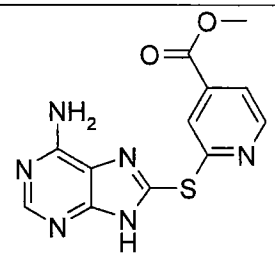
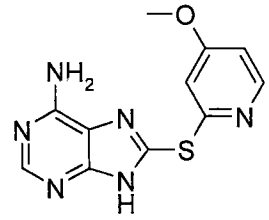
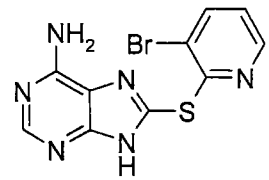
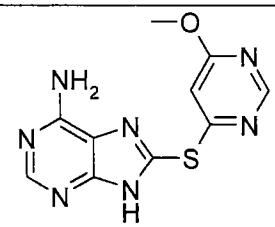
中间体	结构	名称和分析数据
2		056-[(6-氨基-9H-嘌呤-8-基)硫]-1,3-苯并间二氧杂环戊烯-5-甲腈。^{1}H NMR (DMSO-d_6) δ 8.08 (s, 1H), 7.59 (s, 1H), 7.29 (s, 1H), 7.26-7.16 (brs, 2H), 6.23 (s, 2H); TOF-MS $[M+H]^+$ 315.

3		8-{[6-(甲氧基甲基)-1,3-苯并间二氧杂环戊烯-5-基]硫}-9H-嘌呤-6-胺。TOF-MS [M+H]$^+$ 332.08
4		8-[(7-溴-2,3-二氢-1,4-苯并二噁烯-6-基)硫]-9H-嘌呤-6-胺。LC-MS [M+H]$^+$ 382.0
5		8-[(6-溴-2,2-二氟-1,3-苯并间二氧杂环戊烯-5-基)硫]-9H-嘌呤-6-胺。LC-MS [M+H]$^+$ 403.9
6		8-[(2,2-二氟-1,3-苯并间二氧杂环戊烯-5-基)硫]-9H-嘌呤-6-胺。^{1}H NMR (DMSO-d_6) δ 8.08 (s, 1H), 7.70 (brs, 1H), 7.47 (m, 1H), 7.39 (m, 1H), 7.23 (brs, 2H); LC-MS [M+H]$^+$ 324.0
7		8-[(2-溴-4,5-二甲氧基苯基)硫]-9H-嘌呤-6-胺。^{1}H NMR (CD3OD) δ 8.09 (s, 1H), 7.32 (s, 1H), 7.30 (s, 1H), 3.88 (s, 3H), 3.82 (s, 3H); LC-MS [M+H]$^+$ 382.0
8		2-[(6-氨基-9H-嘌呤-8-基)硫]-4,5-二甲氧基苯甲腈。TOF-MS [M+H]$^+$ 329.08
9		8-[(2-溴-4,5-二氟苯基)硫]-9H-嘌呤-6-胺。LC-MS [M+H]$^+$ 292.0

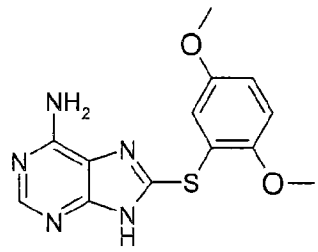
10		8-{[4,5-双(苄氧基)-2-溴苯基]硫}-9H-嘌呤-6-胺。LC-MS [M+H]$^+$ 533.5
11		8-[(4-氯-2,5-二甲氧基苯基)硫]-9H-嘌呤-6-胺。LC-MS [M+H]$^+$ 338.1
12		8-[(2-氯-3,5-二甲氧基苯基)硫]-9H-嘌呤-6-胺。LC-MS [M+H]$^+$ 338.1
13		8-[(3-氯-5-氟-4-甲氧基苯基)硫]-9H-嘌呤-6-胺。LC-MS [M+H]$^+$ 326.2
14		6-[(6-氨基-9H-嘌呤-8-基)硫]茚满-1-酮。LC-MS [M+H]$^+$ 298.0
15		8-[(4-甲氧基-7-甲基-2,3-二氢-1H-茚-5-基)硫]-9H-嘌呤-6-胺。 LC-MS [M+H]$^+$ 328.3
16		8-[(5-甲氧基-1,3-苯并噁唑-7-基)硫]-9H-嘌呤-6-胺。 LC-MS [M+H]$^+$ 315.0

17		7-[(6-氨基-9H-嘌呤-8-基)硫]-4-甲基-2H-色烯-2-酮。LC-MS [M+H]$^+$ 326.0
18		6-[(6-氨基-9H-嘌呤-8-基)硫]-2H-1,4-苯并噁嗪-3(4H)-酮。LC-MS [M+H]$^+$ 315.9
19		6-[(6-氨基-9H-嘌呤-8-基)硫]-7-溴-2H-1,4-苯并噁嗪-3(4H)-酮。TOF-MS [M+H]$^+$ 392.98
20		8-(2,3-二氢-1-苯并呋喃-5-基硫)-9H-嘌呤-6-胺。LC-MS [M+H]$^+$ 285.9
21		1-乙酰基-5-[(6-氨基-9H-嘌呤-8-基)硫]-6-氯-1H-吲哚-3-基乙酸酯。LC-MS [M+H]+ 416.0
22		3-[(6-氨基-9H-嘌呤-8-基)硫]-4-甲氧基苯甲腈。^{1}H NMR (DMSO-d_6) δ 8.10 (s, 1H), 7.83 (d, J = 8.8 Hz, 1H), 7.62 (brs, 1H), 7.31 (brs, 2H), 7.28 (d, J = 8.8 Hz, 2H), 3.91 (s, 1H); LC-MS [M+H]$^+$ 299.1

23		8-[(5-氟-2-甲氧基苯基)硫]-9H-嘌呤-6-胺。 ^{1}H NMR (DMSO-d_6) δ 8.11 (s, 1H), 7.34 (brs, 2H), 7.17-7.11 (m, 2H), 6.89 (m, 1H), 3.82 (s, 3H); LC-MS $[M+H]^+$ 292.1
24		8-[(2-甲氧基-5-甲基苯基)硫]-9H-嘌呤-6-胺。 ^{1}H NMR (DMSO-d_6) δ 8.08 (s, 1H), 7.24 (brs, 2H), 7.11 (d, J = 8.4 Hz, 1H), 6.98 (d, J = 8.4 Hz, 1H), 6.91 (s, 1H), 3.77 (s, 3H), 2.17 (s, 3H); LC-MS $[M+H]^+$ 288.2
25		8-{[2-(环戊氧基)-5-(三氟甲氧基)苯基]硫}-9H-嘌呤-6-胺。 TOF-MS $[M+H]^+$ 412.11
26		8-[(2-氯-5-硝基苯基)硫]-9H-嘌呤-6-胺。LC-MS $[M+H]^+$ 323.2
27		8-[(2-甲氧基-5-硝基苯基)硫]-9H-嘌呤-6-胺。LC-MS $[M+H]^+$ 319.2
28		N-{4-[(6-氨基-9H-嘌呤-8-基)硫]-3-氯苯基}乙酰胺。LC-MS $[M+H]^+$ 335.0

29		8-[(3,5-二甲氧基苯基)硫]-9H-嘌呤-6-胺。LC-MS [M+H]$^+$ 304.0
30		8-[(2-氯-5-甲氧基苯基)硫]-9H-嘌呤-6-胺。LC-MS [M+H]$^+$ 308.0
31		8-[(3-甲基-2-噻吩基)硫]-9H-嘌呤-6-胺。LC-MS [M+H]$^+$ 264.0
32		2-[(6-氨基-9H-嘌呤-8-基)硫]-4,6-二甲基尼古丁腈。LC-MS [M+H]$^+$ 298.0
33		2-[(6-氨基-9H-嘌呤-8-基)硫]异烟酸甲酯。LC-MS [M+H]$^+$ 303.0
34		8-[(4-甲氧基吡啶-2-基)硫]-9H-嘌呤-6-胺。LC-MS [M+H]$^+$ 275.0
35		8-[(3-溴吡啶-2-基)硫]-9H-嘌呤-6-胺。LC-MS [M+H]$^+$ 323.1
36		8-[(6-甲氧基嘧啶-4-基)硫]-9H-嘌呤-6-胺。LC-MS [M+H]$^+$ 276.0

中间体 37



8-(2,5-二甲氧基-苯基硫基)-9H-嘌呤-6-基胺

依照已知方法（*J. Med. Chem.*, 2006, 49, 817）制备 8-(2,5-二甲氧基-苯基磺酰基)-9H-嘌呤-6-基胺。

依照已知方法（*J. Org. Chem.*, 2004, 69, 3230）制备中间体 38-42。

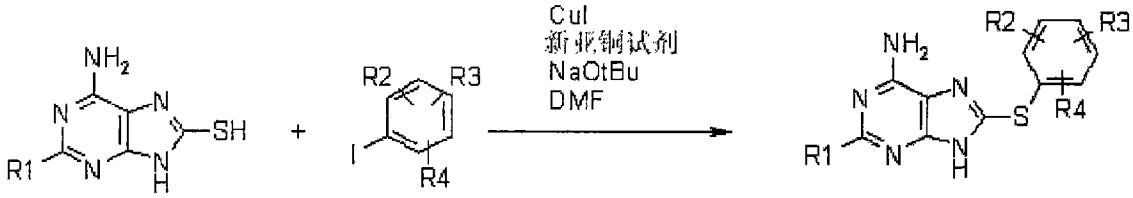
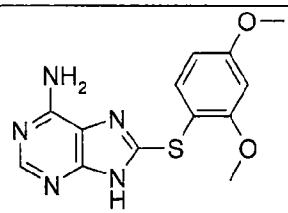
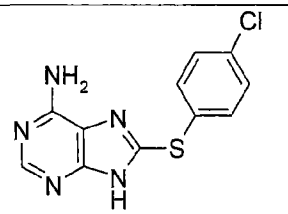
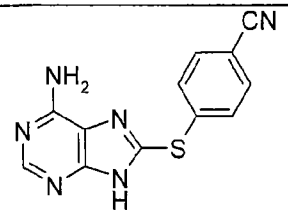
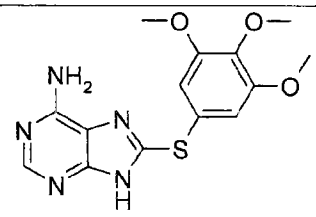
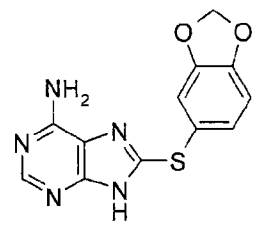


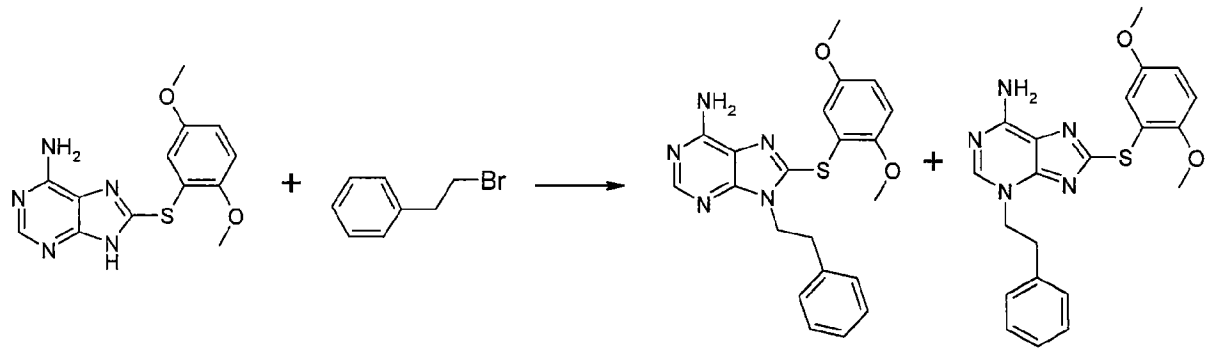
表 2

中间体	结构	名称和分析数据
38		8-[(2,4-二甲氧基苯基)硫]-9H-嘌呤-6-胺。 LC-MS [M+H]$^+$ 304.1
39		8-[(4-氯苯基)硫]-9H-嘌呤-6-胺。 LC-MS [M+H]$^+$ 278.13
40		4-[(6-氨基-9H-嘌呤-8-基)硫]苯甲腈。 LC-MS [M+H]$^+$ 269.2

41		8-[(3,4,5-三甲氧基苯基)硫]-9H-嘌呤-6-胺。LC-MS $[M+H]^+$ 334.1
42		8-(1,3-苯并间二氧杂环戊烯-5-基硫)-9H-嘌呤-6-胺。LC-MS [M+H]+ 288.2

一般烷基化步骤:

实施例 1 和 2



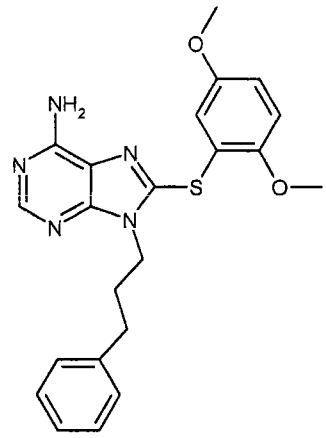
8-(2,5-二甲氧基-苯基硫基)-9-苯乙基-9H-嘌呤-6-基胺和 8-(2,5-二甲氧基-苯基硫基)-3-苯乙基-3H-嘌呤-6-基胺

将 8-(2,5-二甲氧基-苯基硫基)-9H-嘌呤-6-基胺(0.050 g, 0.165 mmol)、(2-溴-乙基)-苯(0.032 g, 0.165 mmol)和 Barton 碱(3.00 mmol)在 DMF(1.3 mL)中的混合物在 90-100 ℃下加热 6-15 h。然后使该反应混合物的温度降至环境温度。在减压条件下除去溶剂后,剩余物经制备型 HPLC 纯化并经冷冻干燥分离以得到 N-9 异构体和 N-3 异构体。8-(2,5-二甲氧基-苯基硫基)-9-苯乙基-9H-嘌呤-6-基胺: 产率 9.0%, ^{1}H NMR (DMSO-d_6) δ 8.18 (s, 1H), 7.43 (bs, 2H), 7.26 - 7.16 (m, 3H), 7.04 - 7.00 (m, 3H), 6.85 (dd, J = 8.8, 4.0 Hz, 1H), 6.45 (d, J = 2.8 Hz, 1H), 4.37 (t, J = 7.2 Hz, 2H), 3.74 (s, 3H), 3.60 (s, 3H), 2.97 (t, J = 7.2 Hz,

2H); LC-MS (MH^+) 408.1。8-(2,5-二甲氧基-苯基硫基)-3-苯乙基-3H-嘌呤-6-基胺: 产率 8.0%, ^1H NMR (DMSO-d_6) δ 7.71 (s, 1H), 7.29-7.12 (m, 5H), 6.90 (d, J = 8.8 Hz, 1H), 6.88 (d, J = 6.4 Hz, 1H), 6.68 (dd, J = 8.8, 2.8 Hz, 1H), 4.33 (t, J = 7.2 Hz, 2H), 3.77 (s, 3H), 3.58 (s, 3H), 3.15 (t, J = 7.2 Hz, 2H); LC-MS (MH^+) 408.1。

以类似于实施例 1 和 2 所述的步骤制备下列实例 3-233, 并且在制备型 HPLC 纯化后作为三氟乙酸盐分离出来。

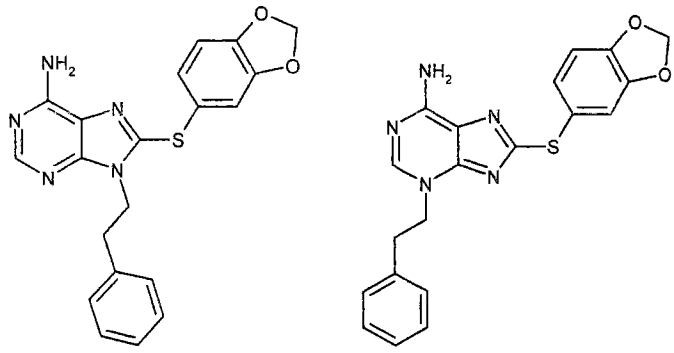
实施例 3



通过类似于实施例 1 和 2 的步骤从 8-(2,5-二甲氧基-苯基硫基)-9H-嘌呤-6-基胺和(3-溴-丙基)-苯制备所述标题化合物。

8-(2,5-二甲氧基-苯基硫基)-9-(3-苯基-丙基)-9H-嘌呤-6-基胺: 产率 21 %, ^1H NMR (DMSO-d_6) δ 8.17 (s, 1H), 7.45 (bs, 2H), 7.25 - 7.00 (m, 6H), 6.85 (dd, J = 8.8, 2.6, 1H), 6.74 (d, J = 2.8 Hz, 1H), 4.19 (t, J = 7.6 Hz, 2H), 3.75 (s, 3H), 3.59 (s, 3H), 2.60 (t, J = 7.6 Hz, 2H), 1.94 (m, 2H); LC-MS $[M+H]^+$ 422.1。

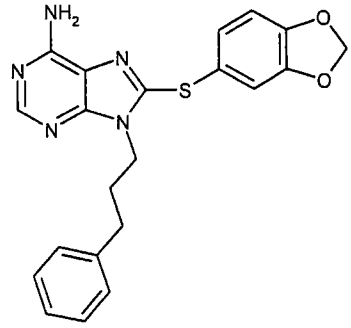
实施例 4 和 5



8-(苯并[1,3]间二氧杂环戊烯-5-基硫基)-9-苯乙基-9H-嘌呤-6-基胺和 8-(苯并[1,3]间二氧杂环戊烯-5-基硫基)-3-苯乙基-3H-嘌呤-6-基胺

通过类似于实施例 1 和 2 的步骤从 8-(苯并[1,3]间二氧杂环戊烯-5-基硫基)-9H-嘌呤-6-基胺和(2-溴-乙基)-苯制备所述标题化合物。通过制备型 HPLC 分离所述异构体。8-(苯并[1,3]间二氧杂环戊烯-5-基硫基)-9-苯乙基-9H-嘌呤-6-基胺:产率 31%, ^{1}H NMR (DMSO-d_6) δ 8.32 (s, 1H), 7.28 - 7.19 (m, 3H), 7.08-7.05 (m, 2H), 6.95 (m, 3H), 6.06 (s, 2H), 4.43 (t, *J* = 6.8 Hz, 2H), 3.02 (t, *J* = 6.8 Hz, 2H); LC-MS $[M+H]^+$ 392.1。8-(苯并[1,3]间二氧杂环戊烯-5-基硫基)-3-苯乙基-3H-嘌呤-6-基胺:产率 13%, ^{1}H NMR (DMSO-d_6) δ 8.35 (s, 1H), 8.17 (bs, 2H), 7.34 - 7.10 (m, 8H), 6.16 (s, 2H), 4.53 (t, *J* = 6.8 Hz, 2H), 3.16 (t, *J* = 6.8 Hz, 2H); LC-MS $[M+H]^+$ 392.1。

实施例 6

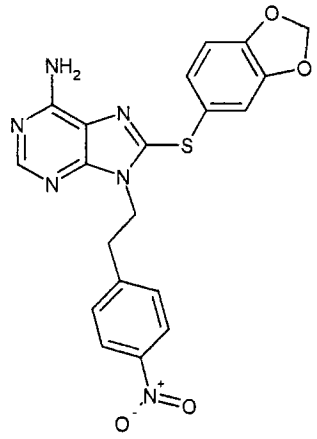


8-(苯并[1,3]间二氧杂环戊烯-5-基硫基)-9-(3-苯基-丙基)-9H-嘌呤-6-基胺

通过类似于实施例 1 和 2 的步骤从 8-(苯并[1,3]间二氧杂环戊烯-5-基硫基)-9H-嘌呤-6-基胺和(3-溴-丙基)-苯制备所述标题化合

物。8-(苯并[1,3]间二氧杂环戊烯-5-基硫基)-9-(3-苯基-丙基)-9H-嘌呤-6-基胺: ^{1}H NMR (DMSO-D_6) δ 8.37 (s, 1H), 7-29-7.11 (m, 5H), 7.05 (s, 1H), 6.96 (s, 2H), 7.07 (s, 2H), 4.21 (t, J = 7.4 Hz, 2H), 2.59 (t, J = 7.4 Hz, 2H), 1.97 (q, J = 8.4 Hz, 2H); LC-MS $[M+H]^+$ 406.13。

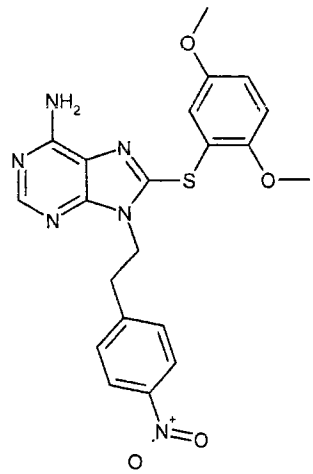
实施例 7



8-(苯并[1,3]间二氧杂环戊烯-5-基硫基)-9-[2-(4-硝基-苯基)-乙基]-9H-嘌呤-6-基胺

通过类似于实施例 1 和 2 的步骤从 8-(苯并[1,3]间二氧杂环戊烯-5-基硫基)-9H-嘌呤-6-基胺和 1-(2-溴-乙基)-4-硝基-苯制备所述标题化合物。8-(苯并[1,3]间二氧杂环戊烯-5-基硫基)-9-[2(4-硝基-苯基)-乙基]-9H-嘌呤-6-基胺: 产率 43%, ^{1}H NMR (DMSO-d_6) δ 8.14 (s, 1H), 8.09 (d, J = 8.8 Hz, 2H), 7.38 (bs , 2H), 7.31 (d, J = 8.8 Hz, 2H), 6.88 -6.82 (m, 3H), 6.02 (s, 2H), 4.47 (t, J= 6.8 Hz, 2H), 3.20 (t, J= 6.8 Hz, 2H); LC-MS $[M+H]^+$ 437.1。

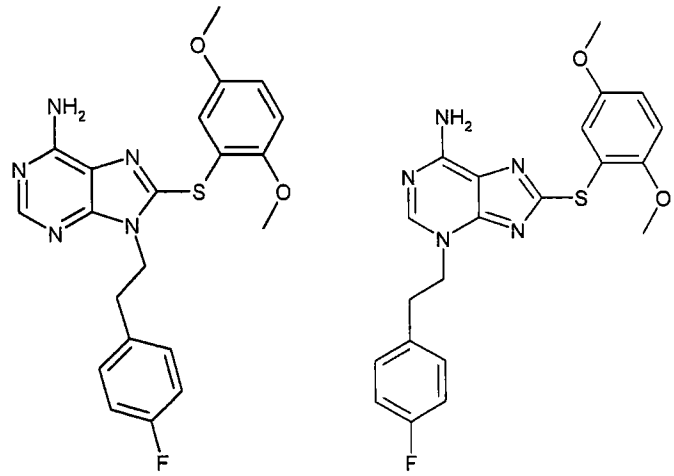
实施例 8



8-(2,5-二甲氧基-苯基硫基)-9-[2-(4-硝基-苯基)-乙基]-9H-嘌呤-6-基胺

通过类似于实施例 1 和 2 的步骤从 8-(2,5-二甲氧基-苯基硫基)-9H-嘌呤-6-基胺和 1-(2-溴-乙基)-4-硝基-苯制备所述标题化合物。通过制备型 HPLC 纯化所述化合物。8-(2,5-二甲氧基-苯基硫基)-9-[2-(4-硝基-苯基)-乙基]-9H-嘌呤-6-基胺: 产率 35%, ^{1}H NMR (DMSO-d_6) δ 8.18 (s, 1H), 8.0 (d, *J* = 8.8 Hz, 2H), 7.46 (bs, 2H), 7.26 (d, *J* = 8.8 Hz, 2H), 6.96 (d, *J* = 9.2, 1H), 6.77 (dd, *J* = 8.8, 3.2 Hz, 1H), 6.27 (d, *J* = 3.2 Hz, 1H), 4.50 (t, *J* = 6.8 Hz, 2H), 3.75 (s, 3H), 3.56 (s, 3H), 3.22 (t, *J* = 6.8 Hz, 2H); LC - MS $[M+H]^+$ 453.5。

实施例 9 和 10

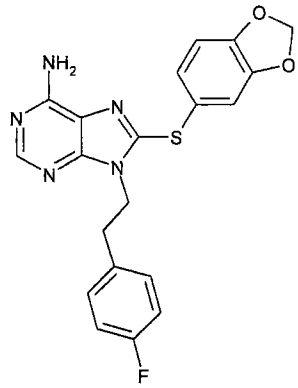


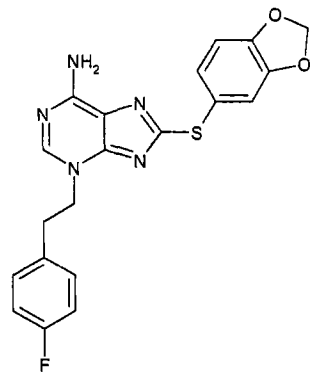
8-(2,5-二甲氧基-苯基硫基)-9-[2-(4-氟-苯基)-乙基]-9H-嘌呤-6-基胺和 8-(2,5-二甲氧基-苯基硫基)-3-[2-(4-氟-苯基)-乙

基]-3H-嘌呤-6-基胺

通过类似于实施例 1 和 2 的步骤从 8-(2,5-二甲氧基-苯基硫基)-9H-嘌呤-6-基胺和 1-(2-溴-乙基)-4-氟-苯制备所述标题化合物。通过制备型 HPLC 分离所述异构体。8-(2,5-二甲氧基-苯基硫基)-9-[2-(4-氟-苯基)-乙基]-9H-嘌呤-6-基胺: 产率 20%, ^{1}H NMR (DMSO-d_6) δ 8.30 (s, 1H), 7.05-7.01 (m, 5H), 6.88 (dd, J = 8.8, 2.8 Hz, 1H), 6.56 (d, J = 2.8 Hz, 1H), 4.43 (t, J = 6.8 Hz, 2H), 3.73 (s, 3H), 3.62 (s, 3H), 3.02 (t, J = 6.8 Hz, 2H); LC-MS $[M+H]^+$ 426.1。8-(2,5-二甲氧基-苯基硫基)-3-[2-(4-氟-苯基)-乙基]-3H-嘌呤-6-基胺: 产率 17%, LC-MS $[M+H]^+$ 426.1。

实施例 11 和 12



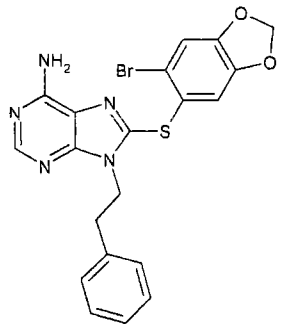


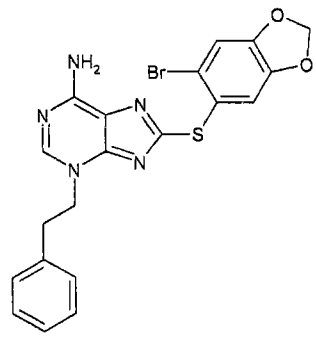
8-(苯并[1,3]间二氧杂环戊烯-5-基硫基)-9-[2-(4-氟-苯基)-乙基]-9H-嘌呤-6-基胺和 8-(苯并[1,3]间二氧杂环戊烯-5-基硫基)-3-[2-(4-氟-苯基)-乙基]-3H-嘌呤-6-基胺

通过类似于实施例 1 和 2 的步骤从 8-(苯并[1,3]间二氧杂环戊烯-5-基硫基)-9H-嘌呤-6-基胺和 1-(2-溴-乙基)-4-氟-苯制备所述标题化合物。通过制备型 HPLC 分离所述异构体。8-(苯并[1,3]间二氧杂环戊烯-5-基硫基)-9-[2-(4-氟-苯基)-乙基]-9H-嘌呤-6-基胺: 产率 33%, ^{1}H NMR (DMSO-d_6) δ 8.27 (s, 1H), 8.10 (bs, 2H), 7.07 - 7.04 (m, 4H), 6.95-6.93 (m, 3H), 6.02 (s, 2H), 4.41(t, J = 6.8 Hz, 2H), 3.02 (t, J = 6.8 Hz, 2H); LC-MS $[M+H]^+$ 410.1。8-(苯并[1,3]间二氧杂环戊烯-5-基硫基)-3-[2-(4-氟-苯基)-乙基]-3H-嘌呤-6-基胺: 产率 11%, ^{1}H NMR (DMSO-d_6) δ 8.35 (s, 1H), 8.23 (bs, 2H), 7.33-7.09 (m, 7H), 6.15 (s, 2H), 4.51 (t, J =

7.2 Hz, 2H), 3.15 (t, J = 7.2 Hz, 2H); LC-MS $[M+H]^+$ 410.1。

实施例 13 和 14

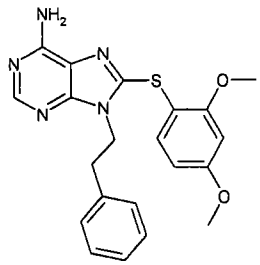


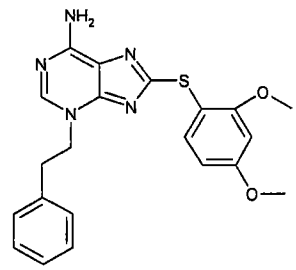


8-(6-溴-苯并[1,3]间二氧杂环戊烯-5-基硫基)-9-苯乙基-9H-嘌呤-6-基胺和 8-(6-溴-苯并[1,3]间二氧杂环戊烯-5-基硫基)-3-苯乙基-3H-嘌呤-6-基胺

通过类似于实施例 1 和 2 的步骤从 8-(6-溴-苯并[1,3]间二氧杂环戊烯-5-基硫基)-9H-嘌呤-6-基胺和(2-溴-乙基)-苯制备所述标题化合物。通过制备型 HPLC 分离所述异构体。8-(6-溴-苯并[1,3]间二氧杂环戊烯-5-基硫基)-9-苯乙基-9H-嘌呤-6-基胺: 产率 38%, ^{1}H NMR (DMSO-d_6) δ 8.31 (s, 1H), 7.37 (s, 1H), 7.26 - 7.18 (m, 3H), 7.09-7.06 (m, 2H), 6.75 (s, 1H), 6.09 (s, 2H), 4.42 (t, J = 7.2 Hz, 2H), 3.05 (t, J = 7.2 Hz, 2H); LC-MS $[M+H]^+$ 472.0。8-(6-溴-苯并[1,3]间二氧杂环戊烯-5-基硫基)-3-苯乙基-3H-嘌呤-6-基胺: 产率 25%, ^{1}H NMR (DMSO-d_6) δ 8.33 (s, 1H), 7.52 (s, 1H), 7.41 (s, 1H), 7.30-7.12 (m, 5H), 6.18 (s, 2H), 4.52 (t, J = 6.8 Hz, 2H), 3.17 (t, J = 6.8 Hz, 2H); LC-MS $[M+H]^+$ 472.0。

实施例 15 和 16



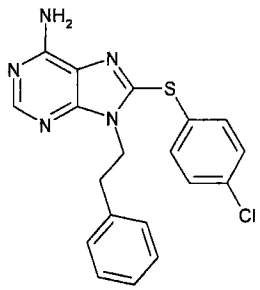


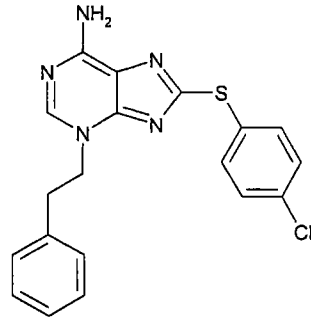
8-(2,4-二甲氧基-苯基硫基)-9-苯乙基-9H-嘌呤-6-基胺和 8-(2,4-二甲氧基-苯基硫基)-3-苯乙基-3H-嘌呤-6-基胺

通过类似于实施例 1 和 2 的步骤从 8-(2,4-二甲氧基-苯基硫

基)-9H-嘌呤-6-基胺和(2-溴-乙基)-苯制备所述标题化合物。通过制备型 HPLC 分离所述异构体。8-(2,4-二甲氧基-苯基硫基)-9-苯乙基-9H-嘌呤-6-基胺: 产率 29 %, ^{1}H NMR (DMSO-d_6) δ 8.23 (s, 1H), 7.82 (bs, 2H), 7.29-7.18 (m, 4H), 7.09 (dd, *J* = 8.4, 1.6 Hz, 2H), 6.65 (d, *J* = 2.4 Hz, 1H), 6.55 (dd, *J* = 8.8, 2.8, 1H), 4.42 (t, *J* = 7.2 Hz, 2H), 3.77 (s, 3H), 3.74 (s, 3H), 3.01 (t, *J* = 7.2 Hz, 2H); LC-MS [M+H]$^+$ 408.1。8-(2,4-二甲氧基-苯基硫基)-3-苯乙基-3H-嘌呤-6-基胺:产率 15 %, ^{1}H NMR (DMSO-d_6) δ 7.62 (bs, 1H), 7.31-7.23 (m, 4H), 7.16-7.12 (m, 2H), 6.83 (bs, 1H), 6.73 (bs, 1H), 4.52 (t, *J* = 7.2 Hz, 2H), 3.86 (s, 3H), 3.81 (s, 3H), 3.16 (t, *J* = 7.2 Hz, 2H), LC-MS [M+H]$^+$ 408.1。

实施例 17 和 18

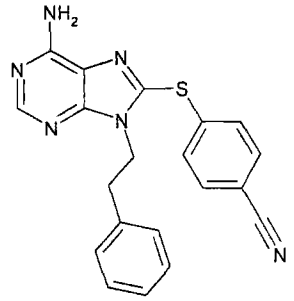


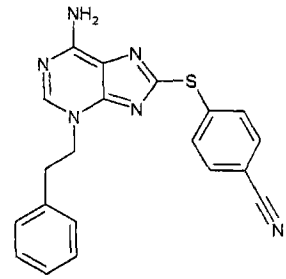


8-(4-氯-苯磺酰基)-9-苯乙基-9H-嘌呤-6-基胺和 8-(4-氯-苯基硫基)-3-苯乙基-3H-嘌呤-6-基胺

通过类似于实施例 1 和 2 的步骤从 8-(4-氯-苯基硫基)-9H-嘌呤-6-基胺和(2-溴-乙基)-苯制备所述标题化合物。通过制备型 HPLC 分离所述异构体。8-(4-氯-苯磺酰基)-9-苯乙基-9H-嘌呤-6-基胺: 产率 45 %, ^{1}H NMR (DMSO-d_6) δ 8.22 (s, 1H), 7.64 (bs, 2H), 7.44-7.40 (m, 2H), 7.32-7.17 (m, 5H), 7.03 (dd, *J* = 8.0, 1.6 Hz, 2H), 4.38 (t, *J* = 7.2 Hz, 2H), 3.01 (t, *J* = 7.2 Hz, 2H); LC-MS [M+H]$^+$ 382.0。8-(4-氯-苯基硫基)-3-苯乙基-3H-嘌呤-6-基胺: 产率 28 %, ^{1}H NMR (DMSO-d_6) δ 8.17 (s, 1H), 8.10 (bs, 2H), 7.60 (d, *J* = 8.4 Hz, 2H), 7.49 (d, *J* = 8.8 Hz, 2H), 7.28-7.22 (m, 3H), 7.12 (dd, *J* = 8.4, 1.6 Hz, 2H), 4.49 (t, *J* = 6.8 Hz, 2H), 3.16 (t, *J* = 6.8 Hz, 2H); LC-MS [M+H]$^+$ 382.0。

实施例 19 和 20

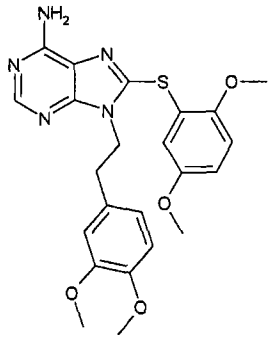


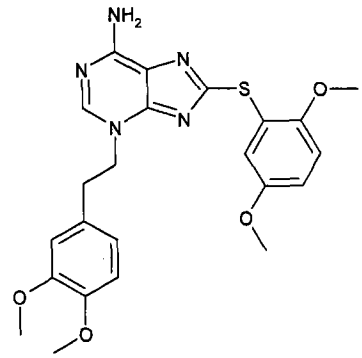


4-(6-氨基-9-苯乙基-9H-嘌呤-8-基硫基)-苯甲腈和 4-(6-氨基-3-苯乙基-3H-嘌呤-8-基硫基)-苯甲腈

通过类似于实施例 1 和 2 的步骤从 4-(6-氨基-9H-基硫基)-苯甲腈和(2-溴-乙基)-苯制备所述标题化合物。通过制备型 HPLC 分离所述异构体。4-(6-氨基-9-苯乙基-9H-嘌呤-8-基硫基)-苯甲腈: 产率 22 %, ^{1}H NMR (DMSO-d_6) δ 8.32 (s, 1H), 7.77 (dd, *J* = 6.8, 2.0 Hz, 2H), 7.33 (dd, *J* = 6.4, 2.0 Hz, 2H), 7.24 - 7.16 (m 3H), 7.01 (dd, *J* = 8.0, 2.0 Hz, 2H), 4.42 (t, *J* = 7.2 Hz, 2H), 3.04 (t, *J* = 7.2 Hz, 2H); LC-MS $[M+H]^+$ 373.0。4-(6-氨基-3-苯乙基-3H-嘌呤-8-基硫基)-苯甲腈: 产率 16 %, ^{1}H NMR (DMSO-d_6) δ 8.47 (bs, 1H), 8.31 (bs, 1H), 8.25 (s, 1H), 7.85 (dd, *J* = 8.4, 1.6 Hz, 2H), 7.68 (d, *J* = 8.4 Hz, 2H), 7.30- 7.20 (m, 3H), 7.13 (dd, *J* = 8.4, 1.6 Hz, 2H), 4.52 (t, *J* = 7.2 Hz, 2H), 3.18 (t, *J* = 7.2 Hz, 2H); LC-MS $[M+H]^+$ 373.0。

实施例 21 和 22

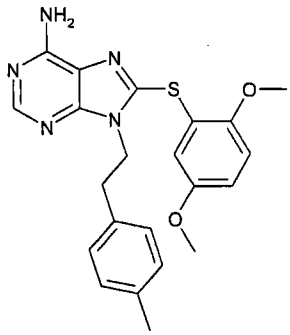


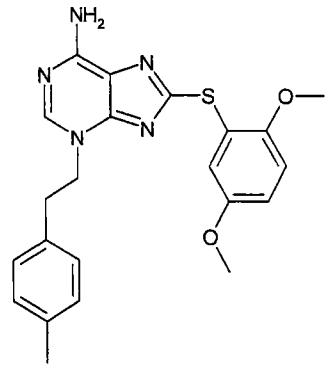


9-[2-(3,4-二甲氧基-苯基)-乙基]-8-(2,5-二甲氧基-苯基硫基)-9H-嘌呤-6-基胺和 3-[2-(3,4-二甲氧基-苯基)-乙基]-8-(2,5-二甲氧基-苯基硫基)-3H-嘌呤-6-基胺

通过类似于实施例 1 和 2 的步骤从 8-(2,5-二甲氧基-苯基硫基)-9H-嘌呤-6-基胺和 4-(2-溴-乙基)-1,2-二甲氧基-苯制备所述标题化合物。通过制备型 HPLC 分离所述异构体。9-[2-(3,4-二甲氧基-苯基)-乙基]-8-(2,5-二甲氧基-苯基硫基)-9H-嘌呤-6-基胺：产率 52 %，^{1}H NMR (DMSO-d_6) δ 8.29 (s, 1H), 7.02 (d, J = 8.8 Hz, 1H), 6.87 (dd, J = 9.2, 2.8 Hz, 1H), 6.77 (d, J = 8.4 Hz, 1H), 6.58 (d, J = 1.6 Hz, 1H), 6.54 (d, J = 3.2 Hz, 1H), 6.49 (dd, J = 8.0, 2.4 Hz, 1H), 4.41 (t, J = 7.2 Hz, 2H), 3.73 (s, 3H), 3.68 (s, 3H), 3.64 (s, 3H), 3.61 (s, 3H), 2.94 (t, J = 7.2 Hz, 2H)；LC-MS $[M+H]^+$ 468.2。3-[2-(3,4-二甲氧基-苯基)-乙基]-8-(2,5-二甲氧基-苯基硫基)-3H-嘌呤-6-基胺：产率 26 %，^{1}H NMR (DMSO-d_6) δ 8.25 (s, 1H), 8.15 (bs, 2H), 6.82 (d, J = 8.4 Hz, 2H), 6.73 (bs, 2H), 6.58 (d, J = 6.4 Hz, 2H), 4.52 (t, J = 6.4 Hz, 2H), 3.77 (s, 3H), 3.71 (s, 3H), 3.70 (s, 3H), 3.68 (s, 3H), 3.09 (t, J = 6.4 Hz, 2H)；LC-MS $[M+H]^+$ 468.1。

实施例 23 和 24



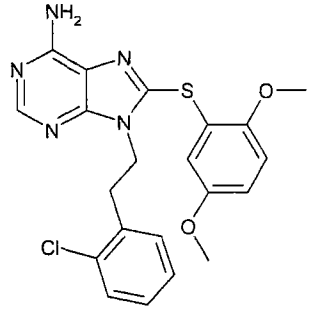


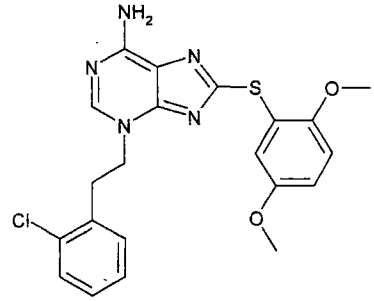
8-(2,5-二甲氧基-苯基硫基)-9-(2-对甲苯基-乙基)-9H-嘌呤-6-基胺和 8-(2,5-二甲氧基-苯基硫基)-3-(2-对甲苯基-乙基)-3H-嘌呤-6-基胺

通过类似于实施例 1 和 2 的步骤从 8-(2,5-二甲氧基-苯基硫基)-9H-嘌呤-6-基胺和 1-(2-溴-乙基)-4-甲基-苯制备所述标题化合物。通过制备型 HPLC 分离所述异构体。8-(2,5-二甲氧基-苯基硫基)-9-(2-对甲苯基-乙基)-9H-嘌呤-6-基胺：产率 37 %，^{1}H NMR (DMSO-d_6) δ 8.24 (s, 1H), 7.77 (bs, 2H), 7.03 (m, 3H), 6.92 (d, J = 8.0 Hz, 2H), 6.86 (dd, J = 8.8, 3.2 Hz, 1H), 6.50 (d,

J = 2.8 Hz, 1H), 4.36 (t, *J* = 7.2 Hz, 2H), 3.74 (s, 3H), 3.60 (s, 3H), 2.94 (t, *J* = 7.2 Hz, 2H), 2.23 (s, 3H); LC-MS $[M+H]^+$ 422.1。8-(2,5-二甲氧基-苯基硫基)-3-(2-对甲苯基-乙基)-3H-嘌呤-6-基胺: 产率 28 %, ^{1}H NMR (DMSO-d_6) δ 8.84 (s, 1H), 8.34 (s, 1H), 8.20 (bs, 2H), 7.25- 6.99 (m, 7H), 4.50 (t, *J* = 7.2 Hz, 2H), 3.76 (s, 3H), 3.73 (s, 3H), 3.12 (t, *J* = 7.2 Hz, 2H) 2.25 (s, 3H); LC-MS $[M+H]^+$ 422.1。

实施例 25 和 26

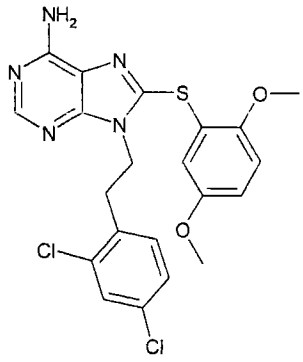


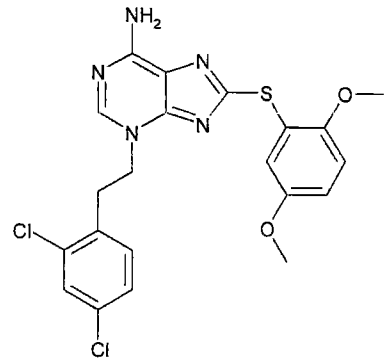


9-[2-(2-氯-苯基)-乙基]-8-(2,5-二甲氧基-苯基硫基)-9H-嘌呤-6-基胺和 3-[2-(2-氯-苯基)-乙基]-8-(2,5-二甲氧基-苯基硫基)-3H-嘌呤-6-基胺

通过类似于实施例 1 和 2 的步骤从 8-(2,5-二甲氧基-苯基硫基)-9H-嘌呤-6-基胺和 1-(2-溴-乙基)-2-氯-苯制备所述标题化合物。通过制备型 HPLC 分离所述异构体。9-[2-(2-氯-苯基)-乙基]-8-(2,5-二甲氧基-苯基硫基)-9H-嘌呤-6-基胺: 产率 18 %, ^{1}H NMR (DMSO-d_6) δ 8.23 (s, 1H), 7.82 (bs, 2H), 7.36 (dd, *J* = 8.0, 1.2 Hz, 1H), 7.24-7.15 (m, 2H), 7.03-6.99 (m, 2H), 6.85 (dd, *J* = 9.2, 3.2 Hz, 1H), 6.47 (d, *J* = 2.8 Hz, 1H), 4.46 (t, *J* = 7.2 Hz, 2H), 3.73 (s, 3H), 3.61 (s, 3H), 3.16 (t, *J* = 7.2 Hz, 2H); LC-MS $[M+H]^+$ 442.1。3-[2-(2-氯-苯基)-乙基]-8-(2,5-二甲氧基-苯基硫基)-3H-嘌呤-6-基胺: 产率 11 %, ^{1}H NMR (DMSO-d_6) δ 8.34 (s, 1H), 8.16 (bs, 1H), 7.41 (m, 1H), 7.29-7.11 (m, 6H), 4.56 (t, *J* = 6.8 Hz, 2H), 3.76 (s, 3H), 3.72 (s, 3H), 3.30 (t, *J* = 6.8 Hz, 2H), LC-MS $[M+H]^+$ 442.1。

实施例 27 和 28

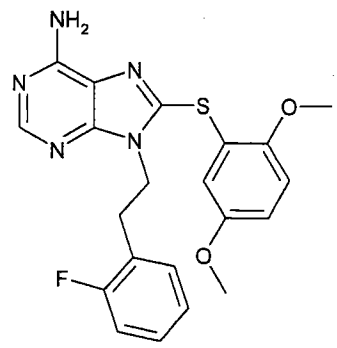


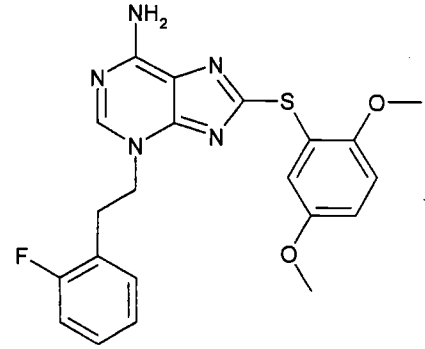


9-[2-(2,4-二氯-苯基)-乙基]-8-(2,5-二甲氧基-苯基硫基)-9H-嘌呤-6-基胺和 3-[2-(2,4-二氯-苯基)-乙基]-8-(2,5-二甲氧基-苯基-硫基)-3H-嘌呤-6-基胺

通过类似于实施例 1 和 2 的步骤从 8-(2,5-二甲氧基-苯基硫基)-9H-嘌呤-6-基胺和 1-(2-溴-乙基)-2,4-二氯-苯制备所述标题化合物。通过制备型 HPLC 分离所述异构体。9-[2-(2,4-二氯-苯基)-乙基]-8-(2,5-二甲氧基-苯基硫基)-9H-嘌呤-6-基胺: 产率 41 %, ^{1}H NMR (DMSO-d_6) δ 8.28 (s, 1H), 7.50 (d, J = 2.8 Hz, 1H), 7.25 (dd, J = 8.4, 2.0 Hz, 1H), 7.05 (d, J = 8.4 Hz, 1H), 7.01 (d, J = 9.2 Hz, 1H), 6.86 (dd, J = 9.2, 2.8 Hz, 1H), 6.52 (d, J = 2.8 Hz, 1H), 4.48 (t, J = 6.8 Hz, 2H), 3.73 (s, 3H), 3.62 (s, 3H), 3.17 (t, J= 6.8 Hz, 2H); LC-MS $[M+H]^+$ 476.1。3-[2-(2,4-二氯-苯基)-乙基]-8-(2,5-二甲氧基-苯基-硫基)-3H-嘌呤-6-基胺: 产率 13 %, ^{1}H NMR (DMSO-d_6) δ 8.37 (s, 1H), 8.15 (bs, 2H), 7.58 (d, J = 2.0 Hz, 1H), 7.36 (dd, J = 8.4, 2.0 Hz, 1H), 7.26 (d, J = 8.0 Hz, 1H), 7.22-7.09 (m, 3H), 4.54 (t, J = 6.8 Hz, 2H), 3.76 (s, 3H), 3.73 (s, 3H), 3.29 (t, J = 6.8 Hz, 2H); LC-MS $[M+H]^+$ 476.1。

实施例 29 和 30

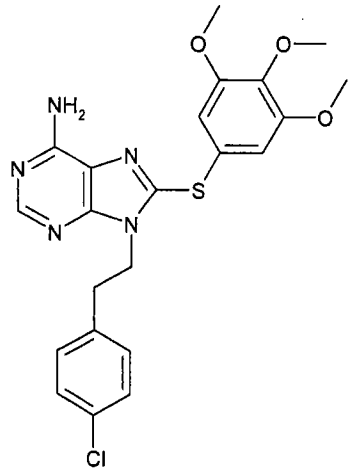


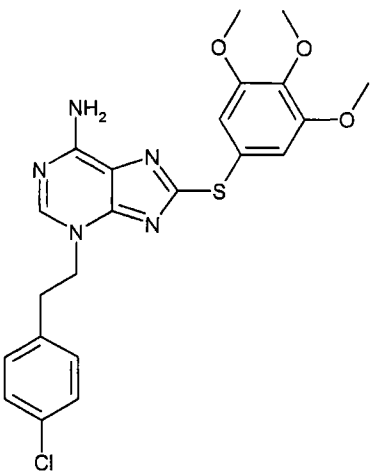


8-(2,5-二甲氧基-苯基硫基)-9-[2-(2-氟-苯基)-乙基]-9H-嘌呤-6-基胺和 8-(2,5-二甲氧基-苯基硫基)-3-[2-(2-氟-苯基)-乙基]-3H-嘌呤-6-基胺

通过类似于实施例 1 和 2 的步骤从 8-(2,5-二甲氧基-苯基硫基)-9H-嘌呤-6-基胺和 1-(2-溴-乙基)-2-氟-苯制备所述标题化合物。通过制备型 HPLC 分离所述异构体。8-(2,5-二甲氧基-苯基硫基)-9-[2-(2-氟-苯基)-乙基]-9H-嘌呤-6-基胺：产率 37 %，^{1}H NMR (DMSO-d_6) δ 8.27 (s, 1H), 7.28-7.22 (m, 1H), 7.12-7.00 (m, 4H), 6.87 (dd, J = 8.8, 3.2 Hz, 1H), 6.55 (d, J = 3.2 Hz, 1H), 4.45 (t, J = 6.8, Hz, 2H), 3.72 (s, 3H), 3.62 (s, 3H), 3.08 (t, J = 6.8, 2H); LC-MS $[M+H]^+$ 426.1。8-(2,5-二甲氧基-苯基硫基)-3-[2-(2-氟-苯基)-乙基]-3H-嘌呤-6-基胺：产率 18 %，^{1}H NMR (DMSO-d_6) δ 8.37 (s, 1H), 8.19 (bs, 2H), 7.33- 7.08 (m, 7H), 4.55 (t, J = 7.2 Hz, 2H), 3.76 (s, 3H), 3.73 (s, 3H), 3.23 (t, J = 7.2 Hz, 2H); LC-MS $[M+H]^+$ 426.1。

实施例 31 和 32



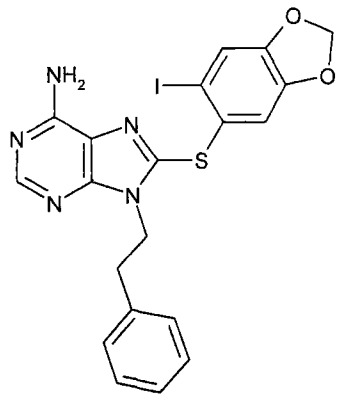


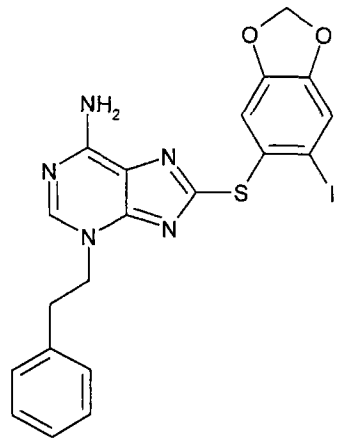
9-[2-(4-氯-苯基)-乙基]-8-(3,4,5-三甲氧基-苯基硫基)-9H-嘌呤-6-基胺和 3-[2-(4-氯-苯基)-乙基]-8-(3,4,5-三甲氧基-苯基硫基)-3H-嘌呤-6-基胺

通过类似于实施例 1 和 2 的步骤从 8-(3,4,5-三甲氧基-苯基硫基)-9H-嘌呤-6-基胺和 1-(2-溴-乙基)-4-氯-苯制备所述标题化合物。通过制备型 HPLC 分离所述异构体。9-[2-(4-氯-苯基)-乙基]-8-(3, 4, 5-三甲氧基-苯基硫基)-9H-嘌呤-6-基胺：产率 7 %，^{1}H

NMR (DMSO-d_6) δ 8.21 (s, 1H), 7.29 (br d, J = 8.8 Hz, 2H), 7.05 (br d, J = 8.8 Hz, 2H), 6.71 (s, 2H), 4.41 (t, J = 7.6 Hz, 2H), 3.71 (s, 6H), 3.63 (s, 3H), 2.99 (t, J = 7.6 Hz, 2H); LC-MS $[M+H]^+$ 472.0。3-[2-(4-氯-苯基)-乙基]-8-(3, 4, 5-三甲氧基-苯基硫基)-3H-嘌呤-6-基胺: 产率 7 %, ^{1}H NMR (DMSO-d_6) δ 8.19 (s, 1H), 7.29-7.26 (m, 2H), 7.13-7.10 (m, 4H), 4.60 (t, J = 6.8 Hz, 2H), 3.88 (s, 6H), 3.86 (s, 3H) 3.23 (t, J = 6.8 Hz, 2H); LC-MS $[M+H]^+$ 472.1。

实施例 33 和 34



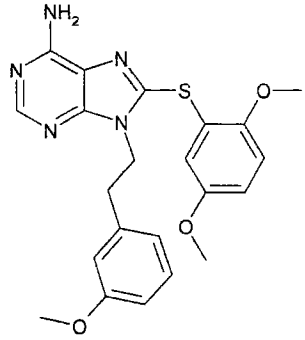


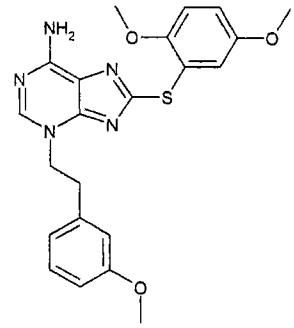
8-(-6-碘-苯并[1,3]间二氧杂环戊烯-5-基硫基)-9-苯乙基-9H-嘌呤-6-基胺和 8-(6-碘-苯并[1,3]间二氧杂环戊烯-5-基硫基)-3-苯乙基-3H-嘌呤-6-基胺

通过类似于实施例 1 和 2 的步骤从 8-(6-碘-苯并[1,3]间二氧杂环戊烯-5-基硫基)-9H-嘌呤-6-基胺和(2-溴-乙基)-苯制备所述标题化合物。通过制备型 HPLC 分离所述异构体。8-(-6-碘-苯并[1,3]间二氧杂环戊烯-5-基硫基)-9-苯乙基-9H-嘌呤-6-基胺: 产率 11 %, ^{1}H NMR (DMSO-d_6) δ 8.31 (s, 1H), 7.49 (s, 1H), 7.27-7.19 (m, 3H), 7.10-7.09 (m, 2H), 6.74 (s, 1H), 6.07 (s, 2H), 4.41 (t, J = 7.2 Hz, 2H), 3.04 (t, J = 7.2 Hz, 2 H); LC-MS $[M+H]^+$ 518.0。8-(6-碘-苯并[1,3]间二氧杂环戊烯-5-基硫基)-3-苯乙基-3H-嘌呤-6-基胺: 产率 6 %, ^{1}H NMR (CD_3OD) δ 8.06 (s, 1H), 7.56 (s, 1H), 7.38 (s, 1H), 7.29-7.18 (m, 3H), 7.11-7.08 (m, 2H), 6.13 (s, 2H), 4.59 (t, J = 7.2 Hz, 2H), 3.22 (t, J = 7.2 Hz, 2H); LC-MS

$[M+H]^+$ 518.0。

实施例 35 和 36

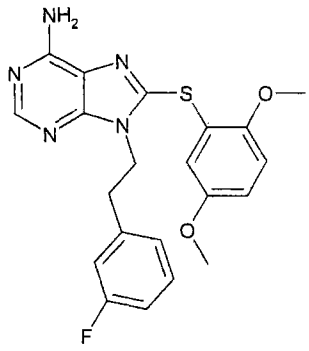


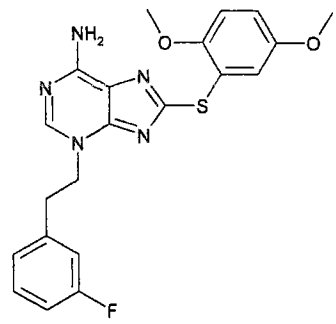


8-(2,5-二甲氧基-苯基硫基)-9-[2-(3-甲氧基-苯基)-乙基]-9H-嘌呤-6-基胺和 8-(2,5-二甲氧基-苯基硫基)-3-[2-(3-甲氧基-苯基)-乙基]-3H-嘌呤-6-基胺

通过类似于实施例 1 和 2 的步骤从 8-(2,5-二甲氧基-苯基硫基)-9H-嘌呤-6-基胺和 1-(2-溴-乙基)-3-甲氧基-苯制备所述标题化合物。通过制备型 HPLC 分离所述异构体。8-(2,5-二甲氧基-苯基硫基)-9-[2-(3-甲氧基-苯基)-乙基]-9H-嘌呤-6-基胺: 产率 27%, ^{1}H NMR (DMSO-d_6) δ 8.24 (s, 1H), 7.13 (t, *J* = 8.0 Hz, 1H), 7.01 (d, *J* = 6.8 Hz, 1H), 6.86 (dd, *J* = 8.8, 3.2 Hz, 1H), 6.75 (m, 1H), 6.60-6.51 (m, 2H), 6.50 (d, *J* = 3.2 Hz, 1H), 4.40 (t, *J* = 7.2 Hz, 2H), 3.74 (s, 3H), 3.67 (s, 3H), 3.60 (s, 3H), 2.96 (t, *J* = 7.2 Hz, 2H); LC-MS $[M+H]^+$ 438.1。8-(2,5-二甲氧基-苯基硫基)-3-[2-(3-甲氧基-苯基)-乙基]-3H-嘌呤-6-基胺: 产率 15 %, ^{1}H NMR (DMSO-d_6) δ 8.32 (bs, 1H), 7.24-7.09 (m, 4H), 6.79 (d, *J*= 8.0 Hz, 1H), 6.72 (bs, 1H), 6.67 (d, *J*= 7.6 Hz, 1H), 4.53 (t, J= 7.2 Hz, 2H), 3.77 (s, 3H), 3.71 (s, 3H), 3.70 (s, 3H), 3.15 (t, *J*= 7.2 Hz, 2H); LC-MS $[M+H]^+$ 438.1。

实施例 37 和 38

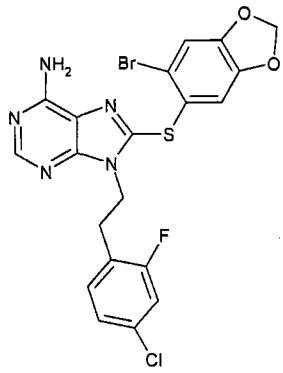


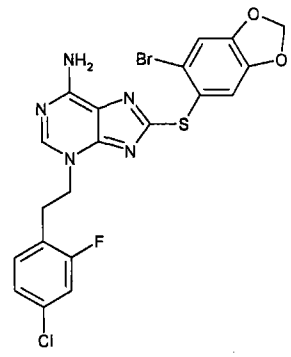


8-(2,5-二甲氧基-苯基硫基)-9-[2-(3-氟-苯基)-乙基]-9H-嘌呤-6-基胺和 8-(2,5-二甲氧基-苯基硫基)-3-[2-(3-氟-苯基)-乙基]-3H-嘌呤-6-基胺

通过类似于实施例 1 和 2 的步骤从 8-(2,5-二甲氧基-苯基硫基)-9H-嘌呤-6-基胺和 1-(2-溴-乙基)-3-氟-苯制备所述标题化合物。通过制备型 HPLC 分离所述异构体。8-(2,5-二甲氧基-苯基硫基)-9-[2-(3-氟-苯基)-乙基]-9H-嘌呤-6-基胺: 产率 19%, ^{1}H NMR (DMSO-d_6) δ 8.23 (s, 1H), 7.82 (bs, 2H), 7.24 (dd, J = 6.0, 2.0 Hz 1H), 7.03-6.97 (m, 2H), 6.90- 6.85 (m, 2H), 6.82 (d, J = 7.2 Hz, 1H), 6.51 (d, J = 2.8 Hz, 1H), 4.43 (t, J = 7.2 Hz, 2H), 3.74 (s, 3H), 3.61 (s, 3H), 3.03 (t, J = 7.2 Hz, 2H); LC-MS $[M+H]^+$ 426.1。8-(2,5-二甲氧基-苯基硫基)-3-[2-(3-氟-苯基)-乙基]-3H-嘌呤-6-基胺: 产率 9%, ^{1}H NMR (DMSO-d_6) δ 8.35 (s, 1H), 8.11 (bs, 2H), 7.31 (q, J=8.0 Hz, 1H), 7.23-7.01 (m, 5H), 6.94 (d, J = 7.2 Hz, 1H), 4.55 (t, J = 7.2 Hz, 2H), 3.77 (s, 3H), 3.72 (s, 3H), 3.20 (t, J = 7.2 Hz, 2H); LC-MS $[M+H]^+$ 426.1。

实施例 39 和 40



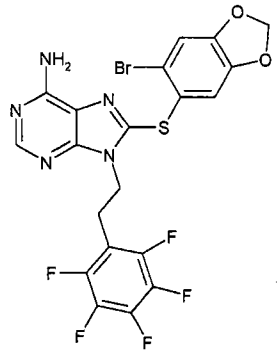


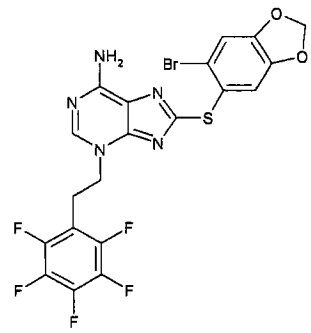
8-(6-溴-苯并[1,3]间二氧杂环戊烯-5-基硫基)-9-[2-(4 氯-2-

氟苯基)-乙基]-9H-嘌呤-6-基胺和 8-(6-溴-苯并[1,3]间二氧杂环戊烯-5-基硫基)-3-[2-(4 氯-2-氟-苯基)-乙基]-3H-嘌呤-6-基胺

通过类似于实施例 1 和 2 的步骤从 8-(6-溴-苯并[1,3]间二氧杂环戊烯-5-基硫基)-9H-嘌呤-6-基胺和 1-(2-溴-乙基)-4-氯-2-氟-苯制备所述标题化合物。通过制备型 HPLC 分离所述异构体。8-(6-溴-苯并[1,3]间二氧杂环戊烯-5-基硫基)-9-[2-(4 氯-2-氟苯基)-乙基]-9H-嘌呤-6-基胺: 产率 20%, ^{1}H NMR (DMSO-d_6) δ 8.24 (s, 1H), 7.36 (s, 1H), 7.31-7.27 (m, 1H), 7.16-7.04 (m, 2H), 6.72 (s, 1H), 6.10 (s, 2H), 4.44 (t, *J*=7.1 Hz, 2H), 3.12 (t, *J*= 7.1, Hz, 2H); LC-MS $[M+H]^+$ 523.9。8-(6-溴-苯并[1,3]间二氧杂环戊烯-5-基硫基)-3-[2-(4 氯-2-氟-苯基)-乙基]-3H-嘌呤-6-基胺: 产率 9%, ^{1}H NMR (DMSO-d_6) δ 8.37 (s, 1H), 7.49 (s, 1H), 7.39-7.30 (m, 2H), 7.22-7.19 (m, 2H), 6.18 (s, 2H), 4.58 (t, *J*=7.6 Hz, 2H), 3.22 (t, *J*=7.6 Hz, 2H); LC-MS $[M+H]^+$ 523.9。

实施例 41 和 42



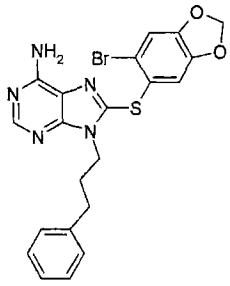


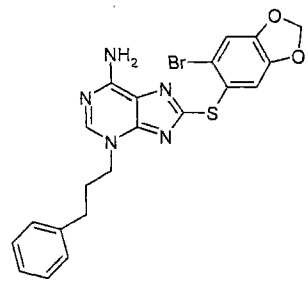
8-(6-溴-苯并[1,3]间二氧杂环戊烯-5-基硫基)-9-(2-五氟苯基-乙基)-9H-嘌呤-6-基胺和 8-(6-溴-苯并[1,3]间二氧杂环戊烯-5-基硫基)-3-(2-五氟苯基-乙基)-3H-嘌呤-6-基胺

通过类似于实施例 1 和 2 的步骤从 8-(6-溴-苯并[1,3]间二氧杂环戊烯-5-基硫基)-9H-嘌呤-6-基胺和 1-(2-溴-乙基)-2,3,4,5,6-五氟-苯制备所述标题化合物。通过制备型 HPLC 分离所述异构体。8-(6-溴-苯并[1,3]间二氧杂环戊烯-5-基硫基)-9-(2-五氟苯基-乙基)-9H-嘌呤-6-基胺: 产率 41 %, ^{1}H NMR (DMSO-d_6) δ 8.19 (s, 1H), 7.38 (s, 1H), 6.79 (s, 1H) 6.13 (s, 2H), 4.44 (t, *J*=7.4 Hz, 2H), 3.22 (t, *J*=7.4 Hz, 2H); LC-MS $[M+H]^+$ 561.9。8-(6-溴-苯

并[1,3]间二氧杂环戊烯-5-基硫基)-3-(2-五氟苯基-乙基)-3H-嘌呤-6-基胺：产率 13%，LC-MS $[M+H]^+$ 561.9。

实施例 43 和 44

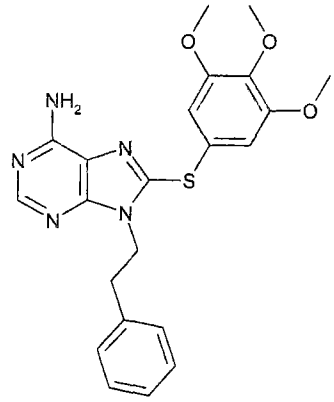


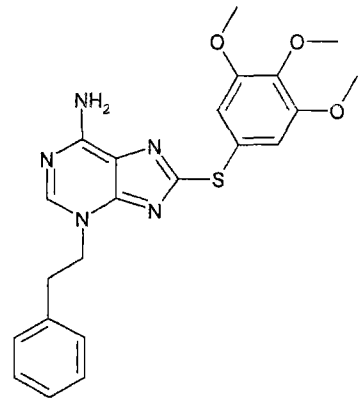


8-(6-溴-苯并[1,3]间二氧杂环戊烯-5-基硫基)-9-(3-苯基-丙基)-9H-嘌呤-6-基胺和 8-(6-溴-苯并[1,3]间二氧杂环戊烯-5-基硫基)-3-(3-苯基-丙基)-3H-嘌呤-6-基胺

通过类似于实施例 1 和 2 的步骤从 8-(6-溴-苯并[1,3]间二氧杂环戊烯-5-基硫基)-9H-嘌呤-6-基胺和(3-溴-丙基)-苯制备所述标题化合物。通过制备型 HPLC 分离所述异构体。8-(6-溴-苯并[1,3]间二氧杂环戊烯-5-基硫基)-9-(3-苯基-丙基)-9H-嘌呤-6-基胺：产率 20%，^{1}H NMR (DMSO-d_6) δ 8.32 (s, 1H), 7.40 (s, 1H), 7.28-7.23 (m, 2H), 7.19-7.13 (m, 3H), 6.92 (s, 1H), 6.92 (s, 1H) 6.10 (s, 2H). 4.23 (t, *J*= 7.2 Hz, 2H), 2.59 (t, *J*=7.2 Hz, 2H), 2.03-1.95 (m, 2H)；LC-MS $[M+H]^+$ 486.0。8-(6-溴-苯并[1,3]间二氧杂环戊烯-5-基硫基)-3-(3-苯基-丙基)-3H-嘌呤-6-基胺：产率 4%，^{1}H NMR (DMSO-d_6) δ 8.59 (s, 1H), 8.20 (s, 1H), 7.49 (s, 1H), 7.38 (s, 1H), 7.27-7.23 (m, 2H), 7.18-7.15 (m, 3H), 6.17 (s, 2H). 4.33 (t, *J*= 6.8 Hz, 2H), 2.63 (t, *J*=7.6 Hz, 2H), 2.23-2.15 (m, 2H)；LC-MS $[M+H]^+$ 486.0。

实施例 45 和 46

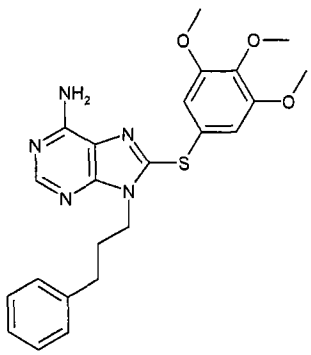


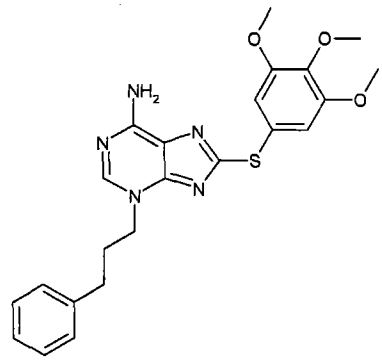


9-苯乙基-8-(3,4,5-三甲氧基-苯硫基)-9H-嘌呤-6-基胺和 3-苯乙基-8-(3,4,5-三甲氧基-苯基硫基)-3H-嘌呤-6-基胺

通过类似于实施例 1 和 2 的步骤从 8-(3,4,5-三甲氧基-苯基硫基)-9H-嘌呤-6-基胺和(2-溴-乙基)-苯制备所述标题化合物。通过制备型 HPLC 分离所述异构体。9-苯乙基-8-(3,4,5-三甲氧基-苯硫基)-9H-嘌呤-6-基胺: 产率 38 %, ^{1}H NMR (DMSO-d_6) δ 8.29 (s, 1H), 7.27-7.18 (m, 3H), 7.06-7.04 (m, 2H), 6.74 (s, 2H), 4.17 (t, *J* = 6.8 Hz, 2H), 3.71 (s, 6H), 3.64 (s, 3H), 2.97 (t, *J* = 6.8 Hz, 2H); LC-MS $[M+H]^+$ 438.1。3-苯乙基-8-(3,4,5-三甲氧基-苯基硫基)-3H-嘌呤-6-基胺: 产率 14 %, ^{1}H NMR (DMSO-d_6) δ 8.37 (s, 1H), 7.31-7.21 (m, 3H), 7.15-7.13 (m, 2H), 7.10 (s, 2H), 4.54 (t, *J* = 6.8 Hz, 2H), 3.80 (s, 6H), 3.73 (s, 3H) 3.17 (t, *J* = 6.8 Hz, 2H); LC-MS $[M+H]^+$ 438.1。

实施例 47 和 48

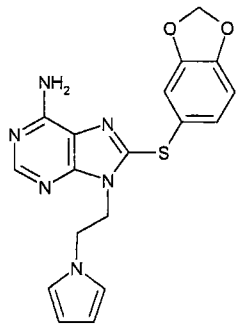


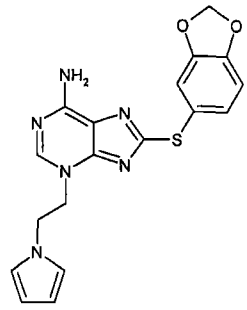


9-(3-苯基-丙基)-8-(3,4,5-三甲氧基-苯基硫基)-9H-嘌呤-6-基胺和 3-(3-苯基-丙基)-8-(3,4,5-三甲氧基-苯基硫基)-3H-嘌呤-6-基胺

通过类似于实施例 1 和 2 的步骤从 8-(3,4,5-三甲氧基-苯基硫基)-9H-嘌呤-6-基胺和(3-溴-丙基)-苯制备所述标题化合物。通过制备型 HPLC 分离所述异构体。9-(3-苯基-丙基)-8-(3,4,5-三甲氧基-苯基硫基)-9H-嘌呤-6-基胺: 产率 34 %, ^{1}H NMR (DMSO-d_6) δ 8.30 (s, 1H), 7.26-7.22 (m, 2H), 7.16 (tt, *J* = 7.6, 1.2 Hz, 1H), 7.12-7.10 (m, 2H), 6.78 (s, 2H), 4.24 (t, *J* = 7.2 Hz, 2H), 3.72 (s, 6H), 3.63 (s, 3H), 2.56 (t, *J* = 7.6 Hz, 2H), 1.94 (tt, *J* =7.6, 7.2 Hz, 2H); LC-MS $[M+H]^+$ 452.0。3-(3-苯基-丙基)-8-(3,4,5-三甲氧基-苯基硫基)-3H-嘌呤-6-基胺: 产率 13 %, ^{1}H NMR (DMSO-d_6) δ 8.61 (s, 1H), 7.27-7.23 (m, 2H), 7.18-7.15 (m, 3H), 7.06 (s, 2H), 4.35 (t, *J* = 7.2 Hz, 2H), 3.77 (s, 6H), 3.71 (s, 3H) 2.64 (t, *J* = 7.2 Hz, 2H), 2.20 (五重峰, *J* =7.2 Hz, 2H); LC-MS $[M+H]^+$ 452.0。

实施例 49 和 50



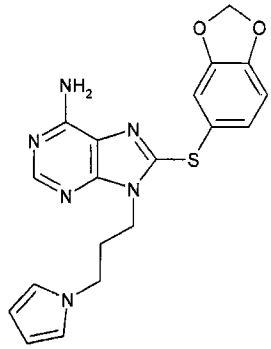


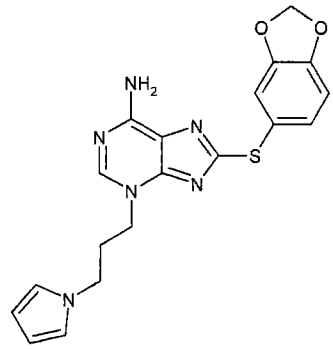
8-(苯并[1,3]间二氧杂环戊烯-5-基硫基)-9-(2-吡咯-1-基-乙基)-9H-嘌呤-6-基胺和 8-(苯并[1,3]间二氧杂环戊烯-5-基硫基)-3-(2-吡咯-1-基-乙基)-3H-嘌呤-6-基胺

通过类似于实施例 1 和 2 的步骤从 8-(苯并[1,3]间二氧杂环戊烯-5-基硫基)-9H-嘌呤-6-基胺和 1-(2-溴-乙基)-1H-吡咯制备所述标题化合物。通过制备型 HPLC 分离所述异构体。8-(苯并[1,3]间二氧杂环戊烯-5-基硫基)-9-(2-吡咯-1-基-乙基)-9H-嘌呤-6-基胺: 产率 27 %, ^{1}H NMR (CD_3OD) δ 8.24 (s, 1H), 7.09 (dd, *J* = 8.0, 1.6 Hz, 1H), 7.00 (d, *J* = 1.6 Hz, 1H), 6.90 (d, *J* = 8.0 Hz, 1H), 6.42 (t, *J* = 2.0 Hz, 2H), 6.03 (s, 2H), 5.98 (t, *J* = 2.0 Hz, 2H), 4.58-4.55 (m, 2H), 4.41-4.38 (m, 2H); LC-MS $[M+H]^+$ 381.2。

8-(苯并[1,3]间二氧杂环戊烯-5-基硫基)-3-(2-吡咯-1-基-乙基)-3H-嘌呤-6-基胺：产率 16%，^{1}H NMR (CD_3OD) δ 7.60 (s, 1H), 7.32 (dd, J = 8.0, 1.6 Hz, 1H), 7.25 (d, J = 1.6 Hz, 1H), 7.05 (d, J = 8.0 Hz, 1H), 6.49 (t, J = 2.4 Hz, 2H), 6.13 (s, 2H), 6.02 (t, J = 2.0 Hz, 2H), 4.67 (br t, J = 6.0 Hz, 2H), 4.40 (br t, J = 6.0 Hz, 2H)；LC-MS $[M+H]^+$ 381.1。

实施例 51 和 52

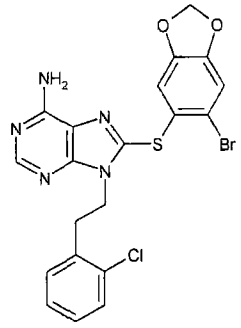


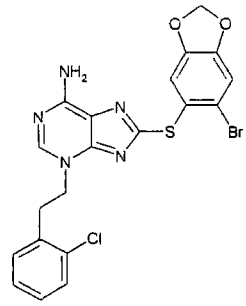


8-(苯并[1,3]间二氧杂环戊烯-5-基硫基)-9-(3-吡咯-1-基-丙基)-9H-嘌呤-6-基胺和 8-(苯并[1,3]间二氧杂环戊烯-5-基硫基)-3-(3-吡咯-1-基-丙基)-3H-嘌呤-6-基胺

通过类似于实施例 1 和 2 的步骤从 8-(苯并[1,3]间二氧杂环戊烯-5-基硫基)-9H-嘌呤-6-基胺和 1-(3-溴-丙基)-1H-吡咯制备所述标题化合物。通过制备型 HPLC 分离所述异构体。8-(苯并[1,3]间二氧杂环戊烯-5-基硫基)-9-(3-吡咯-1-基-丙基)-9H-嘌呤-6-基胺：产率 23 %，^{1}H NMR (CD_3OD) δ 8.18 (s, 1H), 7.06 (dd, J = 8.0, 1.6 Hz, 1H), 7.00 (d, J = 1.6 Hz, 1H), 6.88 (d, J = 8.0 Hz, 1H), 6.69 (t, J = 2.4 Hz, 2H), 6.04 (t, J = 2.4 Hz, 2H), 6.02 (s, 2H), 4.20 (br t, J = 7.6 Hz, 2H), 4.01 (t, J = 6.8 Hz, 2H), 2.21 (五重峰, J = 6.8 Hz, 2H)；LC-MS $[M+H]^+$ 395.1。8-(苯并[1,3]间二氧杂环戊烯-5-基硫基)-3-(3-吡咯-1-基-丙基)-3H-嘌呤-6-基胺：产率 11%，^{1}H NMR (CD_3OD) δ 8.31 (s, 1H), 7.29 (dd, J = 8.0, 2.0 Hz, 1H), 7.21 (d, J = 2.0 Hz, 1H), 7.02 (d, J = 8.0 Hz, 1H), 6.60 (t, J = 2.4 Hz, 2H), 6.11 (s, 2H), 5.96 (t, J = 2.4 Hz, 2H), 4.35 (t, J = 6.8 Hz, 2H), 4.03 (t, J = 6.8 Hz, 2H), 2.45 (五重峰, J = 6.8 Hz, 2H)；LC-MS $[M+H]^+$ 395.1。

实施例 53 和 54

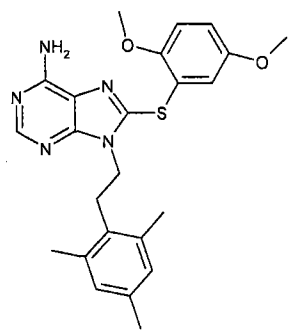


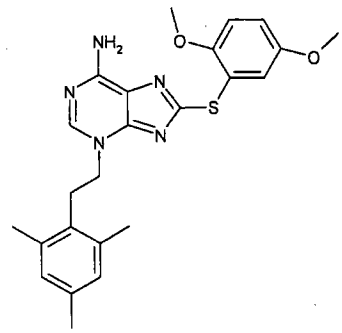


8-(6-溴-苯并[1,3]间二氧杂环戊烯-5-基硫基)-9-[2-(2-氯-苯基)-乙基]-9H-嘌呤-6-基胺和 8-(6-溴-苯并[1,3]间二氧杂环戊烯-5-基硫基)-3-[2-(2-氯-苯基)-乙基]-3H-嘌呤-6-基胺

通过类似于实施例 1 和 2 的步骤从 8-(6-溴-苯并[1,3]间二氧杂环戊烯-5-基硫基)-9H-嘌呤-6-基胺和 1-(2-溴-乙基)-2-氯-苯制备所述标题化合物。通过制备型 HPLC 分离所述异构体。8-(6-溴-苯并[1,3]间二氧杂环戊烯-5-基硫基)-9-[2-(2-氯-苯基)-乙基]-9H-嘌呤-6-基胺: 产率 32%, ^{1}H NMR (CD_3OD) δ 8.18 (s, 1H), 7.34 (br d, J = 7.2 Hz, 1H), 7.22 (br t, J = 7.2 Hz, 1H), 7.20 (s, 1H), 7.14 (br t, J = 7.2 Hz, 1H), 7.02 (br d, J = 7.2 Hz, 1H), 6.89 (s, 1H), 6.05 (s, 2H), 4.57 (t, J = 6.4 Hz, 2H), 3.35 (t, J = 6.4 Hz, 2H); LC-MS $[M+H]^+$ 506.0。8-(6-溴-苯并[1,3]间二氧杂环戊烯-5-基硫基)-3-[2-(2-氯-苯基)-乙基]-3H-嘌呤-6-基胺: 产率 16%, ^{1}H NMR (CD_3OD) δ 8.12 (s, 1H), 7.37-7.34 (m, 3H), 7.26-7.18 (m, 2H), 7.14 (m, 1H), 6.16 (s, 2H), 4.64 (t, J = 6.8 Hz, 2H), 3.38 (t, J = 6.8 Hz, 2H); LC-MS $[M+H]^+$ 506.0。

实施例 55 和 56



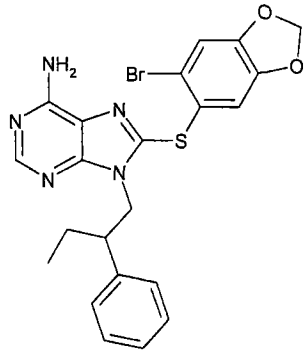


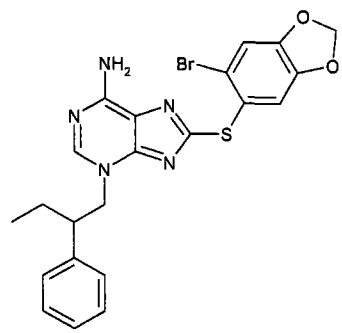
8-(2,5-二甲氧基-苯基硫基)-9-[2-(2,4,6-三甲基-苯基)-乙

基]-9H-嘌呤-6-基胺和 8-(2,5-二甲氧基-苯基硫基)-3-[2-(2,4,6-三甲基-苯基)-乙基]-3H-嘌呤-6-基胺

通过类似于实施例 1 和 2 的步骤从 8-(2,5-二甲氧基-苯基硫基)-9H-嘌呤-6-基胺和 2-(2-溴-乙基)-1,3,5-三甲基-苯制备所述标题化合物。通过制备型 HPLC 分离所述异构体。8-(2,5-二甲氧基-苯基硫基)-9-[2-(2,4,6-三甲基-苯基)-乙基]-9H-嘌呤-6-基胺：产率 18%，^{1}H NMR (DMSO-d_6) δ 8.39 (s, 1H), 7.04 (d, J = 9.0 Hz, 1H), 6.90-6.81 (m, 3H), 6.51 (s, 1H), 4.21 (t, J=8.8 Hz, 2H), 3.77 (s, 3H), 3.61 (s, 3H), 3.00-2.91 (m, 2H), 2.27 (s, 6H), 2.19 (s, 3H)；LC-MS $[M+H]^+$ 450.20。8-(2,5-二甲氧基-苯基硫基)-3-[2-(2,4,6-三甲基-苯基)-乙基]-3H-嘌呤-6-基胺：产率 6%，^{1}H NMR (DMSO-d_6) δ 8.52 (s, 1H), 7.28-7.09 (m, 3H), 6.82 (s, 2H), 4.30 (t, J=13.3 Hz, 2H), 3.78 (s, 3H), 3.76 (s, 3H), 3.10 (t, J=15.1 Hz, 2H), 2.19 (s, 9H)；LC-MS $[M+H]^+$ 450.20。

实施例 57 和 58



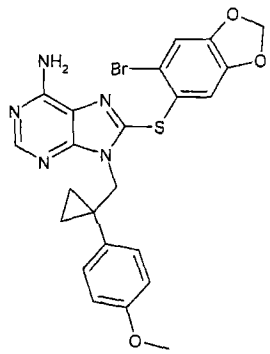


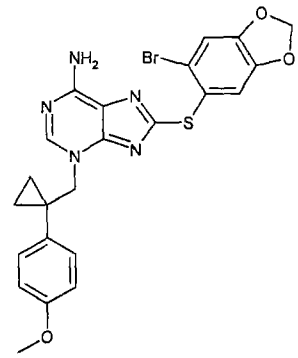
8-(6-溴-苯并[1,3]间二氧杂环戊烯-5-基硫基)-9-(2-苯基-丁基)-9H-嘌呤-6-基胺和 8-(6-溴-苯并[1,3]间二氧杂环戊烯-5-基硫基)-3-(2-苯基-丁基)-3H-嘌呤-6-基胺

通过类似于实施例 1 和 2 的步骤从 8-(6-溴-苯并[1,3]间二氧杂环戊烯-5-基硫基)-9H-嘌呤-6-基胺和(1-溴甲基-丙基)-苯制备所述标题化合物。通过制备型 HPLC 分离所述异构体。8-(6-溴-苯并[1,3]间二氧杂环戊烯-5-基硫基)-9-(2-苯基-丁基)-9H-嘌呤-6-基胺：产率 25%，^{1}H NMR (DMSO-d_6) δ 8.29 (s, 1H), 7.36 (s, 1H), 7.27-7.09 (m, 5H), 6.69 (s, 1H), 6.10 (s, 2H), 4.49-4.30 (m, 2H), 3.21-3.11 (m, 1H), 1.72-1.63 (m, 2H), 0.70 (t, J = 7.6

Hz, 3H); LC-MS $[M+H]^+$ 499.0。8-(6-溴-苯并[1,3]间二氧杂环戊烯-5-基硫基)-3-(2-苯基-丁基)-3H-嘌呤-6-基胺: 产率 8%, ^1H NMR (DMSO-d_6) δ 8.17 (s, 1H), 7.51 (s, 1H), 7.38 (s, 1H), 7.28-7.09 (m, 5H), 6.19 (s, 2H), 4.61-4.52 (m, 1H), 4.47-4.42 (m, 1H), 3.31-3.22 (m, 1H), 1.72-1.61 (m, 2H), 0.72 (t, *J* = 7.1 Hz, 3H); LC-MS $[M+H]^+$ 499.1。

实施例 59 和 60

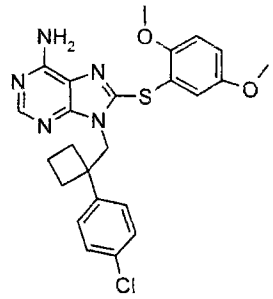


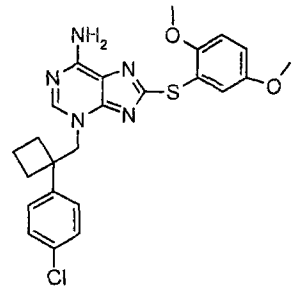


8-(6-溴-苯并[1,3]间二氧杂环戊烯-5-基硫基)-9-[1-(4-甲氧基-苯基)-环丙基甲基]-9H-嘌呤-6-基胺和 8-(6-溴-苯并[1,3]间二氧杂环戊烯-5-基硫基)-3-[1-(4-甲氧基-苯基)-环丙基甲基]-3H-嘌呤-6-基胺

通过类似于实施例 1 和 2 的步骤从 8-(6-溴-苯并[1,3]间二氧杂环戊烯-5-基硫基)-9H-嘌呤-6-基胺和 1-(1-溴甲基-环丙基)-4-甲氧基-苯制备所述标题化合物。通过制备型 HPLC 分离所述异构体。8-(6-溴-苯并[1,3]间二氧杂环戊烯-5-基硫基)-9-[1-(4-甲氧基-苯基)-环丙基甲基]-9H-嘌呤-6-基胺: 产率 30%, ^1H NMR (CD_3OD) δ 7.45 (s, 1H), 7.26 (s, 1H), 7.19 (s, 1H), 7.02 (d, *J* = 8.8 Hz, 2H), 6.78 (d, *J*= 8.9 Hz, 2H), 6.10 (s, 2H) 4.49 (s, 2H), 3.72 (s, 3H), 1.20-1.18 (m, 2H), 0.91-0.88 (m, 2H); LC-MS $[M+H]^+$ 527.0。8-(6-溴-苯并[1,3]间二氧杂环戊烯-5-基硫基)-3-[1-(4-甲氧基-苯基)-环丙基甲基]-3H-嘌呤-6-基胺: 产率 9%, ^1H NMR (CD_3OD) δ 8.16 (br s, 1H), 7.16 (s, 1H), 7.02 (d, *J* = 8.8 Hz, 2H), 6.81 (s, 1H), 6.76 (d, *J*= 8.8 Hz, 2H), 6.04 (s, 2H), 4.40 (s, 2H), 3.72 (s, 3H), 1.31-1.26 (m, 2H), 0.89-0.82 (m, 2H); LC-MS $[M+H]^+$ 527.0。

实施例 61 和 62

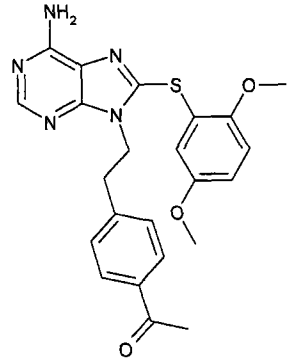


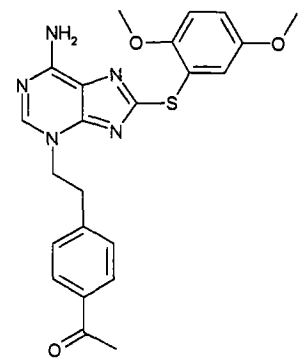


9-[1-(4-氯-苯基)-环丁基甲基]-8-(2,5-二甲氧基-苯基硫基)-9H-嘌呤-6-基胺和 3-[1-(4-氯-苯基)-环丁基甲基]-8-(2,5-二甲氧基-苯基硫基)-3H-嘌呤-6-基胺

通过类似于实施例 1 和 2 的步骤从 8-(2,5-二甲氧基-苯基硫基)-9H-嘌呤-6-基胺和 1-(1-溴甲基-环丁基)-4-氯-苯制备所述标题化合物。通过制备型 HPLC 分离所述异构体。9-[1-(4-氯-苯基)-环丁基甲基]-8-(2,5-二甲氧基-苯基硫基)-9H-嘌呤-6-基胺: 产率 10%, ^{1}H NMR (DMSO-d_6) δ 8.28 (s, 1H), 7.32-7.28 (m, 2H), 6.97-6.91 (m, 3H), 6.85-6.81 (m, 1H), 6.52 (d, *J*=3.0 Hz, 1H), 4.59 (s, 2H) 3.62 (s, 3H), 3.61 (s, 3H), 2.68-2.60 (m, 2H), 2.31-2.21 (m, 2H), 2.17-2.08 (m, 1H), 1.83-1.75 (m, 1H); LC-MS $[M+H]^+$ 482.10。3-[1-(4-氯-苯基)-环丁基甲基]-8-(2,5-二甲氧基-苯基硫基)-3H-嘌呤-6-基胺: 产率 4%, ^{1}H NMR (DMSO-d_6) δ 8.19 (s, 1H), 7.35-7.29 (m, 2H), 7.22-7.05 (m, 3H), 6.98-6.95 (m, 2H), 4.66 (s, 2H) 3.78 (s, 3H), 3.76 (s, 3H), 2.52-2.41 (m, 2H), 2.32-2.21 (m, 2H), 2.07-1.99 (m, 1H), 1.81-1.70 (m, 1H); LC-MS $[M+H]^+$ 482.10。

实施例 63 和 64

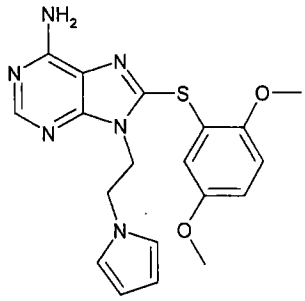


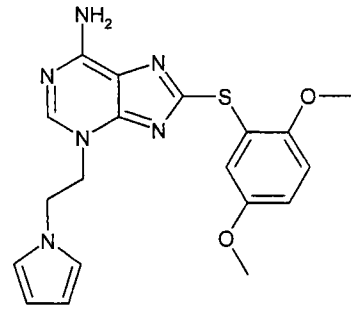


1-(4-{2-[6-氨基-8-(2,5-二甲氧基-苯基硫基)-嘌呤-9-基]-乙基}-苯基)-乙酮和 1-(4-{2-[6-氨基-8-(2,5-二甲氧基-苯基硫基)-嘌呤-3-基]-乙基}-苯基)-乙酮

通过类似于实施例 1 和 2 的步骤从 8-(2,5-二甲氧基-苯基硫基)-9H-嘌呤-6-基胺和 1-[4-(2-氯-乙基)-苯基]-乙酮制备所述标题化合物。通过制备型 HPLC 分离所述异构体。1-(4-{2-[6-氨基-8-(2,5-二甲氧基-苯基硫基)-嘌呤-9-基]-乙基}-苯基)-乙酮:产率 26 %, ^{1}H NMR (DMSO-d_6) δ 8.29 (s, 1H), 7.78 (d, J= 8.4Hz, 2H), 7.17 (d, J= 8.0, 2H), 7.01 (d, *J*= 8.8 Hz, 1H), 6.86 (dd, *J*= 9.2, 2.8 Hz, 1H), 6.49 (d, *J*= 3.2 Hz, 1H), 4.50 (t, *J*= 7.2 Hz, 2H), 3.74 (s, 3H), 3.60 (s, 3H), 3.12 (t, *J*= 7.2 Hz, 2H), 2.52(s, 3H); TOF LC- MS $[M+H]^+$ 450.16。1-(4-{2-[6-氨基-8-(2,5-二甲氧基-苯基硫基)-嘌呤-3-基]-乙基}-苯基)-乙酮: 产率 11 %, ^{1}H NMR (DMSO-d_6) δ 8.37 (bs, 1H), 8.14 (bs, 2H), 7.88 (d, *J*= 8.4 Hz, 2H), 7.30 (d, *J*= 8.4 Hz, 2H), 7.26-7.06 (m, 3H), 4.57 (t, *J*= 6.8 Hz, 2H), 3.77 (s, 3H), 3.72 (s, 3H), 3.27 (t, *J*= 7.2 Hz, 2H), 2.56 (s, 3H); TOF LC-MS $[M+H]^+$ 450.16。

实施例 65 和 66



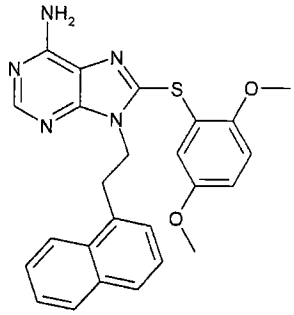


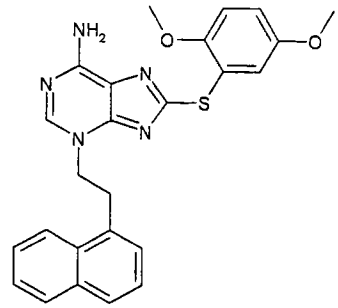
8-(2,5-二甲氧基-苯基硫基)-9-(2-吡咯-1-基-乙基)-9H-嘌呤-6-基胺和 8-(2,5-二甲氧基-苯基硫基)-3-(2-吡咯-1-基-乙基)-3H-嘌呤-6-基胺

通过类似于实施例 1 和 2 的步骤从 8-(2,5-二甲氧基-苯基硫基)-9H-嘌呤-6-基胺和 1-(2-溴-乙基)-1H-吡咯制备所述标题化合物。通过制备型 HPLC 分离所述异构体。8-(2,5-二甲氧基-苯基硫基)-9-(2-吡咯-1-基-乙基)-9H-嘌呤-6-基胺: 产率 26%, ^{1}H NMR (DMSO-d_6) δ 8.29 (s, 1H), 7.01 (d, *J*= 9.2 Hz, 1H), 6.88 (dd,

J= 9.2, 3.2Hz, 1H), 6.55 (d, *J*=2.8 Hz, 1H), 6.43 (t, *J*=2.0 Hz, 2H), 5.90 (t, *J*= 2.0 Hz, 2H), 4.52 (t, J= 6.4 Hz, 2H), 4.29 (t, *J*= 6.4 Hz, 2H), 3.71 (s, 3H), 3.62 (s, 3H); TOF LC-MS $[M+H]^+$ 397.14。8-(2,5-二甲氧基-苯基硫基)-3-(2-吡咯-1-基-乙基)-3H-嘌呤-6-基胺: 产率 16 %, ^{1}H NMR (DMSO-d_6) δ 8.16 (bs, 1H), 7.81 (bs, 1H), 7.24-7.02 (m, 3H), 6.56 (m, 2H), 5.95 (m, 2H), 4.62 (m, 2H), 4.46-4.34 (m, 2H), 3.77 (s, 3H), 3.73 (s, 3H); TOF LC-MS $[M+H]^+$ 397.14。

实施例 67 和 68



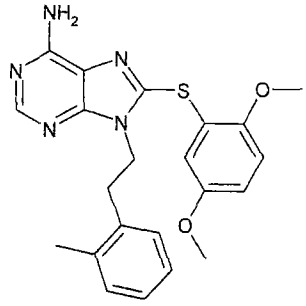


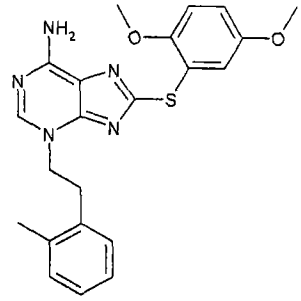
8-(2,5-二甲氧基-苯基硫基)-9-(2-萘-1-基-乙基)-9H-嘌呤-6-基胺和 8-(2,5-二甲氧基-苯基硫基)-3-(2-萘-1-基-乙基)-3H-嘌呤-6-基胺

通过类似于实施例 1 和 2 的步骤从 8-(2,5-二甲氧基-苯基硫基)-9H-嘌呤-6-基胺和 1-(2-溴-乙基)-萘制备所述标题化合物。通过制备型 HPLC 分离所述异构体。8-(2,5-二甲氧基-苯基硫基)-9-(2-萘-1-基-乙基)-9H-嘌呤-6-基胺: 产率 28 %, ^{1}H NMR (DMSO-d_6) δ 8.33 (s, 1H), 8.13-8.10 (m, 1H), 7.94-7.92 (m, 1H), 7.81 (d, *J*= 8.4 Hz, 1H), 7.56-7.52 (m, 2H), 7.37 (t, *J*= 7.2 Hz, 1H), 7.14 (d, *J*= 6.0 Hz, 1H), 7.02 (d, *J*= 8.8 Hz, 1H), 6.86 (dd, *J*= 9.2, 2.8 Hz, 1H), 6.50 (d, *J*= 3.2 Hz, 1H), 4.50 (t, *J*= 6.4 Hz, 2H), 3.72 (s, 3H), 3.60 (s, 3H), 3.45 (t, *J*= 7.2 Hz, 2H); TOF LC-MS $[M+H]^+$ 458.1。8-(2,5-二甲氧基-苯基硫基)-3-(2-萘-1-基-乙基)-3H-嘌呤-6-基胺: 产率 14 %, ^{1}H NMR (DMSO-d_6) δ 8.19 (d, *J*= 8.4 Hz, 1H), 8.11 (bs, 1H), 7.95 (d, *J*= 8.0 Hz, 1H), 7.85 (d, *J*=8.0 Hz, 1H), 7.58-7.40 (m, 3H), 7.32-7.26 (m, 2H), 7.17

(bs, 1H), 7.09 (bs, 1H), 4.60 (t, *J*= 7.2 Hz, 2H), 3.78 (s, 3H), 3.72 (s, 3H), 3.64 (t, *J*= 7.2 Hz, 2H); TOF LC-MS $[M+H]^+$ 458.1。

实施例 69 和 70

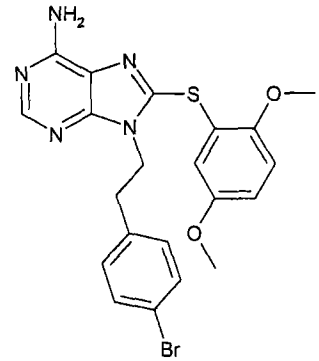


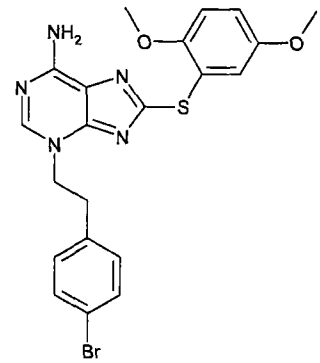


8-(2,5-二甲氧基-苯基硫基)-9-(2-邻甲苯基-乙基)-9H-嘌呤-6-基胺和 8-(2,5-二甲氧基-苯基硫基)-3-(2-邻甲苯基-乙基)-3H-嘌呤-6-基胺

通过类似于实施例 1 和 2 的步骤从 8-(2,5-二甲氧基-苯基硫基)-9H-嘌呤-6-基胺和 1-(2-溴-乙基)-2-甲基-苯制备所述标题化合物。通过制备型 HPLC 分离所述异构体。8-(2,5-二甲氧基-苯基硫基)-9-(2-邻甲苯基-乙基)-9H-嘌呤-6-基胺: 产率 23 %, ^{1}H NMR (DMSO-d_6) δ 8.31 (bs, 1H), 7.18- 7.00 (m, 4H), 6.90-6.84 (m, 2H), 6.56 (bs, 1H), 4.36 (t, *J*= 7.2 Hz, 2H), 3.74 (s, 3H), 3.61 (s, 3H), 2.98 (t, *J*= 7.2 Hz, 2H), 2.26 (s, 3H); TOF LC-MS $[M+H]^+$ 422.1。8-(2,5-二甲氧基-苯基硫基)-3-(2-邻甲苯基-乙基)-3H-嘌呤-6-基胺: 产率 15 %, ^{1}H NMR (DMSO-d_6) δ 8.15 (bs, 1H), 7.24 (bs, 1H), 7.20-7.06 (m, 5H), 6.99 (d, *J*= 7.6 Hz, 1H), 4.46 (t, *J*= 7.2 Hz, 2H), 3.76 (s, 3H), 3.72 (s, 3H), 3.16 (t, *J*= 7.2 Hz, 2H), 2.32 (s, 3H); TOF LC-MS $[M+H]^+$ 422.1。

实施例 71 和 72

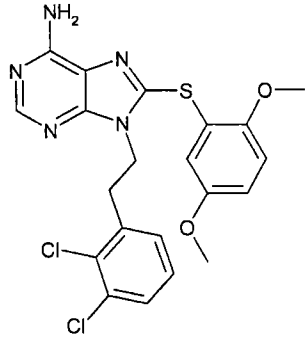


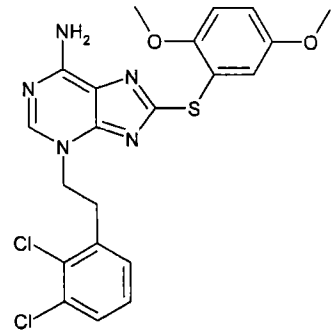


9-[2-(4-溴-苯基)-乙基]-8-(2,5-二甲氧基-苯基硫基)-9H-嘌呤-6-基胺和 3-[2-(4-溴-苯基)-乙基]-8-(2,5-二甲氧基-苯基硫基)-3H-嘌呤-6-基胺

通过类似于实施例 1 和 2 的步骤从 8-(2,5-二甲氧基-苯基硫基)-9H-嘌呤-6-基胺和 1-(2-溴-乙基)-4-溴-苯制备所述标题化合物。通过制备型 HPLC 分离所述异构体。9-[2-(4-溴-苯基)-乙基]-8-(2,5-二甲氧基-苯基硫基)-9H-嘌呤-6-基胺：产率 27 %，^{1}H NMR (DMSO-d_6) δ 8.24 (bs, 1H), 7.40 (dd, *J*= 6.8, 2.0 Hz, 2H), 7.02 (d, *J*= 8.8 Hz, 1H), 6.98 (dd, *J*= 6.4, 2.0 Hz, 2H), 6.87 (dd, *J*= 8.8, 2.8 Hz, 1H), 6.50 (d, *J*= 2.8 Hz, 1H), 4.41 (t, *J*= 7.2 Hz, 2H), 3.74 (s, 3H), 3.61 (s, 3H), 2.98 (t, *J*= 7.2 Hz, 2H)；TOF LC-MS $[M+H]^+$ 488.05。 3-[2-(4-溴-苯基)-乙基]-8-(2,5-二甲氧基-苯基硫基)-3H-嘌呤-6-基胺：产率 13 %，^{1}H NMR (DMSO-d_6) δ 8.15 (bs, 1H), 7.51-7.44 (m, 2H), 7.24 (bs, 1H), 7.18 (d, *J*= 8.4 Hz, 1H), 7.14-7.09 (m, 3H), 4.53 (t, *J*= 6.8 Hz, 2H), 3.76 (s, 3H), 3.73 (s, 3H), 3.16 (t, *J*= 6.8 Hz, 2H)；TOF LC-MS $[M+H]^+$ 488.05。

实施例 73 和 74



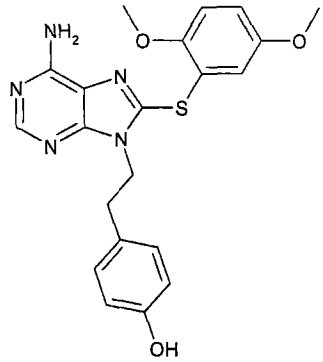


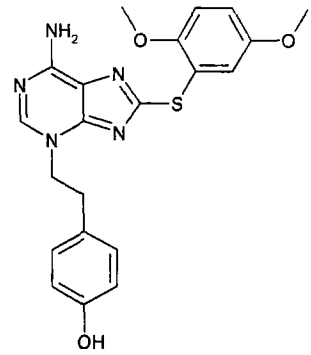
9-[2-(2,3-二氯-苯基)-乙基]-8-(2,5-二甲氧基-苯基硫基)-9H-嘌呤-6-基胺和 3-[2-(2,3-二氯-苯基)-乙基]-8-(2,5-二甲氧基-苯基硫基)-3H-嘌呤-6-基胺

通过类似于实施例 1 和 2 的步骤从 8-(2,5-二甲氧基-苯基硫基)-9H-嘌呤-6-基胺和 1-(2-溴-乙基)-2,3-二氯-苯制备所述标题化合物。通过制备型 HPLC 分离所述异构体。9-[2-(2,3-二氯-苯基)-乙基]-8-(2,5-二甲氧基-苯基硫基)-9H-嘌呤-6-基胺：产率 14 %，^{1}H

NMR (DMSO-d_6) δ 8.23 (s, 1H), 7.46 (dd, *J*= 8.0, 1.6 Hz, 1H), 7.16 (t, *J*= 8.0 Hz, 1H), 7.0 (d, *J*= 9.4 Hz, 1H), 6.95 (dd, *J*= 7.6, 1.6 Hz, 1H), 6.85 (dd, *J*= 8.8, 3.2 Hz, 1H), 6.45 (d, *J*= 2.8 Hz, 1H), 4.48 (t, *J*= 7.2 Hz, 2H), 3.74 (s, 3H), 3.60 (s, 3H), 3.22 (t, *J*= 7.2 Hz, 2H); TOF LC-MS $[M+H]^+$ 476.0。3-[2-(2,3-二氯-苯基)-乙基]-8-(2,5-二甲氧基-苯基硫基)-3H-嘌呤-6-基胺: 产率 10%, ^{1}H NMR (DMSO-d_6) δ 8.09 (bs, 2H), 7.50 (d, *J*= 7.2Hz, 1H), 7.31-7.24 (m, 1H), 7.22-7.10 (m, 3H), 4.60-4.52 (m, 2H), 3.76 (s, 3H), 3.71 (s, 3H), 3.40-3.30 (m, 2H); TOF LC-MS $[M+H]^+$ 476.0。

实施例 75 和 76



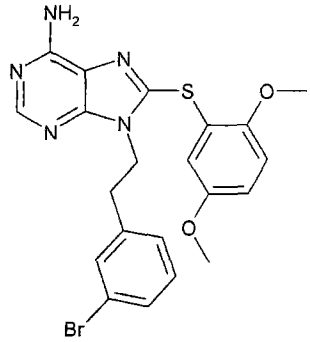


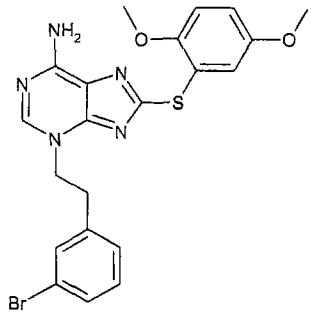
4-{2-[6-氨基-8-(2,5-二甲氧基-苯基硫基)-嘌呤-9-基]-乙基}-苯酚和 4-{2-[6-氨基-8-(2,5-二甲氧基-苯基硫基)-嘌呤-9-基]-乙基}-苯酚

通过类似于实施例 1 和 2 的步骤从 8-(2,5-二甲氧基-苯基硫基)-9H-嘌呤-6-基胺和 4-(2-溴-乙基)-苯酚制备所述标题化合物。4-{2-[6-氨基-8-(2,5-二甲氧基-苯基硫基)-嘌呤-9-基]-乙基}-苯酚: 产率 15%, ^{1}H NMR (DMSO-d_6) δ 9.24 (s, 1H), 8.19 (s, 1H), 7.53 (bs, 2H), 7.02 (d, *J*= 9.2 Hz, 1H), 6.85 (dd, *J*= 8.0, 2.8 Hz, 2H), 6.81 (d, *J*= 8.4 Hz, 2H), 6.62 (d, *J*= 8.4 Hz, 1H), 6.46 (d, *J*= 2.8 Hz, 1H), 4.30 (t, *J*= 7.6 Hz, 2H), 3.74 (s, 3H), 3.60 (s, 3H), 2.85 (t, *J*= 7.6 Hz, 2H); LC-MS $[M+H]^+$ 424.1。4-{2-[6-氨基-8-(2,5-二甲氧基-苯基硫基)-嘌呤-9-基]-乙基}-苯酚: 产率 7%, ^{1}H NMR (DMSO-d_6) δ 9.31 (bs, 1H), 8.28 (bs, 1H), 7.3-7.0 (m, 3H), 6.90 (d, *J*= 8.8 Hz, 2H), 6.66-6.59 (m, 2H), 4.46 (t,

J= 7.2 Hz, 2H), 3.76 (s, 3H), 3.72 (s, 3H), 3.04 (t, *J*= 7.2 Hz, 2H); LC-MS $[M+H]^+$ 424.1。

实施例 77 和 78

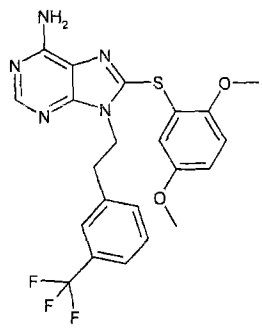


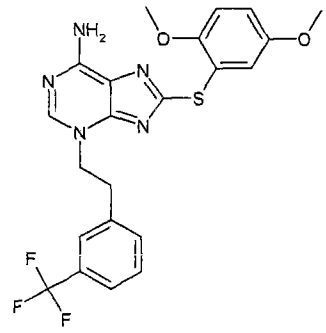


9-[2-(3-溴-苯基)-乙基]-8-(2,5-二甲氧基-苯基硫基)-9H-嘌呤-6-基胺和 3-[2-(3-溴-苯基)-乙基]-8-(2,5-二甲氧基-苯基硫基)-3H-嘌呤-6-基胺

通过类似于实施例 1 和 2 的步骤从 8-(2,5-二甲氧基-苯基硫基)-9H-嘌呤-6-基胺和 1-(2-溴-乙基)-3-溴-苯制备所述标题化合物。通过制备型 HPLC 分离所述异构体。9-[2-(3-溴-苯基)-乙基]-8-(2,5-二甲氧基-苯基硫基)-9H-嘌呤-6-基胺: 产率 24 %, ^{1}H NMR (DMSO-d_6) δ 8.24 (s, 1H), 7.89 (bs, 2H), 7.37 (dd, *J*= 8.0, 0.8Hz, 1H), 7.24 (bs, 1H), 7.17 (t, *J*= 8.0 Hz, 1H), 7.04-6.98 (m, 2H), 6.88 (dd, *J*= 8.8, 3.2 Hz, 1H), 6.53 (d, *J*= 3.2 Hz, 1H), 4.41 (t, *J*= 7.2 Hz, 2H), 3.75 (s, 3H), 3.62 (s, 3H), 3.00 (t, *J*= 7.2 Hz, 2H); LC-MS $[M+H]^+$ 486.1。3-[2-(3-溴-苯基)-乙基]-8-(2,5-二甲氧基-苯基硫基)-3H-嘌呤-6-基胺: 产率 13%, ^{1}H NMR (DMSO-d_6) δ 8.39 (bs, 1H), 8.15 (bs, 2H), 7.45-7.43 (m, 2H), 7.29-7.12 (m, 2H), 7.19-7.09 (m, 3H), 4.54 (t, *J*= 7.2 Hz, 2H), 3.77 (s, 3H), 3.72 (s, 3H), 3.18 (t, *J*= 7.2 Hz, 2H); LC-MS $[M+H]^+$ 486.1。

实施例 79 和 80

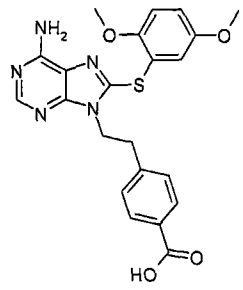


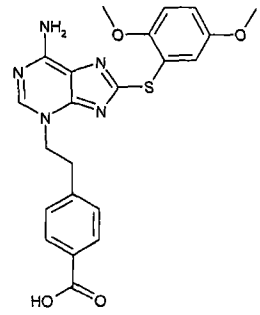


8-(2,5-二甲氧基-苯基硫基)-9-[2-(3-三氟甲基-苯基)-乙基]-9H-嘌呤-6-基胺和 8-(2,5-二甲氧基-苯基硫基)-3-[2-(3-三氟甲基-苯基)-乙基]-3H-嘌呤-6-基胺

通过类似于实施例 1 和 2 的步骤从 8-(2,5-二甲氧基-苯基硫基)-9H-嘌呤-6-基胺和 1-(2-氯-乙基)-3-三氟甲基-苯制备所述标题化合物。通过制备型 HPLC 分离所述异构体。8-(2,5-二甲氧基-苯基硫基)-9-[2-(3-三氟甲基-苯基)-乙基]-9H-嘌呤-6-基胺: 产率 10 %, ^{1}H NMR (DMSO-d_6) δ 8.16 (s, 1H), 7.59 (bs, 2H), 7.52 (d, *J*= 8.0 Hz, 1H), 7.43 (t, *J*= 8.0 Hz, 1H), 7.34 (s, 1H), 7.28 (d, *J*= 8.0 Hz, 1H), 7.01 (d, *J*= 9.2 Hz, 1H), 6.85 (d, *J*= 6.0 Hz, 1H), 6.46 (bs, 1H), 4.44 (t, *J*= 6.8 Hz, 2H), 3.74 (s, 3H), 3.60 (s, 3H), 3.12 (t, *J*= 6.8 Hz, 2H); LC-MS $[M+H]^+$ 476.1。8-(2,5-二甲氧基-苯基硫基)-3-[2-(3-三氟甲基-苯基)-乙基]-3H-嘌呤-6-基胺: 产率 5 %, ^{1}H NMR (DMSO-d_6) δ 8.38 (bs, 1H), 8.12 (bs, 1H), 7.64-7.42 (m, 3H), 7.26-7.02 (m, 3H), 4.58 (m, 2H), 3.76 (s, 3H), 3.71 (s, 3H), 3.29 (m, 2H); LC-MS $[M+H]^+$ 476.1。

实施例 81 和 82



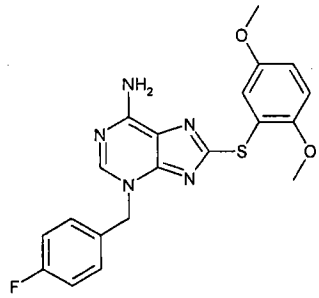


4-{2-[6-氨基-8-(2,5-二甲氧基-苯基硫基)-嘌呤-9-基]-乙基}-苯甲酸和 4-{2-[6-氨基-8-(2,5-二甲氧基-苯基硫基)-嘌呤-3-基]-乙基}-苯甲酸

通过类似于实施例 1 和 2 的步骤从 8-(2,5-二甲氧基-苯基硫基)-9H-嘌呤-6-基胺和 4-(2-氯-乙基)-苯甲酸制备所述标题化合物。通过制备型 HPLC 分离所述异构体。^{1}H NMR (丙酮-d_6) δ 8.27 (s, 1H), 7.91 (d, *J*= 8.0 Hz, 2H), 7.24 (d, *J*= 8.0 Hz, 2H), 7.00 (d, *J*= 8.8Hz, 1H), 6.86 (dd, *J*= 8.8, 3.2 Hz, 1H), 6.69 (d, *J*= 3.2 Hz, 1H), 4.55 (t, *J*= 7.6 Hz, 2H), 3.81 (s, 3H), 3.67 (s, 3H), 3.21 (t, *J*= 7.6 Hz, 2H); TOF LC-MS $[M+H]^+$ 452.14。

4-{2-[6-氨基-8-(2,5-二甲氧基-苯基硫基)-嘌呤-3-基]-乙基}-苯甲酸: 产率 11 %, ^{1}H NMR (CD_3OD) δ 8.19 (s, 1H), 7.93(d, *J* = 7.2 Hz, 2H), 7.29 (s, 1H), 7.24 (d, *J* = 7.6 Hz, 2H), 7.19 (s, 2H), 4.64 (t, *J* = 8.0 Hz, 2H), 3.81 (s, 6H), 3.36 -3.28 (m, 2H); LC-MS $[M+H]^+$ 452.1。

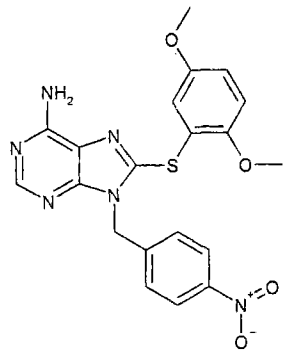
实施例 83



8-(2,5-二甲氧基-苯基硫基)-3-(4-氟-苄基)-3H-嘌呤-6-基胺

通过类似于实施例 1 和 2 的步骤从 8-(2,5-二甲氧基-苯基硫基)-9H-嘌呤-6-基胺和 1-溴甲基-4-氟-苯制备所述标题化合物。通过制备型 HPLC 纯化所述化合物。8-(2,5-二甲氧基-苯基硫基)-3-(4-氟-苄基)-3H-嘌呤-6-基胺: 产率 34%, ^{1}H NMR (DMSO-d_6) δ 8.55 (s, 1H), 8.1 (bs, 2H), 7.51 (m, 2H), 7.15 (m, 2H), 6.97 (m, 2H), 6.76 (dd, *J* = 8.8, 2.8 Hz, 1H), 5.44 (s, 2H), 3.74 (s, 3H), 3.50 (s, 3H); LC-MS $[M+H]^+$ 412.1。

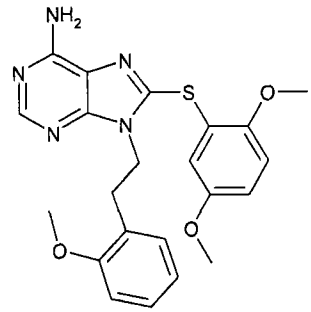
实施例 84

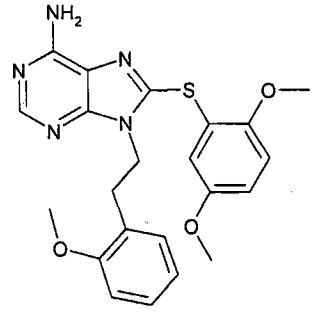


8-(2,5-二甲氧基-苯基硫基)-9-(4-硝基-苄基)-9H-嘌呤-6-基胺

通过类似于实施例 1 和 2 的步骤从 8-(2,5-二甲氧基-苯基硫基)-9H-嘌呤-6-基胺和 1-溴甲基-4-硝基-苯制备所述标题化合物。通过制备型 HPLC 纯化所述化合物。8-(2,5-二甲氧基-苯基硫基)-9-(4-硝基-苄基)-9H-嘌呤-6-基胺: 产率 10%, ^{1}H NMR (DMSO-d_6) δ 8.20 (s, 1H), 8.04 (d, *J* = 6.8 Hz, 2H), 7.57 (bs, 2H), 7.30 (d, 6.8 Hz, 2H), 6.88 (d, J = 8.4 Hz, 1H), 6.70 (dd, *J* = 9.2, 3.2 Hz, 1H), 6.25 (d, *J* = 2.8 Hz, 1H), 5.52 (s, 2H), 3.71 (s, 3H), 3.52 (s, 3H); LC-MS $[M+H]^+$ 439.1。

实施例 85 和 86



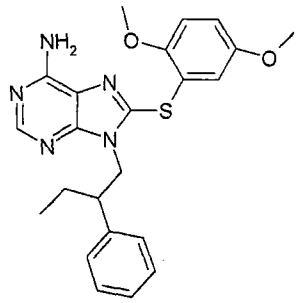


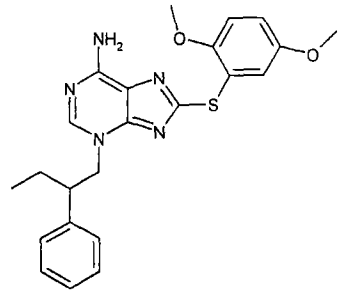
8-(2,5-二甲氧基-苯基硫基)-9-[2-(2-甲氧基-苯基)-乙基]-9H-嘌呤-6-基胺和 8-(2,5-二甲氧基-苯基硫基)-3-[2-(2-甲氧基-苯基)-乙基]-3H-嘌呤-6-基胺

通过类似于实施例 1 和 2 的步骤从 8-(2,5-二甲氧基-苯基硫基)-9H-嘌呤-6-基胺和 1-(2-溴-乙基)-3-甲氧基-苯制备所述标题化合物。通过制备型 HPLC 分离所述异构体。8-(2,5-二甲氧基-苯基硫基)-9-[2-(2-甲氧基-苯基)-乙基]-9H-嘌呤-6-基胺: 产率 27 %, ^{1}H NMR (DMSO-d_6) δ 8.26 (s, 1H), 7.19-7.15 (m, 1H), 7.00 (d, *J*

= 8.8 Hz, 1H), 6.89-6.73 (m, 4H), 6.47 (d, *J* = 2.4 Hz, 1H), 4.42 (t, *J* = 7.2 Hz, 2H), 3.73 (s, 3H), 3.67 (s, 3H), 3.61 (s, 3H), 3.01 (t, *J* = 7.2 Hz, 2H); LC-MS $[M+H]^+$ 438.1。8-(2,5-二甲氧基-苯基硫基)-3-[2-(2-甲氧基-苯基)-乙基]-3H-嘌呤-6-基胺: 产率 11 %, ^{1}H NMR (DMSO-d_6) δ 8.20 (bs, 1H), 7.26-7.16 (m, 3H), 7.15-7.08 (m, 1H), 6.98 (dd, *J* = 7.2, 1.6 Hz, 1H), 6.91 (d, *J* = 7.2 Hz, 1H), 6.83 (t, *J* = 7.2 Hz, 1H), 4.51 (t, *J* = 6.8 Hz, 2H), 3.76 (s, 3H), 3.70 (s, 3H), 3.58 (s, 3H), 3.13 (t, *J* = 6.8 Hz, 2H); LC-MS $[M+H]^+$ 438.1。

实施例 87 和 88

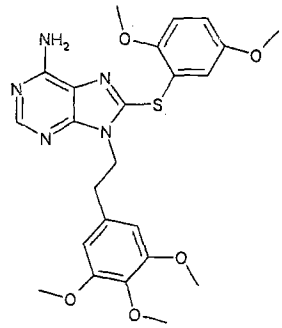


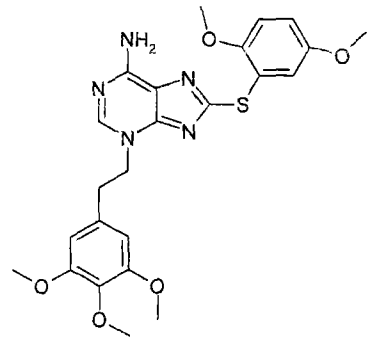


8-(2,5-二甲氧基-苯基硫基)-9-(2-苯基-丁基)-9H-嘌呤-6-基胺和 8-(2,5-二甲氧基-苯基硫基)-3-(2-苯基)-丁基)-3H-嘌呤-6-基胺

通过类似于实施例 1 和 2 的步骤从 8-(2,5-二甲氧基-苯基硫基)-9H-嘌呤-6-基胺和(1-溴甲基-丙基)-苯制备所述标题化合物。通过制备型 HPLC 分离所述异构体。8-(2,5-二甲氧基-苯基硫基)-9-(2-苯基-丁基)-9H-嘌呤-6-基胺: ^{1}H NMR (DMSO-d_6) δ 8.28 (s, 1H), 7.26-7.18 (m, 3H), 7.08-7.01 (m, 3H), 6.88 (dd, *J* = 3.2, 9.0 Hz, 1H), 6.50 (d, *J*, = 2.9Hz, 1H), 4.45-4.29 (m, 2H), 3.74 (s, 3H), 3.60 (s, 3H), 3.15-3.05 (m, 1H), 1.71-1.59 (m, 2H), 0.65 (t, *J* = 7.3 Hz, 3H); LC-MS $[M+H]^+$) 436.1。8-(2,5-二甲氧基-苯基硫基)-3-(2-苯基)-丁基)-3H-嘌呤-6-基胺: 产率 31%, ^{1}H NMR (DMSO-d_6) δ 8.20 (s, 1H), 7.31-7.08 (m, 8H), 4.63-4.51 (m, 1H), 4.48-4.39 (m, 1H), 3.79 (s, 3H), 3.77 (s, 3H), 3.29-3.20 (m, 1H), 1.75-1.61 (m, 2H), 0.73 (t, *J* = 7.0 Hz, 3H); LC-MS $[M+H]^+$ 436.1。

实施例 89 和 90

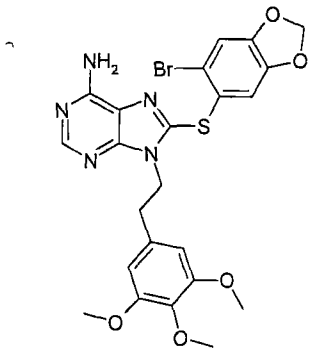


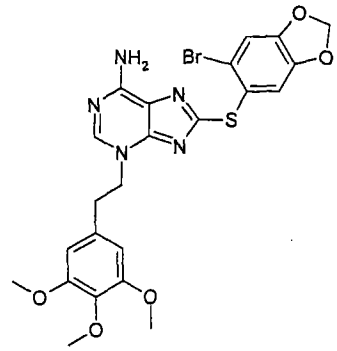


8-(2,5-二甲氧基-苯基硫基)-9-[2-(3,4,5-三甲氧基-苯基)-乙基]-9H-嘌呤-6-基胺和 8-(2,5-二甲氧基-苯基硫基)-3-[2-(3,4,5-三甲氧基-苯基)-乙基]-3H-嘌呤-6-基胺

通过类似于实施例 1 和 2 的步骤从 8-(2,5-二甲氧基-苯基硫基)-9H-嘌呤-6-基胺和 5-(2-溴-乙基)-1,2,3-三甲氧基-苯制备所述标题化合物。通过制备型 HPLC 分离所述异构体。8-(2,5-二甲氧基-苯基硫基)-9-[2-(3,4,5-三甲氧基-苯基)-乙基]-9H-嘌呤-6-基胺: 产率 22%, ^{1}H NMR (DMSO-d_6) δ 8.30 (s, 1H), 7.04 (d, J = 9.0 Hz, 1H), 6.88 (dd, J = 9.0, 3.0 Hz, 1H), 6.58 (d, J = 2.9 Hz, 1H), 6.26 (s, 2H), 4.42 (t, J=6.9 Hz, 2H), 3.77 (s, 3H), 3.66 (s, 6H), 3.62 (s, 3H), 3.59 (s, 3H), 2.96 (t, J=6.9 Hz, 2H); LC-MS $[M+H]^+$ 498.2。8-(2,5-二甲氧基-苯基硫基)-3-[2-(3,4,5-三甲氧基-苯基)-乙基]-3H-嘌呤-6-基胺: 产率 5%, ^{1}H NMR (DMSO-d_6) δ 8.36 (s, 1H), 7.26-7.04 (m, 3H), 6.41 (s, 2H), 4.56 (t, J=6.8 Hz, 2H), 3.77 (s, 3H), 3.74 (s, 3H), 3.69 (s, 6H), 3.61 (s, 3H), 3.09 (t, J=6.8 Hz, 2H); LC-MS $[M+H]^+$ 498.2。

实施例 91 和 92



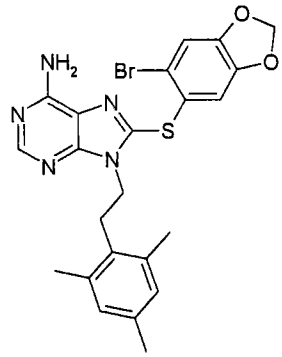


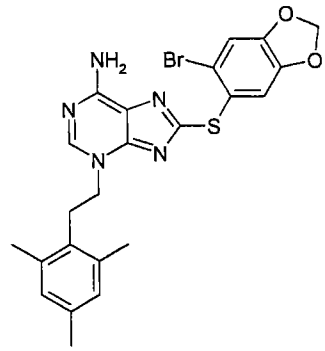
8-(6-溴-苯并[1,3]间二氧杂环戊烯-5-基硫基)-9-[2-(3,4,5-

三甲氧基-苯基)-乙基]-9H-嘌呤-6-基胺和 8-(6-溴-苯并[1,3]间二氧杂环戊烯-5-基硫基)-3-[2-(3,4,5-三甲氧基-苯基)-乙基]-3H-嘌呤-6-基胺

通过类似于实施例 1 和 2 的步骤从 8-(6-溴-苯并[1,3]间二氧杂环戊烯-5-基硫基)-9H-嘌呤-6-基胺和 5-(2-溴-乙基)-1,2,3-三甲氧基-苯制备所述标题化合物。通过制备型 HPLC 分离所述异构体。8-(6-溴-苯并[1,3]间二氧杂环戊烯-5-基硫基)-9-[2-(3,4,5-三甲氧基-苯基)-乙基]-9H-嘌呤-6-基胺: 产率 23%, ^{1}H NMR (DMSO-d_6) δ 8.28 (s, 1H), 7.38 (s, 1H), 6.74 (s, 1H), 6.27 (s, 2H), 6.19 (s, 2H), 4.40 (t, *J*=7.4 Hz, 2H), 3.67 (s, 6H), 3.59 (s, 3H), 2.96 (t, *J*=7.2 Hz, 2H); LC-MS $[M+H]^+$ 561.10。8-(6-溴-苯并[1,3]间二氧杂环戊烯-5-基硫基)-3-[2-(3,4,5-三甲氧基-苯基)-乙基]-3H-嘌呤-6-基胺: 产率 8%, ^{1}H NMR (DMSO-d_6) δ 8.28 (s, 2H), 7.47 (s, 1H), 7.38 (s, 1H), 6.39 (s, 2H), 6.17 (s, 2H), 4.53 (t, *J*=6.8 Hz, 2H), 3.69 (s, 6H), 3.60 (s, 3H), 3.11 (t, *J*=6.9 Hz, 2H); LC-MS $[M+H]^+$ 561.1。

实施例 93 和 94



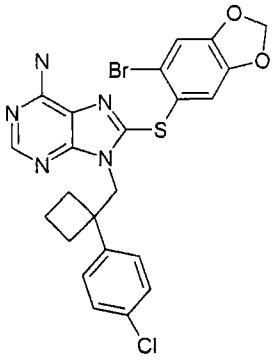


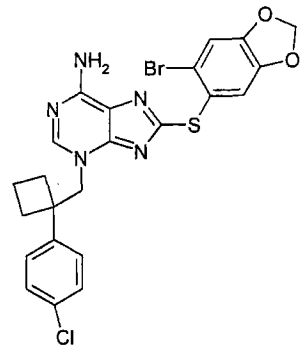
8-(6-溴-苯并[1,3]间二氧杂环戊烯-5-基硫基)-9-[2-(2,4,6-三甲基-苯基)-乙基]-9H-嘌呤-6-基胺和 8-(6-溴-苯并[1,3]间二氧杂环戊烯-5-基硫基)-3-[2-(2,4,6-三甲基-苯基)-乙基]-3H-嘌呤-6-基胺

通过类似于实施例 1 和 2 的步骤从 8-(6-溴-苯并[1,3]间二氧杂环戊烯-5-基硫基)-9H-嘌呤-6-基胺和 2-(2-溴-乙基)-1,3,5-三甲基-苯制备所述标题化合物。通过制备型 HPLC 分离所述异构体。8-(6-溴-苯并[1,3]间二氧杂环戊烯-5-基硫基)-9-[2-(2,4,6-三甲基-苯

基)-乙基]-9H-嘌呤-6-基胺：产率 23%，^{1}H NMR (DMSO-d_6) δ 8.38 (s, 1H), 7.38 (s, 1H), 6.84 (s, 2H), 6.76 (s, 1H), 6.09 (s, 2H), 4.25 (t, *J*=7.8 Hz, 2H), 3.01 (t, *J* = 7.8 Hz, 2H), 2.27 (s, 6H), 2.19 (s, 3H)；LC-MS $[MH]^+$ 513.1。8-(6-溴-苯并[1,3]间二氧杂环戊烯-5-基硫基)-3-[2-(2,4,6-三甲基-苯基)-乙基]-3H-嘌呤-6-基胺：产率 10%，^{1}H NMR (DMSO-d_6) δ 8.52 (s, 1H), 7.50 (s, 1H), 7.42 (s, 1H), 6.82 (s, 2H), 6.20 (s, 2H), 4.28 (t, *J*=8.4 Hz, 2H), 3.19 (t, *J* = 8.3 Hz, 2H), 2.19 (s, 9H)；LC-MS $[M+H]^+$ 513.1。

实施例 95 和 96



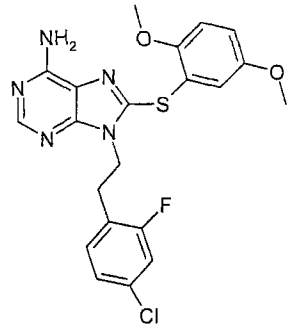


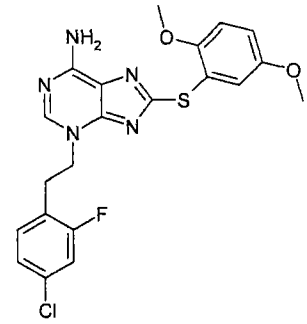
8-(6-溴-苯并[1,3]间二氧杂环戊烯-5-基硫基)-9-[1-(4-氯-苯基)-环丁基甲基]-9H-嘌呤-6-基胺和 8-(6-溴-苯并[1,3]间二氧杂环戊烯-5-基硫基)-3-[1-(4-氯-苯基)-环丁基甲基]-3H-嘌呤-6-基胺

通过类似于实施例 1 和 2 的步骤从 8-(6-溴-苯并[1,3]间二氧杂环戊烯-5-基硫基)-9H-嘌呤-6-基胺和 1-(1-溴甲基-环丁基)-4-氯-苯制备所述标题化合物。通过制备型 HPLC 分离所述异构体。8-(6-溴-苯并[1,3]间二氧杂环戊烯-5-基硫基)-9-[1-(4-氯-苯基)-环丁基甲基]-9H-嘌呤-6-基胺：产率 16%，^{1}H NMR (CD_3OD) δ 8.16 (br s, 1H), 7.26 (d, *J* = 8.8 Hz, 2H), 7.14 (s, 1H), 6.95 (d, *J*= 8.9 Hz, 2H), 6.82 (s, 1H) 6.04 (s, 2H), 4.59 (s, 2H), 2.77-2.69 (m, 2H), 2.42-2.36 (m, 2H), 2.35-2.26 (m, 1H), 1.95-1.85 (m, 1H)；LC-MS $[M+H]^+$ 545.0。8-(6-溴-苯并[1,3]间二氧杂环戊烯-5-基硫基)-3-[1-(4-氯-苯基)-环丁基甲基]-3H-嘌呤-6-基胺：产率 7%，^{1}H NMR (CD_3OD) δ 7.39 (br s, 1H), 7.29-7.24 (m, 3H), 7.19 (br

s, 1H), 6.97-6.92 (m, 2H), 6.09 (s, 2H) 4.69 (s, 2H), 2.58-2.50 (m, 2H), 2.44-2.34 (m, 2H), 2.24-2.17 (m, 1H), 1.91-1.82 (m, 1H); LC-MS $[M+H]^+$ 545.0。

实施例 97 和 98

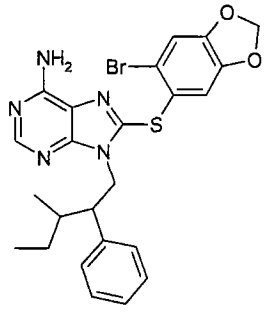


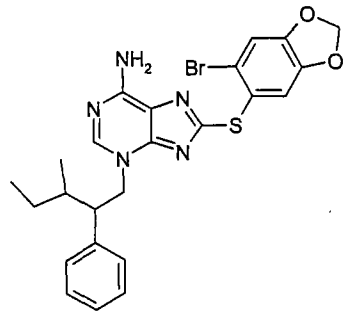


9-[2-(4-氯-2-氟-苯基)-乙基]-8-(2,5-二甲氧基-苯基硫基)-9H-嘌呤-6-基胺和 3-[2-(4-氯-2-氟-苯基)-乙基]-8-(2,5-二甲氧基-苯基硫基)-3H-嘌呤-6-基胺

通过类似于实施例 1 和 2 的步骤从 8-(2,5-二甲氧基-苯基硫基)-9H-嘌呤-6-基胺和 1-(2-溴-乙基)-4-氯-2-氟-苯制备所述标题化合物。通过制备型 HPLC 分离所述异构体。9-[2-(4-氯-2-氟-苯基)-乙基]-8-(2,5-二甲氧基-苯基硫基)-9H-嘌呤-6-基胺: 产率 34%, ^{1}H NMR (DMSO-d_6) δ 8.29 (s, 1H), 7.30 (dd, J = 10.0, 2.1, Hz, 1H), 7.16-7.00 (m, 3H), 6.88 (dd, J = 8.8, 3.0, Hz, 1H), 6.57 (d, J = 2.9 Hz, 1H), 4.46 (t, J=6.8 Hz, 2H), 3.74 (s, 3H), 3.62 (s, 3H), 3.10 (t, J=6.8 Hz, 2H); LC-MS $[M+H]^+$ 460.1。3-[2-(4-氯-2-氟-苯基)-乙基]-8-(2,5-二甲氧基-苯基硫基)-3H-嘌呤-6-基胺: 产率 12%, ^{1}H NMR (DMSO-d_6) δ 8.39 (s, 1H), 7.40-7.38 (m, 1H), 7.25-7.02 (m, 5H), 4.53 (t, J=6.4 Hz, 2H), 3.77 (s, 3H), 3.71 (s, 3H), 3.21 (t, J=6.4 Hz, 2H); LC-MS $[M+H]^+$ 460.1。

实施例 99 和 100

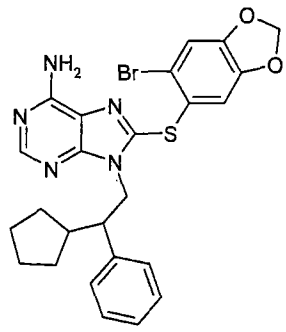


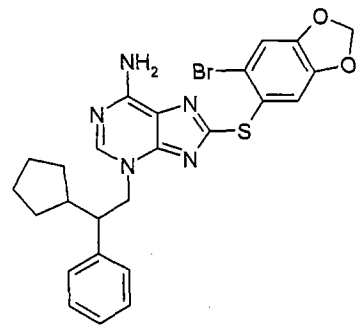


8-(6-溴-苯并[1,3]间二氧杂环戊烯-5-基硫基)-9-(3-甲基-2-苯基-戊基)-9H-嘌呤-6-基胺和 8-(6-溴-苯并[1,3]间二氧杂环戊烯-5-基硫基)-3-(3-甲基-2-苯基-戊基)-3H-嘌呤-6-基胺

通过类似于实施例 1 和 2 的步骤从 8-(6-溴-苯并[1,3]间二氧杂环戊烯-5-基硫基)-9H-嘌呤-6-基胺和(1-溴甲基-2-甲基-丁基)-苯制备所述标题化合物。8-(6-溴-苯并[1,3]间二氧杂环戊烯-5-基硫基)-9-(3-甲基-2-苯基-戊基)-9H-嘌呤-6-基胺，非对映异构体的混合物：产率 19 %, ^{1}H NMR (DMSO-d_6) δ 8.23 (s, 1H), 8.21(s, 1H), 7.36 (s, 2H), 7.15-7.10 (m, 6H), 7.04-6.99 (m, 4H), 6.59 (s, 2H), 6.08 (s, 4H), 4.59 (m, 2H), 4.50 (m, 2H), 3.30 (m, 2H), 3.20 (m, 2H), 2.45 (m, 4H), 1.05 (d, *J* = 6.4 Hz, 3H), 0.90 (t, *J* = 7.2 Hz, 3H), 0.76-0.70 (m, 6H); LC- MS $[M+H]^+$ 528.1。8-(6-溴-苯并[1,3]间二氧杂环戊烯-5-基硫基)-3-(3-甲基-2-苯基-戊基)-3H-嘌呤-6-基胺，非对映异构体的混合物：产率 3%, ^{1}H NMR (DMSO-d_6) δ 8.01 (s, 1H), 7.99 (s, 1H) 7.48 (s, 2H), 7.39 (s, 2H), 7.24-7.10 (m, 6H), 7.05-7.03 (m, 4H), 6.19 (s, 2H), 6.17 (s, 2H), 4.70 (m, 1H), 4.47 (m, 1H), 3.39 (m, 2H), 2.45 (m, 2H), 1.78 (m, 2H), 1.24 (m, 2H), 1.01 (d, *J*= 6.4 Hz, 3H), 0.85 (t, *J* = 7.6 Hz, 3H), 0.76 (t, *J*= 7.6 Hz, 3H), 0.68 (d, *J*= 6.4 Hz, 3H); LC- MS $[M+H]^+$ 528.1。

实施例 101 和 102



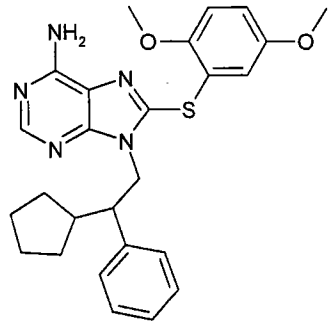


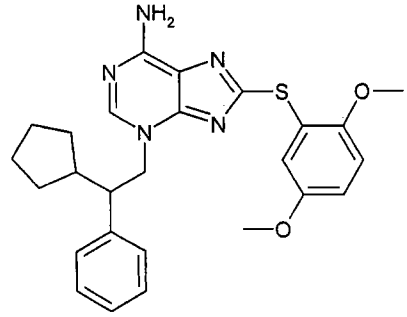
8-(6-溴-苯并[1,3]间二氧杂环戊烯-5-基硫基)-9-(2-环戊基-2-苯基-乙基)-9H-嘌呤-6-基胺和 8-(6-溴-苯并[1,3]间二氧杂环戊烯-5-基硫基)-3-(2-环戊基-2-苯基-乙基)-3H-嘌呤-6-基胺

通过类似于实施例 1 和 2 的步骤从 8-(6-溴-苯并[1,3]间二氧杂

环戊烯-5-基硫基)-9H-嘌呤-6-基胺和(2-溴-1-环戊基-乙基)-苯制备所述标题化合物。通过制备型 HPLC 分离所述异构体。8-(6-溴-苯并[1,3]间二氧杂环戊烯-5-基硫基)-9-(2-环戊基-2-苯基-乙基)-9H-嘌呤-6-基胺: 产率 20 %, ^{1}H NMR (DMSO-d_6) δ 8.21 (s, 1H), 7.34 (s, 1H), 7.14-7.06 (m, 3H), 6.99 (d, *J*= 8.0 Hz, 2H), 6.57 (s, 1H), 6.08 (bs, 2H), 4.47 (d, *J*= 8.0 Hz, 2H), 3.20 (m, 1H), 2.55 (m, 1H), 2.01-1.80 (m, 4H), 1.49-1.30 (m, 4H); LC-MS $[M+H]^+$ 540.1。8-(6-溴-苯并[1,3]间二氧杂环戊烯-5-基硫基)-3-(2-环戊基-2-苯基-乙基)-3H-嘌呤-6-基胺: 产率 11 %, ^{1}H NMR (DMSO-d_6) δ 7.91 (bs, 1H), 7.48 (bs, 1H), 7.40 (bs, 1H), 7.21-7.12 (m, 3H), 7.02 (d, *J*= 7.2 Hz, 2H), 6.16 (s, 1H), 4.65 (dd, *J*= 9.2, 4.4Hz, 1H), 4.41 (t, *J*= 12 Hz, 1H), 3.21 (m, 2H), 2.43-2.23 (m, 1H), 1.99-1.80 (m, 1H), 1.70-1.20 (m, 6H), 0.96-0.91 (m, 1H); LC-MS $[M+H]^+$ 540.1。

实施例 103 和 104



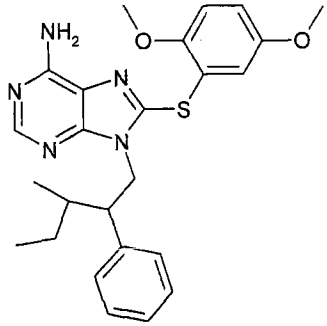


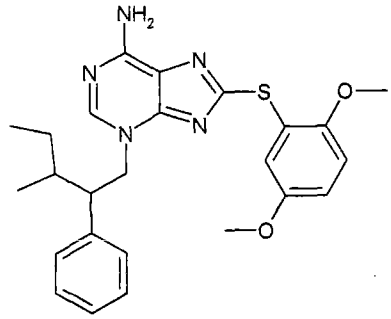
9-(2-环戊基-2-苯基-乙基)-8-(2,5-二甲氧基-苯基硫基)-9H-嘌呤-6-基胺和 3-(2-环戊基-2-苯基-乙基)-8-(2,5-二甲氧基-苯基硫基)-3H-嘌呤-6-基胺

通过类似于实施例 1 和 2 的步骤从 8-(2,5-二甲氧基-苯基硫基)-9H-嘌呤-6-基胺和(2-溴-1-环戊基-乙基)-苯制备所述标题化合物。通过制备型 HPLC 分离所述异构体。9-(2-环戊基-2-苯基-乙基)-8-(2,5-二甲氧基-苯基硫基)-9H-嘌呤-6-基胺: 产率 15 %, ^{1}H NMR (DMSO-d_6) δ 8.20 (s, 1H), 7.12-7.06 (m, 3H), 7.01 (d, *J*= 8.8 Hz, 1H), 6.96-6.93 (m, 2H), 6.86 (dd, *J*= 8.8, 2.8 Hz, 1H), 6.45 (d, *J*= 2.4 Hz, 1H), 4.49-4.45 (m, 2H), 3.74 (s, 3H), 3.60

(s, 3H), 3.18-3.01 (m, 1H), 2.23-2.22 (m, 1H), 2.00-1.25 (m, 6H), 0.80-0.61 (m, 2H); LC- MS $[M+H]^+$ 476.2。3-(2-环戊基-2-苯基-乙基)-8-(2,5-二甲氧基-苯基硫基)-3H-嘌呤-6-基胺: 产率 15 %, ^{1}H NMR (DMSO-d_6) δ 7.99 (bs, 1H), 7.24-7.10 (m, 6H), 7.03 (d, *J*= 6.8 Hz, 2H), 4.65 (m, 2H), 3.77 (s, 3H), 3.72 (s, 3H), 2.60-2.40 (m, 2H), 2.00-1.25 (m, 8H); LC- MS $[M+H]^+$ 476.2。

实施例 105 和 106

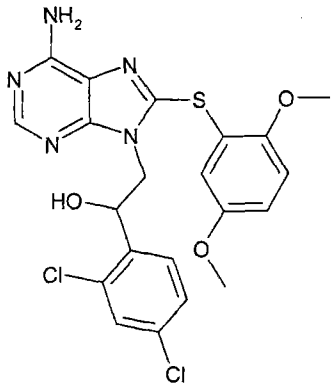


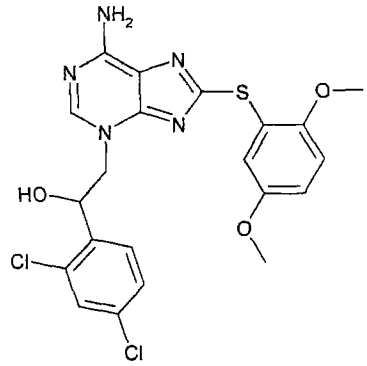


8-(2,5-二甲氧基-苯基硫基)-9-(3-甲基-2-苯基-戊基)-9H-嘌呤-6-基胺和 8-(2,5-二甲氧基-苯基硫基)-3-(3-甲基-2-苯基-戊基)-3H-嘌呤-6-基胺

通过类似于实施例 1 和 2 的步骤从 8-(2,5-二甲氧基-苯基硫基)-9H-嘌呤-6-基胺和(1-溴甲基-2-甲基-丁基)-苯制备所述标题化合物。通过制备型 HPLC 分离所述异构体。8-(2,5-二甲氧基-苯基硫基)-9-(3-甲基-2-苯基-戊基)-9H-嘌呤-6-基胺, 非对映异构体的混合物: 产率 25 %, ^{1}H NMR (DMSO-d_6) δ 8.18 (s, 1H), 8.16 (s, 1H), 7.24-7.06 (m, 6H), 7.03-6.94 (m, 6H), 6.86-6.84 (m, 2H), 6.39 (m, 2H), 4.60-4.45 (m, 2H), 3.75 (s, 6H), 3.59 (s, 6H), 3.50 (m, 4H), 2.43 (m, 4H), 0.98 (d, *J*= 6.4 Hz, 6H), 0.90-0.88 (m, 2H), 0.72-0.67 (m, 6H); LC- MS $[M+H]^+$ 464.2。8-(2,5-二甲氧基-苯基硫基)-3-(3-甲基-2-苯基-戊基)-3H-嘌呤-6-基胺, 非对映异构体的混合物: 产率 9%, ^{1}H NMR (DMSO-d_6) δ 7.99 (s, 2H), 7.24-7.10 (m, 10H), 7.06-7.04 (m, 6H), 4.70 (m, 1H), 4.50 (m, 1H), 3.77 (s, 6H), 3.74 (m, 2H), 3.73 (s, 6H), 2.45 (m, 4H), 1.02 (d, *J*= 6.4 Hz, 3H), 0.88-0.88 (m, 3H), 0.79-0.72 (m, 3H), 0.69 (d, *J*= 6.4 Hz, 3H); LC-MS $[M+H]^+$ 464.2。

实施例 107 和 108

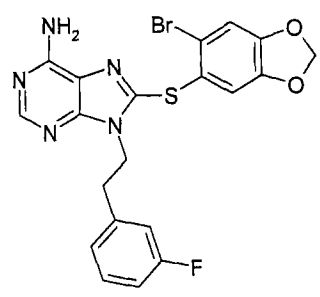


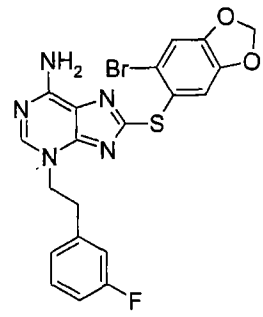


2-[6-氨基-8-(2,5-二甲氧基-苯基硫基)-嘌呤-9-基]-1-(2,4-二氯-苯基)乙醇和 2-[6-氨基-8-(2,5-二甲氧基-苯基硫基)-嘌呤-3-基]-1-(2,4-二氯-苯基)乙醇

通过类似于实施例 1 和 2 的步骤从 8-(2,5-二甲氧基-苯基硫基)-9H-嘌呤-6-基胺和 2-氯-1-(2,4-二氯-苯基)-乙醇制备所述标题化合物。通过制备型 HPLC 分离所述异构体。2-[6-氨基-8-(2,5-二甲氧基-苯基硫基)-嘌呤-9-基]-1-(2,4-二氯-苯基)乙醇：产率 17%，^{1}H NMR (DMSO-d_6) δ 10.10 (s, 1H), 7.98 (s, 1H), 7.61 (d, *J*= 8.8 Hz, 1H), 7.53 (d, *J*= 2.0 Hz, 1H), 6.95 (d, *J*= 3.2Hz, 1H), 6.87 (d, *J*= 8.8 Hz, 1H), 6.76 (dd, *J*= 8.8, 3.2 Hz, 1H), 6.54 (bs, 2H), 6.42 (bs, 1H), 5.54 (t, *J*= 8.8 Hz, 1H), 4.21 (t, *J*= 8.8 Hz, 2H) 3.68 (s, 3H), 3.67 (s, 3H)；TOF LC-MS $[M+H]^+$ 492.0。2-[6-氨基-8-(2,5-二甲氧基-苯基硫基)-嘌呤-3-基]-1-(2,4-二氯-苯基)乙醇：产率 1.0%，^{1}H NMR (DMSO-d_6) δ 8.10 (bs, 1H), 7.63-7.58 (m, 2H), 7.49 (dd, *J* = 8.0, 2.4 Hz, 1H), 6.58 (bs, 1H), 6.17 (bs, 2H), 5.63 (m, 1H), 4.50 (m, 2H), 3.76 (s, 3H), 3.68 (s, 3H)；LC-MS $[M+H]^+$ 492.1。

实施例 109 和 110

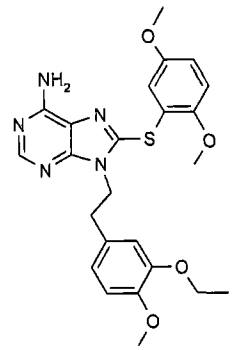


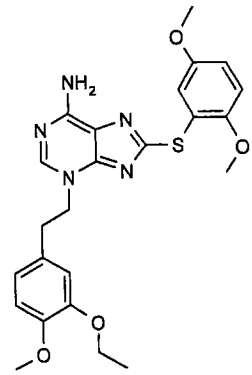


8-(6-溴-苯并[1,3]间二氧杂环戊烯-5-基硫基)-9-[2-(3-氟-苯基)-乙基]-9H-嘌呤-6-基胺和 8-(6-溴-苯并[1,3]间二氧杂环戊烯-5-基硫基)-3-[2-(3-氟-苯基)-乙基]-3H-嘌呤-6-基胺

通过类似于实施例 1 和 2 的步骤从 8-(6-溴-苯并[1,3]二氧杂环戊烯-5-基硫基)-9H-嘌呤-6-基胺和 1-(2-溴-乙基)-3-氟-苯制备所述标题化合物。通过制备型 HPLC 分离所述异构体。8-(6-溴-苯并[1,3]间二氧杂环戊烯-5-基硫基)-9-[2-(3-氟-苯基)-乙基]-9H-嘌呤-6-基胺: 产率 22%, ^{1}H NMR (DMSO-d_6) δ 8.18 (s, 1H), 7.34 (s, 1H), 7.27-7.21 (m, 1H), 7.02-6.97 (m, 1H), 6.93-6.89 (m, 1H), 6.83 (d, *J*= 7.6 Hz, 1H), 6.65 (s, 1H), 6.08 (s, 2H), 4.41 (t, *J*= 7.2 Hz, 2H), 3.07 (t, *J*= 7.2 Hz, 2H); LC- MS $[M+H]^+$ 490.0。8-(6-溴-苯并[1,3]间二氧杂环戊烯-5-基硫基)-3-[2-(3-氟-苯基)-乙基]-3H-嘌呤-6-基胺: 产率 17 %, ^{1}H NMR (DMSO-d_6) δ 8.10 (bs, 1H), 7.50-7.26 (m, 3H), 7.10-7.00 (m, 2H), 6.93 (d, *J*= 7.6 Hz, 1H), 6.16 (bs, 2H), 4.53 (t, *J*= 6.4 Hz, 2H), 3.201 (t, *J*= 6.4 Hz, 2H); LC-MS $[M+H]^+$ 490.0。

实施例 111 和 112





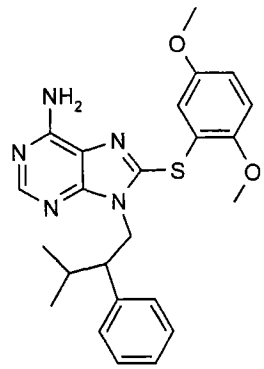
8-(2,5-二甲氧基-苯基硫基)-9-[2-(3-乙氧基-4-甲氧基-苯基)-乙基]-9H-嘌呤-6-基胺和 8-(2,5-二甲氧基-苯基硫基)-3-[2-(3-乙氧基-4-甲氧基-苯基)-乙基]-3H-嘌呤-6-基胺

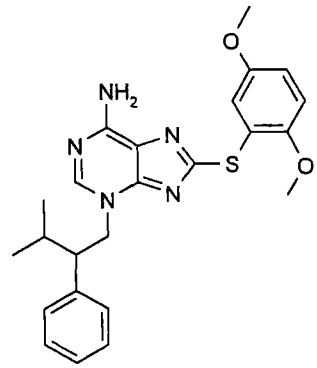
通过类似于实施例 1 和 2 的步骤从 8-(2,5-二甲氧基-苯基硫基)-9H-嘌呤-6-基胺和 4-(2-氯-乙基)-2-乙氧基-1-甲氧基-苯制备所述标题化合物。通过制备型 HPLC 分离所述异构体。8-(2,5-二甲氧基-苯基硫基)-9-[2-(3-乙氧基-4-甲氧基-苯基)-乙基]-9H-嘌呤-6-

基胺: ^{1}H NMR (DMSO-d_6) δ 8.32 (s, 1H), 7.03 (d, *J*=9.2 Hz, 1H), 6.88 (dd, *J*=8.8, 2.8 Hz, 1H), 6.76 (d, *J*=8.4 1H), 6.59-6.56 (m, 2H), 6.48-6.46 (m, 1H), 4.42 (t, *J*= 6.8 Hz, 2H) 3.95-3.89 (m, 2H), 3.73 (s, 3H), 3.65 (s, 3H), 3.62 (s, 3H), 2.94 (t, *J*=6.8 Hz, 2H), 1.28 (t, *J*= 6.8 Hz, 2H); LC-MS [M+H]$^+$ 482.2。

8-(2,5-二甲氧基-苯基硫基)-3-[2-(3-乙氧基-4-甲氧基-苯基)-乙基]-3H-嘌呤-6-基胺: ^{1}H NMR (DMSO-d_6) δ 8.32 (s, 1H), 7.24 (d, *J*=2.8 Hz, 1H), 7.19-7.18 (m,1H), 7.13-7.12 (m, 1H), 6.82 (d, *J*= 8.40Hz, 1H) 6.72 (d, *J*= 2.0 Hz, 1H), 6.56 (dd, *J*=8.0, 2.0 Hz,1H), 4.52 (t, *J*= 6.8 Hz, 2H) 3.97-3.92 (m, 2H), 3.77 (s, 3H), 3.73 (s, 3H), 3.69 (s, 3H), 3.08 (t, *J*=6.8 Hz, 2H), 1.29 (t, *J*= 6.8 Hz, 3H); LC-MS [M+H]$^+$ 482.2。

实施例 113 和 114





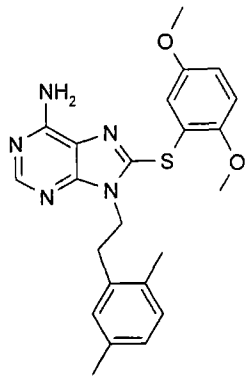
8-(2,5-二甲氧基-苯基硫基)-9-(3-甲基-2-苯基-丁基)-9H-嘌呤-6-基胺和 8-(2,5-二甲氧基-苯基硫基)-3-(3-甲基-2-苯基-丁基)-3H-嘌呤-6-基胺

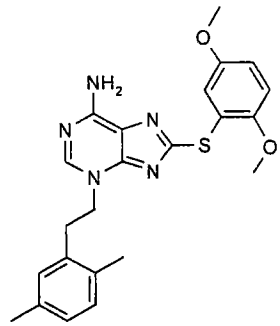
通过类似于实施例 1 和 2 的步骤从 8-(2,5-二甲氧基-苯基硫基)-9H-嘌呤-6-基胺和(1-氯甲基-2-甲基-丙基)-苯制备所述标题化合物。通过制备型 HPLC 分离所述异构体。

8-(2,5-二甲氧基-苯基硫基)-9-(3-甲基-2-苯基-丁基)-9H-嘌呤-6-基胺: ^{1}H NMR (DMSO-d_6) δ 8.23 (s, 1H), 7.15-7.07 (m, 3H), 7.03 (d, *J*=9.2 Hz, 1H), 6.98-6.96 (m, 2H), 6.87 (dd, *J*=6.0, 3.2 Hz, 1H), 6.46 (d, *J*= 2.4 Hz, 1H) 4.60-4.47 (m, 1H), 3.74 (s, 3H), 3.60 (s, 3H), 3.17-3.04 (m, 2H), 1.99-1.94 (m, 1H),

1.0 (d, *J*=6.8 Hz, 3H), 0.92 (d, *J*= 6.4 Hz, 3H); LC-MS $[M+H]^+$ 450.2。8-(2,5-二甲氧基-苯基硫基)-3-(3-甲基-2-苯基-丁基)-3H-嘌呤-6-基胺: ^{1}H NMR (DMSO-d_6) δ 8.06 (s, 1H), 7.23-7.14 (m, 5H), 7.09-7.04 (m, 2H), 4.79-4.75 (m, 1H), 4.54-4.48 (m, 2H), 3.8 (s, 3H), 3.74 (s, 3H), 3.17-3.13 (m, 1H), 2.0-1.96 (m, 1H), 1.03 (d, *J*= 6.8 Hz, 3H), 0.718 (d, *J*=6.4 Hz, 3H); LC-MS $[M+H]^+$ 450.2。

实施例 115 和 116

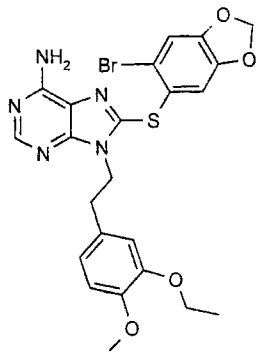


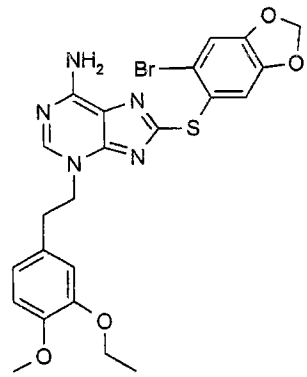


8-(2,5-二甲氧基-苯基硫基)-9-[2-(2,5-二甲基-苯基)-乙基]-9H-嘌呤-6-基胺和 8-(2,5-二甲氧基-苯基硫基)-3-[2-(2,5-二甲基-苯基)-乙基]-3H-嘌呤-6-基胺

通过类似于实施例 1 和 2 的步骤从 8-(2,5-二甲氧基-苯基硫基)-9H-嘌呤-6-基胺和 2-(2-氯-乙基)-1,4-二甲基-苯制备所述标题化合物。通过制备型 HPLC 分离所述异构体。8-(2,5-二甲氧基-苯基硫基)-9-[2-(2,5-二甲基-苯基)-乙基]-9H-嘌呤-6-基胺: ^{1}H NMR (DMSO-d_6) δ 8.36 (s, 1H), 7.06-7.01 (m, 2H), 6.93-6.88 (m, 2H), 6.71(s, 1H), 6.59 (d, *J*=2.8 Hz, 1H), 4.33 (t, *J*=7.6 Hz, 2H), 3.75 (s, 3H), 3.63 (s, 3H), 2.92 (t, *J*=7.6 Hz, 2H), 2.21 (s, 3H), 2.17 (s, 3H); LC-MS $[M+H]^+$ 436.2。8-(2,5-二甲氧基-苯基硫基)-3-[2-(2,5-二甲基-苯基)-乙基]-3H-嘌呤-6-基胺: ^{1}H NMR (DMSO-d_6) δ 8.43 (s, 1H), 7.25 (s, 1H), 7.16 (s, 1H), 7.04 (d, *J*=8.0 Hz, 2H), 6.96-6.94 (m, 1H), 6.84 (s, 1H), 4.44 (t, *J*=7.6 Hz, 2H), 3.76 (s, 3H), 3.73 (s, 3H), 3.10 (t, *J*=7.6 Hz, 2H), 2.19 (s, 3H), 2.17 (s, 3H); LC-MS $[M+H]^+$ 436.2。

实施例 117 和 118

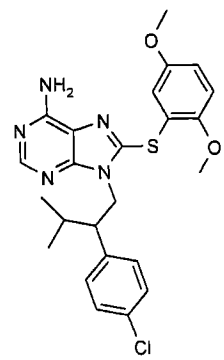


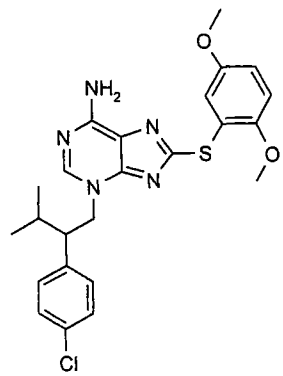


8-(6-溴-苯并[1,3]间二氧杂环戊烯-5-基硫基)-9-[2-(3-乙氧基-4-甲氧基-苯基)-乙基]-9H-嘌呤-6-基胺和 8-(6-溴-苯并[1,3]间二氧杂环戊烯-5-基硫基)-3-[2-(3-乙氧基-4-甲氧基-苯基)-乙基]-3H-嘌呤-6-基胺

通过类似于实施例 1 和 2 的步骤从 8-(6-溴-苯并[1,3]间二氧杂环戊烯-5-基硫基)-9H-嘌呤-6-基胺和 4-(2-氯-乙基)-2-乙氧基-1-甲氧基-苯制备所述标题化合物。通过制备型 HPLC 分离所述异构体。8-(6-溴-苯并[1,3]间二氧杂环戊烯-5-基硫基)-9-[2-(3-乙氧基-4-甲氧基-苯基)-乙基]-9H-嘌呤-6-基胺: LC-MS $[M+H]^+$ 546.0。8-(6-溴-苯并[1,3]间二氧杂环戊烯-5-基硫基)-3-[2-(3-乙氧基-4-甲氧基-苯基)-乙基]-3H-嘌呤-6-基胺: ^1H NMR (DMSO-d_6) δ 8.25 (s, 1H), 7.50 (s, 1H), 7.38 (s, 1H), 6.80 (d, *J*=8.4 Hz, 1H), 6.69 (d, *J*= 1.6 Hz, 1H), 6.55 (dd, *J*=8.4, 1.6 Hz, 1H), 6.17 (s, 2H), 4.51 (t, *J*=7.2 Hz, 2H), 3.96-3.91 (m, 2H), 3.68 (s, 3H), 3.09 (t, *J*=7.2 Hz, 2H), 1.31-1.27 (m, 3H); LC-MS $[M+H]^+$ 546.05。

实施例 119 和 120





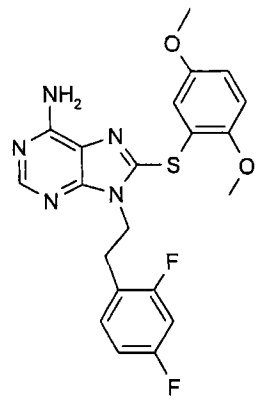
9-[2-(4-氯-苯基)-3-甲基-丁基]-8-(2,5-二甲氧基-苯基硫

基)-9H-嘌呤-6-基胺和 3-[2-(4-氯-苯基)-3-甲基-丁基]-8-(2,5-二甲氧基-苯基硫基)-3H-嘌呤-6-基胺

通过类似于实施例 1 和 2 的步骤从 8-(2,5-二甲氧基-苯基硫基)-9H-嘌呤-6-基胺和 1-氯-4-(1-氯甲基-2-甲基-丙基)-苯制备所述标题化合物。通过制备型 HPLC 分离所述异构体。

9-[2-(4-氯-苯基)-3-甲基-丁基]-8-(2,5-二甲氧基-苯基硫基)-9H-嘌呤-6-基胺: ^{1}H NMR (DMSO-d_6) δ 8.25 (s, 1H), 7.16-7.15 (m, 2H), 7.04-6.99 (m, 2H), 6.88 (s, 2H), 6.44 (s, 1H), 4.52 (d, *J*= 6.2 Hz, 2H), 3.75 (s, 3H), 3.61 (s, 3H), 3.06 (m, 1H), 1.98 (s, 1H), 1.01 (d, *J*=5.6 Hz, 3H), 0.67 (d, *J*=6.0 Hz, 3H); LC-MS $[M+H]^+$ 484.1。3-[2-(4-氯-苯基)-3-甲基-丁基]-8-(2,5-二甲氧基-苯基硫基)-3H-嘌呤-6-基胺: LC-MS $[M+H]^+$ 484.1。

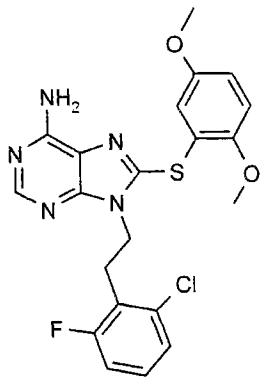
实施例 121

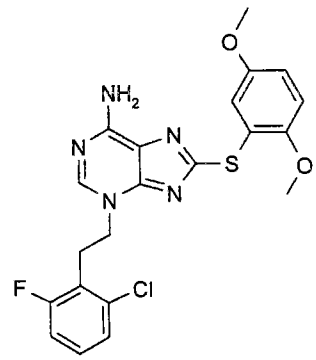


9-[2-(2,4-二氟-苯基)-乙基]-8-(2,5-二甲氧基-苯基硫基)-9H-嘌呤-6-基胺

通过类似于实施例 1 和 2 的步骤从 8-(2,5-二甲氧基-苯基硫基)-9H-嘌呤-6-基胺和 1-(2-氯-乙基)-2,4-二氟-苯制备所述标题化合物。通过制备型 HPLC 纯化所述化合物。LC-MS $[M+H]^+$444.1。

实施例 122 和 123

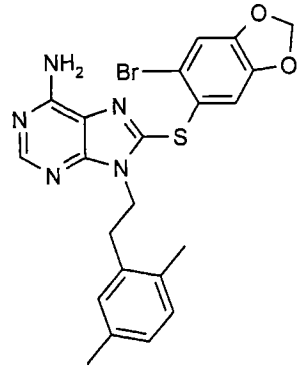


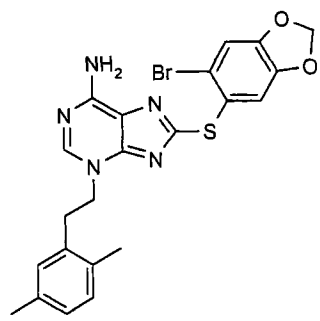


9-[2-(2-氯-6-氟-苯基)-乙基]-8-(2,5-二甲氧基-苯基硫基)-9H-嘌呤-6-基胺和 3-[2-(2-氯-6-氟-苯基)-乙基]-8-(2,5-二甲氧基-苯基硫基)-3H-嘌呤-6-基胺

通过类似于实施例 1 和 2 的步骤从 8-(2,5-二甲氧基-苯基硫基)-9H-嘌呤-6-基胺和 1-氯-2-(2-氯-乙基)-3-氟-苯制备所述标题化合物。通过制备型 HPLC 分离所述异构体。9-[2-(2-氯-6-氟-苯基)-乙基]-8-(2,5-二甲氧基-苯基硫基)-9H-嘌呤-6-基胺: ^{1}H NMR (DMSO-d_6) δ 8.23 (s, 1H), 7.30-7.21 (m, 2H), 7.13-7.08 (m, 1H), 7.08 (d, *J*=3.2 Hz, 1H), 6.86 (dd, *J*=9.2, 3.2 Hz, 1H), 6.53 (d, *J*=3.2 Hz, 1H), 4.48 (t, *J*=6.6 Hz, 2H), 3.73 (s, 3H), 3.62 (s, 3H), 3.30 (t, *J*=6.0 Hz, 2H); LC-MS [M+H]$^+$ 460.1。3-[2-(2-氯-6-氟-苯基)-乙基]-8-(2,5-二甲氧基-苯基硫基)-3H-嘌呤-6-基胺: ^{1}H NMR (DMSO-d_6) δ 8.37 (s, 1H), 7.36-7.26 (m, 2H), 7.19-7.15 (m, 3H), 7.11-7.09 (m, 1H), 7.57 (t, *J*=6.4 Hz, 2H), 3.75 (s, 3H), 3.73 (s, 3H), 3.34 (t, *J*=6.0 Hz, 2H); LC-MS [M+H]$^+$ 486.1。

实施例 124 和 125

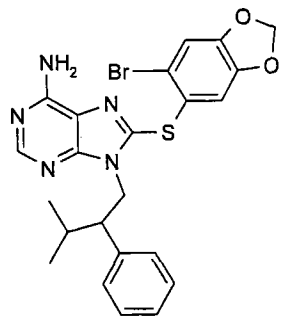


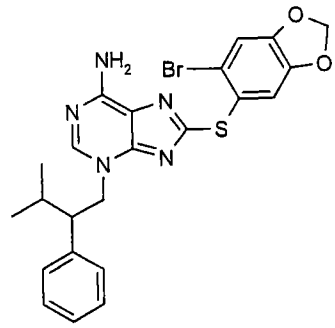


8-(6-溴-苯并[1,3]间二氧杂环戊烯-5-基硫基)-9-[2-(2,5-二甲基-苯基)-乙基]-9H-嘌呤-6-基胺和 8-(6-溴-苯并[1,3]间二氧杂环戊烯-5-基硫基)-3-[2-(2,5-二甲基-苯基)-乙基]-3H-嘌呤-6-基胺

通过类似于实施例 1 和 2 的步骤从 8-(6-溴-苯并[1,3]间二氧杂环戊烯-5-基硫基)-9H-嘌呤-6-基胺和 2-(2-氯-乙基)-1,4-二甲基-苯制备所述标题化合物。通过制备型 HPLC 分离所述异构体。8-(6-溴-苯并[1,3]间二氧杂环戊烯-5-基硫基)-9-[2-(2,5-二甲基-苯基)-乙基]-9H-嘌呤-6-基胺:^{1}H NMR (DMSO-d_6) δ 8.30 (s, 1H), 7.37 (s, 1H), 7.01 (d, *J* = 7.6 Hz, 1H), 6.84 (d, *J*=7.6 Hz, 1H), 6.74 (s, 1H), 6.70 (s, 1H), 6.09 (s, 2H), 4.33 (t, *J*=7.6 Hz, 2H), 3.20 (t, *J*=7.6 Hz, 2H), 2.21 (s, 3H), 2.17 (s, 3H); LC-MS $[M+H]^+$ 500.0。8-(6-溴-苯并[1,3]间二氧杂环戊烯-5-基硫基)-3-[2-(2,5-二甲基-苯基)-乙基]-3H-嘌呤-6-基胺: ^{1}H NMR (DMSO-d_6) δ 8.43 (s, 1H), 7.50 (s, 1H), 7.41 (s, 1H), 7.04 (d, *J*=7.6 Hz, 1H), 6.95-6.93 (m, 1H), 6.85 (s, 1H), 6.18 (s, 2H), 4.41 (t, *J*=7.6 Hz, 2H), 3.12 (t, *J*=8.0 Hz, 2H), 2.19 (s, 3H), 2.16 (s, 3H); LC-MS $[M+H]^+$ 500.0。

实施例 126 和 127



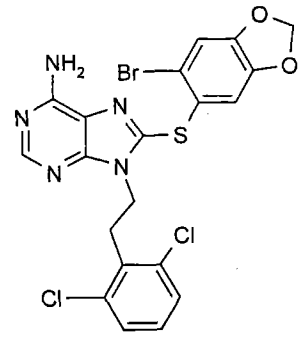


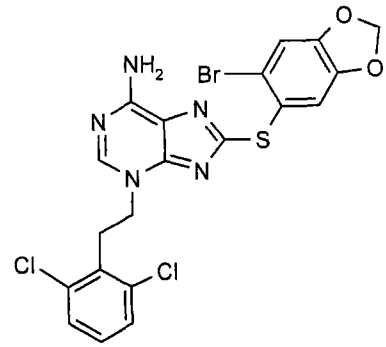
8-(6-溴-苯并[1,3]间二氧杂环戊烯-5-基硫基)-9-(3-甲基-2-苯基-丁基)-9H-嘌呤-6-基胺和 8-(6-溴-苯并[1,3]间二氧杂环戊烯-5-基硫基)-3-(3-甲基-2-苯基-丁基)-3H-嘌呤-6-基胺

通过类似于实施例 1 和 2 的步骤从 8-(6-溴-苯并[1,3]间二氧杂环戊烯-5-基硫基)-9H-嘌呤-6-基胺和 1-氯-4-(1-氯甲基-2-甲基-丙基)-苯制备所述标题化合物。通过制备型 HPLC 分离所述异构体。

8-(6-溴-苯并[1,3]间二氧杂环戊烯-5-基硫基)-9-(3-甲基-2-苯基-丁基)-9H-嘌呤-6-基胺: ^{1}H NMR (DMSO-d_6) δ 8.14 (s, 1H), 7.13-7.07 (m, 3H), 7.00-6.98 (m, 2H), 6.56-6.52 (m, 2H), 6.08 (s, 2H), 4.53-4.44 (m, 2H), 3.17-3.13 (m, 1H), 1.99-1.97 (m, 1H), 1.04 (d, *J*=6.8 Hz, 3H), 0.70 (d, *J*=6.8 Hz, 3H); LC-MS $[M+H]^+$ 514.0。8-(6-溴-苯并[1,3]间二氧杂环戊烯-5-基硫基)-3-(3-甲基-2-苯基-丁基)-3H-嘌呤-6-基胺: ^{1}H NMR (DMSO-d_6) δ 8.0 (s, 1H), 7.39 (s, 1H), 7.24-7.19 (m, 3H), 7.18-7.11 (m, 1H), 7.09-7.02 (m, 2H), 6.12 (s, 2H), 4.75-4.71 (m, 1H), 4.50-4.43 (m, 1H), 3.25-3.19(m, 1H), 1.98-1.90 (m, 1H), 1.02 (d, *J*=6.8 Hz, 3H), 0.710 (d, *J*=6.8 Hz, 3H); LC-MS $[M+H]^+$ 514.0。

实施例 128 和 129

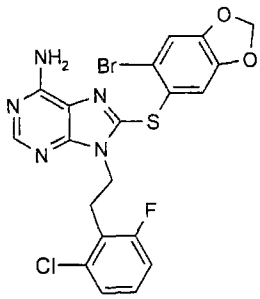


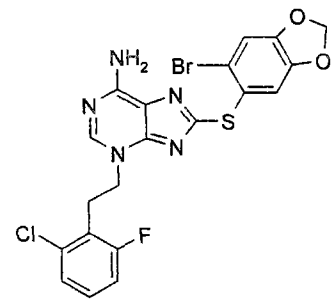


8-(6-溴-苯并[1,3]间二氧杂环戊烯-5-基硫基)-9-[2-(2,6-二氯-苯基)-乙基]-9H-嘌呤-6-基胺和 8-(6-溴-苯并[1,3]间二氧杂环戊烯-5-基硫基)-3-[2-(2,6-二氯-苯基)-乙基]-3H-嘌呤-6-基胺

通过类似于实施例 1 和 2 的步骤从 8-(6-溴-苯并[1,3]间二氧杂环戊烯-5-基硫基)-9H-嘌呤-6-基胺和 1,3-二氯-2-(2-氯-乙基)-苯制备所述标题化合物。通过制备型 HPLC 分离所述异构体。8-(6-溴-苯并[1,3]间二氧杂环戊烯-5-基硫基)-9-[2-(2,6-二氯-苯基)-乙基]-9H-嘌呤-6-基胺: ^{1}H NMR (丙酮-d_6) δ 8.23 (s, 1H), 7.36-7.34 (m, 2H), 7.28-7.24 (m, 1H), 7.18 (s, 1H), 6.81 (s, 1H), 6.09 (s, 2H), 4.64 (t, *J*=6.4 Hz, 2H), 3.52 (t, *J*=6.4 Hz, 2H); LC-MS $[M+H]^+$ 539.9。8-(6-溴-苯并[1,3]间二氧杂环戊烯-5-基硫基)-3-[2-(2,6-二氯-苯基)-乙基]-3H-嘌呤-6-基胺. LC-MS $[M+H]^+$ 539.9。

实施例 130 和 131

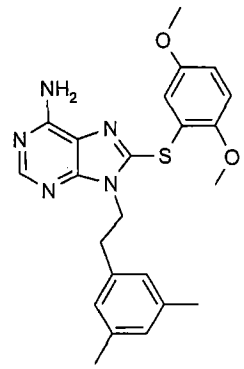


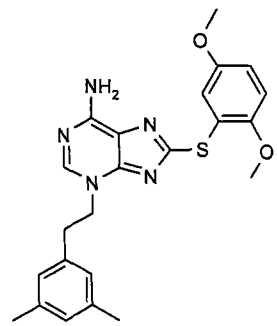


8-(6-溴-苯并[1,3]间二氧杂环戊烯-5-基硫基)-9-[2-(2-氯-6-氟-苯基)-乙基]-9H-嘌呤-6-基胺和 8-(6-溴-苯并[1,3]间二氧杂环戊烯-5-基硫基)-3-[2-(2-氯-6-氟-苯基)-乙基]-3H-嘌呤-6-基胺

通过类似于实施例 1 和 2 的步骤从 8-(6-溴-苯并[1,3]间二氧杂环戊烯-5-基硫基)-9H-嘌呤-6-基胺和 1-氯-2-(2-氯-乙基)-3-氟-苯制备所述标题化合物。通过制备型 HPLC 分离所述异构体。8-(6-溴-苯并[1,3]间二氧杂环戊烯-5-基硫基)-9-[2-(2-氯-6-氟-苯基)-乙基]-9H-嘌呤-6-基胺: ^{1}H NMR (丙酮-d_6) δ 8.24 (s, 1H), 7.32-7.27 (m, 1H), 7.22-7.20 (m, 2H), 7.07-7.03 (m, 1H), 6.82 (s, 1H), 6.10 (s, 2H), 4.60 (t, *J*=8.0 Hz, 2H), 3.41 (t, *J*=6.4 Hz, 2H); LC-MS $[M+H]^+$ 523.9。8-(6-溴-苯并[1,3]间二氧杂环戊烯-5-基硫基)-3-[2-(2-氯-6-氟-苯基)-乙基]-3H-嘌呤-6-基胺: ^{1}H NMR (丙酮-d_6) δ 8.34 (s, 1H), 7.36-7.29 (m, 2H), 7.26-7.23 (m, 2H), 7.09-7.05 (m, 1H), 6.17 (s, 2H), 4.68 (t, *J*=6.8 Hz, 2H), 3.46 (t, *J*=6.8 Hz, 2H); LC-MS $[M+H]^+$ 523.9。

实施例 132 和 133



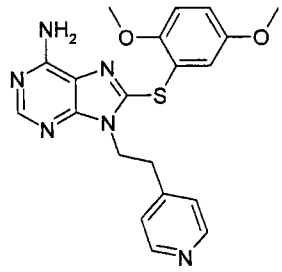


8-(2,5-二甲氧基-苯基硫基)-9-[2-(3,5-二甲基-苯基)-乙基]-9H-嘌呤-6-基胺和 8-(2,5-二甲氧基-苯基硫基)-3-[2-(3,5-二

甲基-苯基)-乙基]-3H-嘌呤-6-基胺

通过类似于实施例 1 和 2 的步骤从 8-(2,5-二甲氧基-苯基硫基)-9H-嘌呤-6-基胺和 1-(2-氯-乙基)-3,5-二甲基-苯制备所述标题化合物。通过制备型 HPLC 分离所述异构体。8-(2,5-二甲氧基-苯基硫基)-9-[2-(3,5-二甲基-苯基)-乙基]-9H-嘌呤-6-基胺: ^{1}H NMR (DMSO-d_6) δ 8.33 (s, 1H), 7.05 (d, J=8.8 Hz, 1H), 6.90 (dd, *J*= 6.0, 3.2 Hz, 1H), 6.60 (d, *J*=3.2 Hz, 1H), 6.82 (s, 1H), 6.65 (s, 2H), 4.37 (t, *J*=7.2 Hz, 2H), 3.75 (s, 3H), 3.63 (s, 3H), 2.87 (t, *J*=7.2 Hz, 2H), 2.18 (s, 6H); LC-MS $[M+H]^+$ 436.2。8-(2,5-二甲氧基-苯基硫基)-3-[2-(3,5-二甲基-苯基)-乙基]-3H-嘌呤-6-基胺: ^{1}H NMR (DMSO-d_6) δ 8.42 (s, 1H), 7.25 (d, *J*=2.8 Hz, 1H), 7.19-7.17 (m, 1H), 7.11-7.09 (m, 1H), 6.87 (s, 1H), 6.87 (s, 2H), 4.49 (t, *J*=6.4 Hz, 2H), 3.77 (s, 3H), 3.73 (s, 3H), 3.07 (t, *J*=6.4 Hz, 2H), 2.21 (s, 6H); LC-MS $[M+H]^+$ 436.2。

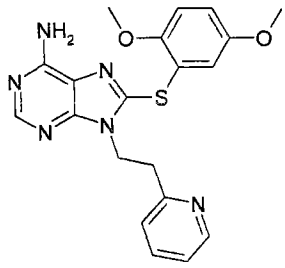
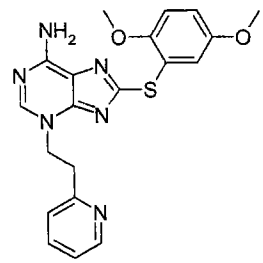
实施例 134



8-(2,5-二甲氧基-苯基硫基)-9-(2-吡啶-4-基-乙基)-9H-嘌呤-6-基胺

通过类似于实施例 1 和 2 的步骤从 8-(2,5-二甲氧基-苯基硫基)-9H-嘌呤-6-基胺和 4-(2-氯-乙基)-吡啶制备所述标题化合物。通过制备型 HPLC 纯化所述化合物。^{1}H NMR (CD3OD) δ 8.68 (d, *J*= 6.4 Hz, 2H), 8.27 (s, 1H), 7.84 (d, *J*= 6.4Hz, 2H), 7.06-6.98 (m, 3H), 4.75 (t, *J*= 6.8 Hz, 2H), 3.75 (s, 3H), 3.74 (s, 3H), 3.53 (t, *J*= 6.8 Hz, 2H); LC-MS $[M+H]^+$ 409.1。

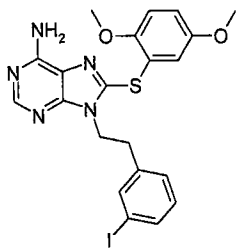
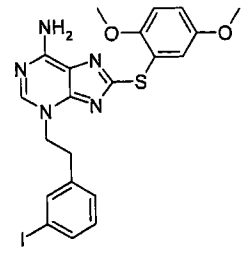
实施例 135 和 136

8-(2,5-二甲氧基-苯基硫基)-9-(2-吡啶-2-基-乙基)-9H-嘌呤-6-基胺和 8-(2,5-二甲氧基-苯基硫基)-3-(2-吡啶-2-基-乙基)-3H-嘌呤-6-基胺

通过类似于实施例 1 和 2 的步骤从 8-(2,5-二甲氧基-苯基硫基)-9H-嘌呤-6-基胺和 2-(2-溴-乙基)-吡啶制备所述标题化合物。通过制备型 HPLC 分离所述异构体。8-(2,5-二甲氧基-苯基硫基)-9-(2-吡啶-2-基-乙基)-9H-嘌呤-6-基胺: ^{1}H NMR (CD_3OD) δ 8.63-8.60 (m, 2H), 8.22 (s, 1H), 8.18 (dt, *J*= 8.0, 2.0 Hz, 1H), 7.77 (dd, *J*= 8.0, 2.0 Hz, 1H), 7.07-6.99 (m, 3H), 4.69 (t, *J*= 6.8Hz, 2H), 3.75 (s, 3H), 3.74 (s, 3H), 3.41 (t, *J*= 6.8 Hz, 2H); TOF LC-MS $[M+H]^+$ 409.1。8-(2,5-二甲氧基-苯基硫基)-3-(2-吡啶-2-基-乙基)-3H-嘌呤-6-基胺: ^{1}H NMR (CD_3OD) δ 8.70-8.50 (m, 2H), 8.40 (s, 1H), 8.11 (d, *J*= 7.6 Hz, 1H), 7.72 (m, 1H), 7.29 (dd, *J*= 6.8, 1.2 Hz, 1H), 7.23-7.17 (m, 2H), 4.69 (t, *J*= 7.2 Hz, 2H), 3.81 (s, 3H), 3.80 (s, 3H), 3.41 (t, *J*= 7.2 Hz, 2H); LC-MS $[M+H]^+$ 409.1。

实施例 137 和 138

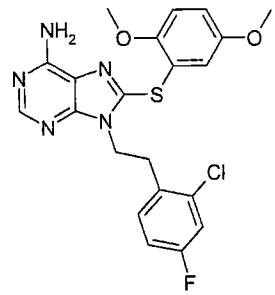



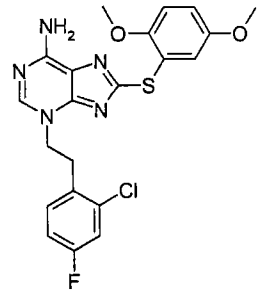
8-(2,5-二甲氧基-苯基硫基)-9-[2-(3-碘-苯基)-乙基]-9H-嘌呤-6-基胺和 8-(2,5-二甲氧基-苯基硫基)-3-[2-(3-碘-苯基)-乙基]-3H-嘌呤-6-基胺

通过类似于实施例 1 和 2 的步骤从 8-(2,5-二甲氧基-苯基硫基)-9H-嘌呤-6-基胺和 1-(2-溴-乙基)-3-碘-苯制备所述标题化合

物。通过制备型 HPLC 分离所述异构体。8-(2,5-二甲氧基-苯基硫基)-9-[2-(3-碘-苯基)-乙基]-9H-嘌呤-6-基胺: ^{1}H NMR (CD_3OD) δ 8.23 (s, 1H), 7.56-7.52 (m, 1H), 7.41 (s, 1H), 7.04-7.01 (m, 3H), 6.88 (d, *J*= 8.8 Hz, 1H), 6.53 (s, 1H), 4.39 (t, *J*= 6.8 Hz, 2H), 3.76 (s, 3H), 3.62 (s, 3H), 2.97 (t, *J*= 6.8 Hz, 2H); LC-MS $[M+H]^+$ 534.0。8-(2,5-二甲氧基-苯基硫基)-3-[2-(3-碘-苯基)-乙基]-3H-嘌呤-6-基胺: ^{1}H NMR (CD_3OD) δ 8.21 (s, 1H), 7.60 (d, *J*= 8.4 Hz, 1H), 7.49 (s, 1H), 7.30 (s, 1H), 7.20-7.14 (m, 3H), 7.06 (t, *J*= 7.6 Hz, 1H), 4.58 (t, *J*= 7.2 Hz, 2H), 3.82 (s, 3H), 3.81 (s, 3H), 3.18 (t, *J*= 7.2 Hz, 2H); LC-MS $[M+H]^+$ 534.0。

实施例 139 和 140

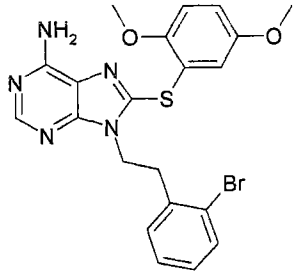


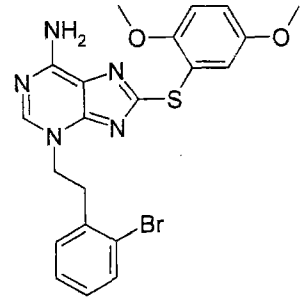


9-[2-(2-氯-4-氟-苯基)-乙基]-8-(2,5-二甲氧基-苯基硫基)-9H-嘌呤-6-基胺和 3-[2-(2-氯-4-氟-苯基)-乙基]-8-(2,5-二甲氧基-苯基硫基)-3H-嘌呤-6-基胺

通过类似于实施例 1 和 2 的步骤从 8-(2,5-二甲氧基-苯基硫基)-9H-嘌呤-6-基胺和 1-(2-溴-乙基)-2-氯-4-氟-苯制备所述标题化合物。通过制备型 HPLC 分离所述异构体。9-[2-(2-氯-4-氟-苯基)-乙基]-8-(2,5-二甲氧基-苯基硫基)-9H-嘌呤-6-基胺: ^{1}H NMR (CD_3OD) δ 8.21 (s, 1H), 7.17 (dd, *J*= 8.8, 2.8Hz, 1H), 7.08-6.92 (m, 5H), 4.59 (t, *J*= 6.8 Hz, 2H), 3.73 (s, 6H), 3.31 (t, *J*= 6.8 Hz, 2H); LC- MS $[M+H]^+$ 460.1。3-[2-(2-氯-4-氟-苯基)-乙基]-8-(2,5-二甲氧基-苯基硫基)-3H-嘌呤-6-基胺: ^{1}H NMR (CD_3OD) δ 8.19 (s, 1H), 7.28 (s, 1H), 7.21-7.18 (m, 4H), 7.03-6.97 (m, 1H), 4.63 (t, *J*= 6.8 Hz, 2H), 3.81 (s, 3H), 3.80 (s, 3H), 3.36 (t, *J*= 6.8 Hz, 2H); LC-MS $[M+H]^+$ 460.1。

实施例 141 和 142

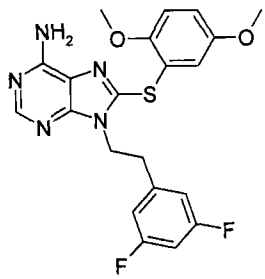


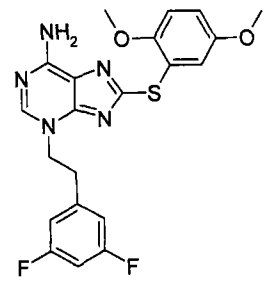


9-[2-(2-溴-苯基)-乙基]-8-(2,5-二甲氧基-苯基硫基)-9H-嘌呤-6-基胺和 3-[2-(2-溴-苯基)-乙基]-8-(2,5-二甲氧基-苯基硫基)-3H-嘌呤-6-基胺

通过类似于实施例 1 和 2 的步骤从 8-(2,5-二甲氧基-苯基硫基)-9H-嘌呤-6-基胺和 1-溴-2-(2-溴-乙基)-苯制备所述标题化合物。通过制备型 HPLC 分离所述异构体。9-[2-(2-溴-苯基)-乙基]-8-(2,5-二甲氧基-苯基硫基)-9H-嘌呤-6-基胺: ^{1}H NMR (DMSO-d6) δ 8.27 (s, 1H), 7.54 (dd, *J*= 8.0, 1.2 Hz, 1H), 7.22 (t, *J*= 7.2 Hz, 1H), 7.14 (t, *J*= 7.6 Hz, 1H), 7.00 (t, *J*= 7.8 Hz, 1H), 6.99 (d, *J*= 8.8 Hz, 1H), 6.86 (dd, *J*= 8.8, 2.8 Hz, 1H), 6.51 (s, 1H), 4.48 (t, *J*= 6.8 Hz, 2H), 3.72 (s, 3H), 3.61 (s, 3H), 3.18 (t, *J*= 6.8 Hz, 2H); LC-MS $[M+H]^+$ 486.1。3-[2-(2-溴-苯基)-乙基]-8-(2,5-二甲氧基-苯基硫基)-3H-嘌呤-6-基胺: ^{1}H NMR (CD_3OD) δ 8.27 (s, 1H), 7.54 (d, *J*= 7.6 Hz, 1H), 7.30-7.25 (m, 2H), 7.19-7.14 (m, 4H), 4.65 (t, *J*= 6.8 Hz, 2H), 3.81 (s, 3H), 3.80 (s, 3H), 3.39 (t, *J*= 6.8 Hz, 2H); LC- MS $[M+H]^+$ 486.1。

实施例 143 和 144



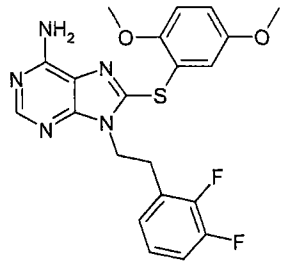


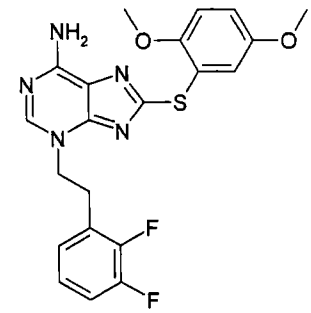
9-[2-(3,5-二氟-苯基)-乙基]-8-(2,5-二甲氧基-苯基硫基)-9H-嘌呤-6-基胺和 3-[2-(3,5-二氟-苯基)-乙基]-8-(2,5-二甲

氧基-苯基硫基)-3H-嘌呤-6-基胺

通过类似于实施例 1 和 2 的步骤从 8-(2,5-二甲氧基-苯基硫基)-9H-嘌呤-6-基胺和 1-(2-溴-乙基)-3,5-二氟-苯制备所述标题化合物。通过制备型 HPLC 分离所述异构体。9-[2-(3,5-二氟-苯基)-乙基]-8-(2,5-二甲氧基-苯基硫基)-9H-嘌呤-6-基胺:^{1}H NMR (CD_3OD) δ 8.28 (s, 1H), 7.07-7.03 (m, 3H), 6.81-6.72 (m, 3H), 4.58 (t, *J*= 6.8 Hz, 2H), 3.75 (s, 3H), 3.74 (s, 3H), 3.20 (t, *J*= 6.8 Hz, 2H); LC-MS $[M+H]^+$ 444.1。3-[2-(3,5-二氟-苯基)-乙基]-8-(2,5-二甲氧基-苯基硫基)-3H-嘌呤-6-基胺: ^{1}H NMR (CD_3OD) δ 8.28 (s, 1H), 7.31 (s, 1H), 7.20-7.19 (m, 2H), 6.90-6.80 (m, 3H), 4.61 (t, *J*= 7.2 Hz, 2H), 3.81 (s, 3H), 3.80 (s, 3H), 3.26 (t, *J*= 7.2 Hz, 2H); LC- MS $[M+H]^+$ 444.1。

实施例 145 和 146



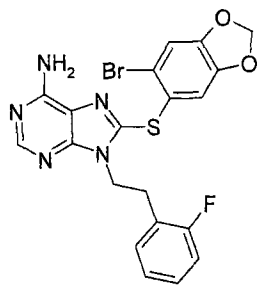


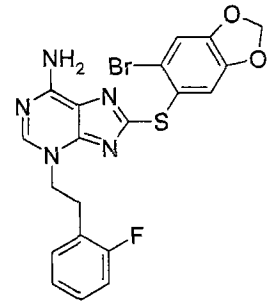
9-[2-(2,3-二氟-苯基)-乙基]-8-(2,5-二甲氧基-苯基硫基)-9H-嘌呤-6-基胺和 3-[2-(2,3-二氟-苯基)-乙基]-8-(2,5-二甲氧基-苯基硫基)-3H-嘌呤-6-基胺

通过类似于实施例 1 和 2 的步骤从 8-(2,5-二甲氧基-苯基硫基)-9H-嘌呤-6-基胺和 1-(2-溴-乙基)-2,3-二氟-苯制备所述标题化合物。通过制备型 HPLC 分离所述异构体。9-[2-(2,3-二氟-苯基)-乙基]-8-(2,5-二甲氧基-苯基硫基)-9H-嘌呤-6-基胺:^{1}H NMR (CD_3OD) δ 8.26 (s, 1H), 7.14-7.10 (m, 1H), 7.03-6.98 (m, 4H), 6.85-6.81 (m, 1H), 4.61 (t, *J*= 6.8 Hz, 2H), 3.75 (s, 3H), 3.74 (s, 3H), 3.30 (t, *J*= 6.8Hz, 2H); LC- MS $[M+H]^+$ 444.1。3-[2-(2,3-二氟-苯基)-乙基]-8-(2,5-二甲氧基-苯基硫基)-3H-嘌呤-6-基胺: ^{1}H NMR (CD_3OD) δ 8.24 (s, 1H), 7.29 (dd, *J*= 2.8, 0.8 Hz, 1H),

7.19-7.13 (m, 3H), 7.10-7.05 (m, 1H), 6.94 (dt, *J*= 7.6, 1.2 Hz, 1H), 4.64 (t, *J*= 6.8 Hz, 2H), 3.81 (s, 3H), 3.80 (s, 3H), 3.34 (t, *J*= 6.8 Hz, 2H); LC- MS $[M+H]^+$ 444.1。

实施例 147 和 148

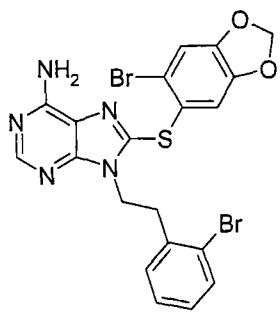


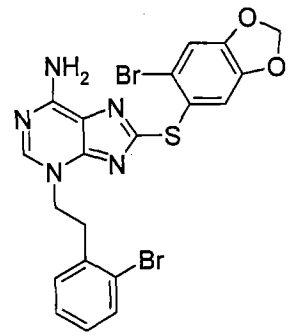


8-(6-溴-1,3-苯并间二氧杂环戊烯-5-基硫基)-9-[2-(2-氟-苯基)-乙基]-9H-嘌呤-6-基胺和 8-(6-溴-苯并[1,3]间二氧杂环戊烯-5-基硫基)-3-[2-(2-氟-苯基)-乙基]-3H-嘌呤-6-基胺

通过类似于实施例 1 和 2 的步骤从 8-(6-溴-苯并[1,3]间二氧杂环戊烯-5-基硫基)-9H-嘌呤-6-基胺和 1-(2-溴-乙基)-2-氟-苯制备所述标题化合物。通过制备型 HPLC 分离所述异构体。8-(6-溴-苯并[1,3]间二氧杂环戊烯-5-基硫基)-9-[2-(2-氟-苯基)-乙基]-9H-嘌呤-6-基胺: ^{1}H NMR (DMSO-d_6) δ 8.17 (s, 1H), 7.33 (s, 1H), 7.25-7.22 (m, 1H), 7.11-7.02 (m, 3H), 6.65 (s, 1H), 6.08 (s, 2H), 4.41 (t, *J*= 7.2 Hz, 2H), 3.10 (t, *J*= 7.2 Hz, 2H); LC- MS $[M+H]^+$ 489.9。8-(6-溴-苯并[1,3]间二氧杂环戊烯-5-基硫基)-3-[2-(2-氟-苯基)-乙基]-3H-嘌呤-6-基胺: ^{1}H NMR (CD_3OD) δ 8.19 (s, 1H), 7.37 (s, 1H), 7.36 (s, 1H), 7.30-7.22 (m, 1H), 7.14-7.00 (m, 3H), 6.16 (s, 2H), 4.62 (t, *J*= 6.8 Hz, 2H), 3.29 (t, *J*= 6.8 Hz, 2H); LC- MS $[M+H]^+$ 489.9。

实施例 149 和 150

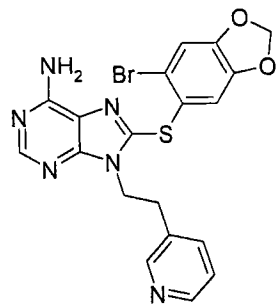


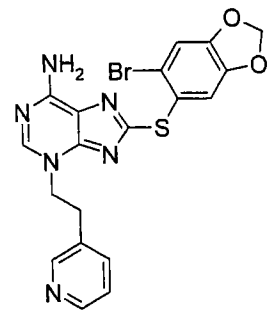


8-(6-溴-苯并[1,3]间二氧杂环戊烯-5-基硫基)-9-[2-(2-溴-苯基)-乙基]-9H-嘌呤-6-基胺和 8-(6-溴-苯并[1,3]间二氧杂环戊烯-5-基硫基)-3-[2-(2-溴-苯基)-乙基]-3H-嘌呤-6-基胺

通过类似于实施例 1 和 2 的步骤从 8-(6-溴-苯并[1,3]间二氧杂环戊烯-5-基硫基)-9H-嘌呤-6-基胺和 1-溴-2-(2-溴-乙基)-苯制备所述标题化合物。通过制备型 HPLC 分离所述异构体。8-(6-溴-苯并[1,3]间二氧杂环戊烯-5-基硫基)-9-[2-(2-溴-苯基)-乙基]-9H-嘌呤-6-基胺: ^{1}H NMR (CD_3OD) δ 8.22 (s, 1H), 7.52 (dd, *J*= 8.0, 1.2 Hz, 1H), 7.21-7.11 (m, 3H), 7.04 (dd, *J*= 7.8, 1.6 Hz, 1H), 6.95 (s, 1H), 6.06 (s, 2H), 4.60 (t, *J*= 6.8 Hz, 2H), 3.31 (t, *J*= 6.8 Hz, 2H); LC- MS $[M+H]^+$ 550.0。8-(6-溴-苯并[1,3]间二氧杂环戊烯-5-基硫基)-3-[2-(2-溴-苯基)-乙基]-3H-嘌呤-6-基胺: ^{1}H NMR (CD_3OD) δ 8.16 (s, 1H), 7.52 (dd, *J*= 8.0, 1.6 Hz, 1H), 7.37 (s, 1H), 7.36 (s, 1H), 7.30-7.23 (m, 1H), 7.17-7.14 (m, 2H), 6.16 (s, 2H), 4.64 (t, *J*= 6.8 Hz, 2H), 3.38 (t, *J*= 6.8 Hz, 2H); LC- MS $[M+H]^+$ 550.0。

实施例 151 和 152



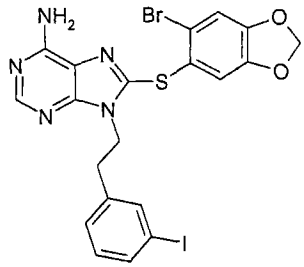


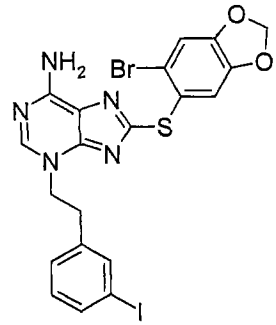
8-(6-溴-苯并[1,3]间二氧杂环戊烯-5-基硫基)-9-(2-吡啶-3-基-乙基)-9H-嘌呤-6-基胺和 8-(6-溴-苯并[1,3]间二氧杂环戊烯-5-基硫基)-3-(2-吡啶-3-基-乙基)-3H-嘌呤-6-基胺

通过类似于实施例 1 和 2 的步骤从 8-(6-溴-苯并[1,3]间二氧杂环戊烯-5-基硫基)-9H-嘌呤-6-基胺和 3-(2-氯-乙基)-吡啶制备所述标题化合物。通过制备型 HPLC 分离所述异构体。8-(6-溴-苯并[1,3]间二氧杂环戊烯-5-基硫基)-9-(2-吡啶-3-基-乙基)-9H-嘌呤-6-基胺: ^{1}H NMR (CD_3OD) δ 8.75-7.74 (m, 2H), 8.38 (d, *J*= 8.0 Hz, 1H), 8.27 (s, 1H), 7.93 (t, *J*= 8.0 Hz, 1H), 7.26 (s, 1H), 7.15

(s, 1H), 6.09 (s, 2H), 4.70 (t, *J*= 6.8 Hz, 2H), 3.49 (t, *J*= 6.8 Hz, 2H); LC- MS $[M+H]^+$ 473.0。8-(6-溴-苯并[1,3]间二氧杂环戊烯-5-基硫基)-3-(2-吡啶-3-基-乙基)-3H-嘌呤-6-基胺: ^1H NMR (CD_3OD) δ 8.65-7.84 (m, 1H), 8.43 (s, 1H), 8.17 (d, *J*= 8.0 Hz, 1H), 7.90 (s, 1H), 7.76 (m, 1H), 7.38 (s, 1H), 7.36 (s, 1H), 6.16 (s, 2H), 4.70 (t, *J*= 7.2 Hz, 2H), 3.43 (t, *J*= 7.2 Hz, 2H); LC-MS $[M+H]^+$ 473.0。

实施例 153 和 154

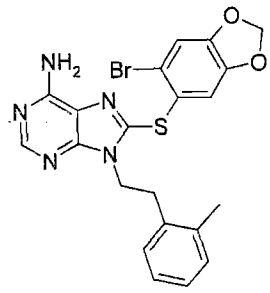


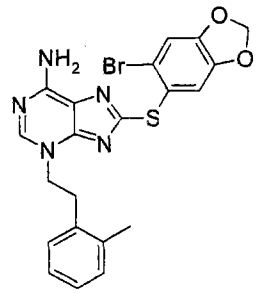


8-(6-溴-苯并[1,3]间二氧杂环戊烯-5-基硫基)-9-[2-(3-碘-苯基)-乙基]-9H-嘌呤-6-基胺和 8-(6-溴-苯并[1,3]间二氧杂环戊烯-5-基硫基)-3-[2-(3-碘-苯基)-乙基]-3H-嘌呤-6-基胺

通过类似于实施例 1 和 2 的步骤从 8-(6-溴-苯并[1,3]间二氧杂环戊烯-5-基硫基)-9H-嘌呤-6-基胺和 1-(2-溴-乙基)-3-碘-苯制备所述标题化合物。通过制备型 HPLC 分离所述异构体。8-(6-溴-苯并[1,3]间二氧杂环戊烯-5-基硫基)-9-[2-(3-碘-苯基)-乙基]-9H-嘌呤-6-基胺: ^1H NMR ($CDCl_3$) δ 8.18 (s, 1H), 7.58 (dd, *J*= 7.6, 1.2 Hz, 1H), 7.52 (s, 1H), 7.15 (s, 1H), 7.07 (d, *J*=8.0 Hz, 1H), 7.01 (t, *J*= 7.6, 1.2 Hz, 1H), 7.00 (s, 1H), 6.07 (s, 2H), 4.46 (t, *J*= 7.6 Hz, 2H), 3.08 (t, *J*= 7.6 Hz, 2H); TOF LC-MS $[M+H]^+$ 597.9。8-(6-溴-苯并[1,3]间二氧杂环戊烯-5-基硫基)-3-[2-(3-碘-苯基)-乙基]-3H-嘌呤-6-基胺: ^1H NMR ($CDCl_3$) δ 7.64-7.58 (m, 2H), 7.46 (s, 1H), 7.19(s, 1H), 7.18 (s, 1H), 7.04-6.98 (m, 1H), 6.94-6.89 (m, 1H), 6.08 (s, 2H), 4.48 (t, *J*= 9.2 Hz, 2H), 3.18 (t, *J*= 9.2 Hz, 2H); TOF LC-MS $[M+H]^+$ 597.9。

实施例 155 和 156

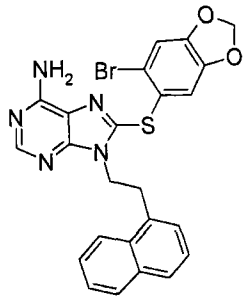


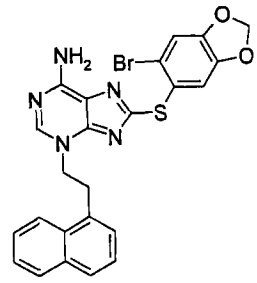


8-(6-溴-苯并[1,3]间二氧杂环戊烯-5-基硫基)-9-(2-邻甲苯基-乙基)-9H-嘌呤-6-基胺和 8-(6-溴-苯并[1,3]间二氧杂环戊烯-5-基硫基)-3-(2-邻甲苯基-乙基)-3H-嘌呤-6-基胺

通过类似于实施例 1 和 2 的步骤从 8-(6-溴-苯并[1,3]间二氧杂环戊烯-5-基硫基)-9H-嘌呤-6-基胺和 1-(2-溴-乙基)-2-甲基-苯制备所述标题化合物。通过制备型 HPLC 分离所述异构体。8-(6-溴-苯并[1,3]间二氧杂环戊烯-5-基硫基)-9-(2-邻甲苯基-乙基)-9H-嘌呤-6-基胺: ^{1}H NMR (CD_3OD) δ 8.27 (s, 1H), 7.24 (s, 1H), 7.15 (d, *J*= 7.2 Hz, 1H), 7.11 (dt, *J*= 7.2, 1.2 Hz, 1H), 7.03 (s, 1H), 7.01 (dt, *J*= 7.2, 1.6 Hz, 1H), 6.87 (d, *J*= 7.6 Hz, 1H), 6.07 (s, 2H), 4.51 (t, *J*= 7.2 Hz, 2H), 3.20 (t, *J*= 7.2 Hz, 2H), 2.37 (s, 3H); TOF LC-MS $[M+H]^+$ 486.0。8-(6-溴-苯并[1,3]间二氧杂环戊烯-5-基硫基)-3-(2-邻甲苯基-乙基)-3H-嘌呤-6-基胺: ^{1}H NMR (CD_3OD) δ 8.18 (s, 1H), 7.37 (s, 1H), 7.36 (s, 1H), 7.17-7.09 (m, 2H), 7.04 (dt, *J*= 7.2, 1.6 Hz, 1H), 6.93 (d, *J*= 7.2 Hz, 1H), 6.16 (s, 2H), 4.54 (t, *J*= 7.2 Hz, 2H), 3.23 (t, *J*= 7.2 Hz, 2H), 2.26 (s, 3H); TOF LC-MS $[M+H]^+$ 486.0。

实施例 157 和 158



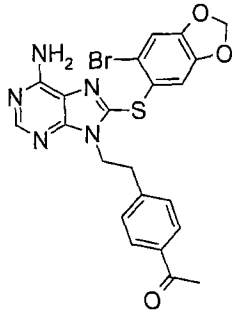


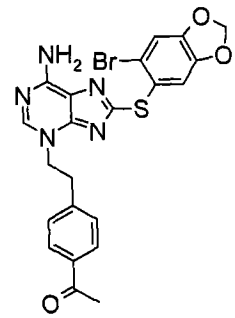
8-(6-溴-苯并[1,3]间二氧杂环戊烯-5-基硫基)-9-(2-萘-1-基-乙基)-9H-嘌呤-6-基胺和 8-(6-溴-苯并[1,3]间二氧杂环戊烯-5-基

硫基)-3-(2-萘-1-基-乙基)-3H-嘌呤-6-基胺

通过类似于实施例 1 和 2 的步骤从 8-(6-溴-苯并[1,3]间二氧杂环戊烯-5-基硫基)-9H-嘌呤-6-基胺和 1-(2-溴-乙基)-萘制备所述标题化合物。通过制备型 HPLC 分离所述异构体。8-(6-溴-苯并[1,3]间二氧杂环戊烯-5-基硫基)-9-(2-萘-1-基-乙基)-9H-嘌呤-6-基胺: ^{1}H NMR ($CDCl_3$) δ 8.14 (s, 1H), 8.09 (d, *J*=7.6 Hz, 1H), 7.88 (d, *J*=8.0 Hz, 1H), 7.79 (d, *J*=8.0 Hz, 1H), 7.58 (dt, *J*=8.4, 1.6 Hz, 1H), 7.52 (dt, *J*=8.4, 1.6 Hz, 1H), 7.36 (t, *J*=8.0 Hz, 1H), 7.22 (d, *J*=7.6 Hz, 1H), 7.13 (s, 1H), 6.95 (s, 1H), 6.06 (s, 2H), 4.62 (t, *J*=7.2 Hz, 2H), 3.60 (t, *J*= 7.2 Hz, 2H); TOF LC-MS $[M+H]^+$ 522.0。8-(6-溴-苯并[1,3]间二氧杂环戊烯-5-基硫基)-3-(2-萘-1-基-乙基)-3H-嘌呤-6-基胺: ^{1}H NMR (丙酮-d_6) δ 8.33 (s, 1H), 8.18 (d, *J*= 8.0 Hz, 1H), 8.28-7.83 (m, 2H), 7.57-7.39 (m, 4H), 7.35-7.32 (m, 2H), 6.13 (s, 2H), 4.73 (t, *J*= 8.0 Hz, 2H), 3.77 (t, *J*= 8.0 Hz, 2H); TOF LC-MS $[M+H]^+$ 522.0。

实施例 159 和 160





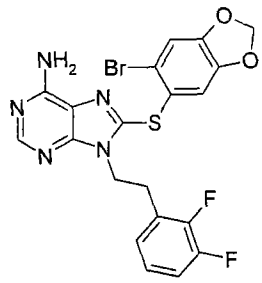
1-(4-{2-[6-氨基-8-(6-溴-苯并[1,3]间二氧杂环戊烯-5-基硫基)-嘌呤-9-基]-乙基}-苯基)-乙酮和 1-(4-{2-[6-氨基-8-(6-溴-苯并[1,3]间二氧杂环戊烯-5-基硫基)-嘌呤-3-基]-乙基}-苯基)-乙酮

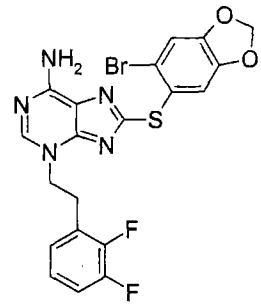
通过类似于实施例 1 和 2 的步骤从 8-(6-溴-苯并[1,3]间二氧杂环戊烯-5-基硫基)-9H-嘌呤-6-基胺和 1-[4-(2-氯-乙基)-苯基]-乙酮制备所述标题化合物。通过制备型 HPLC 分离所述异构体。1-(4-{2-[6-氨基-8-(6-溴-苯并[1,3]间二氧杂环戊烯-5-基硫基)-嘌呤-9-基]-乙基}-苯基)-乙酮: ^{1}H NMR ($CDCl_3$) δ 8.18 (s, 1H),

7.98 (d, *J*=8.4 Hz, 2H), 7.24 (d, *J*=8.4 Hz, 2H), 7.13 (s, 1H), 6.96 (s, 1H), 6.06 (s, 2H), 4.53 (t, *J*=7.6 Hz, 2H), 3.24 (t, *J*= 7.6 Hz, 2H), 2.59 (s, 3H); TOF LC-MS $[M+H]^+$ 514.05。

1-(4-{2-[6-氨基-8-(6-溴-苯并[1,3]间二氧杂环戊烯-5-基硫基)-嘌呤-3-基]-乙基}-苯基)-乙酮: ^{1}H NMR ($CDCl_3$) δ 7.89 (d, *J*=8.0 Hz, 2H), 7.61 (s, 1H), 7.25 (s, 1H), 7.19 (s, 1H), 7.11 (d, *J*=8.0 Hz, 2H), 6.11 (s, 2H), 4.54 (t, *J*=7.2 Hz, 2H), 3.30 (t, *J*= 7.2 Hz, 2H), 2.59 (s, 3H); TOF LC-MS $[M+H]^+$ 514.05。

实施例 161 和 162

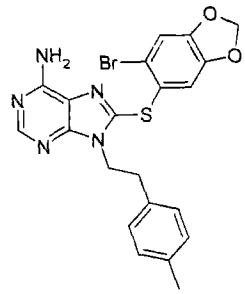


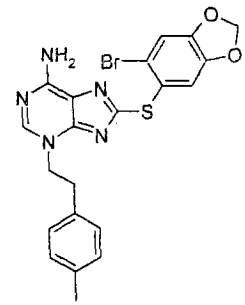


8-(6-溴-苯并[1,3]间二氧杂环戊烯-5-基硫基)-9-[2-(2,3-二氟-苯基)-乙基]-9H-嘌呤-6-基胺和 8-(6-溴-1,3-苯并[1,3]间二氧杂环戊烯-5-基硫基)-3-[2-(2,3-二氟-苯基)-乙基]-3H-嘌呤-6-基胺

通过类似于实施例 1 和 2 的步骤从 8-(6-溴-苯并[1,3]间二氧杂环戊烯-5-基硫基)-9H-嘌呤-6-基胺和 1-(2-溴-乙基)-2,3-二氟-苯制备所述标题化合物。通过制备型 HPLC 分离所述异构体。8-(6-溴-苯并[1,3]间二氧杂环戊烯-5-基硫基)-9-[2-(2,3-二氟-苯基)-乙基]-9H-嘌呤-6-基胺: ^{1}H NMR ($CDCl_3$) δ 8.30 (s, 1H), 7.07 (s, 1H), 7.03 (dt, *J*= 7.6,1.6 Hz, 1H), 6.93-6.90 (m, 1H), 6.80 (s, 1H), 6.70 (dt, *J*= 7.6,1.6 Hz, 1H), 6.00 (s, 2H), 4.50 (t, *J*= 6.8 Hz, 2H), 3.21 (t, *J*= 6.8 Hz, 2H); TOF LC-MS $[M+H]^+$ 508.0。8-(6-溴-苯并[1,3]间二氧杂环戊烯-5-基硫基)-3-[2-(2,3-二氟-苯基)-乙基]-3H-嘌呤-6-基胺: ^{1}H NMR ($CDCl_3$) δ 7.70 (s, 1H), 7.24 (s, 1H), 7.19 (s, 1H), 7.15-7.07 (m, 1H), 7.01-6.95 (m, 1H), 6.63 (dt, *J*= 8.0,1.6 Hz, 1H), 6.10 (s, 2H), 4.54 (t, *J*= 6.8 Hz, 2H), 3.30 (t, *J*= 6.8 Hz, 2H); TOF LC-MS $[M+H]^+$ 508.0。

实施例 163 和 164

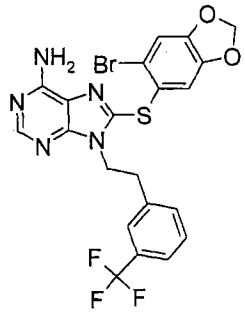


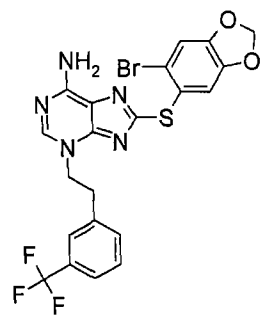


8-(6-溴-苯并[1,3]间二氧杂环戊烯-5-基硫基)-9-(2-对甲苯基-乙基)-9H-嘌呤-6-基胺和 8-(6-溴-苯并[1,3]间二氧杂环戊烯-5-基硫基)-3-(2-对甲苯基-乙基)-3H-嘌呤-6-基胺

通过类似于实施例 1 和 2 的步骤从 8-(6-溴-苯并[1,3]间二氧杂环戊烯-5-基硫基)-9H-嘌呤-6-基胺和 1-(2-溴-乙基)-4-甲基-苯制备所述标题化合物。通过制备型 HPLC 分离所述异构体。8-(6-溴-苯并[1,3]间二氧杂环戊烯-5-基硫基)-9-(2-对甲苯基-乙基)-9H-嘌呤-6-基胺: ^{1}H NMR ($CDCl_3$) δ 8.16 (s, 1H), 7.14 (s, 1H), 7.09 (d, *J*= 7.6 Hz, 2H), 7.00 (d, *J*= 7.6 Hz, 2H), 6.99 (s, 1H), 6.07 (s, 2H), 4.47 (t, *J*=7.6Hz, 2H), 3.11 (t, *J*= 7.6Hz, 2H), 2.31 (s, 3H); TOF LC-MS $[M+H]^+$ 486.0。8-(6-溴-苯并[1,3]间二氧杂环戊烯-5-基硫基)-3-(2-对甲苯基-乙基)-3H-嘌呤-6-基胺: ^{1}H NMR ($CDCl_3$) δ 8.26 (s, 1H), 7.40 (s, 1H), 7.33 (s, 1H), 7.09 (d, *J*= 7.6 Hz, 2H), 7.02 (d, *J*= 7.6 Hz, 2H), 6.19 (s, 2H), 4.61 (t, *J*=7.2Hz, 2H), 3.21 (t, *J*= 7.2 Hz, 2H), 2.27 (s, 3H); TOF LC-MS $[M+H]^+$ 486.0。

实施例 165 和 166



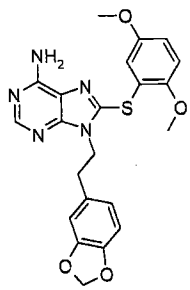


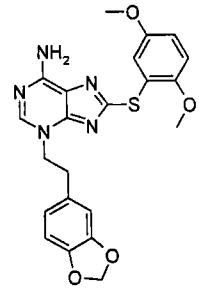
8-(6-溴-苯并[1,3]间二氧杂环戊烯-5-基硫基)-9-[2-(3-三氟甲基-苯基)-乙基]-9H-嘌呤-6-基胺和 8-(6-溴-苯并[1,3]间二氧杂

环戊烯-5-基硫基)-3-[2-(3-三氟甲基-苯基)-乙基]-3H-嘌呤-6-基胺

通过类似于实施例 1 和 2 的步骤从 8-(6-溴-苯并[1,3]间二氧杂环戊烯-5-基硫基)-9H-嘌呤-6-基胺和 1-(2-溴-乙基)-3-三氟甲基-苯制备所述标题化合物。通过制备型 HPLC 分离所述异构体。8-(6-溴-苯并[1,3]间二氧杂环戊烯-5-基硫基)-9-[2-(3-三氟甲基-苯基)-乙基]-9H-嘌呤-6-基胺: ^{1}H NMR ($CDCl_3$) δ 8.16 (s, 1H), 7.54 (d, *J*=8.0 Hz, 1H), 7.41 (t, *J*= 7.2 Hz, 2H), 7.32 (d, *J*= 7.6 Hz, 1H), 7.15 (s, 1H), 7.04 (s, 1H), 6.08 (s, 2H), 4.53 (t, *J*=7.6Hz, 2H), 3.23 (t, *J*= 7.6 Hz, 2H); TOF LC-MS $[M+H]^+$ 540.0。8-(6-溴-苯并[1,3]间二氧杂环戊烯-5-基硫基)-3-[2-(3-三氟甲基-苯基)-乙基]-3H-嘌呤-6-基胺: ^{1}H NMR ($CDCl_3$) δ 7.71 (s, 1H), 7.56 (d, *J*=8.0 Hz, 1H), 7.43 (t, *J*= 7.6 Hz, 1H), 7.38 (s, 1H), 7.25 (s, 1H), 7.20 (s, 1H), 7.18 (d, *J*= 7.6 Hz, 1H), 6.10 (s, 2H), 4.53 (t, *J*=7.2 Hz, 2H), 3.31 (t, *J*= 7.2 Hz, 2H); TOF LC-MS $[M+H]^+$ 540.0。

实施例 167 和 168



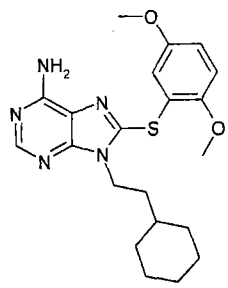


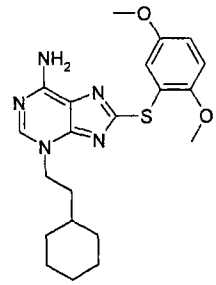
9-(2-苯并[1,3]间二氧杂环戊烯-5-基-乙基)-8-(2,5-二甲氧基-苯基硫基)-9H-嘌呤-6-基胺和 3-(2-苯并[1,3]间二氧杂环戊烯-5-基-乙基)-8-(2,5-二甲氧基-苯基硫基)-3H-嘌呤-6-基胺

通过类似于实施例 1 和 2 的步骤从 8-(2,5-二甲氧基-苯基硫基)-9H-嘌呤-6-基胺和 5-(2-溴-乙基)-苯并[1,3]-二氧杂环戊烯制备所述标题化合物。通过制备型 HPLC 分离所述异构体。9-(2-苯并[1,3]间二氧杂环戊烯-5-基-乙基)-8-(2,5-二甲氧基-苯基硫基)-9H-嘌呤-6-基胺: ^{1}H NMR (丙酮-d_6) δ 8.39 (s, 1H), 7.04 (d, *J*=8.8 Hz, 1H), 6.94 (dd, *J*=8.8, 3.2 Hz, 1H), 6.83 (d, *J*= 3.3

Hz, 1H), 6.90 (d, *J*= 8.0 Hz, 1H), 6.68 (s, 1H), 6.54 (dd, *J*= 8.0, 1.6 Hz, 1H), 5.94 (s, 2H), 4.54 (t, *J*=7.2 Hz, 2H), 3.79 (s, 3H), 3.71 (s, 3H), 3.08 (t, *J*= 7.2 Hz, 2H); TOF LC-MS $[M+H]^+$ 452.1。3-(2-苯并[1,3]间二氧杂环戊烯-5-基-乙基)-8-(2,5-二甲氧基-苯基硫基)-3H-嘌呤-6-基胺: ^{1}H NMR (丙酮-d_6) δ 8.26 (s, 1H), 7.34 (d, *J*=2.8 Hz, 1H), 7.22-7.05 (m, 2H), 6.74-6.70 (m, 2H), 6.53 (dd, *J*=8.0, 2.0 Hz, 1H), 5.97 (s, 2H), 4.58 (t, *J*=7.2 Hz, 2H), 3.81 (s, 3H), 3.79 (s, 3H), 3.16 (t, *J*= 7.2 Hz, 2H); TOF LC-MS $[M+H]^+$ 452.1。

实施例 169 和 170

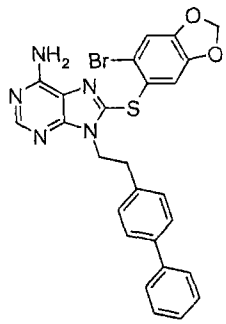


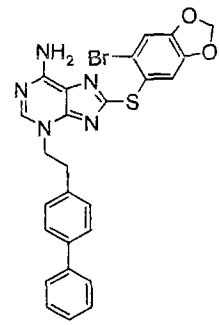


9-(2-环己基-乙基)-8-(2,5-二甲氧基苯基-硫基)-9H-嘌呤-6-基胺和 3-(2-环己基-乙基)-8-(2,5-二甲氧基-苯基硫基)-3H-嘌呤-6-基胺

通过类似于实施例 1 和 2 的步骤从 8-(2,5-二甲氧基-苯基硫基)-9H-嘌呤-6-基胺和(2-溴-乙基)-环己烷制备所述标题化合物。通过制备型 HPLC 分离所述异构体。9-(2-环己基-乙基)-8-(2,5-二甲氧基苯基-硫基)-9H-嘌呤-6-基胺: ^{1}H NMR ($CDCl_3$) δ 8.24 (s, 1H), 6.96 (d, *J*=9.2 Hz, 1H), 6.84 (dd, *J*=9.2, 2.8 Hz, 1H), 6.80 (d, *J*=2.8 Hz, 1H), 4.26 (t, *J*=7.6 Hz, 2H), 3.81 (s, 3H), 3.67 (s, 3H), 2.09-2.07 (m, 2H), 1.79-1.70 (m, 1H), 1.68-1.60 (m, 4H), 0.99-0.82 (m, 6H); TOF LC-MS $[M+H]^+$ 414.2。3-(2-环己基-乙基)-8-(2,5-二甲氧基-苯基硫基)-3H-嘌呤-6-基胺: ^{1}H NMR ($CDCl_3$) δ 8.04 (s, 1H), 7.20 (d, *J*=2.8 Hz, 1H), 7.02 (dd, *J*=9.2, 2.8 Hz, 1H), 6.93 (d, *J*=9.2 Hz, 1H), 4.31 (t, *J*=7.6 Hz, 2H), 3.794 (s, 3H), 3.79 (s, 3H), 1.9-1.6 (m, 3H), 1.38-1.20 (m, 4H), 0.99-0.82 (m, 6H); TOF LC-MS $[M+H]^+$ 414.2。

实施例 171 和 172

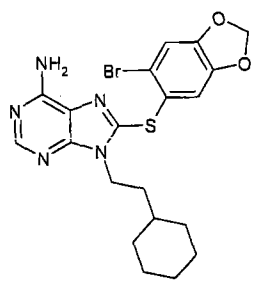


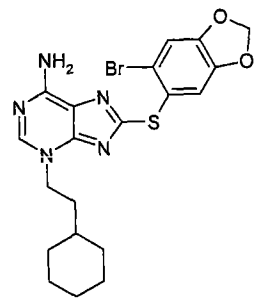


9-(2-联苯-4-基-乙基)-8-(6-溴-苯并[1,3]间二氧杂环戊烯-5-基硫基)-9H-嘌呤-6-基胺和 3-(2-联苯-4-基-乙基)-8-(6-溴-苯并[1,3]间二氧杂环戊烯-5-基硫基)-3H-嘌呤-6-基胺

通过类似于实施例 1 和 2 的步骤从 8-(6-溴-苯并[1,3]间二氧杂环戊烯-5-基硫基)-9H-嘌呤-6-基胺和 4-(2-溴-乙基)-联苯制备所述标题化合物。通过制备型 HPLC 分离所述异构体。9-(2-联苯-4-基-乙基)-8-(6-溴-苯并[1,3]间二氧杂环戊烯-5-基硫基)-9H-嘌呤-6-基胺: ^{1}H NMR ($CDCl_3$) δ 8.19 (s, 1H), 7.58-7.51 (m, 4H), 7.46-7.42 (m, 1H), 7.30-7.28 (m, 3H), 7.14 (s, 1H), 6.99 (d, *J*= 2.8 Hz, 2H), 6.04 (s, 2H), 4.54 (t, *J*=7.6 Hz, 2H), 3.20 (t, *J*= 7.6 Hz, 2H); TOF LC-MS $[M+H]^+$ 548.0。3-(2-联苯-4-基-乙基)-8-(6-溴-苯并[1,3]间二氧杂环戊烯-5-基硫基)-3H-嘌呤-6-基胺: ^{1}H NMR ($CDCl_3$) δ 7.63 (s, 1H), 7.58-7.51 (m, 4H), 7.46-7.42 (m, 2H), 7.39-7.36 (m, 1H), 7.25 (s, 1H), 7.20 (s, 1H), 7.06 (d, *J*= 8.4 Hz, 2H), 6.09 (s, 2H), 4.55 (t, *J*=6.8 Hz, 2H), 3.26 (t, *J*= 6.8 Hz, 2H); TOF LC-MS $[M+H]^+$ 548.0。

实施例 173 和 174



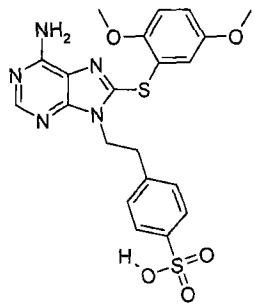


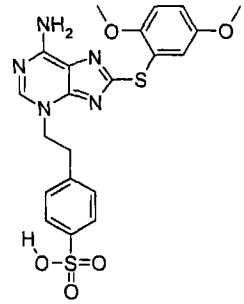
8-(6-溴-苯并[1,3]间二氧杂环戊烯-5-基硫基)-9-(2-环己基-乙基)-9H-嘌呤-6-基胺和 8-(6-溴-苯并[1,3]间二氧杂环戊烯-5-基

硫基)-3-(2-环己基-乙基)-3H-嘌呤-6-基胺

通过类似于实施例 1 和 2 的步骤从 8-(6-溴-苯并[1,3]间二氧杂环戊烯-5-基硫基)-9H-嘌呤-6-基胺和(2-溴-乙基)-环己烷制备所述标题化合物。通过制备型 HPLC 分离所述异构体。8-(6-溴-苯并[1,3]间二氧杂环戊烯-5-基硫基)-9-(2-环己基-乙基)-9H-嘌呤-6-基胺: ^{1}H NMR ($CDCl_3$) δ 8.19 (s, 1H), 7.14 (s, 1H), 7.10 (s, 1H), 6.06 (s, 2H), 4.28 (t, *J*=7.6 Hz, 2H), 1.84-1.60 (m, 7H), 1.30-1.18 (m, 4H), 0.99-0.80 (m, 2H); TOF LC-MS $[M+H]^+$ 487.0。8-(6-溴-苯并[1,3]间二氧杂环戊烯-5-基硫基)-3-(2-环己基-乙基)-3H-嘌呤-6-基胺: ^{1}H NMR ($CDCl_3$) δ 8.03 (s, 1H), 7.22 (s, 1H), 7.17 (s, 1H), 6.08 (s, 2H), 4.33 (t, *J*=7.2 Hz, 2H), 1.84-1.80 (m, 2H), 1.79-1.70 (m, 5H), 1.30-1.18 (m, 4H), 0.99-0.80 (m, 2H); TOF LC-MS $[M+H]^+$ 487.0。

实施例 175 和 176



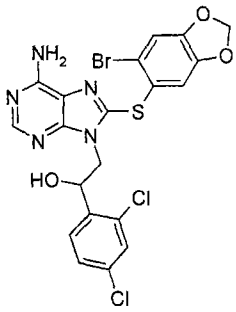


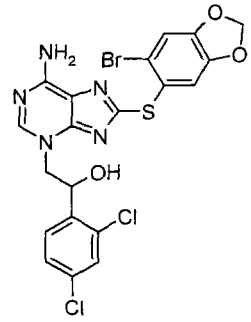
4-{2-[6-氨基-8-(2,5-二甲氧基-苯基硫基)-嘌呤-9-基]-乙基}-苯磺酸和 4-{2-[6-氨基-8-(2,5-二甲氧基-苯基硫基)-嘌呤-3-基]-乙基}-苯磺酸

通过类似于实施例 1 和 2 的步骤从 8-(2,5-二甲氧基-苯基硫基)-9H-嘌呤-6-基胺和 4-(2-溴-乙基)-苯磺酸制备所述标题化合物。通过制备型 HPLC 分离所述异构体。4-{2-[6-氨基-8-(2,5-二甲氧基-苯基硫基)-嘌呤-9-基]-乙基}-苯磺酸: ^{1}H NMR (DMSO-d6) δ 8.40 (s, 1H), 7.47 (d, *J*= 8.0Hz, 2H), 7.06 (d, *J*= 9.2Hz, 1H), 7.01 (d, *J*= 8.0Hz, 2H), 6.93 (dd, *J*= 9.2, 3.2 Hz, 1H), 6.75 (d, *J*= 3.2 Hz, 1H), 4.45 (t, J= 7.2Hz, 2H), 3.73 (s, 3H), 3.65 (s, 3H), 3.01 (t, *J*= 7.2 Hz, 2H); TOF LC-MS $[M+H]^+$ 488.1。4-{2-[6-氨基-8-(2,5-二甲氧基-苯基硫基)-嘌呤-3-基]-乙基}-苯

磺酸: ^{1}H NMR (DMSO-d6) δ 8.24 (s, 1H), 7.56 (d, *J*= 8.4 Hz, 2H), 7.30 (s, 1H), 7.23-7.16 (m, 2H), 7.10 (d, *J*= 8.4 Hz, 2H), 4.59 (t, *J*= 7.2Hz, 2H), 3.79 (s, 3H), 3.77 (s, 3H), 3.21 (t, *J*= 7.2 Hz, 2H); TOF LC-MS $[M+H]^+$ 488.1。

实施例 177 和 178

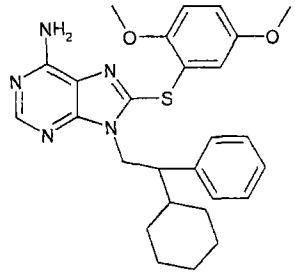


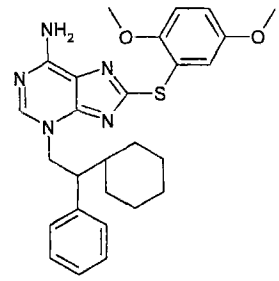


2-[6-氨基-8-(6-溴-苯并[1,3]间二氧杂环戊烯-5-基硫基)-嘌呤-9-基]-1-(2,4-二氯-苯基)-乙醇和 2-[6-氨基-8-(6-溴-苯并[1,3]间二氧杂环戊烯-5-基硫基)-嘌呤-3-基]-1-(2,4-二氯-苯基)-乙醇

通过类似于实施例 1 和 2 的步骤从 8-(6-溴-苯并[1,3]间二氧杂环戊烯-5-基硫基)-9H-嘌呤-6-基胺和 2-氯-1-(2,4-二氯-苯基)-乙醇制备所述标题化合物。通过制备型 HPLC 分离所述异构体。2-[6-氨基-8-(6-溴-苯并[1,3]间二氧杂环戊烯-5-基硫基)-嘌呤-9-基]-1-(2,4-二氯-苯基)-乙醇: ^{1}H NMR (丙酮-d_6) δ 8.13 (s, 1H), 7.66 (d, *J*= 8.2 Hz, 1H), 7.43 (d, *J*= 2.0 Hz, 1H), 7.39 (dd, *J*= 8.2, 2.0 Hz, 1H), 7.23 (s, 1H), 7.11 (s, 1H), 6.10 (s, 2H), 5.51 (t, *J*= 8.0 Hz, 1H), 4.39 (d, *J*= 8.0 Hz, 2H); TOF LC-MS $[M+H]^+$ 555.9。2-[6-氨基-8-(6-溴-苯并[1,3]间二氧杂环戊烯-5-基硫基)-嘌呤-3-基]-1-(2,4-二氯-苯基)-乙醇: ^{1}H NMR (丙酮-d_6) δ 8.53 (s, 1H), 7.62 (d, *J*= 8.2 Hz, 1H), 7.48 (d, *J*= 2.0 Hz, 1H), 7.39 (dd, *J*= 8.2, 2.0 Hz, 1H), 7.33 (s, 1H), 7.30 (s, 1H), 6.22 (s, 2H), 5.51 (dd, 8.4, 3.2 Hz, 1H), 4.74 (dd, *J*= 13.2, 3.2 Hz, 1H), 4.37 (dd, *J*= 13.2, 3.2 Hz, 1H); TOF LC-MS $[M+H]^+$ 555.9。

实施例 179 和 180

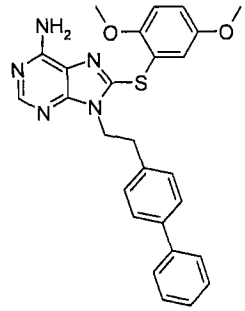


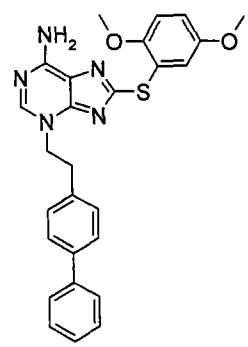


9-(2-环己基-2-苯基-乙基)-8-(2,5-二甲氧基-苯基硫基)-9H-嘌呤-6-基胺和 3-(2-环己基-2-苯基-乙基)-8-(2,5-二甲氧基-苯基硫基)-3H-嘌呤-6-基胺

通过类似于实施例 1 和 2 的步骤从 8-(2,5-二甲氧基-苯基硫基)-9H-嘌呤-6-基胺和(2-溴-1-环己基-乙基)-苯制备所述标题化合物。通过制备型 HPLC 分离所述异构体。9-(2-环己基-2-苯基-乙基)-8-(2,5-二甲氧基-苯基硫基)-9H-嘌呤-6-基胺:^{1}H NMR (丙酮-d_6) δ 8.33 (s, 1H), 7.16-7.03 (m, 6H), 6.94 (dd, *J*= 8.8, 2.8 Hz, 1H), 6.79 (d, *J*=2.8 Hz, 1H), 4.75 (dd, *J*= 9.2, 6.0 Hz, 1H), 4.65 (dd, *J*= 9.2, 6.0 Hz, 1H), 3.79 (s, 3H), 3.70 (s, 3H), 3.30-3.20 (m, 1H), 2.07-2.04 (m, 2H), 1.82-1.78 (m, 1H), 1.64-1.54 (m, 2H), 1.36-1.27 (m, 2H), 1.20-1.13 (m, 2H), 0.9-0.84 (m, 2H); LC-MS $[M+H]^+$ 490.2。3-(2-环己基-2-苯基-乙基)-8-(2,5-二甲氧基-苯基硫基)-3H-嘌呤-6-基胺: ^{1}H NMR (丙酮-d_6) δ 7.81 (s, 1H), 7.37 (d, *J*= 2.8 Hz, 1H), 7.26-7.10 (m, 7H), 4.92 (dd, *J*= 9.2, 4.4 Hz, 1H), 4.42 (dd, *J*= 9.2, 2.8 Hz, 1H), 3.87 (s, 3H), 3.83 (s, 3H), 3.79 (m, 1H), 2.0-1.0 (m, 11H); LC-MS $[M+H]^+$ 490.2。

实施例 181 和 182



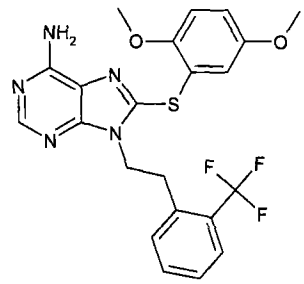


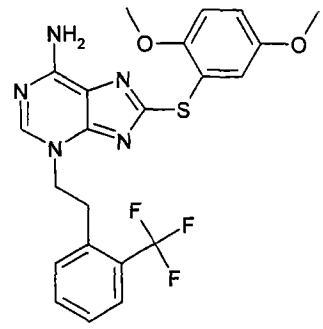
9-(2-联苯-4-基-乙基)-8-(2,5-二甲氧基-苯基硫基)-9H-嘌呤

-6-基胺和 3-(2-联苯-4-基-乙基)-8-(2,5-二甲氧基-苯基硫基)-3H-嘌呤-6-基胺

通过类似于实施例 1 和 2 的步骤从 8-(2,5-二甲氧基-苯基硫基)-9H-嘌呤-6-基胺和 4-(2-溴-乙基)-联苯制备所述标题化合物。通过制备型 HPLC 分离所述异构体。9-(2-联苯-4-基-乙基)-8-(2,5-二甲氧基-苯基硫基)-9H-嘌呤-6-基胺: ^{1}H NMR (丙酮-d_6) δ 8.28 (s, 1H), 7.63 (d, *J*= 8.4 Hz, 2H), 7.56 (d, *J*= 8.4 Hz, 2H), 7.46 (t, *J*= 8.0 Hz, 2H), 7.35 (t, *J*= 8.0 Hz, 1H), 7.23 (d, *J*= 8.8 Hz, 2H), 6.88 (dd, *J*= 8.8, 2.8 Hz, 1H), 6.70(d, *J*= 2.8 Hz, 1H), 4.54 (t, *J*=7.2 Hz, 2H), 3.82 (s, 3H), 3.64 (s, 3H), 3.15 (t, *J*= 7.2 Hz, 2H); TOF LC-MS $[M+H]^+$ 484.1。3-(2-联苯-4-基-乙基)-8-(2,5-二甲氧基-苯基硫基)-3H-嘌呤-6-基胺: ^{1}H NMR (丙酮-d_6) δ 8.27 (s, 1H), 7.63 (d, *J*= 8.0 Hz, 2H), 7.59 (d, *J*= 8.4 Hz, 2H), 7.46 (d, *J*= 8.4 Hz, 2H), 7.37 (d, *J*= 7.2 Hz, 1H), 7.35 (t, *J*= 8.0 Hz, 1H), 7.24 (d, *J*= 8.4 Hz, 2H), 7.10 (d, *J*= 9.2 Hz, 1H), 7.06 (dd, *J*= 9.2, 2.8 Hz, 1H), 4.66 (t, *J*=7.6 Hz, 2H), 3.82 (s, 3H), 3.79 (s, 3H), 3.12 (t, *J*= 7.6 Hz, 2H); TOF LC-MS $[M+H]^+$484.1。

实施例 183 和 184



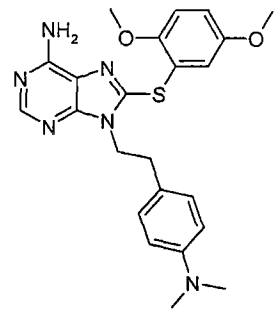


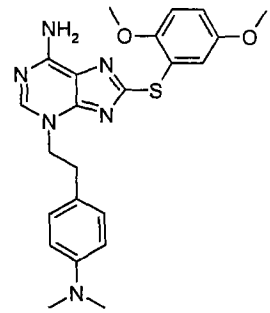
8-(2,5-二甲氧基-苯基硫基)-9-[2-(2-三氟甲基-苯基)-乙基]-9H-嘌呤-6-基胺和 8-(2,5-二甲氧基-苯基硫基)-3-[2-(2-三氟甲基-苯基)-乙基]-3H-嘌呤-6-基胺

通过类似于实施例 1 和 2 的步骤从 8-(2,5-二甲氧基-苯基硫基)-9H-嘌呤-6-基胺和 1-(2-溴-乙基)-2-三氟甲基-苯制备所述标题化合物。通过制备型 HPLC 分离所述异构体。8-(2,5-二甲氧基-苯

基硫基)-9-[2-(2-三氟甲基-苯基)-乙基]-9H-嘌呤-6-基胺: ^{1}H NMR (丙酮-d_6) δ 8.36 (s, 1H), 7.72 (d, *J*= 8.0 Hz, 1H), 7.52 (t, *J*= 7.6Hz, 1H), 7.45 (t, *J*= 7.6 Hz, 1H), 7.20 (d, *J*= 7.6 Hz, 1H), 7.02 (d, *J*= 9.2 Hz, 1H), 6.92 (dd, *J*= 9.2, 2.8 Hz, 1H), 6.81 (d, *J*= 2.8 Hz, 1H), 4.63 (t, *J*= 7.2 Hz, 2H), 3.78 (s, 3H), 3.70 (s, 3H), 3.37 (t, *J*= 7.2 Hz, 2H); TOF LC-MS $[M+H]^+$476.1。8-(2,5-二甲氧基-苯基硫基)-3-[2-(2-三氟甲基-苯基)-乙基]-3H-嘌呤-6-基胺: ^{1}H NMR (丙酮-d_6) δ 8.38 (s, 1H), 7.72 (d, *J*= 8.0 Hz, 1H), 7.56 (t, *J*= 7.6 Hz, 1H), 7.48 (t, *J*= 7.6 Hz, 1H), 7.32 (d, *J*= 2.4 Hz, 1H), 7.27 (d, *J*= 7.6 Hz, 1H), 7.13-7.07 (m, 2H), 4.64 (t, *J*= 7.2 Hz, 2H), 3.80 (s, 3H), 3.79 (s, 3H), 3.44 (t, *J*= 7.2 Hz, 2H); TOF LC-MS $[M+H]^+$ 476.1。

实施例 185 和 186



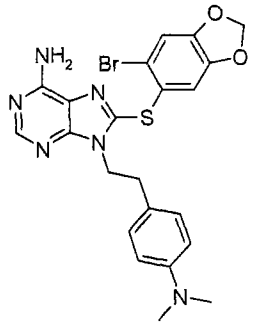


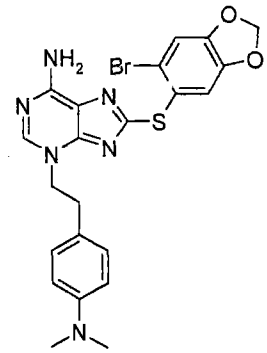
8-(2,5-二甲氧基-苯基硫基)-9-[2-(4-二甲基氨基-苯基)-乙基]-9H-嘌呤-6-基胺和 8-(2,5-二甲氧基-苯基硫基)-3-[2-(4-二甲基氨基-苯基)-乙基]-3H-嘌呤-6-基胺

通过类似于实施例 1 和 2 的步骤从 8-(2,5-二甲氧基-苯基硫基)-9H-嘌呤-6-基胺和[4-(2-溴-乙基)-苯基]-二甲基-胺制备所述标题化合物。通过制备型 HPLC 分离所述异构体。8-(2,5-二甲氧基-苯基硫基)-9-[2-(4-二甲基氨基-苯基)-乙基]-9H-嘌呤-6-基胺: ^{1}H NMR (丙酮-d_6) δ 8.43 (s, 1H), 7.13 (d, *J*= 8.8 Hz, 2H), 7.07 (d, *J*= 8.8 Hz, 2H), 7.05 (d, *J*= 8.8 Hz, 1H), 6.97 (dd, *J*= 8.8, 2.8 Hz, 1H), 6.90 (d, *J*= 2.8Hz, 1H), 4.57 (t, *J*= 7.2 Hz, 2H), 3.78 (s, 3H), 3.72 (s, 3H), 3.13 (t, *J*= 7.2 Hz, 2H), 3.04 (s, 6H); TOF LC-MS $[M+H]^+$ 451.1。8-(2,5-二甲氧基-苯基硫

基)-3-[2-(4-二甲基氨基-苯基)-乙基]-3H-嘌呤-6-基胺: ^{1}H NMR (丙酮-d_6) δ 8.27 (s, 1H), 7.13 (dd, *J*= 2.4, 0.8 Hz, 1H), 7.20-7.04 (m, 6H), 4.60 (t, *J*= 7.2 Hz, 2H), 3.81 (s, 3H), 3.80 (s, 3H), 3.20 (t, *J*= 7.2 Hz, 2H), 3.03 (s, 6H); TOF LC-MS $[M+H]^+$ 451.1。

实施例 187 和 188

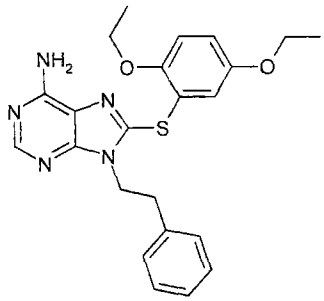


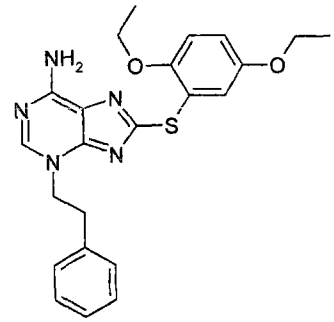


8-(6-溴-苯并[1,3]间二氧杂环戊烯-5-基硫基)-9-[2-(4-二甲基氨基-苯基)-乙基]-9H-嘌呤-6-基胺和 8-(6-溴-苯并[1,3]间二氧杂环戊烯-5-基硫基)-3-[2-(4-二甲基氨基-苯基)-乙基]-3H-嘌呤-6-基胺

通过类似于实施例 1 和 2 的步骤从 8-(6-溴-苯并[1,3]间二氧杂环戊烯-5-基硫基)-9H-嘌呤-6-基胺和[4-(2-溴-乙基)-苯基]-二甲基-胺制备所述标题化合物。通过制备型 HPLC 分离所述异构体。8-(6-溴-苯并[1,3]间二氧杂环戊烯-5-基硫基)-9-[2-(4-二甲基氨基-苯基)-乙基]-9H-嘌呤-6-基胺: ^{1}H NMR (丙酮-d_6) δ 8.45 (s, 1H), 7.25 (s, 1H), 7.13 (d, *J*= 8.8 Hz, 2H), 7.05 (d, *J*= 8.8 Hz, 2H), 6.93 (s, 1H), 6.13 (s, 2H), 4.58 (t, *J*= 7.2 Hz, 2H), 3.16 (t, *J*= 7.2 Hz, 2H), 3.02 (s, 6H); TOF LC-MS $[M+H]^+$ 515.0。8-(6-溴-苯并[1,3]间二氧杂环戊烯-5-基硫基)-3-[2-(4-二甲基氨基-苯基)-乙基]-3H-嘌呤-6-基胺: ^{1}H NMR (丙酮-d_6) δ 8.24 (s, 1H), 7.40 (s, 1H), 7.34 (s, 1H), 6.96 (d, *J*= 8.4 Hz, 2H), 6.71 (d, *J*= 8.4 Hz, 2H), 6.19 (s, 2H), 4.57 (t, *J*= 7.2 Hz, 2H), 3.13 (t, *J*= 7.2 Hz, 2H), 2.91 (s, 6H); TOF LC-MS $[M+H]^+$ 515.0。

实施例 189 和 190

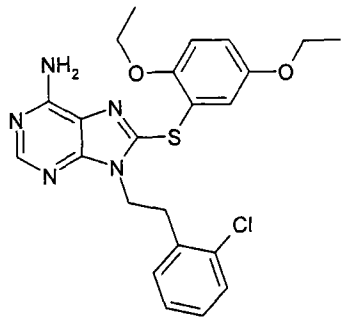


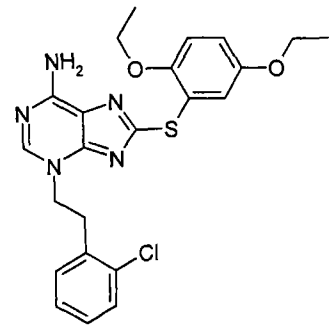


8-(2,5-二乙氧基-苯基硫基)-9-苯乙基-9H-嘌呤-6-基胺和 8-(2,5-二乙氧基-苯基硫基)-3-苯乙基-3H-嘌呤-6-基胺

通过类似于实施例 1 和 2 的步骤从 8-(2,5-二乙氧基-苯基硫基)-9H-嘌呤-6-基胺和(2-溴-乙基)-苯制备所述标题化合物。通过制备型 HPLC 分离所述异构体。8-(2,5-二乙氧基-苯基硫基)-9-苯乙基-9H-嘌呤-6-基胺: ^{1}H NMR (CD_3OD) δ 8.25 (s, 1H), 7.26-7.20 (m, 3H), 7.11-7.07 (m, 2H), 7.00-6.96 (m, 3H), 4.55 (t, *J*= 7.2 Hz, 2H), 4.00-3.91 (m, 4H), 3.13 (t, *J*= 7.2 Hz, 2H), 1.35 (t, *J*= 7.2 Hz, 3H), 1.56 (t, *J*= 6.8Hz, 3H); LC-MS $[M+H]^+$ 436.5。8-(2,5-二乙氧基-苯基硫基)-3-苯乙基-3H-嘌呤-6-基胺: ^{1}H NMR (CD_3OD) δ 8.12 (s, 1H), 7.30-7.25 (m, 4H), 7.16-7.15 (m, 2H), 7.11-7.08 (m, 2H), 4.61 (t, *J*= 7.2 Hz, 2H), 4.08-4.01 (m, 4H), 3.23 (t, *J*= 7.2 Hz, 2H), 1.38 (t, *J*= 7.2 Hz, 3H), 1.21 (t, *J*= 6.8 Hz, 3H); LC-MS $[M+H]^+$ 436.5。

实施例 191 和 192



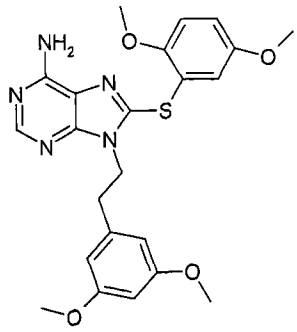


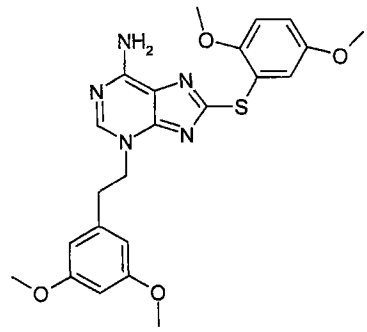
9-[2-(2-氯-苯基)-乙基]-8-(2,5-二乙氧基-苯基硫基)-9H-嘌呤-6-基胺和 3-[2-(2-氯-苯基)-乙基]-8-(2,5-二乙氧基-苯基硫基)-3H-嘌呤-6-基胺

通过类似于实施例 1 和 2 的步骤从 8-(2,5-二乙氧基-苯基硫

基)-9H-嘌呤-6-基胺和 1-(2-溴-乙基)-2-氯-苯制备所述标题化合物。通过制备型 HPLC 分离所述异构体。9-[2-(2-氯-苯基)-乙基]-8-(2,5-二乙氧基-苯基硫基)-9H-嘌呤-6-基胺: ^{1}H NMR (CD_3OD) δ 8.25 (s, 1H), 7.35 (dd, *J*= 8.0, 1.2 Hz, 1H), 7.23 (dt, *J*= 7.6, 2.0 Hz, 1H), 7.15 (dt, *J*= 7.6, 1.2 Hz, 1H), 7.05 (dd, *J*= 7.6, 2.0 Hz, 1H), 6.96-6.94 (m, 3H), 4.63 (t, *J*= 6.8 Hz, 2H), 3.99-3.91 (m, 4H), 3.33 (t, *J*= 6.8 Hz, 2H), 1.35 (t, *J*= 6.4 Hz, 3H), 1.17 (t, *J*= 6.4 Hz, 3H); LC-MS $[M+H]^+$ 470.5。3-[2-(2-氯-苯基)-乙基]-8-(2,5-二乙氧基-苯基硫基)-3H-嘌呤-6-基胺: ^{1}H NMR (CD_3OD) δ 8.11 (s, 1H), 7.36 (dd, *J*= 7.6, 2.0 Hz, 1H), 7.28-7.27 (bs, 1H), 7.25-7.20 (m, 2H), 7.18-7.14 (m, 3H), 4.66 (t, *J*= 7.2 Hz, 2H), 4.07-4.02 (m, 4H), 3.41 (t, *J*= 7.2 Hz, 2H), 1.38 (t, *J*= 6.0 Hz, 3H), 1.21 (t, *J*= 6.0 Hz, 3H); LC-MS $[M+H]^+$ 470.5。

实施例 193 和 194



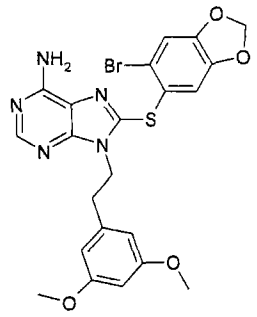


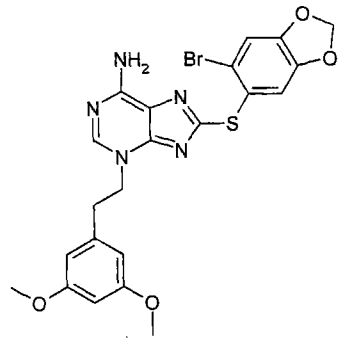
9-[2-(3,5-二甲氧基-苯基)-乙基]-8-(2,5-二甲氧基-苯基硫基)-9H-嘌呤-6-基胺和 3-[2-(3,5-二甲氧基-苯基)-乙基]-8-(2,5-二甲氧基-苯基硫基)-3H-嘌呤-6-基胺

通过类似于实施例 1 和 2 的步骤从 8-(2,5-二甲氧基-苯基硫基)-9H-嘌呤-6-基胺和 1-(2-溴-乙基)-3,5-二甲氧基-苯制备所述标题化合物。通过制备型 HPLC 分离所述异构体。9-[2-(3,5-二甲氧基-苯基-乙基]-8-(2,5-二甲氧基-苯基硫基)-9H-嘌呤-6-基胺: ^{1}H NMR (DMSO-d_6) δ 8.33 (s, 1H), 7.03 (d, *J* = 9.0 Hz, 1H), 6.91-6.86 (m, 1H), 6.58 (d, *J* = 2.9 Hz, 1H), 6.30 (t, *J* = 1.9 Hz, 1H), 6.17 (d, *J* = 2.2 Hz, 2H), 4.42 (t, *J* = 7.0 Hz, 2H),

3.75 (s, 3H), 3.66 (s, 6H), 3.20 (s, 3H), 2.95 (t, J = 7.0 Hz, 2H); LC-MS $[M+H]^+$ 468.1。3-[2-(3,5-二甲氧基-苯基-乙基]-8-(2,5-二甲氧基-苯基硫基)-3H-嘌呤-6-基胺: ^{1}H NMR (DMSO-d_6) δ 8.37 (s, 1H), 7.25-7.03 (m, 3H), 6.37 (t, J = 2.1 Hz, 1H), 6.29 (d, J = 2.3 Hz, 2H), 4.55 (t, J = 7.1 Hz, 2H), 3.78 (s, 3H), 3.73 (s, 3H), 3.69 (s, 6H), 3.10 (t, J = 7.1 Hz, 2H); LC-MS $[M+H]^+$ 468.1。

实施例 195 和 196

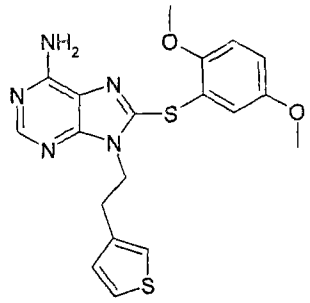


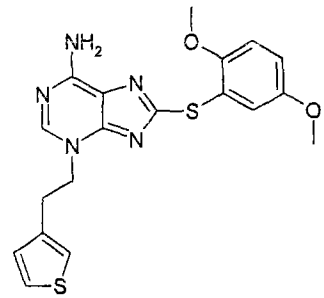


8-(6-溴-苯并[1,3]间二氧杂环戊烯-5-基硫基)-9-[2-(3,5-二甲氧基-苯基)-乙基]-9H-嘌呤-6-基胺和 8-(6-溴-苯并[1,3]间二氧杂环戊烯-5-基硫基)-3-[2-(3,5-二甲氧基-苯基)-乙基]-3H-嘌呤-6-基胺

通过类似于实施例 1 和 2 的步骤从 8-(6-溴-苯并[1,3]间二氧杂环戊烯-5-基硫基)-9H-嘌呤-6-基胺和 1-(2-溴-乙基)-3,5-二甲氧基-苯制备所述标题化合物。通过制备型 HPLC 分离所述异构体。8-(6-溴-苯并[1,3]间二氧杂环戊烯-5-基硫基)-9-[2-(3,5-二甲氧基-苯基)-乙基]-9H-嘌呤-6-基胺: ^{1}H NMR (DMSO-d_6) δ 8.21 (s, 1H), 7.35 (s, 1H), 6.20 (s, 1H), 6.29 (t, J = 2.2 Hz, 1H), 6.18 (d, J = 2.2 Hz, 2H), 6.07 (s, 2H), 4.39 (t, J = 7.2 Hz, 2H), 3.64 (s, 6H), 2.97 (t, J = 7.2 Hz, 2H); LC-MS $[M+H]^+$ 531.0。8-(6-溴-苯并[1,3]间二氧杂环戊烯-5-基硫基)-3-[2-(3,5-二甲氧基-苯基)-乙基]-3H-嘌呤-6-基胺: ^{1}H NMR (DMSO-d_6) δ 8.31 (s, 1H), 7.49 (s, 1H), 7.39 (s, 1H), 6.36 (t, J = 2.3 Hz, 1H), 6.27 (d, J = 2.2 Hz, 2H), 6.17 (s, 2H), 4.52 (t, J = 7.2 Hz, 2H), 3.67 (s, 6H), 3.10 (t, J = 7.2 Hz, 2H); LC-MS $[M+H]^+$ 531.0。

实施例 197 和 198

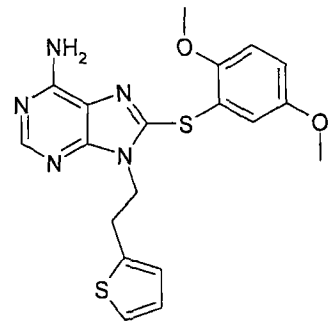


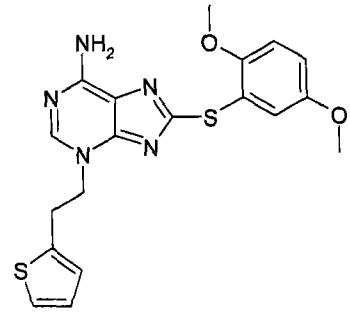


8-(2,5-二甲氧基-苯基硫基)-9-(2-噻吩-3-基-乙基)-9H-嘌呤-6-基胺和 8-(2,5-二甲氧基-苯基硫基)-3-(2-噻吩-3-基-乙基)-3H-嘌呤-6-基胺

通过类似于实施例 1 和 2 的步骤从 8-(2,5-二甲氧基-苯基硫基)-9H-嘌呤-6-基胺和 3-(2-溴-乙基)-噻吩制备所述标题化合物。通过制备型 HPLC 分离所述异构体。8-(2,5-二甲氧基-苯基硫基)-9-(2-噻吩-3-基-乙基)-9H-嘌呤-6-基胺: ^{1}H NMR (DMSO-d_6) δ 8.26 (s,1H), 7.34 (dd, J = 1.2, 5.1 Hz, 1H), 7.01 (d, J = 9.0 Hz, 1H), 6.92-6.85 (m, 2H), 6.73 (dd, J = 3.3, 1.0 Hz, 1H), 6.57 (d, J = 3.1 Hz, 1H), 4.41 (t, J = 6.8 Hz, 2H), 3.74 (s, 3H), 3.61 (s, 3H), 3.25 (t, J = 7.4 Hz, 2H); LC-MS $[M+H]^+$ 414.1。8-(2,5-二甲氧基-苯基硫基)-3-(2-噻吩-3-基-乙基)-3H-嘌呤-6-基胺: ^{1}H NMR (DMSO-d_6) δ 8.41 (s, 1H), 7.38 (dd, J = 5.1, 1.2 Hz, 1H), 7.26-7.05 (m, 3H), 6.96-6.93 (m, 1H), 6.82-6.80 (m, 1H), 4.57 (t, J = 7.1 Hz, 2H), 3.78 (s, 3H), 3.73 (s, 3H), 3.42 (t, J = 6.9 Hz, 2H); LC-MS $[M+H]^+$ 414.1。

实施例 199 和 200



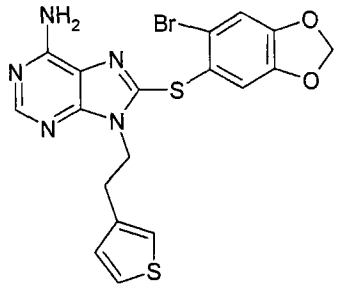


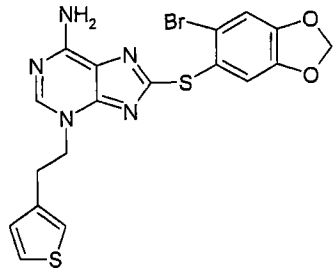
8-(2,5-二甲氧基-苯基硫基)-9-2-噻吩-2-基-乙基)-9H-嘌呤-6-基胺和 8-(2,5-二甲氧基-苯基硫基)-3-(2-噻吩-2-基-乙

基)-3H-嘌呤-6-基胺

通过类似于实施例 1 和 2 的步骤从 8-(2,5-二甲氧基-苯基硫基)-9H-嘌呤-6-基胺和 2-(2-溴-乙基)-噻吩制备所述标题化合物。通过制备型 HPLC 分离所述异构体。8-(2,5-二甲氧基-苯基硫基)-9-2-噻吩-2-基-乙基)-9H-嘌呤-6-基胺: ^{1}H NMR (DMSO-d_6) δ 8.35 (s,1H), 7.44 (dd, J = 4.9, 2.9 Hz, 1H), 7.11-7.02 (m, 2H), 6.93-6.83 (m, 2H), 6.62 (d, J = 3.0 Hz, 1H), 4.43 (t, J = 6.8 Hz, 2H), 3.72 (s, 3H), 3.63 (s, 3H), 3.02 (t, J = 6.8 Hz, 2H); LC-MS [M+H]$^+$ 414.1。8-(2,5-二甲氧基-苯基硫基)-3-(2-噻吩-2-基-乙基)-3H-嘌呤-6-基胺: ^{1}H NMR (DMSO-d_6) δ 8.37 (s, 1H), 7.51 (dd, J = 4.9, 2.7 Hz, 1H), 7.28-7.02 (m, 4H), 6.98 (dd, J = 4.9, 1.2 Hz, 1H), 4.57 (t, J = 6.8 Hz, 2H), 3.78 (s, 3H), 3.73 (s, 3H), 3.21 (t, J = 6.8 Hz, 2H); LC-MS [M+H]$^+$ 414.1。

实施例 201 和 202



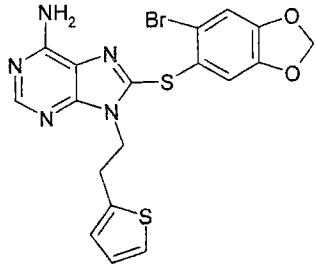


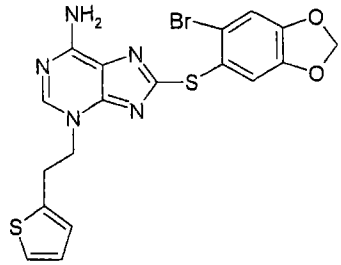
8-(6-溴-苯并[1,3]间二氧杂环戊烯-5-基硫基)-9-(2-噻吩-3-基-乙基)-9H-嘌呤-6-基胺和 8-(6-溴-苯并[1,3]间二氧杂环戊烯-5-基硫基)-3-(2-噻吩-3-基-乙基)-3H-嘌呤-6-基胺

通过类似于实施例 1 和 2 的步骤从 8-(6-溴-苯并[1,3]间二氧杂环戊烯-5-基硫基)-9H-嘌呤-6-基胺和 3-(2-溴-乙基)-噻吩制备所述标题化合物。通过制备型 HPLC 分离所述异构体。8-(6-溴-苯并[1,3]间二氧杂环戊烯-5-基硫基)-9-(2-噻吩-3-基-乙基)-9H-嘌呤-6-基胺: ^{1}H NMR (DMSO-d_6) δ 8.26 (s, 1H), 7.38-7.31 (m, 2H), 6.90 (dd, J = 5.1, 3.5 Hz, 1H), 6.79-6.76 (m, 2H), 6.10 (s, 2H), 4.41 (t, J = 6.8 Hz, 2H), 3.29 (t, J = 6.8 Hz, 2H); LC-MS [M+H]$^+$ 477.9。8-(6-溴-苯并[1,3]间二氧杂环戊烯-5-基硫基)-3-(2-噻吩-3-基-乙基)-3H-嘌呤-6-基胺: ^{1}H NMR (DMSO-d_6) δ 8.39 (s, 1H),

7.50 (s, 1H), 7.38-7.35 (m, 2H), 6.95 (dd, J = 5.1, 3.3 Hz, 1H), 6.81 (dd, J = 3.5, 1.2 Hz, 1H), 6.19 (s, 2H), 4.55 (t, J = 6.8 Hz, 2H), 3.42 (t, J = 6.8 Hz, 2H); LC-MS $[M+H]^+$ 477.9。

实施例 203 和 204

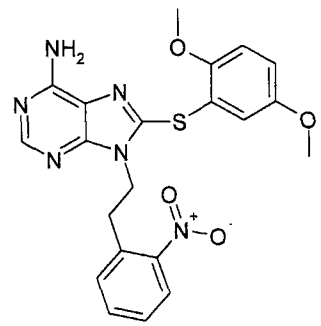


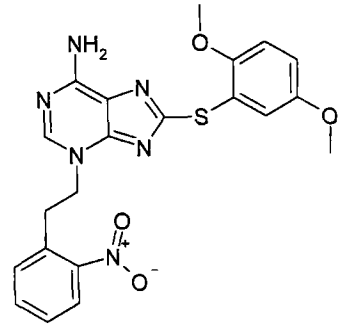


8-(6-溴-苯并[1,3]间二氧杂环戊烯-5-基硫基)-9-(2-噻吩-2-基-乙基)-9H-嘌呤-6-基胺和 8-(6-溴-苯并[1,3]间二氧杂环戊烯-5-基硫基)-3-(2-噻吩-2-基-乙基)-3H-嘌呤-6-基胺

通过类似于实施例 1 和 2 的步骤从 8-(6-溴-苯并[1,3]间二氧杂环戊烯-5-基硫基)-9H-嘌呤-6-基胺和 2-(2-溴-乙基)-噻吩制备所述标题化合物。通过制备型 HPLC 分离所述异构体。8-(6-溴-苯并[1,3]间二氧杂环戊烯-5-基硫基)-9-(2-噻吩-2-基-乙基)-9H-嘌呤-6-基胺: ^{1}H NMR (DMSO-d_6) δ 8.29 (s, 1H), 7.45 (dd, J = 4.9, 2.9 Hz, 1H), 7.39 (s, 1H), 7.12 (dd, J = 3.0, 1.2 Hz, 1H), 6.89 (dd, J = 4.9, 1.4 Hz, 1H), 6.80 (s, 1H), 6.10 (s, 2H), 4.40 (t, J= 7.2 Hz, 2H), 3.18 (t, J= 7.2 Hz, 2H); LC-MS $[M+H]^+$ 477.9。8-(6-溴-苯并[1,3]间二氧杂环戊烯-5-基硫基)-3-(2-噻吩-2-基-乙基)-3H-嘌呤-6-基胺: ^{1}H NMR (DMSO-d_6) δ 8.36 (s, 1H), 7.52-7.48 (m, 2H), 7.39 (s, 1H), 7.18 (dd, J= 3.0, 1.2 Hz, 1H), 6.98-6.95 (m, 1H), 6.19 (s, 2H), 4.54 (t, J = 7.2 Hz, 2H), 3.20 (t, J = 7.2 Hz, 2H); LC-MS $[M+H^+$ 477.9。

实施例 205 和 206

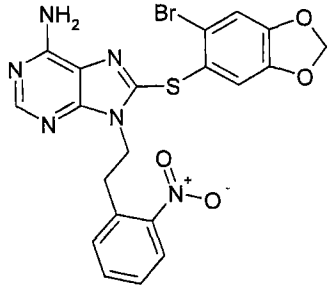


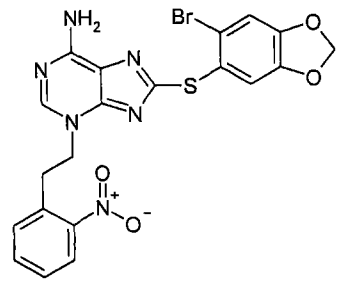


8-(2,5-二甲氧基-苯基硫基)-9-[2-(2-硝基-苯基)-乙基]-9H-嘌呤-6-基胺和 8-(2,5-二甲氧基-苯基硫基)-3-[2-(2-硝基-苯基)-乙基]-3H-嘌呤-6-基胺

通过类似于实施例 1 和 2 的步骤从 8-(2,5-二甲氧基-苯基硫基)-9H-嘌呤-6-基胺和 1-(2-溴-乙基)-2-硝基-苯制备所述标题化合物。通过制备型 HPLC 分离所述异构体。8-(2,5-二甲氧基-苯基硫基)-9-[2-(2-硝基-苯基)-乙基]-9H-嘌呤-6-基胺: ^{1}H NMR (DMSO-d_6) δ 8.25 (s, 1H), 8.02-7.97 (m, 1H), 7.92-7.89 (m, 1H), 7.48-7.41 (m, 2H), 7.00 (d, J = 9.0 Hz, 1H), 6.85 (dd, J = 9.0, 3.1 Hz, 1H), 6.42 (d, J = 3.0 Hz, 1H), 4.53 (t, J = 6.9 Hz, 2H), 3.75 (s, 3H), 3.60 (s, 3H), 3.21 (t, J = 6.9 Hz, 2H); LC-MS [M+H$^+$ 453.13。8-(2,5-二甲氧基-苯基硫基)-3-[2-(2-硝基-苯基)-乙基]-3H-嘌呤-6-基胺: ^{1}H NMR (DMSO-d_6) δ 8.43 (s, 1H), 8.14-8.10 (m, 2H), 7.60-7.57 (m, 2H), 7.26-7.05 (m, 3H), 4.60 (t, J = 6.9 Hz, 2H), 3.78 (s, 3H), 3.74 (s, 3H), 3.35 (t, J = 6.9 Hz, 2H); LC-MS [M+H]$^+$ 453.13。

实施例 207 和 208



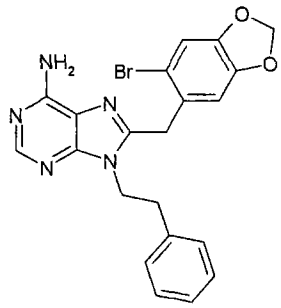


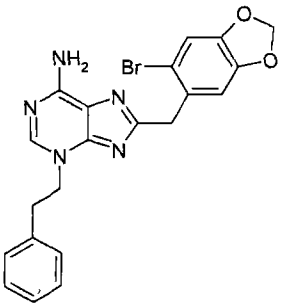
8-(6-溴-苯并[1,3]间二氧杂环戊烯-5-基硫基)-9-[2-(2-硝基-苯基)-乙基]-9H-嘌呤-6-基胺和 8-(6-溴-苯并[1,3]间二氧杂环戊烯-5-基硫基)-3-[2-(2-硝基-苯基)-乙基]-3H-嘌呤-6-基胺

通过类似于实施例 1 和 2 的步骤从 8-(6-溴-苯并[1,3]间二氧杂环戊烯-5-基硫基)-9H-嘌呤-6-基胺和 1-(2-溴-乙基)-2-硝基-苯制备所述标题化合物。通过制备型 HPLC 分离所述异构体。8-(6-溴-苯并[1,3]间二氧杂环戊烯-5-基硫基)-9-[2-(2-硝基-苯基)-乙基]-9H-嘌呤-6-基胺: ^{1}H NMR (DMSO-d_6) δ 8.19 (s, 1H), 8.02-7.90 (m, 1H), 7.93-7.91 (m, 1H), 7.50-7.40 (m, 2H), 7.29 (s, 1H),

6.53 (s, 1H), 6.18 (s, 2H), 4.49 (t, J = 6.9 Hz, 2H), 3.26 (t, J = 7.0 Hz, 2H); LC-MS $[M+H]^+$ 516.0。8-(6-溴-苯并[1,3]间二氧杂环戊烯-5-基硫基)-3-[2-(2-硝基-苯基)-乙基]-3H-嘌呤-6-基胺: ^{1}H NMR (DMSO-d_6) δ 8.41 (s, 1H), 8.12-8.09 (m, 2H), 7.59-7.54 (m, 2H), 7.50 (s, 1H), 7.39 (s, 1H), 6.19 (s, 2H), 4.59 (t, J = 6.9 Hz, 2H), 3.36 (t, J = 7.0 Hz, 2H); LC-MS $[M+H]^+$ 516.0。

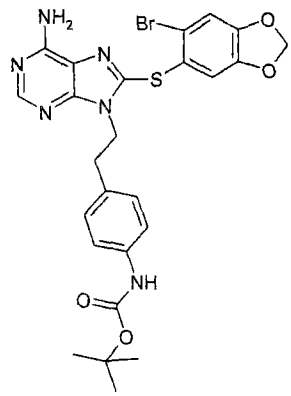
实施例 209 和 210

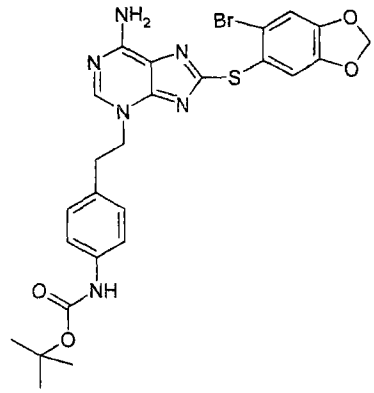




通过类似于实施例 1 和 2 的步骤从 8-(6-溴-苯并[1,3]二氧杂环戊烯-5-基硫基)-9H-嘌呤-6-基胺 (J. Comb. Chem, 2001, 3, 518) 和(2-溴-乙基)-苯制备所述标题化合物。通过制备型 HPLC 分离所述异构体。8-(6-溴-苯并[1,3]间二氧杂环戊烯-5-基甲基)-9-苯乙基-9H-嘌呤-6-基胺: 产率 11 %, ^{1}H NMR (DMSO-d6) δ 8.24 (s, 1H), 7.30-7.20 (m, 4H), 7.11-7.09 (m, 2H), 6.69 (s, 1H), 6.05 (s, 2H), 4.40-4.34 (m, 2H), 3.97 (s, 2H), 3.04-2.98 (m, 2H); LC-MS $[M+H]^+$ 452.0。8-(6-溴-苯并[1,3]间二氧杂环戊烯-5-基甲基)-3-苯乙基-3H-嘌呤-6-基胺: 产率 8 %, (CD_3OD) δ 8.19 (s, 1H), 7.26-7.20 (m, 3H), 7.17 (s, 1H), 7.11-7.07 (m, 2H), 7.06 (s, 1H), 6.05 (s, 2H), 4.67 (t, J= 6.8 Hz, 2H), 4.45 (s, 2H), 3.26 (t, J= 6.8 Hz, 2H); LC-MS $[M+H]^+$ 452.1。

实施例 211 和 212

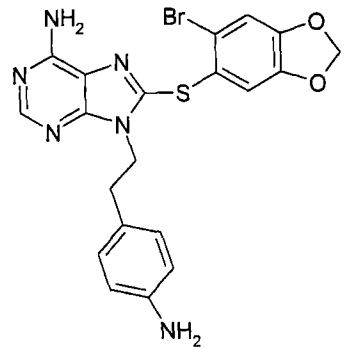




(4-{2-[6-氨基-8-(6-溴-苯并[1,3]间二氧杂环戊烯-5-基硫基)-嘌呤-9-基]-乙基}-苯基)氨基甲酸叔丁酯和(4-{2-[6-氨基-8-(6-溴-苯并[1,3]间二氧杂环戊烯-5-基硫基)-嘌呤-3-基]-乙基}-苯基)氨基甲酸叔丁酯

通过类似于实施例1和2的步骤从8-(6-溴-苯并[1,3]间二氧杂环戊烯-5-基硫基)-9H-嘌呤-6-基胺和[4-(2-溴-乙基)-苯基]-氨基甲酸叔丁酯制备所述标题化合物。通过制备型HPLC分离所述异构体。(4-{2-[6-氨基-8-(6-溴-苯并[1,3]间二氧杂环戊烯-5-基硫基)-嘌呤-9-基]-乙基}-苯基)氨基甲酸叔丁酯: ^{1}H NMR (DMSO-d_6) δ 9.30 (s, 1H), 8.35 (s, 1H), 7.36 (s, 1H), 7.30 (d, J = 8.2 Hz, 2H), 6.99 (d, J = 8.4 Hz, 2H), 6.71 (s, 1H), 6.09 (s, 2H), 4.39 (t, J = 6.6 Hz, 2H), 2.99 (t, J = 6.8 Hz, 2H), 1.48 (s, 9H); LC-MS $[M+H]^+$ 586.0。(4-{2-[6-氨基-8-(6-溴-苯并[1,3]间二氧杂环戊烯-5-基硫基)-嘌呤-3-基]-乙基}-苯基)氨基甲酸叔丁酯: ^{1}H NMR (DMSO-d_6) δ 9.30 (s, 1H), 8.29 (s, 1H), 7.68-7.31 (m, 4H), 6.99 (d, J = 8.4 Hz, 2H), 6.19 (s, 2H), 4.99 (t, J = 6.6 Hz, 2H), 3.09 (t, J = 6.8 Hz, 2H), 1.48 (s, 9H); LC-MS $[M+H]^+$ 586.0。

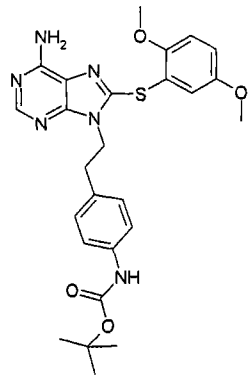
实施例213

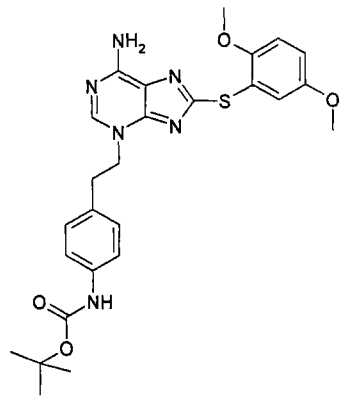


9-[2-(4-氨基-苯基)-乙基]-8-(6-溴-苯并[1,3]间二氧杂环戊烯-5-基硫基)-9H-嘌呤-6-基胺

向(4-{2-[6-氨基-8-(6-溴-苯并[1,3]间二氧杂环戊烯-5-基硫基)嘌呤-9-基]-乙基}-苯基)-氨基甲酸叔丁酯(0.03g, 0.04 mmol)在二氯甲烷(4.3 mL)的溶液中加入TFA(0.02 mL, 0.22 mmol),并将该反应混合物在室温下搅拌过夜。在该阶段的末期用100 mL甲苯稀释反应物,然后在减压条件下浓缩。再重复该过程3次以得到TFA盐形式的所述标题产物(0.03 g, 95%)。^{1}H NMR (DMSO-d_6) δ 8.19 (s, 1H), 7.24 (s, 1H), 7.19-7.02 (m, 4H), 7.00 (s, 1H), 6.13 (s, 2H), 4.45 (t, J = 6.8 Hz, 2H), 3.18 (t, J = 6.8 Hz, 2H); LC-MS $[M+H]^+$ 486.3。

实施例214和215



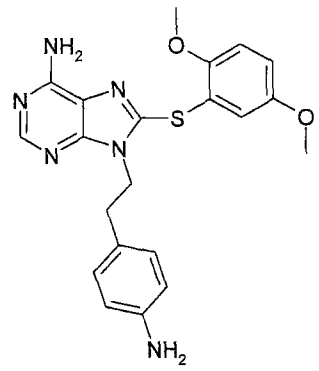


(4-{2-[6-氨基-8-(2,5-二甲氧基-苯基硫基)-嘌呤-9-基]-乙基}-苯基)-氨基甲酸叔丁酯和(4-{2-[6-氨基-8-(2,5-二甲氧基-苯基硫基)-嘌呤-3-基]-乙基}-苯基)-氨基甲酸叔丁酯

通过类似于实施例1和2的步骤从8-(2,5-二甲氧基-苯基硫基)-9H-嘌呤-6-基胺和[4-(2-溴-乙基)-苯基]-氨基甲酸叔丁酯制备所述标题化合物。通过制备型HPLC分离所述异构体。(4-{2-[6-氨基-8-(2,5-二甲氧基-苯基硫基)-嘌呤-9-基]-乙基}-苯基)-氨基甲酸叔丁酯: ^{1}H NMR (DMSO-d_6) δ 9.28 (s, 1H), 8.28 (s, 1H), 7.31 (d, J = 8.4 Hz, 2H), 7.03 (d, J = 8.4 Hz, 1H), 6.92-6.84 (m, 3H), 6.58 (d, J = 3.0 Hz, 1H), 4.39 (t, J = 6.8 Hz, 2H), 3.74 (s, 3H), 3. 61 (s, 3H), 2.91 (t, J = 6.8 Hz, 2H), 1.49 (s, 9H); LC-MS $[M+H]^+$ 523.22。(4-{2-[6-氨基-8-(2,5-二甲氧基-苯基硫基)-

嘌呤-3-基]-乙基}-苯基)-氨基甲酸叔丁酯：^{1}H NMR (DMSO-d_6) δ 9.32 (s, 1H), 8.31 (s, 1H), 7.38 (d, *J* = 8.4 Hz, 2H), 7.29-7.10 (m, 3H), 7.01 (d, *J* = 8.6 Hz, 2H), 4.50 (t, *J* = 6.8 Hz, 2H), 3.79 (s, 3H), 3. 65 (s, 3H), 3.09 (t, *J* = 6.8 Hz, 2H), 1.49 (s, 9H); LC-MS $[M+H]^+$ 523.2。

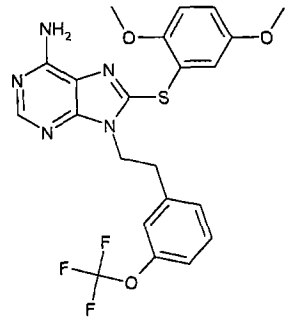
实施例 216



9-[2-(4-氨基-苯基)-乙基]-8-(2,5-二甲氧基-苯基硫基)-9H-嘌呤-6-基胺

通过类似于实施例 213 的步骤从(4-{2-[6-氨基-8-(2,5-二甲氧基-苯基硫基)-嘌呤-9-基]-乙基}-苯基)-氨基甲酸叔丁酯制备所述标题化合物。^{1}H NMR (DMSO-d_6) δ 8.19 (s, 1H), 7.19-6.92 (m, 7H), 4.45 (t, *J* = 6.8 Hz, 2H), 3.78 (s, 6H), 3.17 (t, *J* = 6.8 Hz, 2H); LC-MS $[M+H]^+$ 423.1。

实施例 217

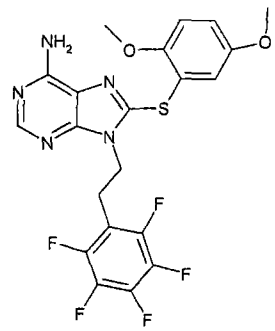


8-(2,5-二甲氧基-苯基硫基)-9-[2-(3-三氟甲氧基-苯基)-乙基]-9H-嘌呤-6-基胺

通过类似于实施例 1 和 2 的步骤从 8-(2,5-二甲氧基-苯基硫基)-9H-嘌呤-6-基胺和 1-(2-溴-乙基)-3-三氟甲氧基-苯制备所述标题化合物。通过制备型 HPLC 纯化所述化合物。8-(2,5-二甲氧基-

苯基硫基)-9-[2-(3-三氟甲氧基-苯基)-乙基]-9H-嘌呤-6-基胺：产率 17 %，^{1}H NMR (CD_3OD) δ 8.18 (s, 1H), 7.33 (t, J= 8.0 Hz, 1H), 7.12-7.10 (m, 2H), 7.04-7.01 (m, 3H), 6.95 (bs, 1H), 4.57 (t, *J*= 7.2 Hz, 2H), 3.75 (s, 3H), 3.74 (s, 3H), 3.24 (t, *J*= 7.2 Hz, 2H)；LC-MS $[M+H]^+$ 492.1。

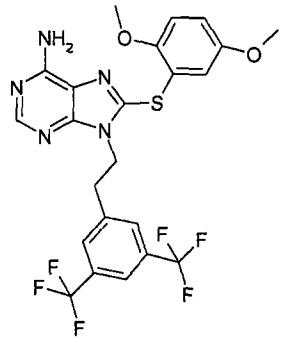
实施例 218



8-(2,5-二甲氧基-苯基硫基)-9-(2-五氟苯基-乙基)-9H-嘌呤-6-基胺

通过类似于实施例 1 和 2 的步骤从 8-(2,5-二甲氧基-苯基硫基)-9H-嘌呤-6-基胺和 1-(2-溴-乙基)-2,3,4,5,6-五氟-苯制备所述标题化合物。通过制备型 HPLC 纯化所述化合物。8-(2,5-二甲氧基-苯基硫基)-9-(2-五氟苯基-乙基)-9H-嘌呤-6-基胺。产率 23%，LC-MS $[M+H]^+$ 498.1。

实施例 219

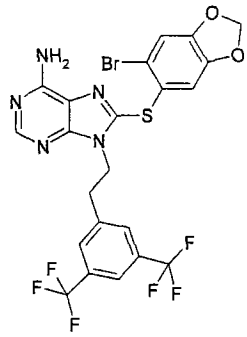


9-[2-(3,5-双三氟甲基-苯基)-乙基]-8-(2,5-二甲氧基-苯基硫基)-9H-嘌呤-6-基胺

通过类似于实施例 1 和 2 的步骤从 8-(2,5-二甲氧基-苯基硫基)-9H-嘌呤-6-基胺和 1-(2-溴-乙基)-3,5-双-三氟甲基-苯制备所述标题化合物。通过制备型 HPLC 纯化所述化合物。9-[2-(3,5-双三

氟甲基-苯基)-乙基]-8-(2,5-二甲氧基-苯基硫基)-9H-嘌呤-6-基胺: ^{1}H NMR (DMSO-d_6) δ 8.10 (s, 1H), 7.86 (s, 1H), 7.54 (s, 2H), 7.01 (d, J = 9.0 Hz, 1H), 6.83 (dd, J = 11.0, 3.0 Hz, 1H), 6.40 (d, J = 2.9 Hz, 1H), 4.50 (t, J = 7.2 Hz, 2H), 3.75 (s, 3H), 3.59 (s, 3H), 3.24 (t, J = 7.2 Hz, 2H); LC-MS [M+H]$^+$ 544.1。

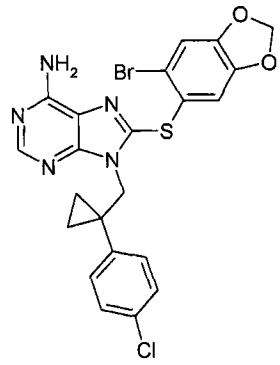
实施例 220



9-[2-(3,5-双三氟甲基-苯基)-乙基]-8-(6-溴-苯并[1,3]间二氧杂环戊烯-5-基硫基)-9H-嘌呤-6-基胺

通过类似于实施例 1 和 2 的步骤从 8-(6-溴-苯并[1,3]间二氧杂环戊烯-5-基硫基)-9H-嘌呤-6-基胺和 1-(2-溴-乙基)-3,5-双-三氟甲基-苯制备所述标题化合物。通过制备型 HPLC 纯化所述化合物。^{1}H NMR (DMSO-d_6) δ 8.13 (s, 1H), 7.79 (s, 1H), 7.66 (s, 2H), 7.23 (s, 1H), 7.01 (s, 1H), 6.09 (s, 2H), 4.59 (t, J=7.4 Hz, 2H), 3.35 (t, J=7.4 Hz, 2H); LC-MS [M+H]$^+$ 607.0。

实施例 221

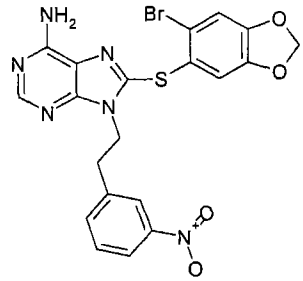


8-(6-溴-苯并[1,3]间二氧杂环戊烯-5-基硫基)-9-[1-(4-氯-苯基)-环丙基甲基]-9H-嘌呤-6-基胺

通过类似于实施例 1 和 2 的步骤从 8-(6-溴-苯并[1,3]间二氧杂环戊烯-5-基硫基)-9H-嘌呤-6-基胺和 1-(-溴甲基-环丙基)-4-氯-

苯制备所述标题化合物。通过制备型 HPLC 纯化所述化合物。8-(6-溴-苯并[1,3]间二氧杂环戊烯-5-基硫基)-9-[1-(4-氯-苯基)-环丙基甲基]-9H-嘌呤-6-基胺: ^{1}H NMR (CD_3OD) δ 8.24 (s, 1H), 7.24 (d, J = 9.3 Hz, 2H), 7.19 (s, 1H), 714 (d, J = 8.6 Hz, 2H), 6.93 (s, 1H), 6.08 (s, 2H) 4.49 (s, 2H), 1.41-1.35 (m, 2H), 0.95-0.91 (m, 2H); LC-MS $[M+H]^+$ 531.8。

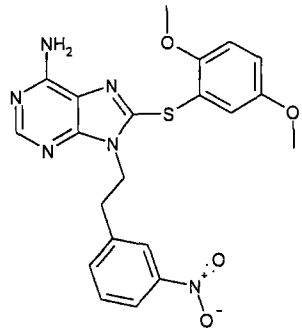
实施例 222



8-(6-溴-苯并[1,3]间二氧杂环戊烯-5-基硫基)-3-[2-(3-硝基-苯基)-乙基]-3H-嘌呤-6-基胺

通过类似于实施例 1 和 2 的步骤从 8-(6-溴-苯并[1,3]间二氧杂环戊烯-5-基硫基)-9H-嘌呤-6-基胺和 1-(2-溴-乙基)-3-硝基-苯制备所述标题化合物。通过制备型 HPLC 纯化所述化合物。^{1}H NMR (DMSO-d_6) δ 8.29 (s, 1H), 7.99-7.95 (m, 1H), 7.56-7.42 (m, 2H), 7.33 (s, 1H), 7.10-7.05 (m, 1H), 6.72 (s, 1H), 6.10 (s, 2H), 4.60 (t, J = 6.9 Hz, 2H), 3.36 (t, J = 7.0 Hz, 2H); LC-MS $[M+H]^+$ 516.0。

实施例 223

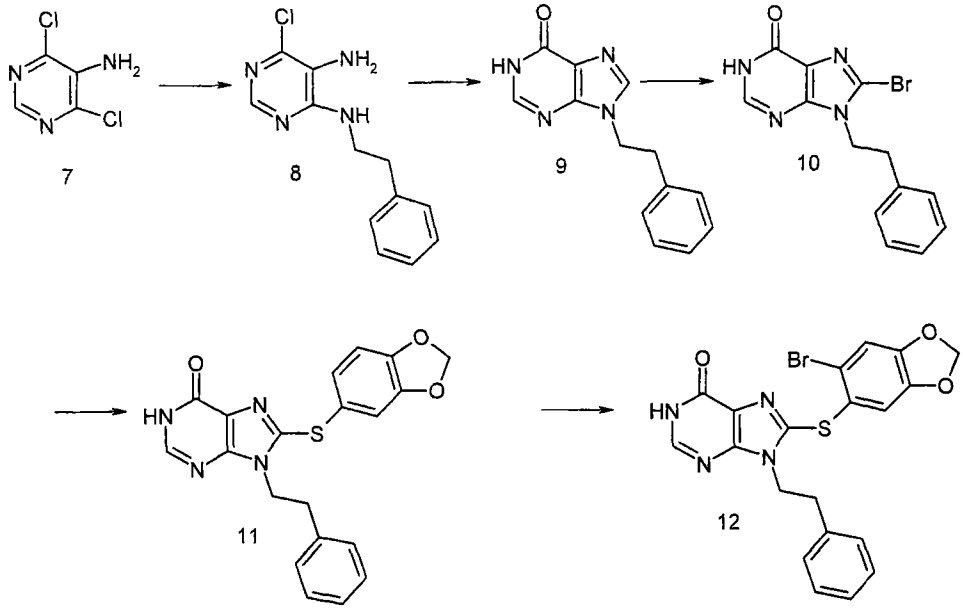


8-(2,5-二甲氧基-苯基硫基)-9-[2-(3-硝基-苯基)-乙基]-9H-嘌呤-6-基胺

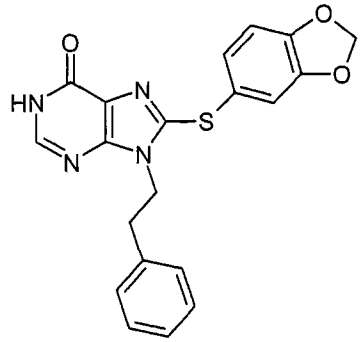
通过类似于实施例 1 和 2 的步骤从 8-(2,5-二甲氧基-苯基硫

基)-9H-嘌呤-6-基胺和 1-(2-溴-乙基)-3-硝基-苯制备所述标题化合物。通过制备型 HPLC 纯化所述化合物。^{1}H NMR (DMSO-d_6) δ 8.28 (s, 1H), 7.96 (dd, J = 8.0, 1.3 Hz, 1H), 7.53-7.42 (m, 2H), 7.07-7.03 (m, 1H), 7.00 (d, J = 9.0 Hz, 1H), 6.87 (dd, J = 3.1, 9.0 Hz, 1H), 6.53 (d, J = 2.8 Hz, 1H), 4.60 (t, J = 6.9 Hz, 2H), 3.71 (s, 3H), 3.62 (s, 3H), 3.33 (t, J = 6.9 Hz, 2H); LC-MS $[M+H]^+$ 453.13。

图 2



实施例 224



8-(苯并[1,3]间二氧杂环戊烯-5-基硫基)-9-苯乙基-1,9-二氢-嘌呤-6-酮

步骤 1: 6-氯-N^4-苯乙基-嘧啶-4,5-二胺

向装有二氯嘧啶 (2.8g, 17.0 mmol) 的正丁醇溶液 (0.1 M) 的

烧瓶中加入胺（2.3 mL，18.6 mmol）和 TEA（4.7 mL，33.9 mmol）。然后将形成的反应混合物加热至 120 ℃，直至原料通过 TLC 判断消失（大约 4h）。然后将该反应物冷却至室温并倒入己烷中，此时形成固体。使用玻璃漏斗滤出所述固体，并用己烷洗涤固体滤饼。所述固体（3.8 g，产率 90%）不经过进一步纯化而使用。^{1}H NMR ($CDCl_3$) δ 8.07 (s, 1H), 7.38-7.21 (m, 5H), 5.29 (bs, 1H), 3.81 (t, J = 7.1 Hz, 2H), 3.60 (bs, 2H), 2.97 (t, J = 7.3 Hz, 2H)。

步骤 2：9-苯乙基-1,9-二氢-嘌呤-6-酮

向装有上述氯嘧啶产物（1.0 g，4.0 mmol）的甲酰胺溶液（0.25 M）的烧瓶中加入 2 mL 甲酸。然后将形成的反应混合物加热至 175 ℃ 4h，此时 HPLC 显示原料已耗尽。使该反应物冷却并加入水（0.80 M）。使用玻璃漏斗滤出形成的固体，并用甲苯洗涤固体滤饼。然后所述固体（0.6 g，64%）不经过进一步纯化而用于下一反应中。^{1}H NMR (DMSO-d_6) δ 12.29 (s, 1H), 8.04 (s, 1H), 7.90 (s, 1H), 7.31-7.7.10 (m, 5H), 4.39 (t, J = 7.0 Hz, 2H), 3.13 (t, J = 7.3 Hz, 2H)。

步骤 3：8-溴-9-苯乙基-1,9-二氢-嘌呤-6-酮

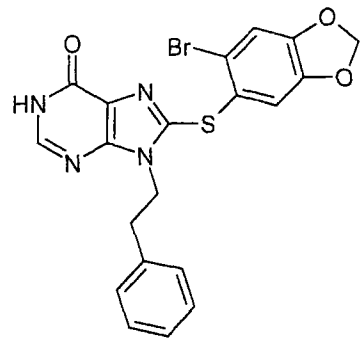
向来自上述反应的步骤 2 的嘌呤酮（0.29 g，1.21 mmol）于二噁烷的溶液（0.1M）中加入 NBS（0.32g，1.81 mmol）。将形成的反应混合物加热至 105 ℃直至 HPLC 显示原料已耗尽（大约 2h）。冷却所述反应物至室温并通过 MPLC 用 0 - 20% MeOH/CH_2Cl_2 的溶剂梯度进行纯化。将含所述产物的馏分收集并浓缩以得到所需的产物（0.22 g，产率 57%）。^{1}H NMR (DMSO-d_6) δ 12.49 (s, 1H), 8.08 (s, 1H), 7.30-7.21 (m, 3H), 7.10-7.04 (m, 2H), 4.36 (t, J = 7.0 Hz, 2H), 3.17 (t, J = 7.3 Hz, 2H)。

步骤 4：8-(苯并[1,3]间二氧杂环戊烯-5-基硫基)-9-苯乙基-1,9-二氢-嘌呤-6-酮

向处于 0℃的氢化钠（0.035 g，0.882 mmol，60%于矿物油中）的 DMF 溶液（0.1 M）中加入所需的苯硫酚（0.140 g，0.882 mmol）。使所述反应混合物的温热至室温并混合 15 min，此时加入来自上述反应的步骤 3 的溴-嘌呤酮（0.113 g，0.353 mmol）。然后将所形成的反应混合物在 90 ℃加热过夜。然后将所述反应物冷却至室温，浓

缩，随后通过MPLC用0-20% MeOH/ CH_2Cl_2进行纯化。将含所述产物的馏分收集并浓缩以得到所需的产物（0.098 g，产率71%）。^{1}H NMR ($CDCl_3$) δ 12.95 (s, 1H), 8.02 (s, 1H), 7.29-6.80 (m, 8H), 5.95 (s, 2H), 4.47 (t, *J*=7.4 Hz, 2H), 3.09 (t, *J*=7.4 Hz, 2H); LC-MS $[M+H]^+$ 393.0。

实施例225



8-(6-溴-苯并[1,3]间二氧杂环戊烯-5-基硫基)-9-苯乙基-1,9-二氢-嘌呤-6-酮

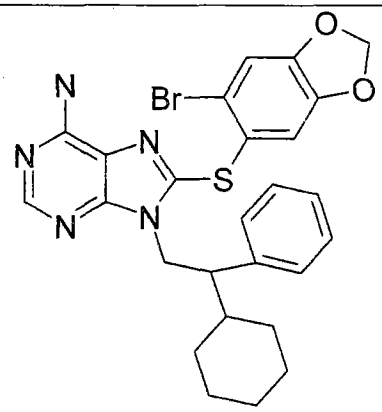
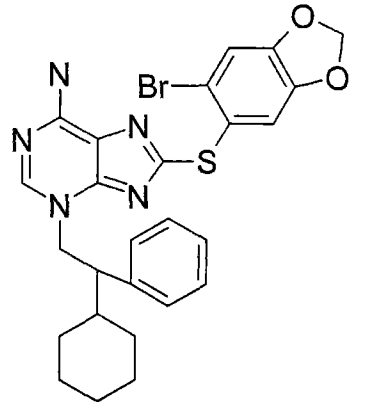
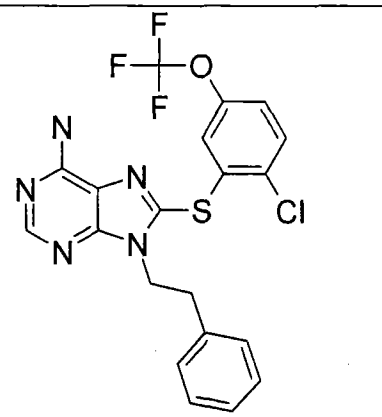
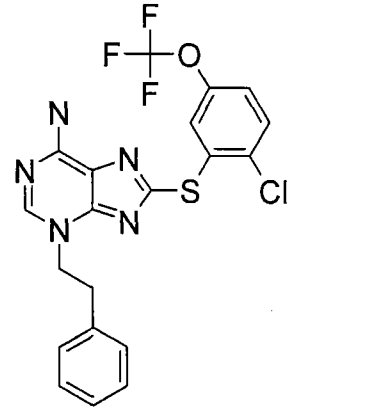
向来自上述反应的步骤4的嘌呤（0.088 g，0.266 mmol）的AcOH溶液（0.2 M）中加入溴（0.02 mL，0.319 mmol）。将形成的反应混合物用铝箔覆盖并在室温下混合直至HPLC显示原料已耗尽。将形成的溶液用150 mL的甲苯稀释并浓缩。再重复该步骤2次，并通过制备型HPLC纯化所形成的固体，得到白色固态的所需产物（0.059 g，产率46%）。^{1}H NMR (DMSO-d_6) δ 12.42 (s, 1H), 8.09 (m, 1H), 7.39 (s, 1H), 7.25-7.17 (m, 3H), 7.10-7.04 (m, 2H), 6.81 (s, 1H), 6.05 (s, 2H), 4.39 (t, *J*=7.1 Hz, 2H), 3.03 (t, *J*=7.1 Hz, 2H); LC-MS $[M+H]^+$ 472.3。

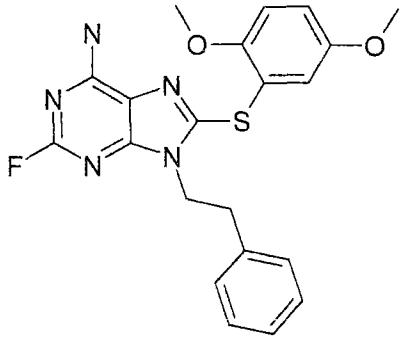
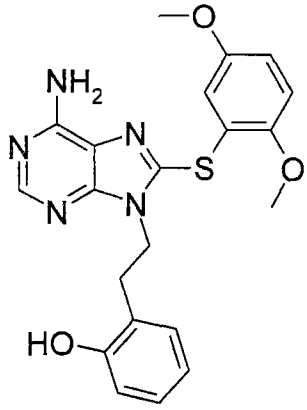
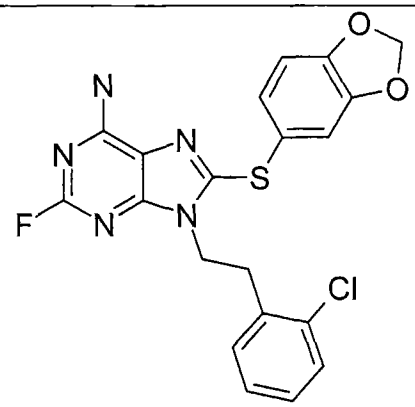
实施例226-336

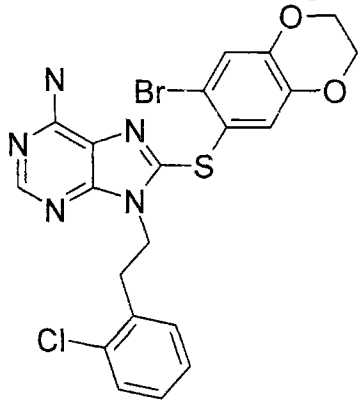
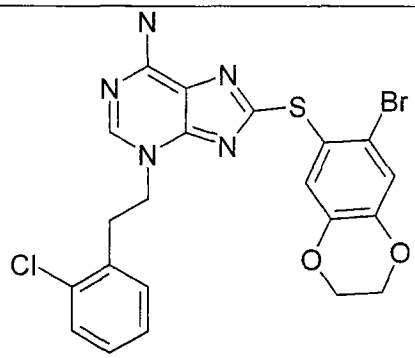
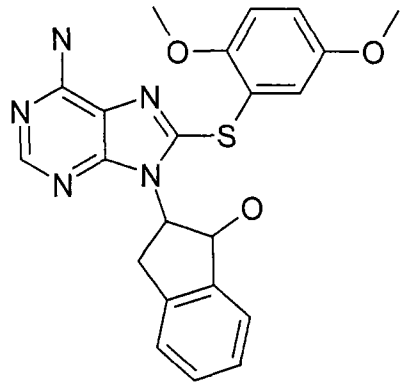
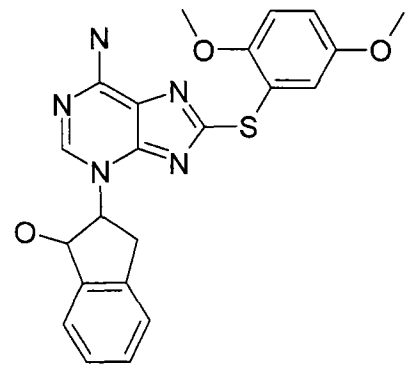
依照实施例1和2所述的步骤，使用合适的原料制备实例226-336，所述实例226-336的名称和分析数据总结于表3中。所有化合物以三氟乙酸盐形式分离出来。本领域技术人员容易理解，嘌呤环系上的侧-N为氨基（$-NH_2$）且茚满环上的侧-O为羟基。

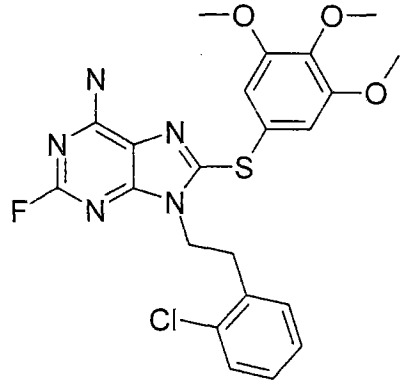
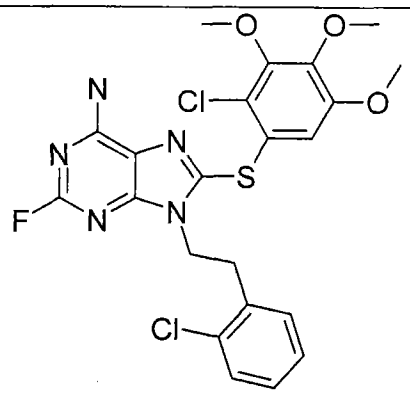
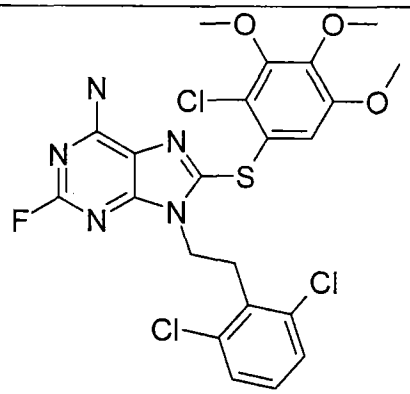
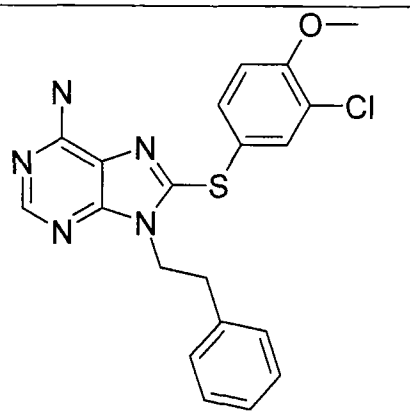
表3

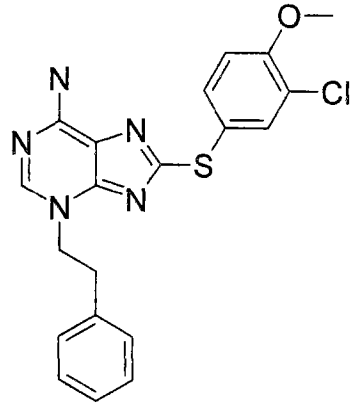
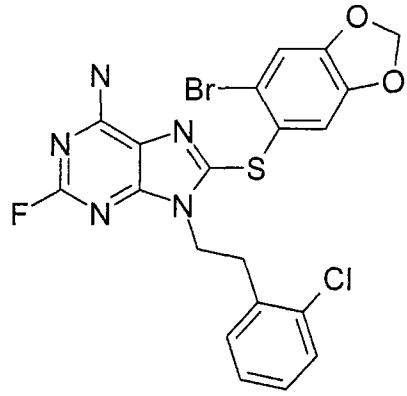
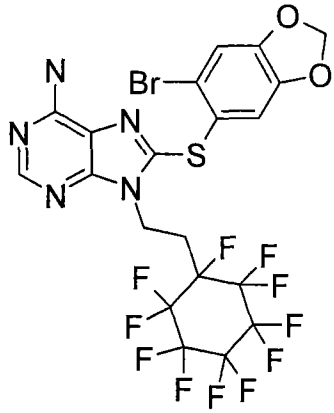
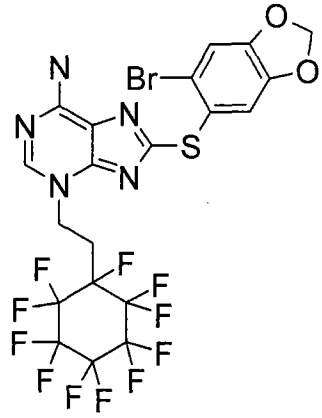
编号	结构	名称和分析数据

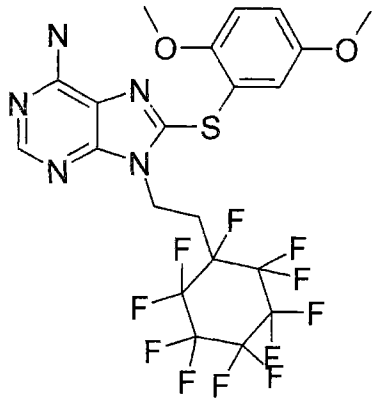
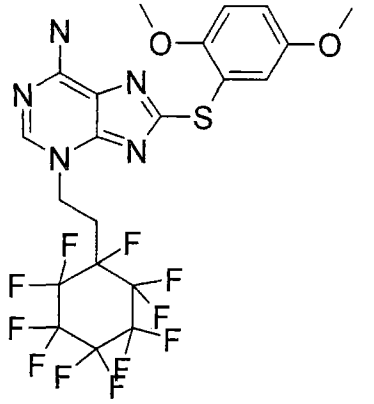
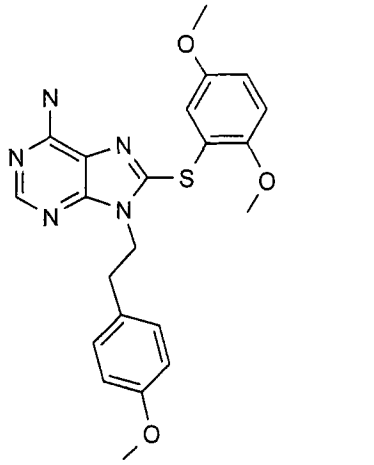
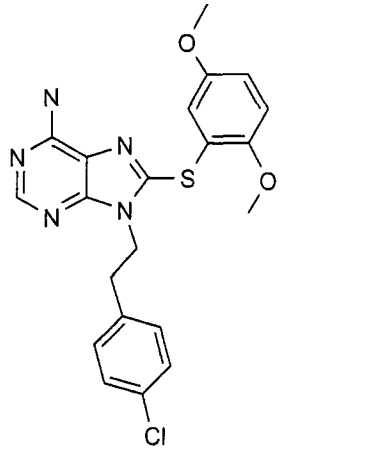
226		8-[(6-溴-1,3-苯并间二氧杂环戊烯-5-基)硫]-9-(2-环己基-2-苯基乙基)-9H-嘌呤-6-胺。^{1}H NMR (丙酮 d_6) δ 8.19 (s, 1H), 7.20 (s, 1H), 7.15-7.07 (m, 5H), 6.63 (s, 1H), 6.08 (s, 2H), 4.60-4.50 (m, 3H), 2.50-1.0 (m, 11H); LC-MS $[M+H]^+$ 552.1
227		8-[(6-溴-1,3-苯并间二氧杂环戊烯-5-基)硫]-3-(2-环己基-2-苯基乙基)-3H-嘌呤-6-胺。^{1}H NMR (丙酮 d_6) δ 7.82 (s, 1H), 7.45 (s,1H), 7.36 (s, 1H), 7.23-7.17 (m, 3H), 7.09-7.07 (m, 2H), 6.20 (s, 2H), 4.95-4.91 (m, 1H), 4.45-4.43 (m, 1H), 3.30-3.20 (m, 2H), 2.60-2.50 (m, 3H), 2.40-1.00 (m, 7H); LC-MS $[M+H]^+$ 552.1
228		8-{[2-氯-5-(三氟甲氧基)苯基]硫}-9-(2-苯基乙基)-9H-嘌呤-6-胺。^{1}H NMR ($CDCl_3$) δ 8.31 (s, 1H), 7.65 (d, J = 8.8 Hz, 1H), 7.36-7.30 (m, 2H), 7.22-7.16 (m, 3H), 7.08-7.04 (m, 2H), 4.59 (t, J = 6.8 Hz, 2H), 3.17 (t, J = 6.8 Hz, 2H); LC-MS $[M+H]^+$ 466.0
229		8-{[2-氯-5-(三氟甲氧基)苯基]硫}-3-(2-苯基乙基)-3H-嘌呤-6-胺。^{1}H NMR ($CDCl_3$) δ 8.08 (s, 1H), 7.74 (d, J = 8.8 Hz, 1H), 7.71-7.70 (m, 1H), 7.47-7.44 (m, 1H), 7.26-7.20 (m, 3H), 7.07-7.03 (m, 2H), 4.56 (t, J = 6.8 Hz, 2H), 3.18 (t, J = 6.8 Hz, 2H); LC-MS

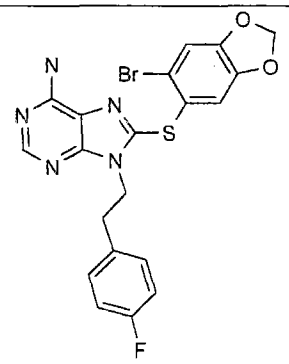
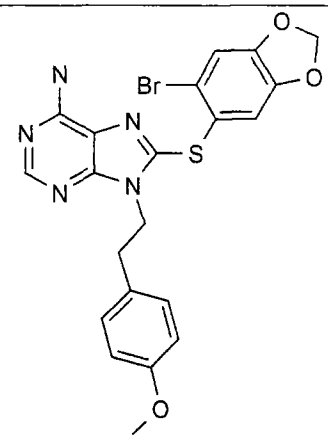
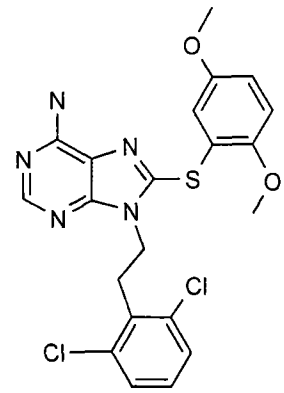
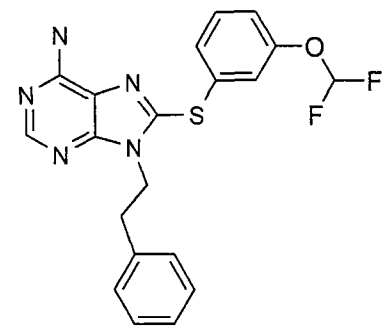
		$[M+H]^+$ 466.0
230		8-[(2,5-二甲氧基苯基)硫]-2-氟-9-(2-苯基乙基)-9H-嘌呤-6-胺。^{1}H NMR (DMSO-d_6) δ 7.24-7.18 (m, 3H), 7.05-7.00 (m, 3H), 6.88-6.84 (m, 1H), 6.49-6.47 (m, 1H), 4.32 (t, J = 6.8 Hz, 2H), 3.74 (s, 3H), 3.60 (s, 3H), 2.95 (t, J = 6.8 Hz, 2H); TOF-MS $[M+H]^+$ 426.2
231		2-(2-{6-氨基-8-[(2,5-二甲氧基苯基)硫]-9H-嘌呤-9-基}乙基)苯酚。^{1}H NMR (CD_3OD) δ 7.92 (s, 1H), 7.30 (s, 1H), 7.20-7.18 (m, 2H), 7.07-7.02 (m, 1H), 6.87-6.84 (m, 1H), 6.72-6.67 (m, 2H), 4.62 (t, J = 6.2 Hz, 2H), 3.82 (s, 3H), 3.80 (s, 3H), 3.19 (t, J = 6.2 Hz, 2H); TOF-MS $[M+H]^+$ 424.1
232		8-(1,3-苯并间二氧杂环戊烯-5-基硫)-9-[2-(2-氯苯基)乙基]-2-氟-9H-嘌呤-6-胺。^{1}H NMR (DMSO-d_6) δ 7.39 (d, J = 8.0 Hz, 1H), 7.27-7.16 (m, 2H), 7.03-7.00 (m, 1H), 6.91 (d, J = 8.0 Hz, 1H), 6.90-6.83 (m, 2H), 6.04 (s, 2H), 4.37 (t, J = 6.8 Hz, 2H), 3.13 (t, J = 6.8 Hz, 2H); LC-MS $[M+Na]^+$ 469.2

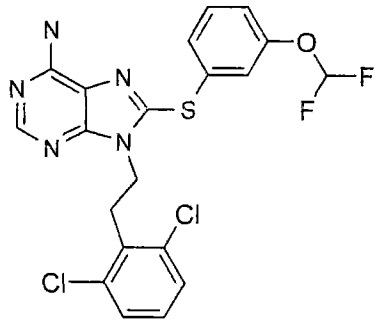
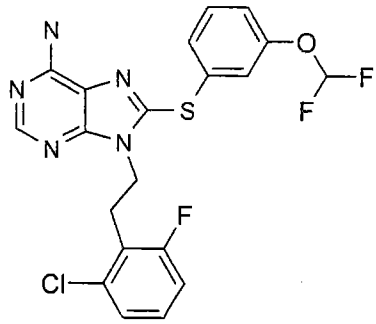
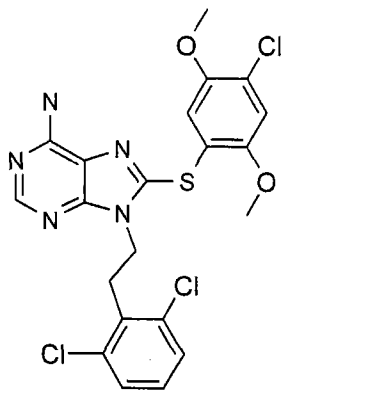
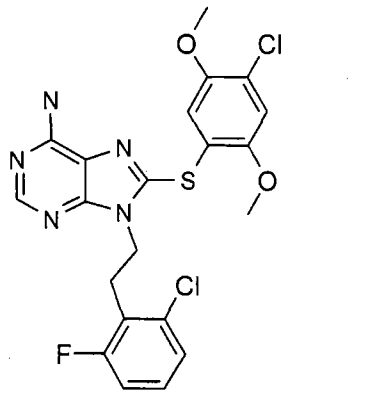
233		8-[(7-溴-2,3-二氢-1,4-苯并二噁烯-6-基)硫]-9-[2-(2-氯苯基)乙基]-9H-嘌呤-6-胺。^{1}H NMR (CD_3OD) δ 8.14 (s, 1H), 7.38-7.34 (m, 1H), 7.23-7.14 (m, 3H), 7.04-7.00 (m, 1H), 6.92 (s, 1H), 4.90-4.80 (m, 2H), 4.60-4.50 (m, 4H), 4.28-4.22 (m, 2H); TOF-MS $[M+H]^+$ 518.0
234		8-[(7-溴-2,3-二氢-1,4-苯并二噁烯-6-基)硫]-3-[2-(2-氯苯基)乙基]-3H-嘌呤-6-胺。^{1}H NMR (CD_3OD) δ 8.47 (s, 1H), 7.40-7.30 (m, 1H), 7.23-7.05 (m, 3H) 7.19 (s, 1H), 7.12 (s, 1H), 4.90-4.80 (m, 4H), 4.28-4.26 (m, 2H), 1.80-1.60 (m, 2H); TOF-MS $[M+H]^+$ 518.0
235		2-{6-氨基-8-[(2,5-二甲氧基苯基)硫]-9H-嘌呤-9-基}茚满-1-醇。^{1}H NMR (DMSO-d_6) δ 8.14 (s, 1H), 7.29-7.21 (m, 2H), 7.10-7.05 (m, 1H), 7.00-6.98 (m, 1H), 6.90-6.87 (m, 1H), 6.75-6.74 (m, 1H), 6.03-6.02 (m, 1H), 5.28-5.25 (m, 1H), 3.65 (s, 3H), 3.54 (s, 3H), 3.40-3.33 (m, 1H), 2.90-2.80 (m, 2H); TOF-MS $[M+H]^+$ 436.1
236		2-{6-氨基-8-[(2,5-二甲氧基苯基)硫]-3H-嘌呤-3-基}茚满-1-醇。^{1}H NMR (DMSO -d_6) δ 8.27 (s, 1H), 7.32-7.30 (m, 2H), 7.20-7.10 (m, 3H), 7.02-6.99 (m, 2H), 5.97-5.95 (m, 1H), 3.72 (s, 3H), 3.69 (s, 3H), 3.70-3.30 (m, 1H), 2.90-2.80 (m, 2H); TOF-MS [M+H]+ 436.1

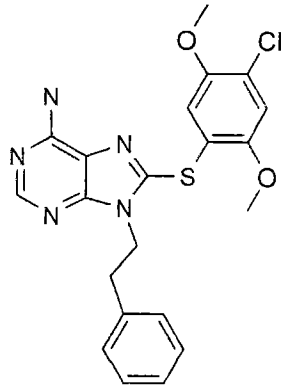
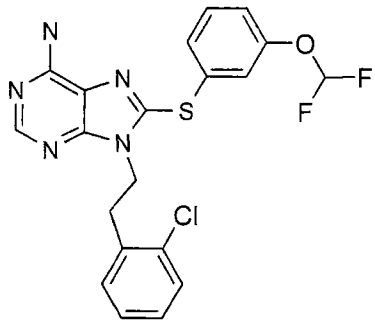
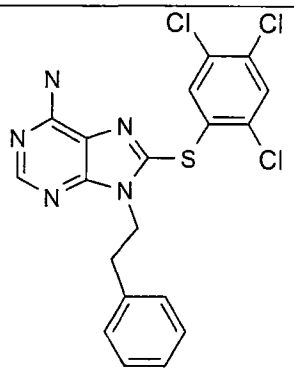
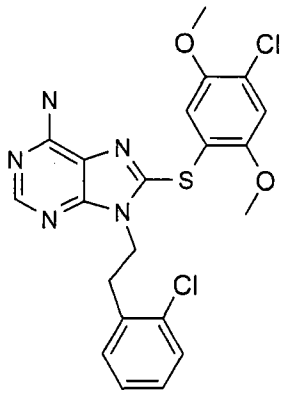
237		9-[2-(2-氯苯基)乙基]-2-氟-8-[(3,4,5-三甲氧基苯基)硫]-9H-嘌呤-6-胺。^{1}H NMR (CD_3OD) δ 7.34 (dd, J = 8.0, 1.6 Hz. 1H), 7.21 (dt, J = 8.0, 1.6 Hz. 1H), 7.14 (dt, J = 8.0, 1.6 Hz, 1H), 6.98 (dd, J = 8.0, 1.6 Hz, 1H), 6.70 (s, 2H), 4.46 (t, J = 6.8 Hz, 2H), 3.78 (s, 6H), 3.48 (s, 3H), 3.25 (t, J = 6.8 Hz, 2H); LC-MS $[M+H]^+$ 490.3
238		9-[2-(2-氯苯基)乙基]-8-[(2-氯-3,4,5-三甲氧基苯基)硫]-2-氟-9H-嘌呤-6-胺。TOF-MS $[M+H]^+$ 522.0
239		8-[(2-氯-3,4,5-三甲氧基苯基)硫]-9-[2-(2,6-二氯苯基)乙基]-2-氟-9H-嘌呤-6-胺。 TOF-MS $[M+H]^+$ 558.0
240		8-[(3-氯-4-甲氧基苯基)硫]-9-(2-苯基乙基)-9H-嘌呤-6-胺。^{1}H NMR (CD_3OD) δ 7.87-7.84 (m, 1H), 7.79-7.72 (m, 1H), 7.65-7.61 (m, 1H), 7.58-7.43 (m, 2H), 7.32-7.26 (m, 1H), 7.08-6.97 (m, 2H), 6.15-6.11 (m, 1H), 4.67-4.50 (m, 2H), 1.60 (s, 3H), 1.40-1.20 (m, 2H); TOF-MS $[M+H]^-$ 410.4

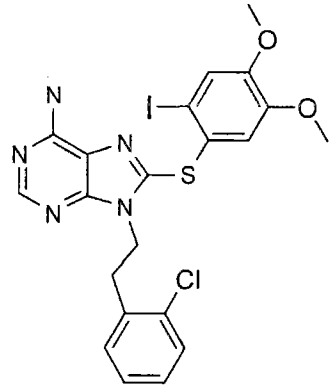
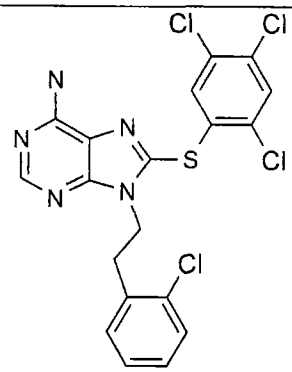
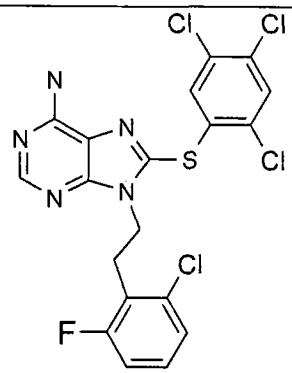
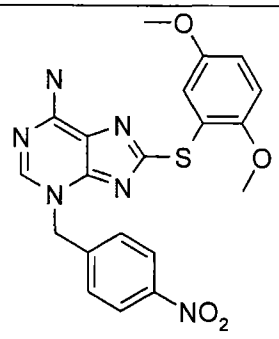
241		8-[(3-氯-4-甲氧基苯基)硫]-3-(2-苯基乙基)-3H-嘌呤-6-胺。 TOF-MS [M+H]$^+$ 412.3
242		8-[(6-溴-1,3-苯并间二氧杂环戊烯-5-基)硫]-9-[2-(2-氯苯基)乙基]-2-氟-9H-嘌呤-6-胺。^{1}H NMR (DMSO-d_6) δ 7.38-7.34 (m, 1H), 7.31 (s, 1H), 7.24-7.16 (m, 2H), 7.06-7.0 (m, 1H), 6.59 (s, 1H), 6.07 (s, 2H), 4.40-4.36 (m, 2H), 3.20-3.10 (m, 2H); TOF-MS [M+H]$^+$ 522.9
243		8-[(6-溴-1,3-苯并间二氧杂环戊烯-5-基)硫]-9-[2-(十一氟环己基)乙基]-9H-嘌呤-6-胺。 TOF-MS [M+H]$^+$ 673.8
244		8-[(6-溴-1,3-苯并间二氧杂环戊烯-5-基)硫]-3-[2-(十一氟环己基)乙基]-3H-嘌呤-6-胺。TOF-MS [M+H]$^+$ 673.8

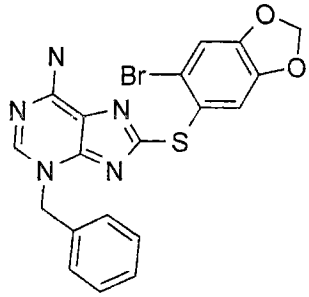
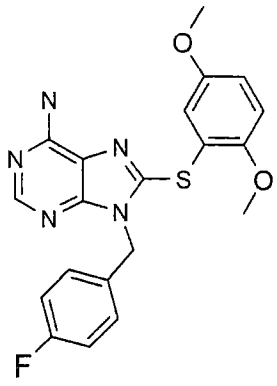
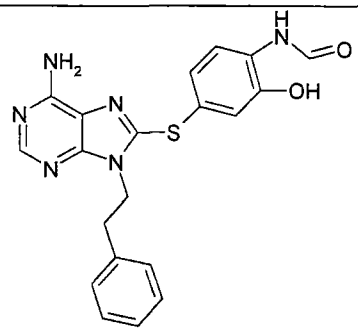
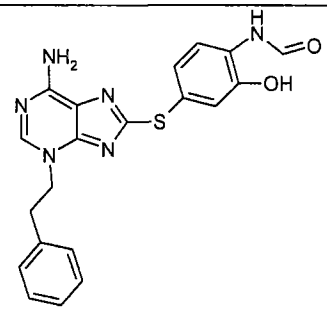
245		8-[(2,5-二甲氧基苯基)硫]-9-[2-(十一氟环己基)乙基]-9H-嘌呤-6-胺。^{1}H NMR (丙酮 -d_6) δ 8.65 (s, 1H), 7.27 (s,1H), 7.07-7.02 (m, 2H), 4.82-4.77 (m, 2H), 3.81-3.70 (m, 2H) 3.78 (s, 3H), 3.75 (s, 3H); TOF-MS [M+H]$^+$ 612.0
246		8-[(2,5-二甲氧基苯基)硫]-3-[2-(十一氟环己基)乙基]-3H-嘌呤-6-胺。 ^{1}H NMR (丙酮 -d_6) δ 8.38 (s, 1H), 7.08-7.05 (m,1H), 6.98-6.94 (m, 1H), 6.87-6.86 (m, 1H), 4.72 (t, J = 8.4 Hz, 2H), 3.80 (s, 3H), 3.71 (s, 3H), 2.95 (d, J = 8.4 Hz, 2H); TOF-MS [M+H]$^+$ 612.0
247		8-[(2,5-二甲氧基苯基)硫]-9-[2-(4-甲氧基苯基)乙基]-9H-嘌呤-6-胺。^{1}H NMR (DMSO-d_6) δ 8.22 (s, 1H), 7.62 (s, 1H), 7.02 (d, J = 8.8 Hz, 1H), 6.94 (d, J = 7.2 Hz, 2H), 6.86 (d, J = 8.8 Hz, 2H), 6.79 (d, J = 7.6 Hz, 1H), 4.35 (t, J = 7.2 Hz, 2H), 3.75 (s, 3H), 3.69 (s, 3H), 3.60 (s, 3H), 2.92 (t, J = 7.2 Hz, 2H); LC-MS [M+H]$^+$ 438.1
248		9-[2-(4-氯苯基)乙基]-8-[(2,5-二甲氧基苯基)硫]-9H-嘌呤-6-胺。^{1}H NMR (DMSO- d_6) δ 8.25 (s, 1H), 7.27 (d, J = 7.6 Hz, 2H), 7.05-7.01 (m, 2H), 6.87 (d, J = 9.2 Hz, 2H), 6.52 (s, 1H), 4.42 (t, J = 7.2 Hz, 2H), 3.74 (s, 3H), 3.62 (s, 3H), 3.02 (t, J = 7.2 Hz, 2H); LC-MS [M+H]$^+$ 442.1

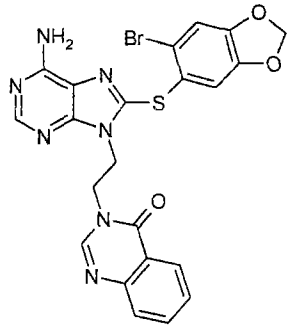
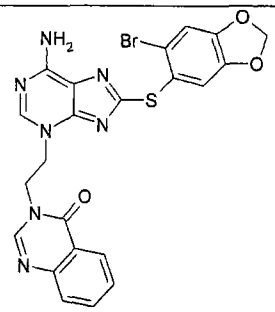
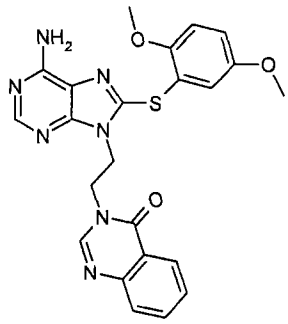
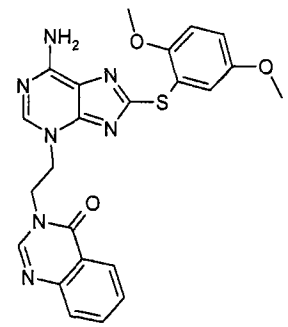
249		8-[(6-溴-1,3-苯并间二氧杂环戊烯-5-基)硫]-9-[2-(4-氟苯基)乙基]-9H-嘌呤-6-胺。LC-MS [M+H]$^+$ 488.0
250		8-[(6-溴-1,3-苯并间二氧杂环戊烯-5-基)硫]-9-[2-(4-甲氧基苯基)乙基]-9H-嘌呤-6-胺。LC-MS [M+H]$^+$ 500.0
251		9-[2-(2,6-二氯苯基)乙基]-8-[(2,5-二甲氧基苯基)硫]-9H-嘌呤-6-胺。LC-MS [M+H]$^+$ 476.1
252		8-{[3-(二氟甲氧基)苯基]硫}-9-(2-苯基乙基)-9H-嘌呤-6-胺 ^{1}H NMR (DMSO-d_6) δ 8.30 (s, 1H), 7.40 (s, 1H), 7.30-7.10 (m, 8H), 4.50 (t, J =7.2 Hz, 2H), 3.10 (t, J =7.2 Hz, 2H), 1.30 (s, 1H); LC-MS [M+H]$^+$ 414.4

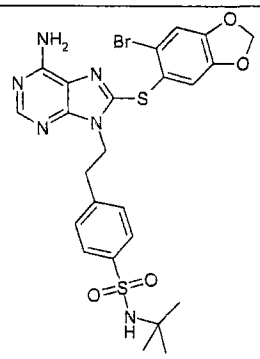
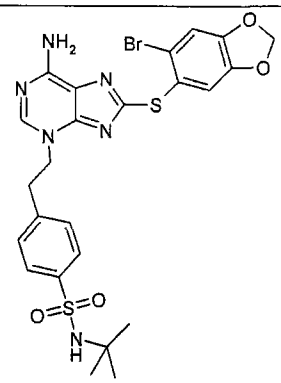
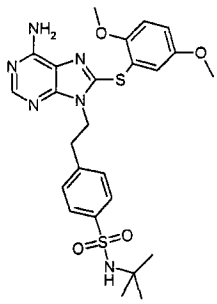
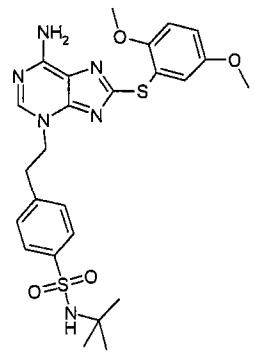
253		9-[2-(2,6-二氯苯基)乙基]-8-{[3-(二氟甲氧基)苯基]硫}-9H-嘌呤-6-胺。LC-MS [M+H]$^+$ 482.0
254		9-[2-(2-氯-6-氟苯基)乙基]-8-{[3-(二氟甲氧基)苯基]硫}-9H-嘌呤-6-胺。LC-MS [M+H]$^+$ 466.1
255		8-[(4-氯-2,5-二甲氧基苯基)硫]-9-[2-(2,6-二氯苯基)乙基]-9H-嘌呤-6-胺。LC-MS [M+H]$^+$ 512.0
256		8-[(4-氯-2,5-二甲氧基苯基)硫]-9-[2-(2-氯-6-氟苯基)乙基]-9H-嘌呤-6-胺。^{1}H NMR (DMSO-d_6) δ 8.15 (s, 1H), 7.25-7.20 (m, 5H), 4.50 (t, J = 6.0 Hz, 2H) 3.73 (s, 3H), 3.67 (s, 3H), 3.25-3.20 (m, 2H); LC-MS [M+H]$^+$ 494.0

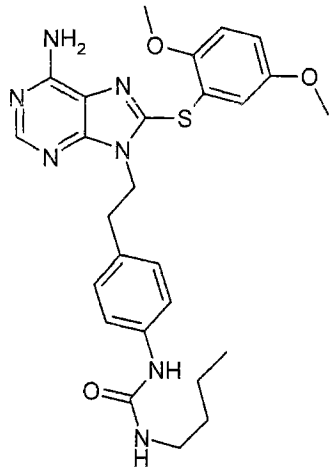
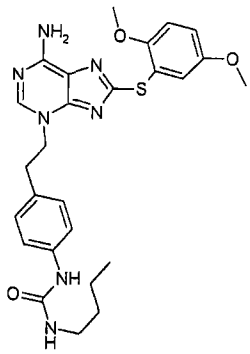
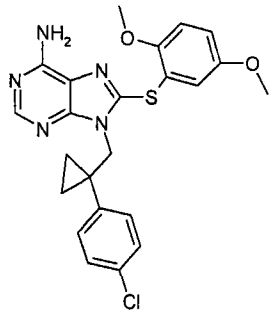
257		8-[(4-氯-2,5-二甲氧基苯基)硫]-9-(2-苯基乙基)-9H-嘌呤-6-胺。 ^{1}H NMR (DMSO-d_6) δ 8.25 (s, 1H), 7.30-7.20 (m, 4H), 7.10-7.00 (m, 3H), 4.50 (t, J = 6.8 Hz, 2H), 3.73 (s, 3H), 3.70 (s, 3H), 3.00 (t, J = 6.8 Hz, 2H); LC-MS $[M+H]^+$ 442.1
258		9-[2-(2-氯苯基)乙基]-8-{[3-(二氟甲氧基)苯基]硫}-9H-嘌呤-6-胺。 LC-MS $[M+H]^+$ 448.0
259		9-(2-苯基乙基)-8-[(2,4,5-三氯苯基)硫]-9H-嘌呤-6-胺 ^{1}H NMR (DMSO- d_6) δ 8.30 (s, 1H), 7.97 (s, 1H), 7.22 (s, 1H), 7.17-7.00 (m, 3H), 7.00-6.98 (m, 2H), 4.50 (t, J = 6.8 Hz, 2H), 3.00 (t, J = 6.8 Hz, 2H); LC-MS $[M+H]^+$ 450.4
260		8-[(4-氯-2,5-二甲氧基苯基)硫]-9-[2-(2-氯苯基)乙基]-9H-嘌呤-6-胺 ^{1}H NMR (丙酮-d_6) δ 8.20 (s, 1H), 7.36-7.29 (m, 1H), 7.23-7.13 (m, 2H), 7.13 (s, 1H), 7.07-7.04 (m, 1H), 6.98 (s, 1H), 4.57 (t, J = 7.2 Hz, 2H), 3.83 (s, 3H), 3.72 (s, 3H), 3.28 (t, J = 7.2 Hz, 2H); LC-MS $[M+H]^+$ 476.0

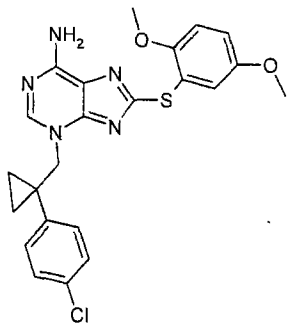
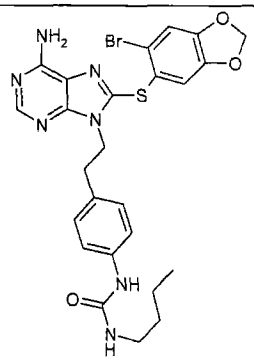
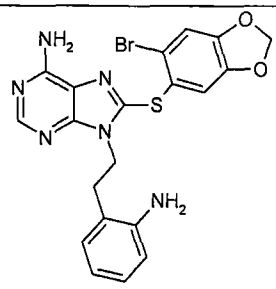
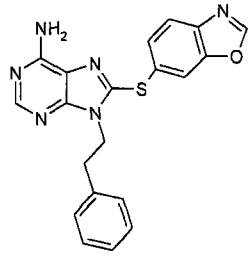
261		9-[2-(2-氯苯基)乙基]-8-[(2-碘-4,5-二甲氧基苯基)硫]-9H-嘌呤-6-胺。^{1}H NMR (DMSO- d_6) δ 8.23 (s, 1H), 7.40 -7.37 (m, 2H), 7.26-7.17 (m, 2H), 7.10-7.06 (m, 1H), 6.89 (s, 1H), 4.50 (t, J = 6.8 Hz, 2H), 3.77 (s, 3H), 3.61 (s, 3H), 3.20 (t, J = 6.8 Hz, 2H); LC-MS $[M+H]^+$ 568.3
262		9-[2-(2-氯苯基)乙基]-8-[(2,4,5-三氯苯基)硫]-9H-嘌呤-6-胺。LC-MS $[M+H]^+$ 484.2
263		9-[2-(2-氯-6-氟苯基)乙基]-8-[(2,4,5-三氯苯基)硫]-9H-嘌呤-6-胺。 LC-MS $[M+H]^+$ 502.9
264		8-[(2,5-二甲氧基苯基)硫]-3-(4-硝基苄基)-3H-嘌呤-6-胺。^{1}H NMR (DMSO- d_6) δ 8.60 (s, 1H), 8.21-8.18 (m, 2H), 7.65-7.62 (m, 2H), 6.94-6.92 (m, 1H), 6.91-6.89 (m, 1H), 6.76-6.73 (m, 1H), 5.60 (s, 2H), 3.70 (s, 3H), 3.60 (s, 3H); LC-MS $[M+H]^+$ 439.1

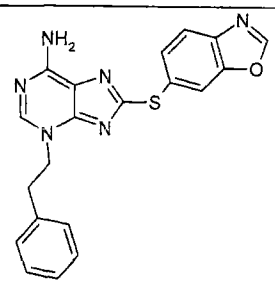
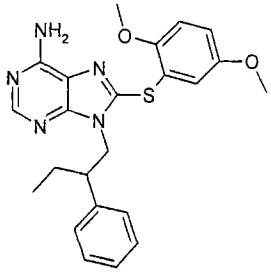
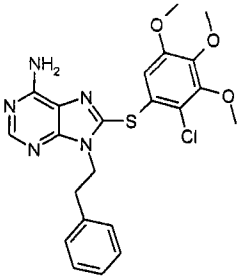
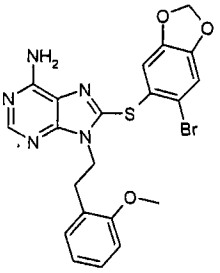
265		3-苄基-8-[(6-溴-1,3-苯并间二氧杂环戊烯-5-基)硫]-3H-嘌呤-6-胺。^{1}H NMR (DMSO- d_6) δ 8.80 (s, 1H), 7.50-7.45 (m, 3H), 7.40-7.30 (m, 4H), 6.20 (s, 2H), 5.50 (s, 2H); LC-MS $[M+H]^+$ 457.9
266		8-[(2,5-二甲氧基苯基)硫]-9-(4-氟苄基)-9H-嘌呤-6-胺。^{1}H NMR (DMSO- d_6) δ 8.20 (s, 1H), 7.23-7.20 (m, 2H), 6.97-6.95 (m, 2H), 6.82-6.70 (m, 2H), 6.33 (d, J = 2.8 Hz, 1H), 5.40 (s, 2H), 3.70 (s, 3H), 3.60 (s, 3H); LC-MS $[M+H]^+$ 412.1
267		N-(4-{[6-氨基-9-(2-苯基乙基)-9H-嘌呤-8-基]硫}-2-羟苯基)甲酰胺。^{1}H-NMR (DMSO- d_6) δ 10.52 (s, 1H), 9.72 (s, 1H), 8.38 (d, J = 11.7, 1.9 Hz, 2H), 7.58-7.48 (宽 s, 1H), 7.30-7.19 (m, 3H), 7.10-7.05 (m, 2H), 4.35 (t, J = 7.2 Hz, 2H), 2.93 (t, J = 7.2 Hz, 2H); TOF-MS $[M+H]^+$ 407.1
268		N-(4-{[6-氨基-3-(2-苯基乙基)-3H-嘌呤-8-基]硫}-2-羟苯基)甲酰胺。TOF-MS $[M+H]^+$ 407.1

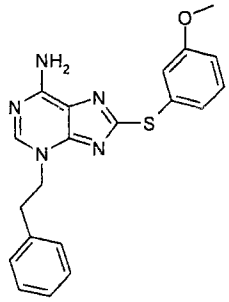
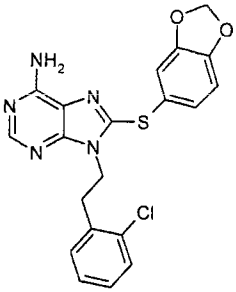
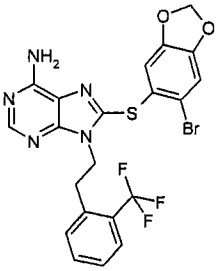
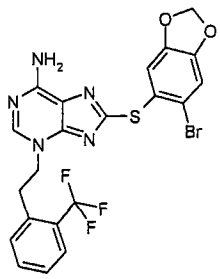
269		3-(2-{6-氨基-8-[(6-溴-1,3-苯并间二氧杂环戊烯-5-基)硫]-9H-嘌呤-9-基}乙基)喹唑啉-4(3H)-酮 ^{1}H-NMR (DMSO-d_6) δ 8.06-8.00 (m, 2H), 7.98 (s, 1H), 7.79 (dt, J = 7.1, 1.5 Hz, 1H), 7.67 (d, H = 7.6 Hz, 1H), 7.53-7.47 (m, 1H), 7.20
		(s, 1H), 6.51 (s, 1H), 6.60 (s, 2H), 4.65-4.60 (m, 2H), 4.44-4.39 (m, 2H); LC-MS $[M-H]^+$ 538.3
270		3-(2-{6-氨基-8-[(6-溴-1,3-苯并间二氧杂环戊烯-5-基)硫]-3H-嘌呤-3-基}乙基)喹唑啉-4(3H)-酮 LC-MS $[M+H]^+$ 538.3
271		3-(2-{6-氨基-8-[(2,5-二甲氧基苯基)硫]-9H-嘌呤-9-基}乙基)喹唑啉-4(3H)-酮 ^{1}H-NMR (DMSO- d_6) δ 8.07-8.01 (m, 2H), 7.94 (s, 1H), 7.82-7.77 (m, 1H), 7.59 (d, J = 8.2 Hz, 1H), 7.54-7.48 (m, 1H), 6.95 (d, J = 9.1 Hz, 1 H), 6.80 (dd, J = 9.0, 2.9 Hz, 1H), 6.53 (d, J = 2.9 Hz, 1H), 4.66-4.60 (m, 2H), 4.42-4.36 (m, 2H), 3.69 (s, 3H), 3.61 (s, 3H); LC-MS $[M+H]^+$ 476.4
272		3-(2-{6-氨基-8-[(2,5-二甲氧基苯基)硫]-3H-嘌呤-3-基}乙基)喹唑啉-4(3H)-酮 LC-MS $[M+H]^+$ 476.4

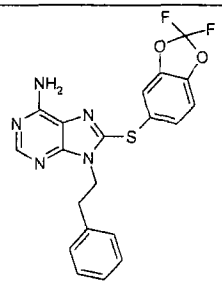
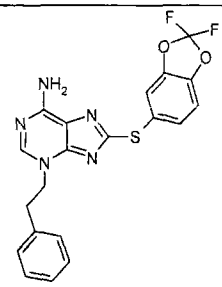
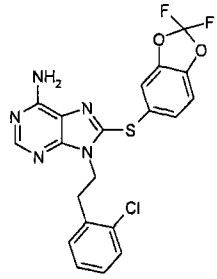
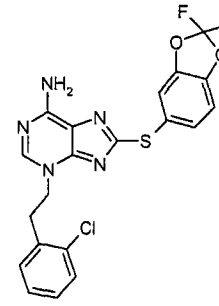
273		4-(2-{6-氨基-8-[(6-溴-1,3-苯并间二氧杂环戊烯-5-基)硫]-9H-嘌呤-9-基}乙基)-N-(叔丁基)苯磺酰胺。^{1}H-NMR (DMSO- d_6) δ 8.27 (s, 1H), 7.68 (d, J = 8.4 Hz, 2H), 7.38 (s, 1H), 7.24 (d, J = 8.4 Hz, 2H), 7.00 (s, 2H), 6.85 (s, 1H), 4.49 (t,
		J = 6.8 Hz, 2H), 3.16 (t, J = 6.8 Hz, 2H), 1.04 (s, 9H); LC-MS $[M+H]^+$ 605.4
274		4-(2-{6-氨基-8-[(6-溴-1,3-苯并间二氧杂环戊烯-5-基)硫]-3H-嘌呤-3-基}乙基)-N-(叔丁基)苯磺酰胺。LC-MS $[M+H]^+$ 605.4
275		4-(2-{6-氨基-8-[(2,5-二甲氧基苯基)硫]-9H-嘌呤-9-基}乙基)-N-(叔丁基)苯磺酰胺。^{1}H NMR (DMSO-d_6) δ 8.24 (s, 1H), 7.66 (d, J = 8.2 Hz, 2H), 7.20 (d, J = 8.2 Hz, 2H), 7.03 (d, J = 9.0 Hz, 1H), 6.90 (dd, J = 9.0, 3.1 Hz, 1H), 6.58 (d, J = 2.9 Hz, 1H), 4.50-4.42 (m, 2H), 3.73 (s, 3H), 3.63 (s, 3H), 3.20-3.08 (m, 2H), 1.05 (s, 9H); LC-MS $[M+H]^+$ 543.5
276		4-(2-{6-氨基-8-[(2,5-二甲氧基苯基)硫]-3H-嘌呤-3-基}乙基)-N-(叔丁基)苯磺酰胺。LC-MS $[M+H]^+$ 543.5

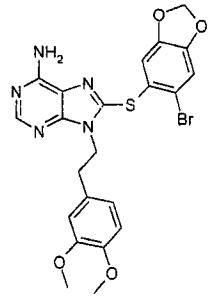
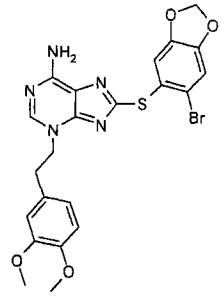
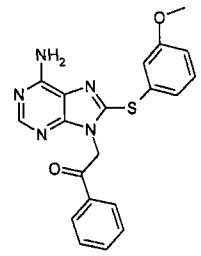
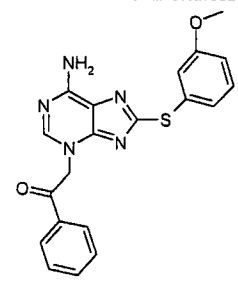
277		N-[4-(2-{6-氨基-8-[(2,5-二甲氧基苯基)硫]-9H-嘌呤-9-基}乙基)苯基]-N′-丁基脲。 ^{1}H-NMR (DMSO- d_6) δ 8.35 (s, 1H), 8.31 (s, 1H), 7.25 (d, J = 8.6 Hz, 2H), 7.03 (d, J = 9.0 Hz, 1H), 6.91-6.84 (m, 2H), 6.59 (d, J = 2.9 Hz, 1H), 6.12 -6.08 (m, 1H), 4.37 (t, J = 8.0 Hz, 2H), 3.75 (s, 3H), 3.12 (s, 3H), 3.05 (q, J = 6.5 Hz, 2H), 2.90 (t, J = 8.0 Hz, 2H), 1.42-1.25 (m, 4H), 0.89 (t, J = 7.23 Hz, 3H); LC-MS $[M+H]^+$ 522.5
278		N-[4-(2-{6-氨基-8-[(2,5-二甲氧基苯基)硫]-3H-嘌呤-3-基}乙基)苯基]-N′-丁基脲。LC-MS $[M+H]^+$ 522.5
279		9-{[1-(4-氯苯基)环丙基]甲基}-8-[(2,5-二甲氧基苯基)硫]-9H-嘌呤-6-胺。 ^{1}H NMR (DMSO-d_6) δ 8.15 (s, 1H), 7.21 (d, J = 8.4 Hz, 2H), 7.05 (d, J = 8.4 Hz, 2H), 6.94 (d, J = 9.0 Hz, 1H), 6.81 (dd, J = 9.0, 3.1 Hz, 1H), 6.42 (d, J = 2.9 Hz, 1H), 4.40 (s, 2H), 3.69 (s, 3H), 3.60 (s, 3H), 1.30-1.25 (m, 2H), 0.80-0.75 (m, 2H); TOF-MS $[M+H]^+$ 468.1

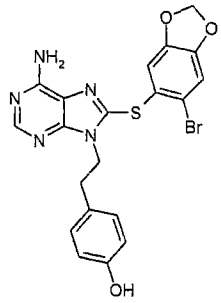
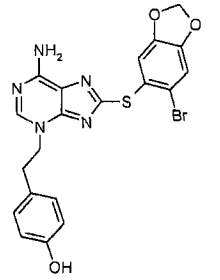
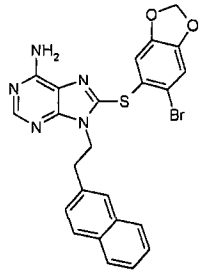
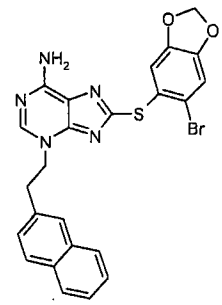
280		3-{[1-(4-氯苯基)环丙基]甲基}-8-[(2,5-二甲氧基苯基)硫]-3H-嘌呤-6-胺。TOF-MS [M+H]$^+$ 468.1
281		N-[4-(2-{6-氨基-8-[(6-溴-1,3-苯并间二氧杂环戊烯-5-基)硫]-9H-嘌呤-9-基}乙基)苯基]-N′-丁基脲。^{1}H NMR (DMSO-d_6) δ 8.24 (s, 1H), 7.35 (s, 1H), 7.24 (d, J = 8.4 Hz, 2H), 6.90 (d, J = 8.40 Hz, 2H), 6.71 (s, 1H), 6.18 (s, 2H), 4.35 (t, J = 7.4 Hz, 2H), 3.05 (q, J = 6.6 Hz, 2H), 2.93 (t, J = 7.2 Hz, 2H), 1.42-1.25 (m, 4H), 0.89 (t, J = 7.2 Hz, 3H); LC-MS [M+H]$^+$ 584.5
282		9-[2-(2-氨基苯基)乙基]-8-[(6-溴-1,3-苯并间二氧杂环戊烯-5-基)硫]-9H-嘌呤-6-胺。^{1}H NMR (DMSO-d_6) δ 8.30 (s, 1H), 7.38 (s, 1H), 7.19-7.13 (m, 1H), 6.84-6.70 (m, 4H), 6.10 (s, 2H), 4.39 (t, J = 7.6 Hz, 2H), 2.99 (t, J = 7.6 Hz, 2H); TOF-MS [M+H]$^+$ 485.04
283		8-(1,3-苯并噁唑-6-基硫)-9-(2-苯基乙基)-9H-嘌呤-6-胺。^{1}H-NMR (DMSO-d_6) δ 8.82 (s, 1H), 8.18 (s, 1H), 7.83 (d, J = 1.7 Hz, 1H), 7.79 (d, J = 8.6 Hz, 1H), 7.42-7.15 (m, 3H), 7.26-7.16 (m, 3H), 4.42 (t, J = 7.6 Hz, 2H), 3.00 (t, J = 7.0 Hz, 2H); TOF-MS [M+H]$^+$ 389.1

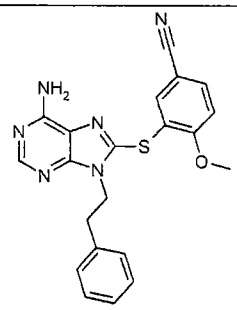
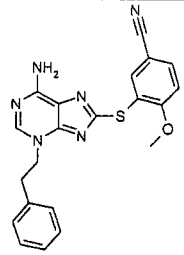
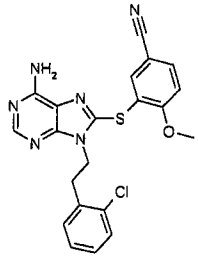
284		8-(1,3-苯并噁唑-6-基硫)-3-(2-苯基乙基)-3H-嘌呤-6-胺。 TOF-MS [M+H]$^+$ 389.12
285		8-[(2,5-二甲氧基苯基)硫]-9-(2-苯基丁基)-9H-嘌呤-6-胺。 ^{1}H NMR (DMSO- d_6) δ 8.28 (s, 1H), 7.25-7.14 (m, 3H), 7.08-7.01 (m, 3H), 6.87 (dd, J = 9.0, 3.1 Hz, 1H), 6.51 (d, J = 2.9 Hz, 1H), 4.45-4.30 (m, 2H), 3.75 (s, 3H), 3.60 (s, 3H), 3.15-3.05 (m, 1H), 1.70-1.55 (m, 2H), 0.65 (t, J = 7.4 Hz, 3H); TOF-MS [M+H]$^+$ 436.1
286		8-[(2-氯-3,4,5-三甲氧基苯基)硫]-9-(2-苯基乙基)-9H-嘌呤-6-胺。 ^{1}H NMR (CD_3OD) δ 8.19 (s, 1H), 7.90-7.26 (m, 3H), 7.10-7.07 (m, 2H), 6.94 (s, 1H), 4.52 (t, J = 6.8 Hz, 2H), 3.87 (s, 6H), 3.78 (s, 3H), 3.13 (t, J = 6.8 Hz, 2H); LC-MS [M+H]$^+$ 472.4
287		8-[(6-溴-1,3-苯并间二氧杂环戊烯-5-基)硫]-9-[2-(2-甲氧基苯基)乙基]-9H-嘌呤-6-胺。^{1}H NMR (CD_3OD) δ 8.23 (s, 1H), 7.23-7.17 (m, 2H), 6.97 (s, 1H), 6.90-6.85 (m, 2H), 6.76 (dd, J = 7.6, 0.8 Hz, 1H), 6.06 (s, 2H), 4.55 (t, J = 6.8 Hz, 2H), 3.72 (s, 3H), 3.19 (t, J = 6.8 Hz, 2H); TOF-MS [M+H]$^+$ 500.03

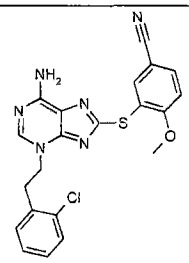
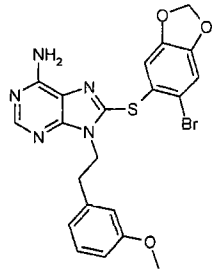
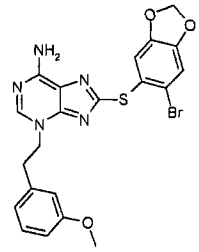
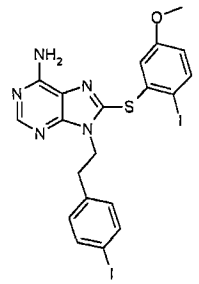
288		8-[(3-甲氧基苯基)硫]-3-(2-苯基乙基)-3H-嘌呤-6-胺。 ^{1}H NMR (CD_3OD) δ 7.74 (s, 1H), 7.32-7.17 (m, 4H), 7.13-7.05 (m, 4H), 6.91 (m, 1H), 4.53 (t, J = 6.8 Hz, 2H), 3.78 (s, 3H), 3.20 (t, J = 6.8 Hz, 2H); TOF-MS $[M+H]^+$ 378.18
289		8-(1,3-苯并间二氧杂环戊烯-5-基硫)-9-[2-(2-氯苯基)乙基]-9H-嘌呤-6-胺。 ^{1}H NMR (CD_3OD) δ 8.11 (s, 1H), 7.39-7.32 (m, 2H), 7.26-7.19 (m, 1H), 7.16-7.11 (m, 1H), 6.99-6.94 (m, 1H), 6.87-6.80 (m, 2H), 6.00 (s, 2H), 4.50 (t, J = 6.4 Hz, 2H), 3.33-3.25 (m, 2H); LC-MS $[M+H]^+$ 426.1
290		8-[(6-溴-1,3-苯并间二氧杂环戊烯-5-基)硫]-9-{2-[2-(三氟甲基)苯基]乙基}-9H-嘌呤-6-胺。^{1}H NMR (CD_3OD) δ 8.26 (s, 1H), 7.70 (d, J = 7.2 Hz, 1H), 7.50-7.40 (m, 2H), 7.23 (s, 1H), 7.16 (d, J = 7.2 Hz, 1H), 7.04 (s, 1H), 6.07 (s, 2H), 4.59 (t, J = 6.8 Hz, 2H), 3.38 (t, J = 6.8 Hz, 2H); TOF-MS $[M+H]^+$ 538.01
291		8-[(6-溴-1,3-苯并间二氧杂环戊烯-5-基)硫]-3-{2-[2-(三氟甲基)苯基]乙基}-3H-嘌呤-6-胺。^{1}H NMR (CD_3OD) δ 8.24 (s, 1H), 7.68 (d, J = 7.6 Hz, 1H), 7.53 (t, J = 7.2 Hz, 1H), 7.44 (t, J = 7.6 Hz, 1H), 7.36 (s, 1H), 7.34 (s, 1H), 7.3 (d, J = 7.6 Hz, 1H), 6.15 (s, 2H), 4.62 (t, J = 6.8 Hz, 2H), 3.41 (t, J = 6.8 Hz, 2H); TOF-MS $[M+H]^+$

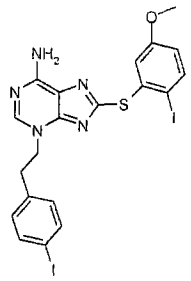
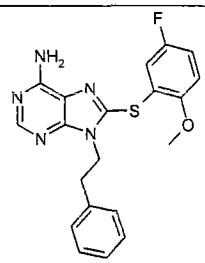
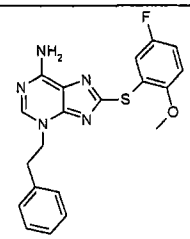
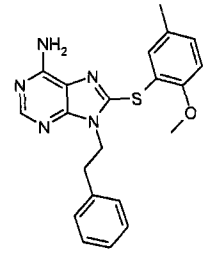
		538.01
292		8-[(2,2-二氟-1,3-苯并间二氧杂环戊烯-5-基)硫]-9-(2-苯基乙基)-9H-嘌呤-6-胺。 ^{1}H NMR (CD_3OD) δ 8.27 (s, 1H), 7.40-7.20 (m, 6H), 7.10-7.04 (m, 2H), 4.54 (t, J = 6.8 Hz, 2H), 3.18 (t, J = 6.8 Hz, 2H); TOF-MS $[M+H]^+$ 428.1
293		8-[(2,2-二氟-1,3-苯并间二氧杂环戊烯-5-基)硫]-3-(2-苯基乙基)-3H-嘌呤-6-胺。 ^{1}H NMR (CD_3OD) δ 8.11 (s, 1H), 7.70 (d, J = 2.0 Hz, 1H), 7.61 (dd, J = 8.4, 1.6 Hz, 1H), 7.42 (d, J = 8.4 Hz, 1H), 7.29-7.22 (m, 3H), 7.11-7.07 (m, 2H), 4.58 (t, J = 7.2 Hz, 2H), 3.20 (t, J = 7.2 Hz, 2H); TOF-MS $[M+H]^+$ 428.1
294		9-[2-(2-氯苯基)乙基]-8-[(2,2-二氟-1,3-苯并间二氧杂环戊烯-5-基)硫]-9H-嘌呤-6-胺。 ^{1}H NMR (CD_3OD) δ 8.11 (s, 1H), 7.40-7.27 (m, 4H), 7.23 (dt, J = 7.6, 1.6 Hz, 1H), 7.16 (dt, J = 7.6, 1.6 Hz, 1H), 7.04 (dd, J = 7.6, 1.6 Hz, 1H), 4.60 (t, J = 6.8 Hz, 2H), 3.34 (t, J = 6.8 Hz, 2H); TOF-MS $[M+H]^+$ 462.0
295		3-[2-(2-氯苯基)乙基]-8-[(2,2-二氟-1,3-苯并间二氧杂环戊烯-5-基)硫]-3H-嘌呤-6-胺。 ^{1}H NMR (CD_3OD) δ 8.93 (s, 1H), 8.55 (d, J = 2.0 Hz, 1H), 8.28-8.19 (m, 3H), 8.1-7.97 (m, 3H), 5.31 (t, J = 6.8 Hz, 2H), 4.11 (t, J = 6.8 Hz, 2H); TOF-MS $[M+H]^+$ 462.0

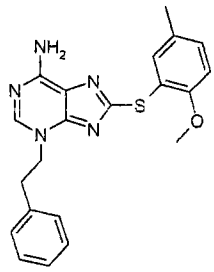
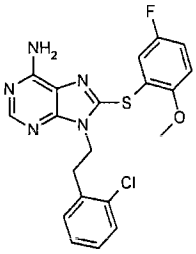
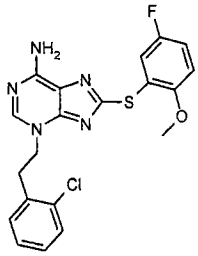
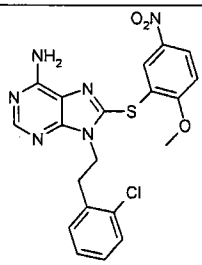
296		8-[(6-溴-1,3-苯并间二氧杂环戊烯-5-基)硫]-9-[2-(3,4-二甲氧基苯基)乙基]-9H-嘌呤-6-胺。^{1}H NMR (CD_3OD) δ 8.27 (s, 1H), 7.22 (s, 1H), 6.97 (s, 1H), 6.78 (d, J = 8.0 Hz, 1H), 6.62 (d, J = 2.0 Hz, 1H), 6.57 (dd, J = 8.0, 2.0 Hz, 1H), 6.06 (s, 2H), 4.53 (t, J = 6.8 Hz, 2H), 3.76 (s, 3H), 3.71 (s, 3H), 3.12 (t, J = 6.8 Hz, 2H); TOF-MS $[M+H]^+$ 530.0
297		8-[(6-溴-1,3-苯并间二氧杂环戊烯-5-基)硫]-3-[2-(3,4-二甲氧基苯基)乙基]-3H-嘌呤-6-胺。 ^{1}H NMR (CD_3OD) δ 8.16 (s, 1H), 7.4 (d, J = 4.0 Hz, 2H), 6.84 (d, J = 8.4 Hz, 1H), 6.71 (d, J = 2.0 Hz, 1H), 6.62 (dd, J = 8.4, 2.0 Hz, 1H), 6.19 (s, 2H), 4.62 (t, J = 6.8 Hz, 2H), 3.81 (s, 3H), 3.78 (s, 3H), 3.18 (t, J = 6.8 Hz, 2H); TOF-MS $[M+H]^+$ 530.0
298		2-{6-氨基-8-[(3-甲氧基苯基)硫]-9H-嘌呤-9-基}-1-苯乙酮。^{1}H NMR (CD_3OD) δ 8.24 (s, 1H), 8.05 (dd, J = 8.4, 1.2 Hz, 2H), 7.72 (t, J = 7.2 Hz, 1H), 7.58 (t, J = 7.2 Hz, 2H), 7.23 (t, J = 8.0 Hz, 1H), 7.06-7.02 (m, 2H), 6.91-6.86 (m, 1H), 5.89 (s, 2H), 3.70 (s, 3H); TOF-MS $[M+H]^+$ 392.1
299		2-{6-氨基-8-[(3-甲氧基苯基)硫]-3H-嘌呤-3-基}-1-苯乙酮。^{1}H NMR (CD_3OD) δ 8.45 (s, 1H), 8.13-8.09 (m, 2H), 7.75 (dt, J = 8.0, 1.2 Hz, 1H), 7.61 (t, J = 7.6 Hz, 2H), 7.43 (dt, J = 8.4, 1.6

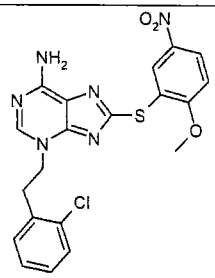
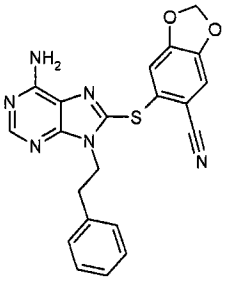
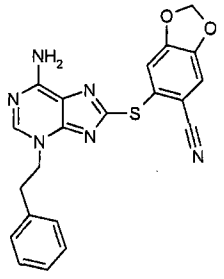
		Hz, 1H), 7.28-7.24 (m, 2H), 7.14-7.1 (m, 1H), 6.03 (s, 2H), 3.80 (s, 3H); TOF-MS $[M+H]^+$ 392.1
300		4-(2-{6-氨基-8-[(6-溴-1,3-苯并间二氧杂环戊烯-5-基)硫]-9H-嘌呤-9-基}乙基)苯酚。^{1}H NMR (CD_3OD) δ 8.27 (s, 1H), 7.24 (s, 1H), 7.05 (d, J = 7.6 Hz, 2H), 7.00-6.95 (m, 3H), 6.07 (s, 2H), 4.52 (t, J = 6.8 Hz, 2H), 3.14 (t, J = 6.8 Hz, 2H); TOF-MS $[M+H]^+$ 486.0
301		4-(2-{6-氨基-8-[(6-溴-1,3-苯并间二氧杂环戊烯-5-基)硫]-3H-嘌呤-3-基}乙基)苯酚。^{1}H NMR (CD_3OD) δ 8.09 (s, 1H), 7.37 (s, 1H), 7.36 (s, 1H), 7.07 (d, J = 8.0 Hz, 2H), 6.96 (d, J = 8.0 Hz, 2H), 6.15 (s, 2H), 4.57 (t, J = 6.8 Hz, 2H), 3.16 (t, J = 6.8 Hz, 2H); TOF-MS $[M+H]^+$ 486.0
302		8-[(6-溴-1,3-苯并间二氧杂环戊烯-5-基)硫]-9-[2-(2-萘基)乙基]-9H-嘌呤-6-胺。 ^{1}H NMR (CD_3OD) δ 8.17 (s, 1H), 7.8-7.77 (m, 1H), 7.74 (d, J = 8.4 Hz, 1H), 7.71-7.67 (m, 1H), 7.46 (s, 1H), 7.45-7.40 (m, 2H), 7.25 (dd, J = 8.8, 2.0 Hz, 1H), 7.12 (s, 1H), 6.67 (s, 1H), 5.99 (s, 2H), 4.58 (t, J = 6.8 Hz, 2H), 3.34-3.28 (m, 2H); TOF-MS $[M+H]^+$ 520.0
303		8-[(6-溴-1,3-苯并间二氧杂环戊烯-5-基)硫]-3-[2-(2-萘基)乙基]-3H-嘌呤-6-胺。 ^{1}H NMR (CD_3OD) δ 8.17 (s, 1H), 7.85-7.75 (m, 2H), 7.73-7.67 (m, 1H), 7.51 (s, 1H), 7.70-7.44 (m, 2H), 7.39 (s,

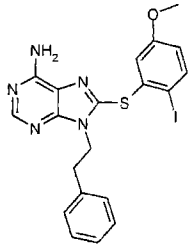
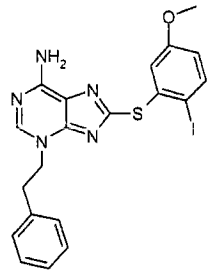
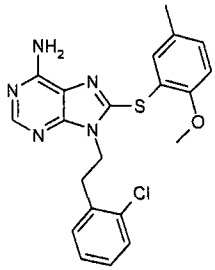
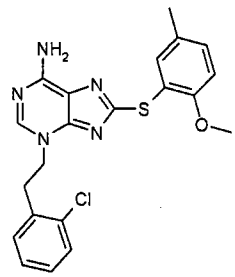
		1H), 7.35 (s, 1H), 7.29 (dd, J = 8.4, 1.6 Hz, 1H), 6.15 (s, 2H), 4.70 (t, J = 6.8 Hz, 2H), 3.39 (t, J = 6.8 Hz, 2H); TOF-MS $[M+H]^+$ 520.0
304		3-{[6-氨基-9-(2-苯基乙基)-9H-嘌呤-8-基]硫}-4-甲氧基苯甲腈。^{1}H NMR (CD_3OD) δ 8.22 (s, 1H), 7.77 (dd, J = 10.8, 2.4 Hz, 1H), 7.61 (d, J = 2.0 Hz, 1H), 7.27-7.20 (m, 4H), 7.07-7.14 (m, 2H), 4.57 (t, J = 6.8 Hz, 2H), 3.91 (s, 3H), 3.18 (t, J = 6.8 Hz, 2H); TOF-MS $[M+H]^+$ 403.1
305		3-{[6-氨基-3-(2-苯基乙基)-3H-嘌呤-8-基]硫}-4-甲氧基苯甲腈。^{1}H NMR (CD_3OD) δ 9.38 (d, J = 2.0 Hz, 1H), 9.27 (s, 1H), 9.22 (dd, J = 8.8, 2.4 Hz, 1H), 8.65-8.57 (m, 4H), 8.46-8.39 (m, 2H), 5.81 (t, J = 6.8 Hz, 2H), 5.25 (s, 3H), 4.48 (t, J = 6.8 Hz, 2H); TOF-MS $[M+H]^+$ 403.1
306		3-({6-氨基-9-[2-(2-氯苯基)乙基]-9H-嘌呤-8-基}硫)-4-甲氧基苯甲腈。^{1}H NMR (CD_3OD) δ 8.25 (s, 1H), 7.65 (dd, J = 8.4, 2.0 Hz, 1H), 7.32 (d, J = 2.0 Hz, 1H), 7.29 (dd, J = 8.0, 1.2 Hz, 1H), 7.15 (dt, J = 7.6, 2.0 Hz, 1H), 7.13-7.07 (m, 2H), 6.93 (dd, J = 7.6, 2.0 Hz, 1H), 4.53 (t, J = 6.8 Hz, 2H), 3.91 (s, 3H), 3.27 (t, J = 6.8 Hz, 2H); TOF-MS $[M+H]^+$ 437.1

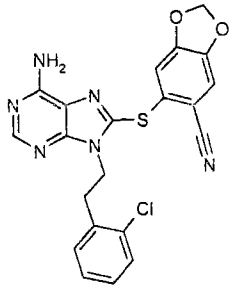
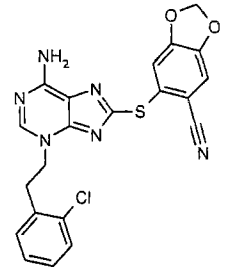
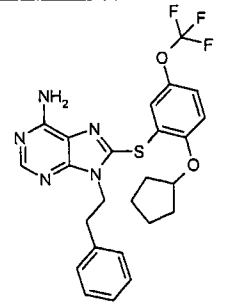
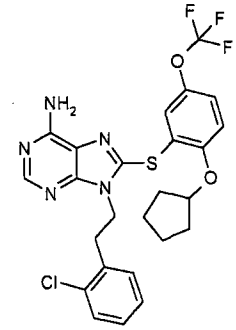
307		3-({6-氨基-3-[2-(2-氯苯基)乙基]-3H-嘌呤-8-基}硫)-4-甲氧基苯甲腈。^{1}H NMR (CD_3OD) δ 8.14 (s, 1H), 8.08 (d, J = 2.0 Hz, 1H), 7.95 (dd, J = 8.8, 2.0 Hz, 1H), 7.37-7.33 (m, 2H), 7.22 (dq, J = 7.6, 2.0 Hz, 2H), 7.15-7.12 (m, 1H), 4.61 (t, J = 6.8 Hz, 2H), 3.94 (s, 3H), 3.35 (t, J = 6.8 Hz, 2H); TOF-MS $[M+H]^+$ 437.1
308		8-[(6-溴-1,3-苯并间二氧杂环戊烯-5-基)硫]-9-[2-(3-甲氧基苯基)乙基]-9H-嘌呤-6-胺。^{1}H NMR (CD_3OD) δ 8.25 (s, 1H), 7.22 (s, 1H), 7.12 (t, J = 7.6 Hz, 1H), 7.00 (s, 1H), 6.74 (ddd, J = 8.4, 2.8, 1.2 Hz, 1H), 6.67-6.6 (m, 2H), 6.06 (s, 2H), 4.53 (t, J = 6.8 Hz, 2H), 3.70 (s, 3H), 3.14 (t, J = 6.8 Hz, 2H); TOF-MS $[M+H]^+$ 500.0
309		8-[(6-溴-1,3-苯并间二氧杂环戊烯-5-基)硫]-3-[2-(3-甲氧基苯基)乙基]-3H-嘌呤-6-胺。^{1}H NMR (CD_3OD) δ 7.97 (s, 1H), 7.29 (s, 1H), 7.24 (s, 1H), 7.15 (t, J = 7.6 Hz, 1H), 6.79-6.75 (m, 1H), 6.66-6.61 (m, 2H), 6.10 (s, 2H), 4.56 (t, J = 6.8 Hz, 2H), 3.70 (s, 3H), 3.17 (t, J = 6.8 Hz, 2H); LC-MS $[M+H]^+$ 500.3
310		8-[(2-碘-5-甲氧基苯基)硫]-9-[2-(4-碘苯基)乙基]-9H-嘌呤-6-胺。 ^{1}H NMR ($CDCl_3$) δ 8.37 (s, 1H), 8.16 (s, 1H), 7.25-7.18 (m, 3H), 7.13-7.09 (m, 2H), 6.69 (s, 1H), 4.48 (t, J = 6.8 Hz, 2H), 3.48 (s,

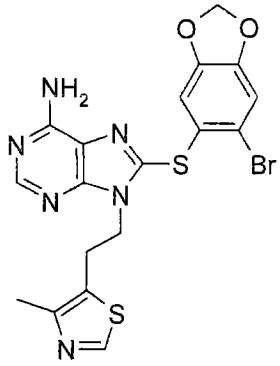
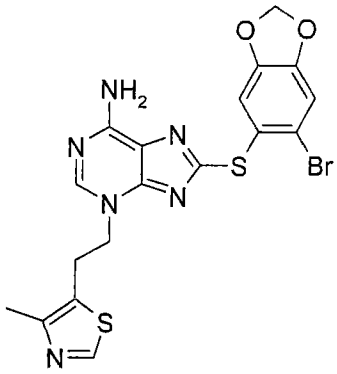
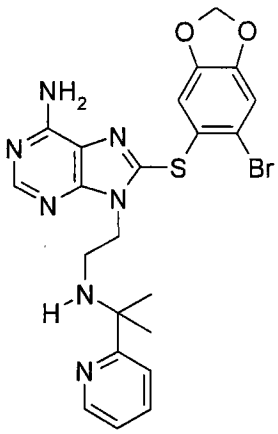
		3H), 3.12 (t, J = 6.8 Hz, 2H); TOF-MS $[M+H]^+$ 629.9
311		8-[(2-碘-5-甲氧基苯基)硫]-3-[2-(4-碘苯基)乙基]-3H-嘌呤-6-胺。^{1}H NMR ($CDCl_3$) δ 8.35 (s, 1H), 7.57 (s, 1H), 7.34-7.25 (m, 4H), 6.94 (dd, J =7.6, 2.0 Hz, 2H), 4.46 (t, J = 6.8 Hz, 2H), 3.9 (s, 3H), 3.18 (t, J = 6.8 Hz, 2H); TOF-MS $[M+H]^+$ 629.9
312		8-[(5-氟-2-甲氧基苯基)硫]-9-(2-苯基乙基)-9H-嘌呤-6-胺。^{1}H NMR ($CDCl_3$) δ 8.50- 8.40 (broad s, 1H), 7.29-7.19 (m, 3H), 7.15-7.11 (m, 2H), 7.02-6.95 (m, 1H), 6.91 (dd, J = 8.0, 2.8 Hz, 1H), 6.84 (dd, J = 9.2, 4.4 Hz, 1H), 4.49 (t, J = 6.8 Hz, 2H), 3.81 (s, 3H), 3.10 (t, J = 6.8 Hz, 2H); LC-MS $[M+H]^+$ 396.3
313		8-[(5-氟-2-甲氧基苯基)硫]-3-(2-苯基乙基)-3H-嘌呤-6-胺。^{1}H NMR ($CDCl_3$) δ 7.55-7.52 (m, 1H), 7.41 (dd, J = 7.6, 2.8 Hz, 1H), 7.33-7.26 (m, 3H), 7.23-7.16 (m, 1H), 6.99-6.93 (m, 3H), 4.50 (t, J = 6.8 Hz, 2H), 3.83 (s, 3H), 3.19 (t, J = 6.8 Hz, 2H); LC-MS $[M+H]^+$ 396.4
314		8-[(2-甲氧基-5-甲基苯基)硫]-9-(2-苯基乙基)-9H-嘌呤-6-胺 LC-MS $[M+H]^+$ 392.4

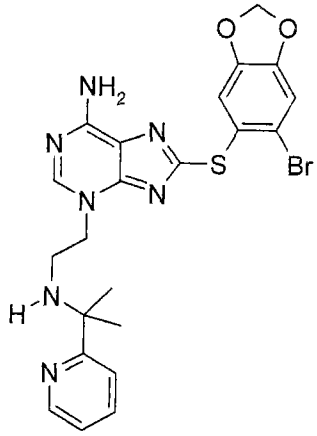
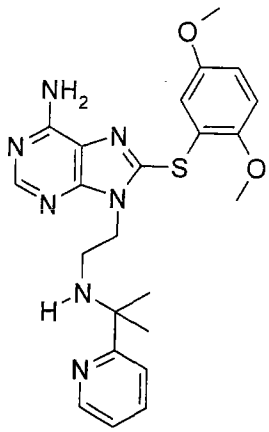
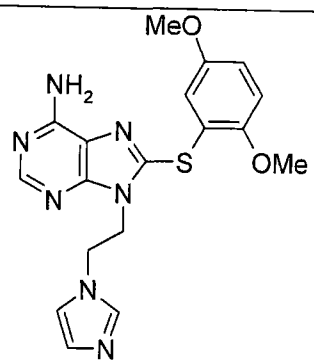
315		8-[(2-甲氧基-5-甲基苯基)硫]-3-(2-苯基乙基)-3H-嘌呤-6-胺。 ^{1}H NMR ($CDCl_3$) δ 7.51-7.43 (m, 2H), 7.33-7.25 (m, 4H), 6.98-6.94 (m, 2H), 6.91 (d, J = 8.4 Hz, 1H), 4.49 (t, J = 6.8 Hz, 2H), 3.81 (s, 3H), 3.19 (t, J = 6.8 Hz, 2H), 2.35 (s, 3H); LC-MS $[M+H]^+$ 392.4
316		9-[2-(2-氯苯基)乙基]-8-[(5-氟-2-甲氧基苯基)硫]-9H-嘌呤-6-胺。 ^{1}H NMR ($CDCl_3$) δ 8.21 (s, 1H), 7.33 (dd, J = 7.6, 1.2 Hz, 1H), 7.18 (dt, J = 7.6, 1.6 Hz, 1H), 7.1 (dt, J = 7.6, 1.6 Hz, 1H), 7.07-6.94 (m, 3H), 6.86 (dd, J = 9.2, 4.4 Hz, 1H), 4.57 (t, J = 7.2 Hz, 2H), 3.79 (s, 3H), 3.28 (t, J = 7.2 Hz, 2H); LC-MS $[M+H]^+$ 430.3
317		3-[2-(2-氯苯基)乙基]-8-[(5-氟-2-甲氧基苯基)硫]-3H-嘌呤-6-胺。 ^{1}H NMR ($CDCl_3$) δ 7.61-7.57 (broad s, 1H), 7.43-7.37 (m, 2H), 7.25-7.12 (m, 3H), 6.95 (dd, J = 8.8, 4.0 Hz, 1H), 6.84 (dd, J = 7.6, 1.6 Hz, 1H), 4.56 (t, J = 6.8 Hz, 2H), 3.83 (s, 3H), 3.34 (t, J = 6.8 Hz, 2H); LC-MS $[M+H]^+$ 430.3
318		9-[2-(2-氯苯基)乙基]-8-[(2-甲氧基-5-硝基苯基)硫]-9H-嘌呤-6-胺。 ^{1}H NMR ($CDCl_3$) δ 8.28 (s, 1H), 8.22 (dd, J = 9.2, 2.8 Hz, 1H), 8.15 (d, J = 2.4 Hz, 1H), 7.31 (dd, J = 7.6, 1.6 Hz, 1H), 7.15 (dt, J = 7.6, 1.6 Hz, 1H), 7.09 (dt,

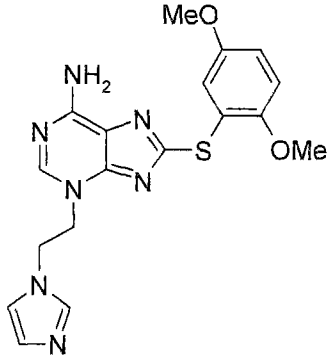
		J = 7.6, 1.2 Hz, 1H), 6.98 (d, J = 9.2 Hz, 1H), 6.94 (dd, J = 7.2, 1.6 Hz, 1H), 4.59 (t, J = 6.8 Hz, 2H), 3.94 (s, 3H), 3.31 (t, J = 6.8 Hz, 2H); LC-MS $[M+H]^+$ 457.3
319		3-[2-(2-氯苯基)乙基]-8-[(2-甲氧基-5-硝基苯基)硫]-3H-嘌呤-6-胺。^{1}H NMR ($CDCl_3$) δ 8.59 (s, 1H), 8.23-8.21 (m, 1H), 7.52 (s, 1H), 7.38 (dd, J = 8.0, 1.2 Hz, 1H), 7.22 (dt, J = 7.6, 1.6 Hz, 1H), 7.11 (dt, J = 7.6, 1.2 Hz, 1H), 7.01 (d, J = 8.8 Hz, 1H), 6.85 (dd, J = 7.6, 1.6 Hz, 1H), 4.61 (t, J = 6.8 Hz, 2H), 4.01 (s, 3H), 3.41 (t, J = 6.8 Hz, 2H); LC-MS $[M+H]^+$ 457.3
320		6-{[6-氨基-9-(2-苯基乙基)-9H-嘌呤-8-基]硫}-1,3-苯并间二氧杂环戊烯-5-甲腈。^{1}H NMR (CD_3OD) δ 8.23 (s, 1H), 7.32 (s, 1H), 7.28-7.20 (m, 3H), 7.13-7.08 (m, 3H), 6.17 (s, 2H), 4.56 (t, J = 6.8 Hz, 2H), 3.19 (t, J = 6.8 Hz, 2H); TOF-MS $[M+H]^+$ 417.1
321		6-{[6-氨基-3-(2-苯基乙基)-3H-嘌呤-8-基]硫}-1,3-苯并间二氧杂环戊烯-5-甲腈。^{1}H NMR (CD_3OD) δ 8.08 (s, 1H), 7.44 (s, 1H), 7.41 (s, 1H), 7.30-7.20 (m, 3H), 7.10-7.06 (m, 2H), 6.24 (s, 2H), 4.57 (t, J = 6.8 Hz, 2H), 3.20 (t, J = 6.8 Hz, 2H); TOF-MS $[M+H]^+$ 417.1

322		8-[(2-碘-5-甲氧基苯基)硫]-9-(2-苯基乙基)-9H-嘌呤-6-胺。^{1}H NMR ($CDCl_3$) δ 8.18 (s, 1H), 7.78 (d, J = 8.4 Hz, 1H), 7.32-7.24 (m, 3H), 7.40-7.10 (m, 2H), 6.98 (d, J = 2.8 Hz, 1H), 6.68 (dd, J = 8.4, 2.8 Hz, 1H), 4.5 (t, J = 6.8 Hz, 2H), 3.75 (s, 3H), 3.12 (t, J = 6.8 Hz, 2H); LC-MS $[M+H]^+$ 504.3
323		8-[(2-碘-5-甲氧基苯基)硫]-3-(2-苯基乙基)-3H-嘌呤-6-胺。 ^{1}H NMR ($CDCl_3$) δ 7.85 (d, J = 8.4 Hz, 1H), 7.52 (s, 1H), 7.42 (d, J = 4.4 Hz, 1H), 7.30-7.25 (m, 3H), 6.98-6.94 (m, 2H), 6.76 (dd, J = 8.8, 3.2 Hz, 1H), 4.47 (t, J = 6.8 Hz, 2H), 3.82 (s, 3H), 3.19 (t, J = 6.8 Hz, 2H); LC-MS $[M+H]^+$ 504.3
324		9-[2-(2-氯苯基)乙基]-8-[(2-甲氧基-5-甲基苯基)硫]-9H-嘌呤-6-胺。 LC-MS $[M+H]^+$ 426.3
325		3-[2-(2-氯苯基)乙基]-8-[(2-甲氧基-5-甲基苯基)硫]-3H-嘌呤-6-胺。 ^{1}H NMR ($CDCl_3$) δ 7.54 (s, 1H), 7.48-7.46 (m, 1H), 7.39 (dd, J = 8.0, 1.2 Hz, 1H), 7.32-7.28 (m, 1H), 7.25-7.21 (m, 1H), 7.15 (dt, J = 7.6, 1.2 Hz, 1H), 6.91 (d, J = 8.4 Hz, 1H), 6.82 (dd, J = 7.6, 1.6 Hz, 1H), 4.55 (t, J = 6.8 Hz, 2H), 3.81 (s, 3H), 3.34 (t, J = 6.8 Hz, 2H), 2.33 (s, 3H); LC-MS $[M+H]^+$ 426.3

326		6-({6-氨基-9-[2-(2-氯苯基)乙基]-9H-嘌呤-8-基}硫)-1,3-苯并间二氧杂环戊烯-5-甲腈。^{1}H NMR (CD_3OD) δ 8.26 (s, 1H), 7.36 (dd, J = 8.0, 1.6 Hz, 1H), 7.33 (s, 1H), 7.23 (dt, J = 7.6, 2.0 Hz, 1H), 7.18-7.14 (m, 2H), 7.09 (dd, J = 7.6, 1.6 Hz, 1H), 6.18 (s, 2H), 4.65 (t, J = 6.8 Hz, 2H), 3.37 (t, J = 6.8 Hz, 2H); TOF-MS [M+H]$^+$ 451.0
327		6-({6-氨基-3-[2-(2-氯苯基)乙基]-3H-嘌呤-8-基}硫)-1,3-苯并间二氧杂环戊烯-5-甲腈。^{1}H NMR (CD_3OD) δ 8.16 (s, 1H), 7.43 (s, 1H), 7.39 (s, 1H), 7.34 (dd, J = 7.6, 1.2 Hz, 1H), 7.23 (dt, J = 7.2, 1.6 Hz, 1H), 7.17 (dt, J = 7.6, 1.6 Hz, 1H), 7.01 (dd, J = 7.6, 1.6 Hz, 1H), 6.25 (s, 2H), 4.61 (t, J = 6.8 Hz, 2H), 3.34 (t, J = 6.8 Hz, 2H); TOF-MS [M+H]$^+$ 451.0
328		8-{[2-(环戊基氧基)-5-(三氟甲氧基)苯基]硫}-9-(2-苯基乙基)-9H-嘌呤-6-胺。 TOF-MS [M+H]+ 516.1
329		9-[2-(2-氯苯基)乙基]-8-{[2-(环戊基氧基)-5-(三氟甲氧基)苯基]硫}-9H-嘌呤-6-胺。TOF-MS [M+H]+ 550.1

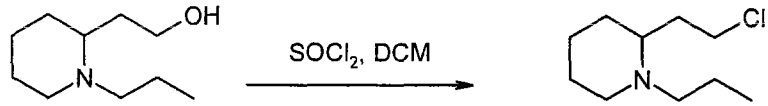
330		8-[(6-溴-1,3-苯并间二氧杂环戊烯-5-基)硫]-9-[2-(4-甲基-1,3-噻唑-5-基)乙基]-9H-嘌呤-6-胺。^{1}H NMR (CD_3OD) δ 8.75 (s, 1H), 8.19 (s, 1H), 7.23 (s, 1H), 6.97 (s, 1H), 6.07 (s, 2H), 4.50 (t, J = 6.8 Hz, 2H), 3.41 (t, J = 6.8 Hz, 2H), 2.13 (s, 3H); LC-MS $[M+H]^+$ 491.1
331		8-[(6-溴-1,3-苯并间二氧杂环戊烯-5-基)硫]-3-[2-(4-甲基-1,3-噻唑-5-基)乙基]-3H-嘌呤-6-胺。^{1}H NMR (CD_3OD) δ 8.80 (s, 1H), 8.35 (s, 1H), 7.40 (s, 1H), 7.39 (s, 1H), 6.17 (s, 2H), 4.58 (t, J = 6.8 Hz, 2H), 3.47 (t, J = 6.8 Hz, 2H), 2.18 (s, 3H); LC-MS $[M+H]^+$ 491.3
332		8-[(6-溴-1,3-苯并间二氧杂环戊烯-5-基)硫]-3-{2-[(1-甲基-1-吡啶-2-基乙基)氨基]乙基}-3H-嘌呤-6-胺。^{1}H NMR (CD_3OD) δ 8.45 (ddd, J = 4.8, 2.0, 0.8 Hz, 1H), 8.28 (s, 1H), 7.90 (td, J = 8.4, 2.0 Hz, 1H), 7.57 (dt, J = 8.4, 0.8 Hz, 1H), 7.38 (ddd, J = 8.4, 4.8, 0.8 Hz, 1H), 7.23 (s, 1H), 7.05 (s, 1H), 6.06 (s, 2H), 4.68 (t, J = 6.8 Hz, 2H), 3.33 (t, J = 6.8 Hz, 2H), 1.75 (s, 6H); TOF-MS $[M+H]^+$ 528.08

333		8-[(6-溴-1,3-苯并间二氧杂环戊烯-5-基)硫]-3-{2-[(1-甲基-1-吡啶-2-基乙基)氨基]乙基}-3H-嘌呤-6-胺。^{1}H NMR (CD_3OD) δ 8.42-8.39 (m, 2H), 7.91 (td, J = 7.6, 2.0 Hz, 1H), 7.58 (d, J = 8.4 Hz, 1H), 7.39 (ddd, J = 6.0, 5.2, 1.2 Hz, 1H), 7.31 (s, 1H), 7.21 (s, 1H), 6.12 (s, 2H), 4.71 (t, J = 6.4 Hz, 2H), 3.52 (t, J = 6.4 Hz, 2H), 1.73 (s, 6H); TOF-MS $[M+H]^+$528.08
334		8-[(2,5-二甲氧基苯基)硫]-9-{2-[(1-甲基-1-吡啶-2-基乙基)氨基]乙基}-9H-嘌呤-6-胺。^{1}H NMR (CD_3OD) δ 8.43 (ddd, J = 4.8, 1.6, 0.8 Hz, 1H), 8.28 (s, 1H), 7.89 (td, J = 8.0, 2.0 Hz, 1H), 7.57 (td, J = 8.0, 1.2 Hz, 1H), 7.36 (ddd, J = 8.0, 4.8, 1.2 Hz, 1H), 6.99 (dd, J = 9.2, 0.8 Hz, 1H), 6.96 (d, J = 9.2 Hz, 1H), 6.92 (dd, J = 2.8, 0.8 Hz, 1H), 4.70 (t, J = 6.4 Hz, 2H), 3.72 (s, 3H), 3.66 (s, 3H), 3.32 (t, J = 6.4 Hz, 2H), 1.74 (s, 6H); TOF-MS $[M+H]^+$ 466.2
335		8-[(2,5-二甲氧基苯基)硫]-9-[2-(1H-咪唑-1-基)乙基]-9H-嘌呤-6-胺。^{1}H NMR (CD_3CN) δ 8.33 (t, J = 1.2 Hz, 1H), 8.18 (s, 1H), 7.28 (t, J = 1.6 Hz, 1H), 7.13 (t, J = 1.6 Hz, 1H), 7.01 (d, J = 9.2 Hz, 1H), 6.95 (dd, J = 9.2, 2.8 Hz, 1H), 6.83 (d, J = 3.2 Hz, 1H), 4.69 (m, 2H), 4.61 (m, 2H), 3.88 (s, 3H), 3.72 (s, 3H); TOF-MS $[M+H]^+$ 398.1

336		8-[(2,5-二甲氧基苯基)硫]-3-[2-(1H-咪唑-1-基)乙基]-3H-嘌呤-6-胺。^{1}H NMR (CD_3CN) δ 8.26 (s, 1H), 8.04 (s, 1H), 7.29 (brt, J = 1.6 Hz, 1H), 7.21 (dd, J = 2.0, 0.8 Hz, 1H), 7.10 (brt, J = 1.6 Hz, 1H), 7.07-7.06 (m, 2H), 4.67-4.63 (m, 2H), 4.61-4.58 (m, 2H), 3.78 (s, 3H), 3.77 (s, 3H); TOF-MS $[M+H]^+$ 398.14

中间体 43

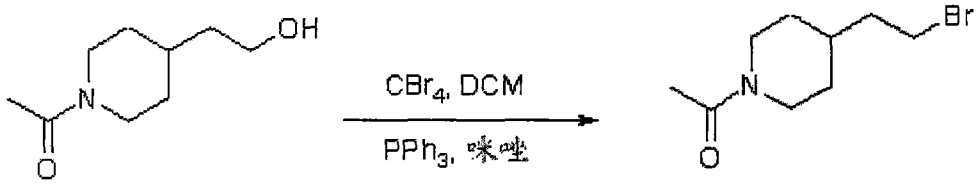
合成 2-(2-氯-乙基)-1-丙基-哌啶



在室温下,向 2-(1-丙基-哌啶-2-基)-乙醇(0.150 g,0.875 mmol)在二氯甲烷(5 mL)的溶液中加入亚硫酰氯(1.0 mL, 13.70 mmol)并将该反应混合液回流 3h。在减压条件下除去溶剂及过量的亚硫酰氯。将产物溶解于二氯甲烷中并蒸发至干。该产物不经过进一步纯化而用于下一步中。GC-MS *m/z* 189.00。

中间体 44

合成 1-[4-(2-溴-乙基)-哌啶-1-基]-乙酮

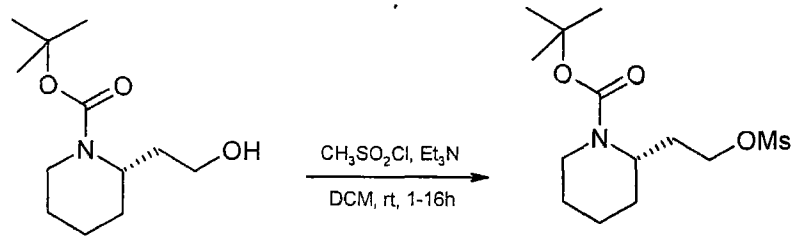


在 0 ℃下,向 1-[4-(2-羟基-乙基)-哌啶-1-基]-乙酮(0.500 g, 2.92 mmol)在二氯甲烷(15 mL)的溶液中加入四溴化碳(1.45 g, 4.38 mmol)、三苯膦(0.728 g, 2.77 mmol)和咪唑(0.398 g, 5.84 mmol)。将该反应混合液的温度缓慢升至室温并在室温下持续搅拌 18 h。将该反应物用二氯甲烷稀释并用水洗涤。有机层经干燥(Na_2SO_4)、过滤,并将溶剂蒸发。产物经硅胶使用 0-10%梯度的甲

醇在二氯甲烷中的混合物进行色谱纯化。GC-MS *m/z* 235。

中间体 45

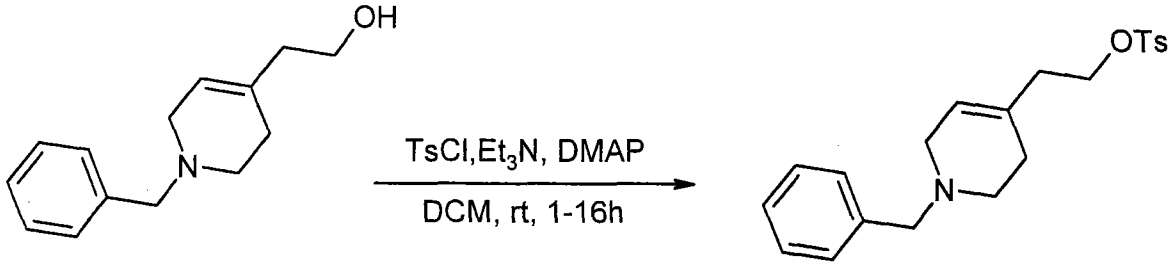
合成(S)-2-(2-甲磺酰氧基-乙基)-哌啶-1-羧酸叔丁酯。



在室温下，用 1-16 h 向(*S*)-2-(2-羟基-乙基)-哌啶-1-羧酸叔丁酯（0.300 g，1.30mmol）在二氯甲烷（5 mL）的溶液中加入甲磺酰氯（0.304 mL，3.9 mmol）和三乙胺（0.547 mL，3.9 mmol）。将所述反应混合物用二氯甲烷稀释并用 $NaHCO_3$（10%，W/V）洗涤，然后用水洗涤。所述二氯甲烷层经干燥（Na_2SO_4）、过滤，并且将溶剂蒸发至干。产物对于下一步而言是足够纯的，不经过任何进一步的纯化而使用。LC-MS [M+Na] 329.9。

中间体 46

合成甲苯-4-磺酸 2-(1-苄基-1,2,3,6-四氢-吡啶-4-基)-乙酯

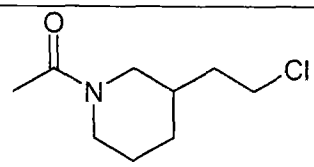
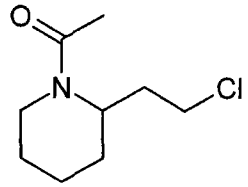
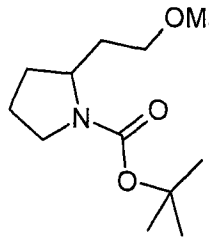
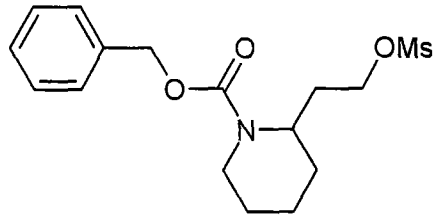
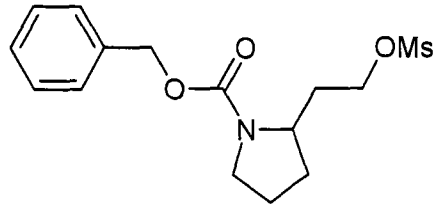


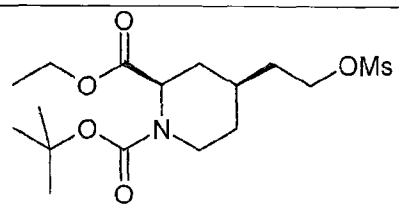
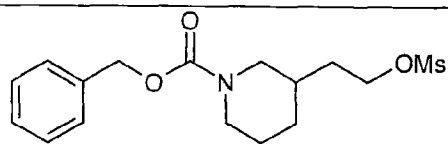
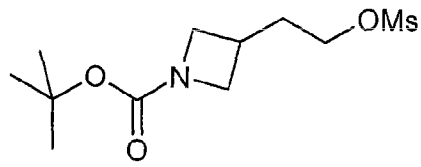
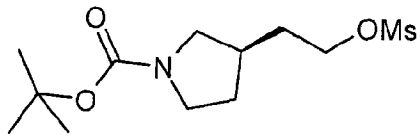
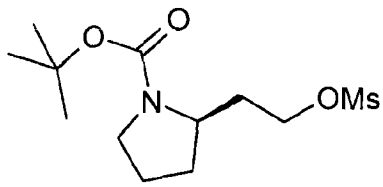
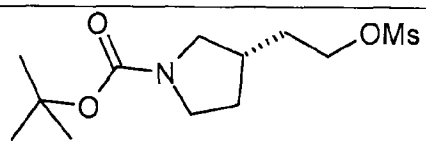
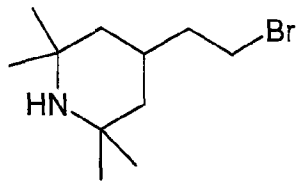
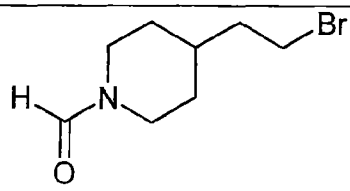
在室温下，向 2-(1-苄基-1,2,3,6-四氢-吡啶-4-基)乙醇（0.822 g，4.09 mmol）（*J. Med. Chem.* 1990，33，3133）在二氯甲烷的溶液中加入对甲苯磺酰氯（1.71 g，9.00 mmol）、三乙胺（2.3 mL，16.4 mmol）和 DMAP（0.050 g，0.41 mmol）并在室温下连续搅拌 3h。将所述反应混合物用二氯甲烷稀释并用 $NaHCO_3$（10%，W/V）水溶液洗涤，然后用饱和 NaCl 溶液洗涤。所述有机层经干燥（Na_2SO_4）、过滤，并且将溶剂蒸发至干。产物经硅胶使用 0-10%梯度的甲醇在二氯甲烷中的混合物进行闪式色谱纯化。^1H NMR ($CDCl_3$) δ 7.77 (d, 8.4 Hz,

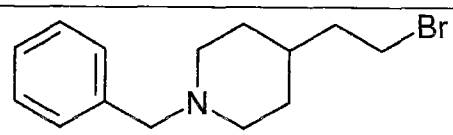
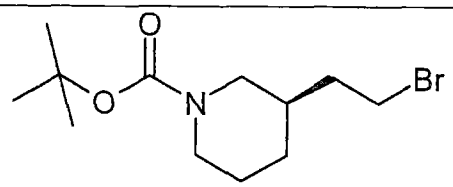
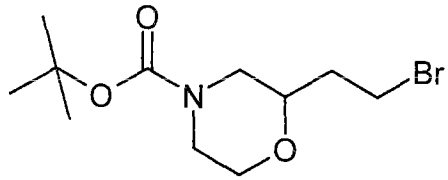
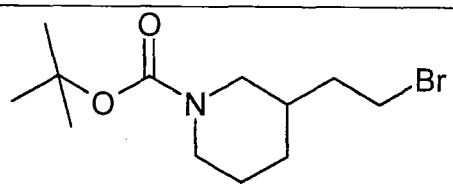
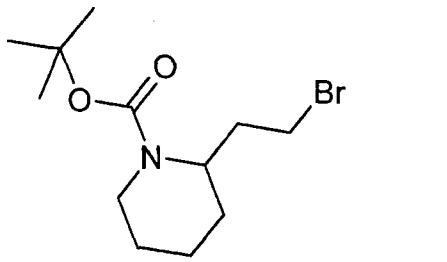
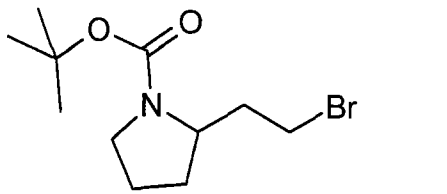
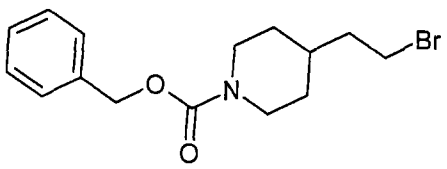
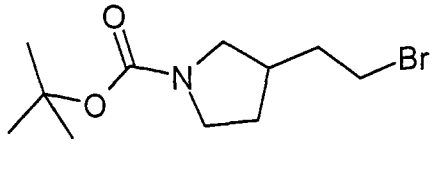
2H), 7.34-7.30 (m, 5H), 7.26 (m, 1H), 5.36 (m, 1H), 4.09 (t, J = 6.8 Hz, 2H), 3.54 (s, 2H), 2.92-2.88 (m, 2H), 2.50 (t, J = 5.6 Hz, 2H), 2.44 (s, 3H), 2.31 (brt, J = 6.8 Hz, 2H), 2.20-1.84 (m, 2H)。

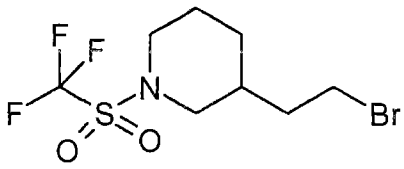
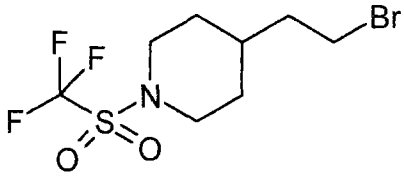
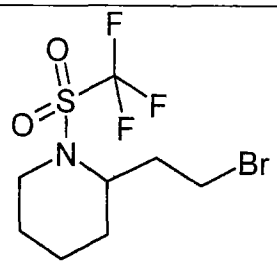
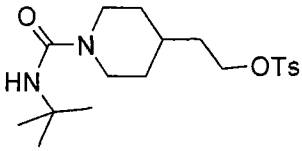
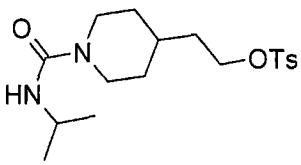
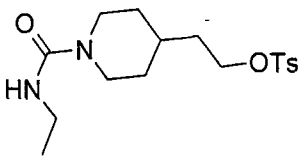
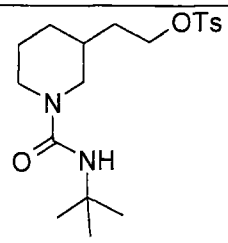
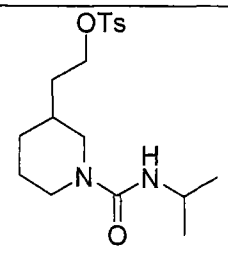
以类似于所述中间体 43- 46 的步骤使用合适的原料制备中间体 47 - 86，这些中间体在表 4 中列出。

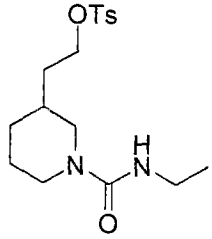
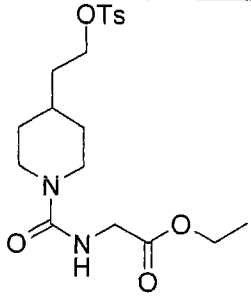
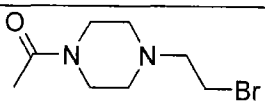
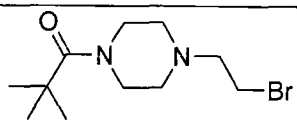
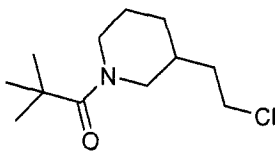
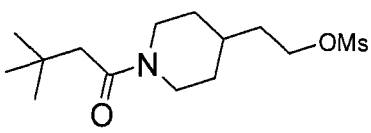
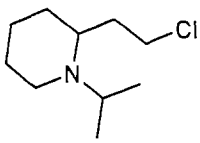
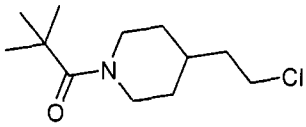
表 4

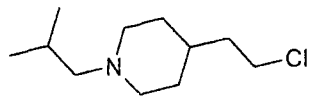
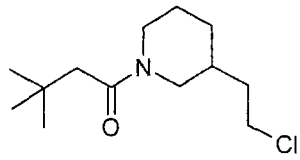
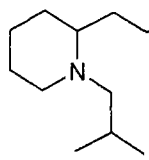
中间体	结构	名称和分析数据
47		1-[3-(2-氯-乙基)-哌啶-1-基]-乙酮。GC-MS *m/z* 189.0
48		1-[2-氯-乙基)哌啶-1-基]-乙酮。GC-MS *m/z* 189.0
49		2-(2-甲磺酰氧基-乙基)-吡咯烷-1-羧酸叔丁酯。LC-MS $[M+H]^+$ 294.3
50		2-(2-甲磺酰氧基-乙基)-哌啶-1-羧酸苄酯。LC-MS $[M-H]^+$ 340.8
51		2-(2-甲磺酰氧基-乙基)-吡咯烷-1-羧酸苄酯。LC-MS $[M+H]^+$ 328.0
52		(2*R*,4*S*)-4-(2-甲磺酰氧基-乙基)-哌啶-1,2-二羧酸 1-叔丁酯 2-乙酯。LC-MS $[M-H]^+$ 378.0

		
53		3-(2-甲磺酰氧基-乙基)-哌啶-1-羧酸苄酯。LC-MS [M-H]$^+$ 340.1
54		3-(2-甲磺酰氧基-乙基)-吖丁啶-1-羧酸叔丁酯。LC-MS [M+H]$^+$ 279.9
55		(*R*)-3-(2-甲磺酰氧基-乙基)-吡咯烷-1-羧酸叔丁酯。LC-MS [M+H]$^+$ 294.1
56		(*R*)-2-(2-甲磺酰氧基-乙基)-吡咯烷-1-羧酸叔丁酯。LC-MS [M+H]$^+$ 294.6
57		(*S*)-3-(2-甲磺酰氧基-乙基)-吡咯烷-1-羧酸叔丁酯。LC-MS [M+H]$^+$ 294.3
58		4-(2-溴-乙基)-2,2,6,6-四甲基-哌啶。GC-MS *m/z* 248.11
59		4-(2-溴-乙基)-哌啶-1-甲醛。GC-MS *m/z* 219
60		1-苄基-4-(2-溴-乙基)-哌啶。LC-MS [M+H]$^+$ 282.2

		
61		(*R*)-3-(2-(溴-乙基哌啶-1-羧酸叔丁酯。GC-MS *m/z* 291
62		2-(2-溴-乙基)吗啉-4-羧酸叔丁酯。GC-MS *m/z* 293
63		3-(2-溴-乙基)-哌啶-1-羧酸叔丁酯。GC-MS *m/z* 291
64		2-(2-溴-乙基)-哌啶-1-羧酸叔丁酯。GC-MS *m/z* 291
65		2-(2-溴-乙基)-吡咯烷-1-羧酸叔丁酯。GC-MS *m/z* 277
66		4-(2-(溴-乙基)-哌啶-1-羧酸苄酯。GC-MS *m/z* 325
67		3-(2-溴-乙基)- 吡咯烷-1-羧酸叔丁酯。GC-MS *m/z* 277

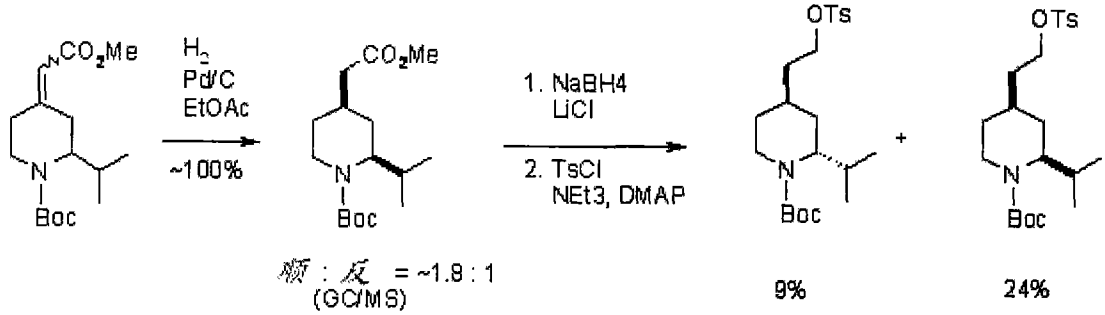
68		3-(2-溴-乙基)-1-三氟甲磺酰基-哌啶。GC-MS *m/z* 323.0
69		4-(2-溴-乙基)-1-三氟甲磺酰基-哌啶。GC-MS *m/z* 323.00
70		2-(2-溴-乙基)-1-三氟甲磺酰基-哌啶。GC-MS *m/z* 216 [M-C_2H_4Br]
71		甲苯-4-磺酸 2-(1-叔丁基氨基甲酰-哌啶-4-基)-乙酯。LC-MS $[M+H]^+$ 383.2
72		甲苯-4-磺酸 2-(1-异丙基氨基甲酰-哌啶-4-基)-乙酯。LC-MS $[M+H]^+$ 369.2
73		甲苯-4-磺酸 2-(1-乙基氨基甲酰-哌啶-4-基)-乙酯。LC-MS $[M+H]^+$ 355.2
74		甲苯-4-磺酸 2-(1-叔丁基氨基甲酰-哌啶-3-基)-乙酯。LC-MS $[M+H]^+$ 383.3
75		甲苯-4-磺酸 2-(1-异丙基氨基甲酰-哌啶-3-基)-乙酯。LC-MS $[M+H]^+$ 369.2

76		甲苯-4-磺酸 2-(1-乙基氨基甲酰-哌啶-3-基)-乙酯。LC-MS $[M+H]^+$ 355.2
77		({4-[2-(甲苯-4-磺酰氧)-乙基]-哌啶-1-羰基}-氨基)-乙酸乙酯。LC-MS $[M+H]^+$ 413.5
78		1-[4-(2-溴-乙基)-哌嗪-1-基]-乙酮。^1H NMR ($CDCl_3$) δ 3.65-3.62 (m, 2H), 3.50-3.47 (m, 2H), 3.43 (t, J = 7.2 Hz, 2H), 2.81 (t, J = 7.2 Hz, 2H), 2.53-2.51 (m, 2H), 2.49-2.47 (m, 2H), 2.10 (s, 3H)。
79		1-[4-(2-溴-乙基)-哌嗪-1-基]-2,2-二甲基-丙-1-酮。^1H NMR ($CDCl_3$): 3.68-3.65 (m, 2H), 3.43 (t, J = 7.2 Hz, 2H), 2.80 (t, J = 7.2 Hz, 2H), 2.51-2.48 (m, 2H), 1.28 (s, 9H)
80		1-[3-(2-氯-乙基)-哌啶-1-基]-2.2-二甲基-丙-1-酮。LC-MS $[M+H]^+$ 232
81		甲磺酸 2-[1-(3,3-二甲基-丁酰基)-哌啶-4-基]-乙酯。LC-MS $[M+H]^+$ 305
82		2-(2-氯-乙基)-1-异丙基-哌啶。GC-MS m/z 189.0
83		1-[4-(2-氯-乙基)-哌啶-1-基]-2,2-二甲基-丙-1-酮。LC-MS $[M+H]^+$ 232

84		4-(2-氯-乙基)-1-异丁基-哌啶。GC-MS m/z 203.0
85		1-[3[(2-氯-乙基)-哌啶-1-基]-3, 3-二甲基-丁-1-酮。GC-MS m/z 245.0
86		2-(2-氯-乙基)-1-异丁基-哌啶。GC-MS m/z 203.0

中间体 87 和 88

合成*反*-2-异丙基-4-[2-(甲苯-4-磺酰氧)-乙基]-哌啶-1-羧酸叔丁酯和*顺*-2-异丙基-4-[2-(甲苯-4-磺酰氧)-乙基]-哌啶-1-羧酸叔丁酯。



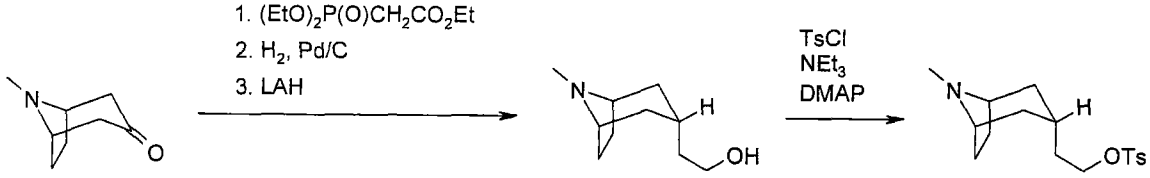
依照已知的文献步骤（*Org. Lett.* 2000, *2*, 3679）制备 2-异丙基-4-甲氧羰甲基-哌啶-1-羧酸叔丁酯的顺式异构体和反式异构体的混合物。随后用 $NaBH_4$/LiCl 处理该酯，然后在存在 NEt_3 和催化量的 DMAP 的条件下加入 TsCl，得到*顺*-2-异丙基-4-[2-(甲苯-4-磺酰氧)-乙基]-哌啶-1-羧酸叔丁酯和*顺*-2-异丙基-4-[2-(甲苯-4-磺酰氧)-乙基]-哌啶-1-羧酸叔丁酯，并通过 ISCO 闪式色谱将它们分离。*顺*-2-异丙基-4-[2-(甲苯-4-磺酰氧)-乙基]-哌啶-1-羧酸叔丁酯，^1H NMR ($CDCl_3$) δ 7.79 (dt, J = 8.4, 2.0 Hz, 2H), 7.35 (d, J = 8.4 Hz, 2H), 4.04 (m, 2H), 3.78 (ddd, J = 14.0, 8.0, 2.0 Hz, 1H), 3.52 (q, 8.4 Hz, 1H), 2.83 (ddd, J = 14.5, 10.8, 6.8 Hz, 1H), 2.46 (s, 3H), 1.86-1.76 (m, 2H), 1.69-1.59 (m, 3H), 1.52 (m, 1H), 1.45 (m, 9H), 1.06 (m, 1H), 1.00 (m, 1H), 0.85 (d, J =

6.4 Hz, 6H)。

顺-2-异丙基-4-[2-(甲苯-4-磺酰氧)-乙基]-哌啶-1-羧酸叔丁酯，^{1}H NMR ($CDCl_3$) δ 7.79 (dt, J = 8.8, 2.2 Hz, 2H), 7.35 (d, J = 8.8 Hz, 2H), 4.10-4.02 (m, 2H), 3.89 (m, 1H), 3.67 (m, 1H), 2.68 and 2.59 (two t, J = 14.4 and 13.6 Hz, 1H), 2.46 (s, 3H), 1.93 (m, 1H), 1.75 (brd, J =14.0 Hz, 1H), 1.68 (m, 1H), 1.55-1.47 (m, 3H), 1.43 (s, 9H), 1.07 (dt, J = 12.8, 5.2 Hz, 1H), 0.97 (m, 1H)。

中间体 89

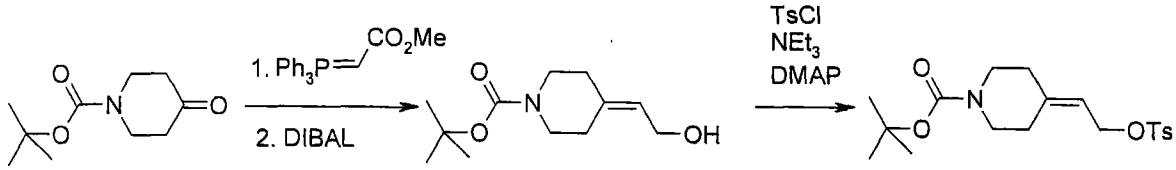
合成甲苯-4-磺酸 2-(8-甲基-8-氮杂-双环[3.2.1]辛-3-基)-乙酯



依照已知的文献步骤（*J. Med. Chem.* 2001, *44*, 3937）从市售可得的 3-托品酮制备 2-(8-甲基-8-氮杂-双环[3.2.1]辛-3-基)乙醇。依照所述制备中间体 46 的步骤将其转化成相应的甲苯磺酸酯，无需进一步纯化而将其用于下一步中。

中间体 90

合成 4[2-(甲苯-4-磺酰氧)-亚乙基]-哌啶-1-羧酸叔丁酯。

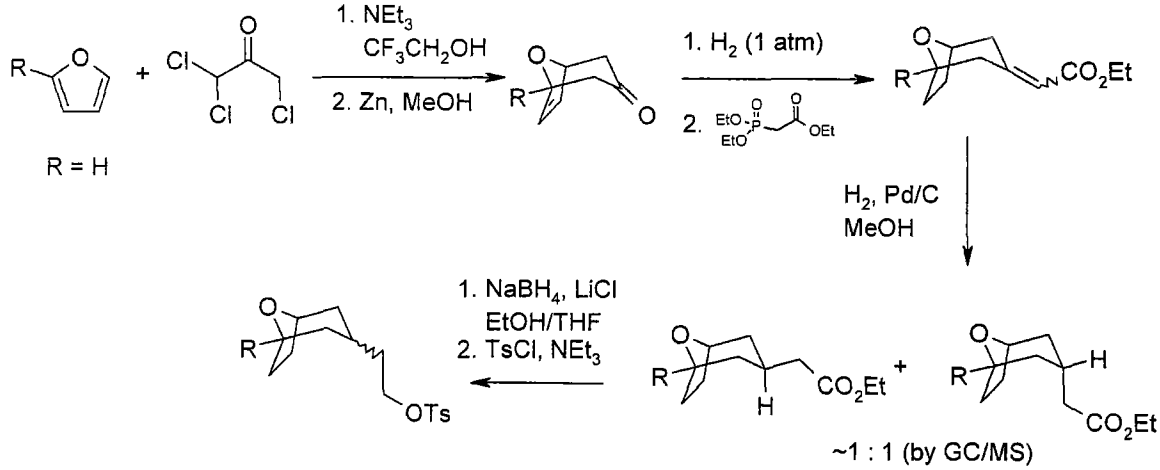


以三步顺序制备所述标题产物：从 N-Boc-4-哌啶酮开始经过标准维提稀反应（Wittig reaction），然后经 DIBAL 还原以得到 4-(2-羟基-亚乙基)-哌啶-1-羧酸叔丁酯。依照所述制备中间体 46 的步骤处理该醇以得到相应的甲苯磺酸酯。^{1}H NMR ($CDCl_3$) δ 7.77 (dt, J = 8.4, 2.0 Hz, 2H), 7.35 (d, J = 2H), 5.37 (m, 1H), 4.09 (t, J = 6.4 Hz, 2H), 3.97-3.78 (m, 2H), 3.42 (t, J = 6.4 Hz, 2H), 2.46 (s, 3H), 2.34 (brt, J = 7.2 Hz, 2H), 1.98-1.92 (m, 2H),

1.47 (s, 9H)。

中间体 91

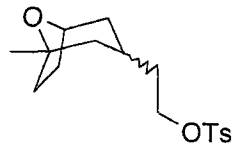
合成甲苯-4-磺酸 2-(8-氧杂-双环[3.2.1]辛-3-基)乙酯



通过商购获得的呋喃和由 1,1,3-三氯丙酮产生的氧烯丙基(oxyally)的已知[4+3]环化加成反应，然后用锌还原(*J. Org. Chem.* 1999, *64*, 3398 和 *J. Am. Chem. Soc.* 2001, *123*, 5590)，合成 8-氧杂-双环[3.2.1]辛-6-烯-3-酮。使用 MeOH 中的 Pd/C 还原该环加成产物的内部双键以得到 8-氧杂-双环[3.2.1]辛烷-3-酮。形成的酮经过 Eadsworth-Horner-Emmons 条件以得到 α,β-不饱和酯。所述共轭酯的催化氢化生成不具有非对映选择性的非对映异构体的不可分离混合物(~1:1)。将所述非对映异构体的混合物接着进行以下两步反应。所述步骤包括用 $NaBH_4$/LiCl 还原酯，然后在存在 NEt_3 的条件下用 TsCl 处理，以得到氧杂双环[3.2.1]辛烷乙基甲基苯磺酸酯(oxabicyclo[3.2.1]octaneethylmethylbenzensolfonate)。^{1}H NMR ($CDCl_3$): δ 7.81-7.78 (m, 2H), 7.37-7.34 (m, 2H), 4.35-4.28 (m, 2H), 4.07-4.02 (m, 2H), 2.46 (s, 3H), 2.07 (m, 1H), 1.95-1.87 (m, 2H), 1.82-1.76 (m, 1H), 1.68-1.63 (m, 2H), 1.55-1.50 (m, 2H), 1.43-1.28 (m, 2H), 1.10 (m, 1H)。

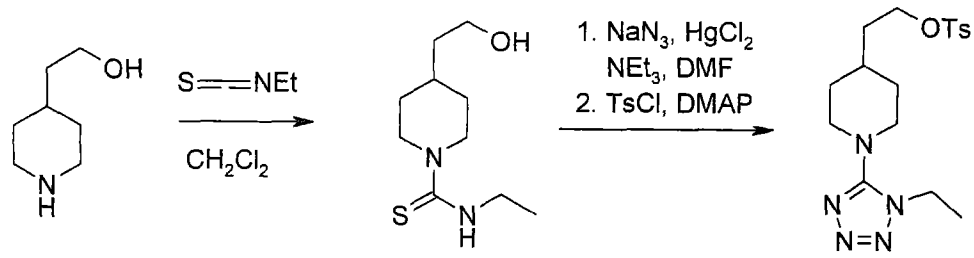
中间体 92

合成甲苯-4-磺酸 2-(1-甲基-8-氧杂-双环[3.2.1]辛-3-基)-乙酯。



依照所述中间体 91 的步骤从 2-甲基呋喃起始合成所述标题化合物。^{1}H NMR ($CDCl_3$): δ 7.81-7.78 (m, 2H), 7.37-7.35 (m, 2H), 4.37-4.29 (m, 1H), 4.07-4.02 (m, 2H), 2.46 (s, 3H), 2.10-1.96 (m, 2H), 1.89-1.50 (m, 6H), 1.39 (m, 1H), 1.27 (s, 1.5H), 1.26 (s, 1.5H), 1.25 (m, 1H), 1.10 (m, 1H)。

中间体 93



2-{1-(1-乙基-1H-四唑-5-基)哌啶-4-基)乙基-4-乙基苯磺酸酯

通过 3 个连续步骤制备中间体 93

步骤 1: N-乙基-4-(2-羟乙基)哌啶-1-硫代甲酰胺。

向 2-(哌啶-4-基)乙醇 (509 mg, 3.94 mmol) 在 CH_2Cl_2 (13 mL) 的溶液中加入异硫氰酸根合乙烷 (isothiocyanatoethane) (343 μL, 3.94 mmol)。在室温下搅拌 10 h 后，在真空中将所述混合物浓缩以得到所述标题化合物 (716 mg, 84%): ^{1}H NMR ($CDCl_3$) δ 5.38 (brs, 1H), 4.59 (d, J = 13.6 Hz, 1H), 3.74-3.67 (m, 3H), 3.15 (d, J = 12.8 Hz, 1H), 3.00 (t, J = 13.2 Hz, 2H), 2.65 (t, J = 12.4 Hz, 1H), 1.81-1.72 (m, 3H), 1.55-1.52 (m, 3H), 1.28-1.22 (m, 4H)。

步骤 2: 2-{1-(1-乙基-1H-四唑-5-基)哌啶-4-基}乙醇。

在室温下，向 N-乙基-4-(2-羟乙基)哌啶-1-硫代甲酰胺(200 mg, 0.93 mmol)、$HgCl_2$ (277 mg, 1.02 mmol) 和 NaN_3 (181 mg, 2.78 mmol) 在 DMF (2.5 mL) 的混合物中加入 NEt_3 (388 μL, 2.78 mmol)。搅拌 10 小时后，将所述反应混合物过滤并将滤饼用 CH_2Cl_2 洗涤。合并的滤液和洗涤液经盐水洗涤，干燥 (Na_2SO_4)，过滤并在真空中浓缩，

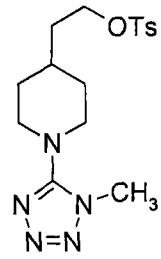
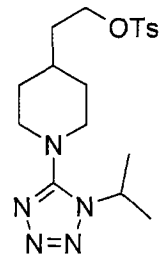
得到的剩余物经 SiO_2 色谱（60% EtOAc/己烷）纯化以得到所述标题化合物（85 mg，41%）：^{1}H NMR ($CDCl_3$) δ 4.18 (q, J = 7.2 Hz, 2H), 3.75 (td, J = 6.8, 5.2 Hz, 2H), 3.51 (brd, J = 12.4, 2H), 3.03 (td, J = 12.4, 2.8 Hz, 2H), 1.84 (brd, J = 14.4 Hz, 2H), 1.71 (m, 1H), 1.59 (q, J = 6.8 Hz, 2H), 1.56 (t, J = 7.2 Hz, 3H), 1.48-1.38 (m, 2H)。

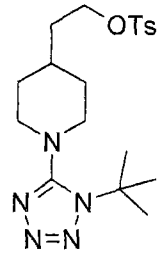
步骤 3: 2-{1-(1-乙基-1H-四唑-5-基)哌啶-4-基)乙基-4-乙基苯磺酸酯。

依照所述中间体 46 的步骤从 2-{1-(1-乙基-1H-四唑-5-基)哌啶-4-基}乙醇（85 mg，0.38 mmol）得到所述标题化合物（79 mg，55%）。^{1}H NMR ($CDCl_3$) δ 7.80 (brd, J = 8.0 Hz, 2H), 7.37 (brd, J = 8.0 Hz, 2H), 4.15 (q, J = 7.6 Hz, 2H), 4.10 (t, J = 6.0 Hz, 2H), 3.46 (brd, J = 12.4, 2H), 2.97 (td, J = 12.4, 2.0 Hz, 2H), 2.46 (s, 3H), 1.71 (brd, J = 12.8 Hz, 2H), 1.67-1.63 (m, 3H), 1.54 (t, J = 7.6 Hz, 3H), 1.41-1.31 (m, 2H)。

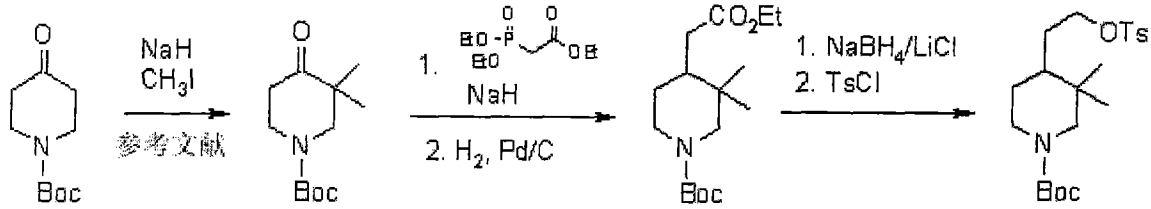
依照所述中间体 46 的步骤使用合适的原料制备以下总结于表 5 中的化合物。

表 5

中间体编号	结构	名称和分析数据
94		2-{1-(1-甲基-1H-四唑-5-基)哌啶-4-基}乙基-4-甲基苯磺酸酯。LC-MS $[M+Na]^+$ 365.5
95		2-{1-(1-异丙基-1H-四唑-5-基)哌啶-4-基}乙基-4-甲基苯磺酸酯。1H NMR ($CDCl_3$) δ 7.80 (brd, J = 7.2 Hz, 2H), 7.37 (brd, J = 7.2 Hz, 2H), 4.41 (sep, J = 6.4 Hz, 1H), 4.10 (t, J = 5.2 Hz, 2H), 3.36 (d, J = 12.0 Hz, 2H), 2.96 (t, J = 12.8 Hz, 2H), 2.46 (s, 3H), 1.72-1.60 (m, 5H), 1.56 (d,

		J = 6.4 Hz, 6H), 1.42-1.33 (m, 2H)
96		2-{1-(1-叔丁基-1H-四唑-5-基)哌啶-4-基}乙基-4-甲基苯磺酸酯。1H NMR ($CDCl_3$) δ 7.81 (d, J = 7.2 Hz, 2H), 7.37 (d, J = 7.2 Hz, 2H), 4.41 (brt, J = 5.0 Hz, 2H), 3.00-2.93 (m, 4H), 2.47 (s, 3H), 1.71 (s, 9H), 1.66-1.58 (m, 5H), 1.39-1.29 (m, 2H)

中间体 97



2-{1-(叔丁氧羰基)-3,3-二甲基哌啶-4-基}乙基-4-乙基苯磺酸酯。

以 4 个连续步骤制备所述标题化合物

步骤 1: (*E*)-叔丁基 4-{(乙氧羰基)亚甲基}-3,3-二甲基哌啶-1-羧酸酯。

在 0 ℃下，向 NaH (0.212 g, 5.29 mmol) 在 THF (2 mL) 的悬液中加入三乙基 2-膦酰丙酸酯 (1.05 mL, 5.29 mmol) 的 THF (2 mL) 溶液。在室温下搅拌混合物 1 h，然后加入叔丁基-3,3-二甲基-4-氧代哌啶-1-羧酸酯 (*J. Org. Chem,*. 2001, 66, 2487) (0.600 g, 2.64 mmol) 在 THF 中的溶液并搅拌 10 h。用水骤冷所形成的混合物，产物部分用 Et_2O 萃取。合并的萃取液经盐水洗涤，干燥 (Na_2SO_4)，过滤并在真空中浓缩。剩余物经 SiO_2 色谱纯化 (梯度: 5% EtOAc/己烷 - 40% EtOAc/己烷) 以得到所述标题化合物 (784 mg, ~100%)；^1H NMR ($CDCl_3$) δ 5.73 (s, 1H), 4.15 (q, J = 6.8 Hz, 2H), 3.52-3.42 (m, 2H), 3.25-3.18 (m, 2H), 3.05 (t, J = 5.6 Hz, 2H), 1.47 (s, 9H), 1.29 (t, J = 6.8 Hz, 3H), 1.12 (s, 6H)。

步骤 2: 叔丁基 4-{(乙氧羰基)甲基}-3,3-二甲基哌啶-1-羧酸酯。

在一个大气压下，将(*E*)-叔丁基 4-{(乙氧羰基)亚甲基}-3,3-二甲基哌啶-1-羧酸酯（784 mg，2.64 mmol）在含 Pd/C（131 mg）的 MeOH（10 mL）中氢化。10 h 后，将该混合物过滤，并且用 MeOH 洗涤滤饼。浓缩合并的滤液得到所述标题化合物（540 mg，68%）：^{1}H NMR ($CDCl_3$) δ 4.13 (q, J = 6.8 Hz, 2H), 4.05 (m, 1H), 3.57 (m, 1H), 2.57 (m, 1H), 2.46 (dd, J = 15.2, 3.2 Hz, 1H), 1.93 (dd, J = 15.2, 10.4 Hz, 1H), 1.76 (m, 1H), 1.59-1.50 (m, 2H), 1.45 (s, 9H) 1.34 (m, 1H), 1.26 (t, J = 6.8 Hz, 3H), 0.91 (s, 3H), 0.79 (s, 3H)。

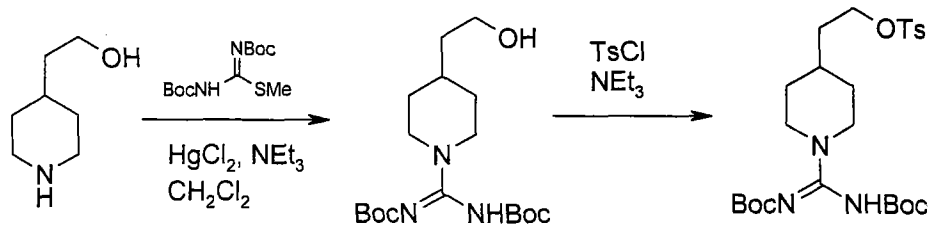
步骤 3: 叔丁基 4-(2-羟乙基)-3,3-二甲基哌啶-1-羧酸酯。

在 0 ℃下，向 $NaBH_4$（204 mg，5.40 mmol）和 LiCl（229 mg，5.40 mmol）的 EtOH（8 mL）浆液中加入叔丁基 4-{(乙氧羰基)甲基}-3,3-二甲基哌啶-1-羧酸酯（538 mg，1.80 mmol）的 THF（10 mL）溶液。在室温下搅拌 10 h 后，用水骤冷所形成混合液，产物部分用 Et_2O 萃取。将合并的萃取液干燥（Na_2SO_4），过滤并在真空中浓缩。剩余物经 SiO_2 色谱纯化（梯度：40% EtOAc/己烷 - 90% EtOAc/己烷）以得到所述标题化合物（275 mg，59%）。

步骤 4: 2-{1-(叔丁氧羰基)-3,3-二甲基哌啶-4-基}乙基-4-乙基苯磺酸酯。

依照所述中间体 46 的步骤从叔丁基 4-(2-羟乙基)-3,3-二甲基哌啶-1-羧酸酯（275 mg，1.07 mmol）得到所述标题化合物（350 mg，55%）。^{1}H NMR ($CDCl_3$) δ 7.79 (brd, J = 8.0 Hz, 2H), 7.36 (brd, J = 8.0 Hz, 2H), 4.15-3.96 (m, 4H), 3.60 (m, 1H), 2.46 (s, 3H), 2.61-2.23 (m, 2H), 1.89 (m, 1H), 1.44 (s, 9H), 1.26 (m, 3H), 0.84 (s, 3H), 0.74 (s, 3H)。

中间体 98



2-(1-{(*Z*)-[(叔丁氧羰基)氨基][(叔丁氧羰基)亚氨基]甲基}哌啶

-4-基)乙基 4-甲基苯磺酸酯

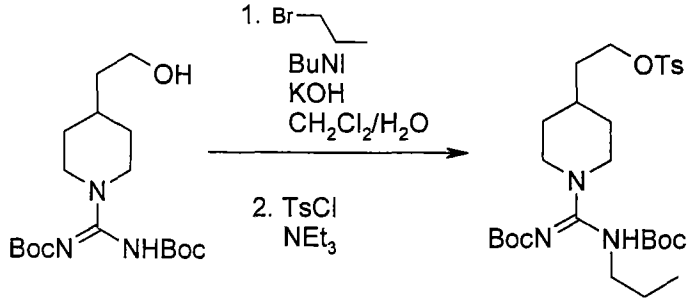
步骤 1: 二-叔丁基{(Z)-[4-(2-羟乙基)哌啶-1-基]亚甲基}双氨基甲酸酯。

向 2-(哌啶-4-基)乙醇(400 mg, 3.10 mmol)和 NEt_3(864 μL, 6.20 mmol)的 CH_2Cl_2(8 mL)溶液中加入 1,3-双(叔丁氧羰基)-2-甲基-2-硫异脲(899 mg, 3.10 mmol)和 $HgCl_2$(842 mg, 3.10 mmol)。在室温下搅拌 10 h 后, 用 CH_2Cl_2 萃取所述反应混合物。合并的萃取液经干燥(Na_2SO_4), 过滤并在真空中浓缩。剩余物经 SiO_2 色谱纯化(梯度: 50% EtOAc/己烷 - 90% EtOAc/己烷)以得到所述标题化合物(969 mg, 84%): ^1H NMR ($CDCl_3$) δ 10.16 (brs, 1H), 4.25-4.20 (m, 2H), 3.75-3.65 (m, 2H), 2.94 (t, J = 12.8 Hz, 2H), 1.78-1.72 (m, 3H), 1.54 (q, J = 6.4 Hz, 2H), 1.49 (s, 18 H), 1.38-1.29 (m, 2H)。

步骤 2: 2-(1-{(*Z*)-[(叔丁氧羰基)氨基][(叔丁氧羰基)亚氨基]甲基}哌啶-4-基)乙基 4-甲基苯磺酸酯。

依照所述中间体 46 的步骤从二-叔丁基{(*Z*)-[4-(2-羟乙基)哌啶-1-基]亚甲基}双氨基甲酸酯(484 mg, 1.307 mmol)得到所述标题化合物(446 mg, 65%)。^1H NMR ($CDCl_3$) δ 10.16 (brs, 1H), 7.79 (d, J = 8.4 Hz, 2H), 7.36 (d, J = 8.4 Hz, 2H), 4.07 (t, J = 6.0 Hz, 2H), 4.20-3.91 (m, 2H), 2.85 (t, J = 12.8 Hz, 2H), 2.46 (s, 3H), 1.61-1.59 (m, 5H), 1.48 (s, 9H), 1.28-1.18 (m, 2H)。

中间体 99



2-(1-{(*E*)-[(叔丁氧羰基)亚氨基][(叔丁氧羰基)(丙基)氨基]甲基}哌啶-4-基)乙基 4-甲基苯磺酸酯

通过 2 个连续步骤制备所述标题化合物

步骤 1: 2-(1-{(*E*)-[(叔丁氧羰基)亚氨基][(叔丁氧羰基)(丙基)

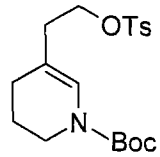
氨基]甲基}哌啶-4-基)乙醇

向二-叔丁基{(*Z*)-[4-(2-羟乙基)哌啶-1-基]亚甲基}双氨基甲酸酯（200 mg，0.538 mmol）、Bu_4NI（40 mg，0.11 mmol）和KOH（70 mg，1.3 mmol）在CH_2Cl_2（2.5 mL）和H_2O（2.5 mL）中的混合物中加入碘丙烷（63 μL，0.65 mmol）并回流3 h。冷却至室温后，产物部分经CH_2Cl_2萃取，盐水洗涤，干燥（Na_2SO_4），过滤并在真空中浓缩。剩余物经SiO_2色谱纯化（梯度：40% EtOAc/己烷 - 100% EtOAc/己烷）以得到所述标题化合物（192 mg，86%）；LC-MS $[M+H]^+$ 442.5。

步骤2：2-(1-{(*E*)-[(叔丁氧羰基)亚氨基][(叔丁氧羰基)(丙基)氨基]甲基}哌啶-4-基)乙基 4-甲基苯磺酸酯

依照类似于所述中间体46的步骤从2-(1-{(E)-[(叔丁氧羰基)亚氨基][(叔丁氧羰基)(丙基)氨基]甲基}哌啶-4-基)乙醇（190 mg，0.460 mmol）得到所述标题化合物（189 mg，72%）。^1H NMR ($CDCl_3$) δ 7.79 (d, J = 7.2 Hz, 2H), 7.36 (d, J = 7.2 Hz, 2H), 4.49 (brs, 1H), 4.12-4.02 (m, 2H), 2.46 (s, 3H), 1.74-1.52 (m, 7H), 1.31-1.05 (m, 2H), 0.87 (t, J = 7.2 Hz, 3H)。

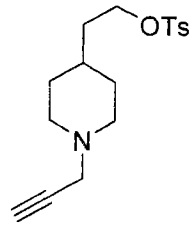
中间体100



5-(2-{[4-甲基苯基)磺酰基]
氧}乙基)-3,4-二氢吡啶-1-(2H)-羧酸叔丁酯。

依照类似于所述中间体46的步骤使用合适的原料制备所述标题化合物。^1H NMR ($CDCl_3$) δ 7.79 (d, J = 8.4 Hz, 2H), 7.34 (d, J = 8.4 Hz, 2H), 6.66和6.56 (s, 1H), 4.06 (q, J = 6.8 Hz, 2H), 3.46-3.41 (m, 2H), 2.45 (s, 3H), 2.31 (t, J = 7.2 Hz, 2H), 1.91 (m, 1H), 1.85 (m, 1H), 1.78-1.70 (m, 2H), 1.48 (s, 9H)。

中间体101

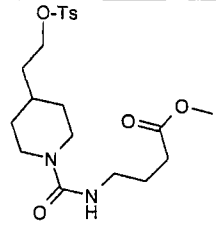
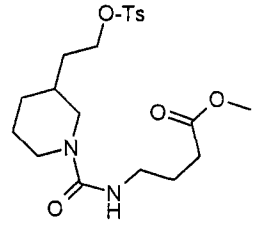
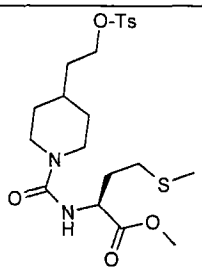
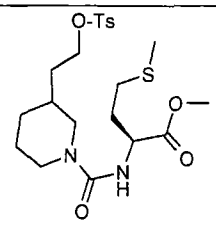


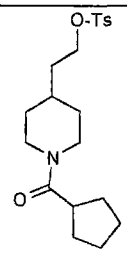
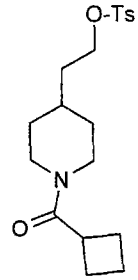
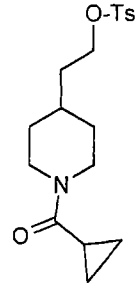
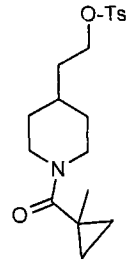
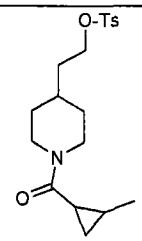
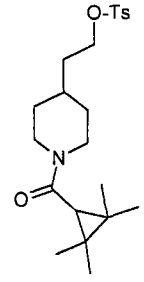
1-(1-丙-2-炔-1-基)哌啶-4-基)乙基 4-甲基苯磺酸酯

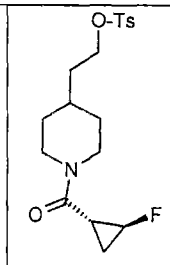
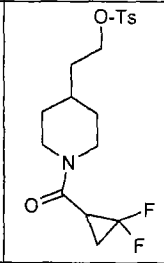
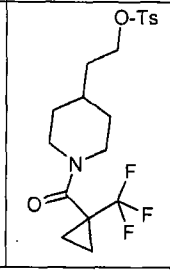
依照所述中间体 46 的步骤用合适的原料制备所述标题化合物。LC-MS $[M+H]^+$ 322.1。

依照类似于所述中间体 46 的步骤用合适的原料制备总结于表 6 中的中间体 102 – 104。

表 6

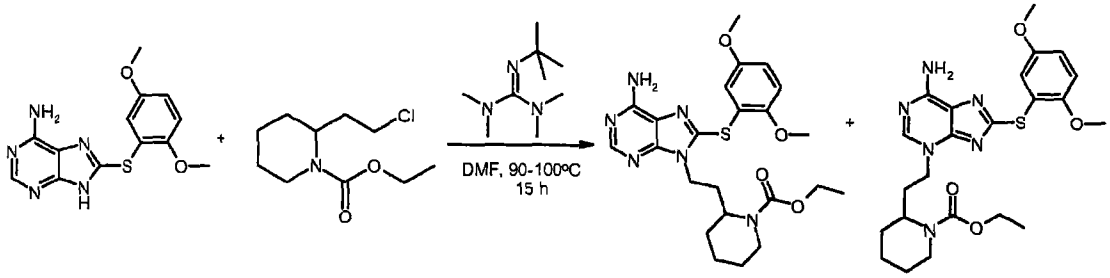
中间体编号	结构	名称和分析数据
102		4-({4-[2-(甲苯-4-磺酰氧)-乙基]-哌啶-1-羰基}-氨基)-丁酸甲酯; LC-MS $[M+H]^+$ 413.2
103		4-({3-[2-(甲苯-4-磺酰氧)-乙基]-哌啶-1-羰基}-氨基)-丁酸甲酯; LC-MS $[M+H]^+$ 413.2
104		(*S*)-4-甲硫基-2-({4-[2-(甲苯-4-磺酰氧)-乙基]-哌啶-1-羰基}-氨基)-丁酸甲酯; LC-MS $[M+H]^+$ 473.1
105		(*S*)-4-甲硫基-2-({3-[2-(甲苯-4-磺酰氧)-乙基]-哌啶-1-羰基}-氨基)-丁酸甲酯; LC-MS $[M+23]^+$ 495.1

106		甲苯-4-磺酸 2-(1-环戊羰基-哌啶-4-基)-乙酯; LC-MS [M+H]$^+$ 380.3
107		甲苯-4-磺酸 2-(1-环丁羰基-哌啶-4-基)-乙酯; LC-MS [M+H]$^+$ 366.1
108		甲苯-4-磺酸 2-(1-环丙羰基-哌啶-4-基)-乙酯; LC-MS [M+H]$^+$ 352.1
109		甲苯-4-磺酸 2-[1-(1-甲基-环丙羰基)-哌啶-4-基]-乙酯; LC-MS [M+H]$^+$ 366.2
110		甲苯-4-磺酸 2-[1-(2-甲基-环丙羰基)-哌啶-4-基]-乙酯; LC-MS [M+H]$^+$ 366.2
111		甲苯-4-磺酸 2-[1-(2,2,3,3-四甲基-环丙羰基)-哌啶-4-基]-乙酯; LC-MS [M+H]$^+$ 408.4

112		甲苯-4-磺酸 2-[1-((1*R*,2*S*)-2-氟-环丙羰基)-哌啶-4-基]-乙酯; LC-MS $[M+H]^+$ 370.2
113		甲苯-4-磺酸 2-[1-(2,2-二氟-环丙羰基)-哌啶-4-基]-乙酯; LC-MS $[M+H]^+$ 388.1
114		甲苯-4-磺酸 2-[1-(1-三氟甲基-环丙羰基)-哌啶-4-基]-乙酯; LC-MS $[M+H]^+$ 420.1

实施例 337 和 338

2-{2-[6-氨基-8-(2,5-二甲氧基-苯基硫基)-嘌呤-9-基]-乙基}-哌啶-1-羧酸乙酯和 2-{2-[6-氨基-8-(2,5-二甲氧基-苯基硫基)-嘌呤-3-基]-乙基}-哌啶-1-羧酸乙酯。

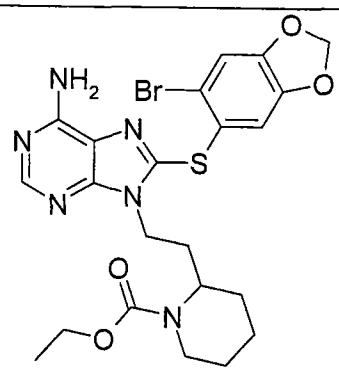


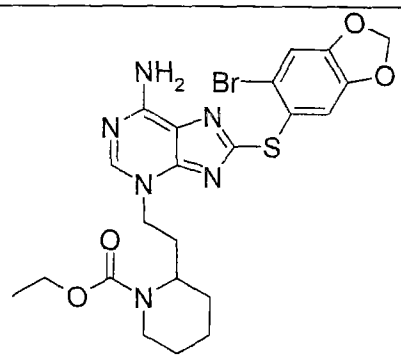
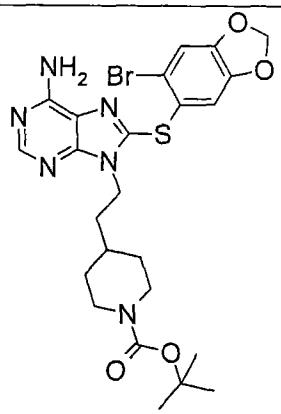
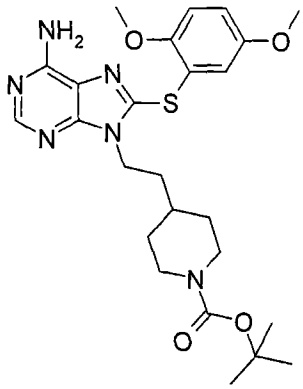
实例1 实例2

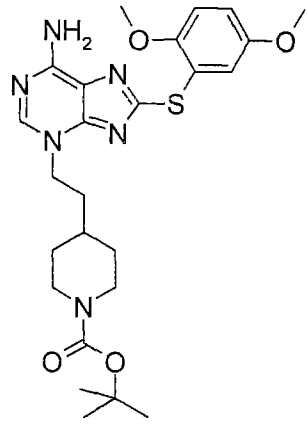
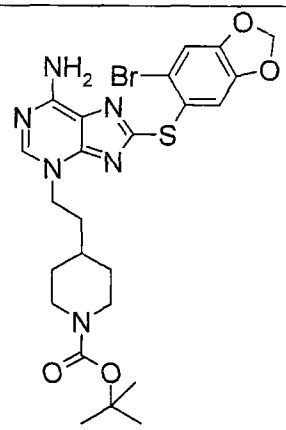
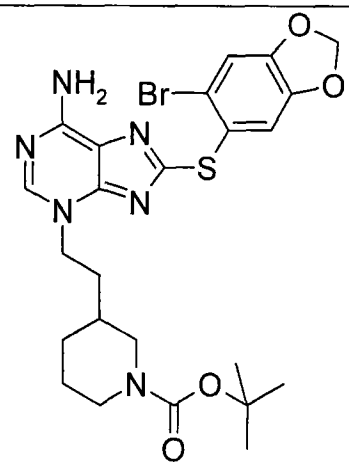
将 8-(2,5-二甲氧基-苯基硫基)-9H-嘌呤-6-基胺(0.29 g, 0.66 mmol)、(2-氯-乙基)-哌啶-1-羧酸乙酯(0.174 g, 0.79 mmol)和 Barton 碱(0.163 mL, 0.79 mmol)在 DMF(3 mL)中的混合物在 90-100 ℃加热 15 小时。然后使反应混合物达到环境温度。在减压条件下除去溶剂后,通过制备型 HPLC [X-Terra prep-RP18 10 um, 19×250 mm (水),流动相: 溶剂 A: 含 0.01% TFA 的 HPLC 级水,和 B: 含 0.01% TFA 的乙腈,一般洗脱梯度 – 在 15 至 25 分钟的实验时间内溶剂 B

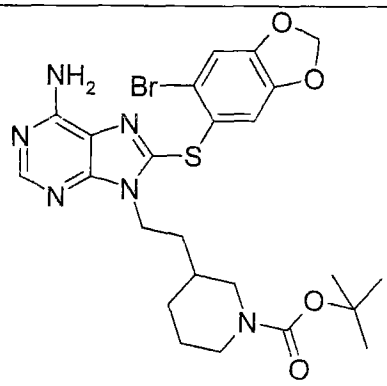
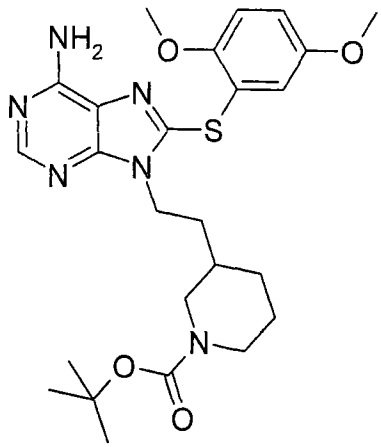
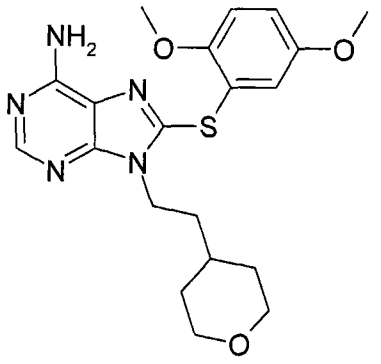
从15%至80%]纯化剩余物。HPLC馏分经冷冻干燥后，分离三氟乙酸盐形式的N-9异构体和N-3异构体。2-{2-[6-氨基-8-(2,5-二甲氧基-苯基硫基)-嘌呤-9-基]-乙基}-哌啶-1-羧酸乙酯。^{1}H NMR δ (CD$_3$OD) 8.29 (s, 1H), 7.05-6.97 (m, 3H), 4.39-4.30 (m, 2H), 4.21-4.15 (m, 1H), 4.09-3.9 (m, 3H), 3.70 (d, 5.2 Hz, 2H), 3.75 (s, 3H), 3.73 (s, 3H), 2.98-2.88 (m, 1H), 2.34-2.28 (m, 1H), 2.02-1.98 (m, 1H), 1.78-1.70 (m, 1H), 1.66-1.58 (m, 2H), 1.34-1.24 (m, 4H); LC-MS TOF [M+H]$^+$ 487.2。2-{2-[6-氨基-8-(2,5-二甲氧基-苯基硫基)-嘌呤-3-基]-乙基}-哌啶-1-羧酸乙酯。^{1}H NMR δ (CD$_3$OD) 8.41 (s, 1H), 7.2 (s, 1H), 7.12 (m, 2H), 4.32-4.30 (m, 2H), 4.08 (m, 1H), 3.79 (s, 3H), 3.78 (s, 3H), 3.48-4.41 (m, 1H), 3.36-3.35 (m, 3H), 3.2-3.17(m, 1H), 3.13-3.12 (m, 2H), 1.7-1.6 (m, 5H), 1.28-1.22 (m, 3H); LC-MS TOF [M+H]$^+$ 487.2。

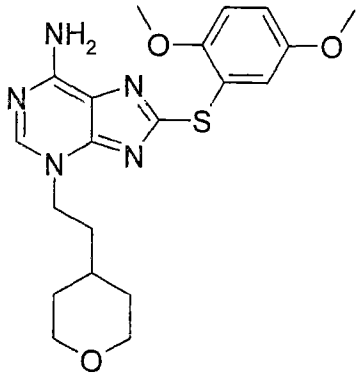
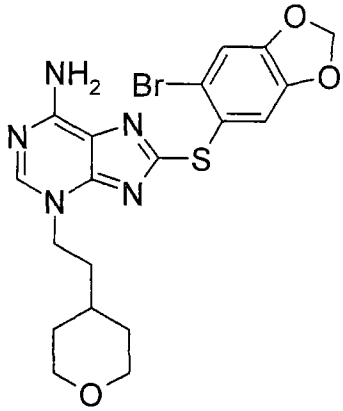
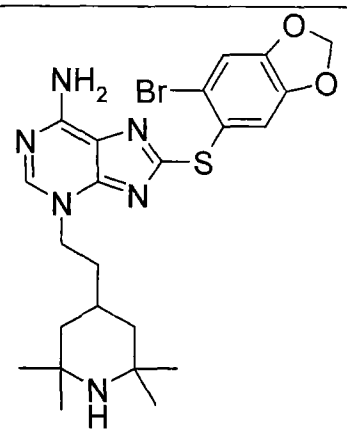
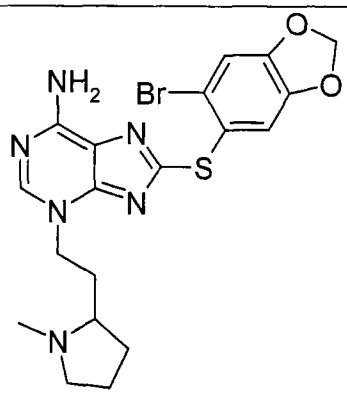
依照类似于所述实施例337和338的步骤制备总结于表7中的实例339 - 464。所有化合物以三氟乙酸盐的形式分离出来。

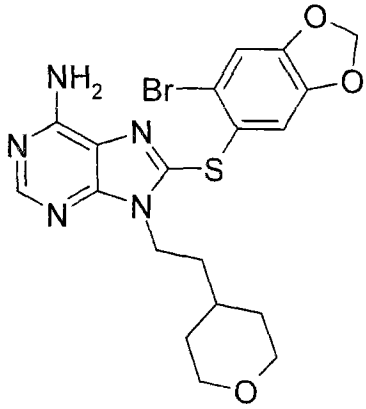
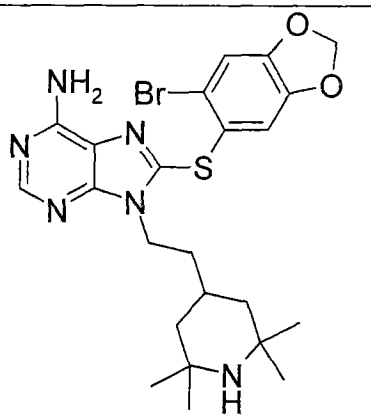
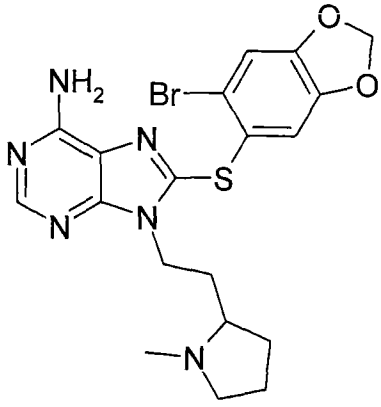
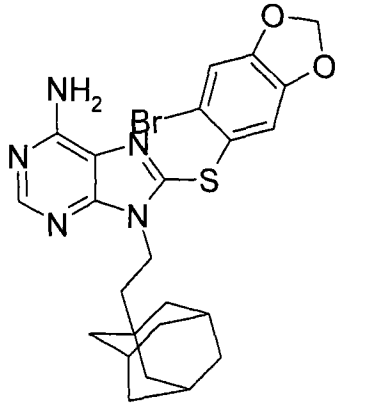
实例编号	结构	名称和分析数据
339		2-(2-{6-氨基-8-[(6-溴-1,3-苯并间二氧杂环戊烯-5-基)硫]-9H-嘌呤-9-基}乙基)哌啶-1-羧酸乙酯。^{1}H NMR (CD$_3$OD) δ 8.29 (s, 1H), 7.26 (s, 1H), 7.14 (s, 1H), 6.08 (s, 2H), 4.38-4.3 (m, 2H), 4.23-4.18 (m, 1H), 4.09-4.0 (m, 3H), 3.0-2.94 (m, 1H), 2.36-2.26 (m, 2H), 2.11-2.01 (m, 2H), 1.91-1.82 (m , 2H), 1.7-1.6 (m, 2H), 0.99-0.96 (m, 3H); LC-MS [M+H]$^+$ 549.3。

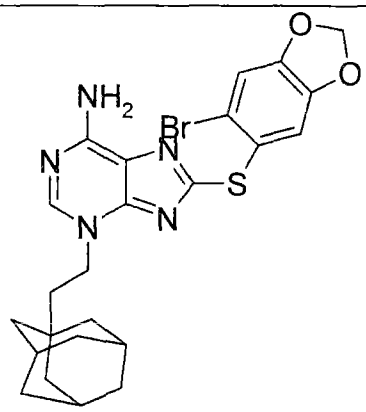
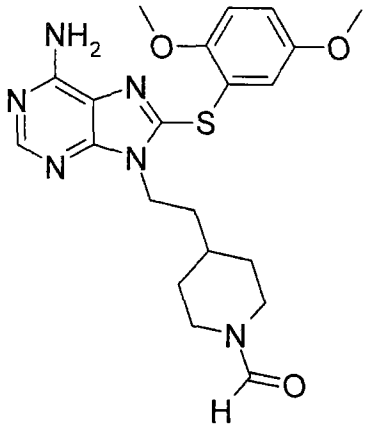
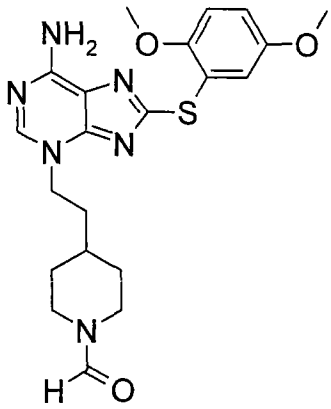
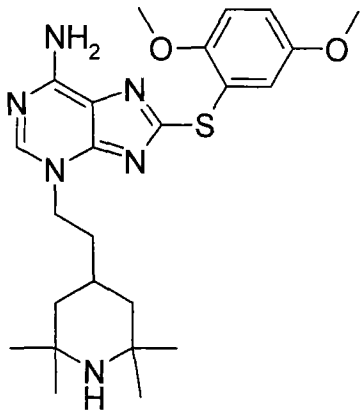
340		2-(2-{6-氨基-8-[(6-溴-1,3-苯并间二氧杂环戊烯-5-基)硫]-3H-嘌呤-3-基}乙基)哌啶-1-羧酸乙酯。^{1}H NMR (CD_3OD) δ 8.49 (s, 1H), 7.36 (s, 1H), 7.35 (s, 1H), 6.15 (s, 2H), 4.34-4.29 (m, 3H), 4.11-4.05 (m, 3H), 3.97-3.9 (m, 1H), 2.9-2.8 (m, 1H), 2.58-2.49 (m, 1H), 2.03-2.01 (m, 1H), 1.91-1.82 (m , 1H), 1.79-1.7 (m, 2H), 1.66-1.58 (m, 2H), 0.99-0.96 (m, 3H); LC-MS $[M+H]^+$ 549.3。
341		4-(2-{6-氨基-8-[(6-溴-1,3-苯并间二氧杂环戊烯-5-基)硫]-9H-嘌呤-9-基}乙基)哌啶-1-羧酸叔丁酯。^{1}H NMR(丙酮-d_6) δ 8.28 (s, 1H), 7.26 (s, 1H), 6.92 (s, 1H), 6.11 (s, 2H), 4.34 (t, J= 7.2 Hz, 2H), 4.1-4.0 (m, 2H), 2.07-2.05 (m, 4H), 1.8-1.71 (m, 5H), 1.46 (s, 9H); LC-MS $[M+H]^+$ 577.4。
342		4-(2-{6-氨基-8-[(2,5-二甲氧基苯基)硫]-9H-嘌呤-9-基}乙基)哌啶-1-羧酸叔丁酯。^{1}H NMR (丙酮-d_6) δ 8.24 (s, 1H), 7.07 (d, J=9.2 Hz, 1H), 6.96 (dd, J=9.2, 2.8 Hz, 1H), 6.86 (d, J=2.8 Hz, 1H), 4.40 (t, J= 7.6 Hz, 2H), 4.40-3.9 (m, 2H), 3.8 (s, 3H), 3.7 (s, 3H), 2.06-2.0 (m, 3H), 1.78-1.73 (m, 4H), 1.42 (s, 9H), 1.12-1.0 (m, 2H); LC-MS $[M+H]^+$ 515.5。

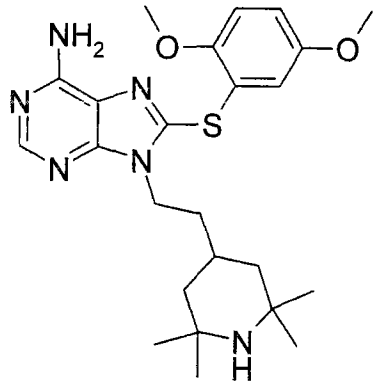
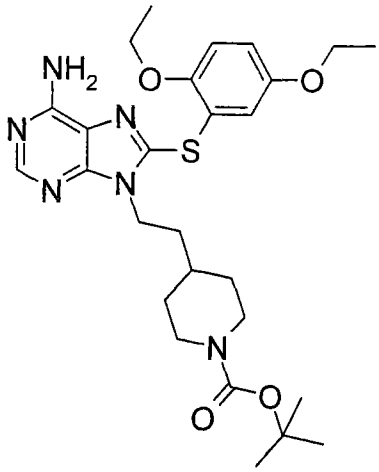
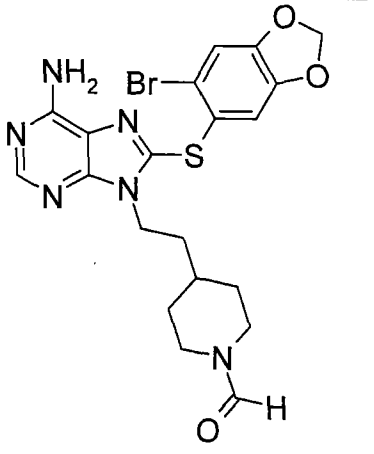
343		4-(2-{6-氨基-8-[(2,5-二甲氧基苯基)硫]-3H-嘌呤-3-基}乙基)哌啶-1-羧酸叔丁酯。^{1}H NMR (丙酮-d_6) δ 8.58 (s, 1H), 7.29 (d, J=2.8 Hz, 1H), 7.09 (d, J=8.8 Hz, 1H), 7.03 (dd, J=8.8, 2.8 Hz, 1H), 4.46 (t, J= 7.6 Hz, 2H), 4.41-3.9 (m, 2H), 3.80 (s, 3H), 3.78 (s, 3H), 1.93-1.87 (m, 2H), 1.68-1.60 (m, 2H), 1.52-1.39 (m, 3H), 1.42 (s, 9H), 1.1-1.0 (m, 2H); LC-MS [M+H]$^+$ 515.5。
344		4-(2-{6-氨基-8-[(6-溴-1,3-苯并间二氧杂环戊烯-5-基)硫]-3H-嘌呤-3-基}乙基)哌啶-1-羧酸叔丁酯。^{1}H NMR (丙酮-d_6) δ 8.55 (s, 1H), 7.36 (s, 1H), 7.29 (s, 1H), 6.18 (s, 2H), 4.46 (t, J= 7.2 Hz, 2H), 2.22-2.20 (m, 1H), 2.04-2.01 (m, 2H), 1.93-1.89 (m, 3H), 1.74-1.71 (m, 2H), 1.52-1.49 (m, 1H), 1.44 (s, 9H), 1.1-1.0 (m, 2H); LC-MS [M+H]$^+$ 577.4。
345		3-(2-{6-氨基-8-[(6-溴-1,3-苯并间二氧杂环戊烯-5-基)硫]-3H-嘌呤-3-基}乙基)哌啶-1-羧酸叔丁酯。^{1}H NMR (DMSO-d_6) δ 8.6 (s, 1H), 7.5 (s, 1H), 7.4 (s, 1H), 6.15 (s, 2H), 4.4-4.3 (m, 2H), 3.8-3.4 (m, 5H), 2.90-2.70 (m, 1H), 2.52-2.49 (m, 2H), 1.90-1.50 (m, 3H), 1.4 (s, 9H); TOF LC-MS [M+H]$^+$ 577.1

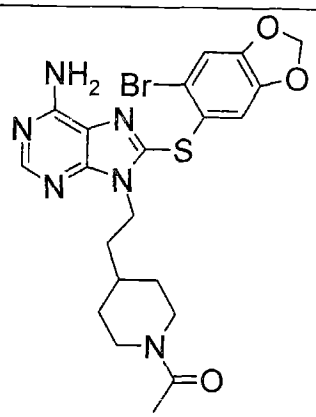
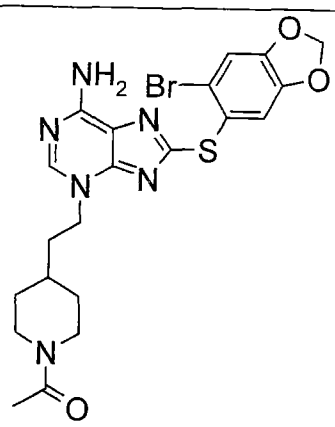
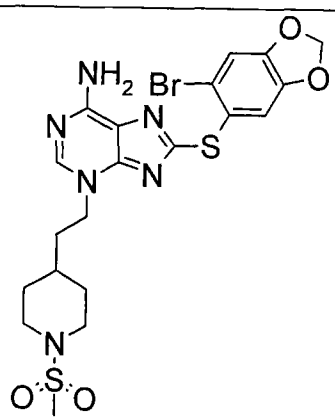
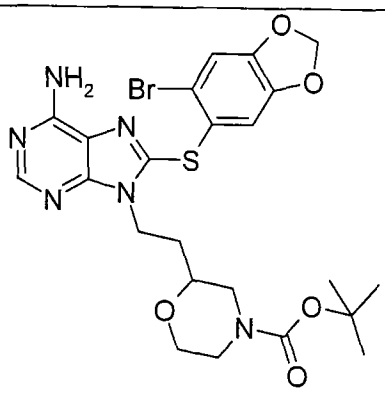
346		3-(2-{6-氨基-8-[(6-溴-1,3-苯并间二氧杂环戊烯-5-基)硫]-9H-嘌呤-9-基}乙基)哌啶-1-羧酸叔丁酯。^{1}H NMR (丙酮-d_6) δ 8.43 (s, 1H), 7.29 (s, 1H), 7.08 (s, 1H), 6.15 (s, 2H), 4.42 (t, J= 7.2 Hz, 2H), 3.86-3.76 (m, 2H), 2.91-2.85 (m, 2H), 1.77-1.69 (m, 2H), 1.65-1.49 (m, 5H), 1.48 (s, 9H); TOF LC-MS $[M+H]^+$ 577.1
347		3-(2-{6-氨基-8-[(2,5-二甲氧基苯基)硫]-9H-嘌呤-9-基}乙基)哌啶-1-羧酸叔丁酯。^{1}H NMR (DMSO-d_6) δ 8.27 (s, 1H), 7.05 (d, J=8.8 Hz, 1H), 6.90 (dd, J=8.8, 2.8 Hz, 1H), 6.59 (d, J=2.8 Hz, 1H), 4.22 (t, J= 7.2 Hz, 2H), 3.75 (s, 3H), 3.62 (s, 3H), 2.75-2.68 (m, 1H), 2.52-2.49 (m, 6H), 1.8-1.7 (m, 1H), 1.58-1.50 (m, 2H), 1.36 (s, 9H), 1.1-1.0 (m, 1H); TOF LC-MS $[M+H]^+$ 515.2
348		8-[(2,5-二甲氧基苯基)硫]-9-[2-(四氢-2H-吡喃-4-基)乙基]-9H-嘌呤-6-胺。 ^{1}H NMR (DMSO-d_6) δ 8.24 (s, 1H), 7.05 (d, J=9.2 Hz, 1H), 6.88 (dd, J=9.2, 2.8 Hz, 1H), 6.52 (d, J=2.8 Hz, 1H), 4.22 (t, J= 5.6 Hz, 2H), 3.76 (s, 3H), 3.75-3.73 (m, 3H), 3.61 (s, 3H), 3.16-3.10 (m, 2H), 1.59-1.51 (m, 4H), 1.12-1.04 (m, 2H); TOF LC-MS $[M+H]^+$ 416.2

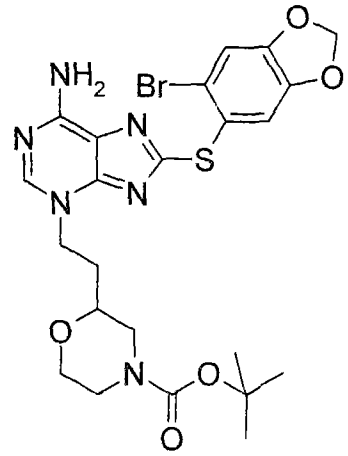
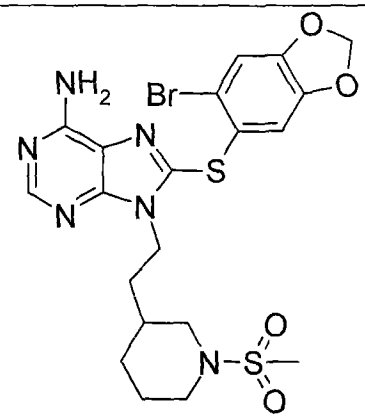
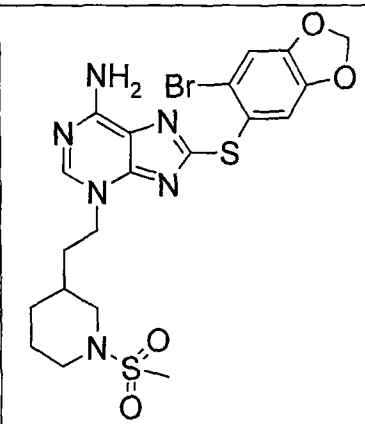
349		8-[(2,5-二甲氧基苯基)硫]-3-[2-(四氢-2H-吡喃-4-基)乙基]-3H-嘌呤-6-胺。TOF LC-MS $[M+H]^+$ 416.2
350		8-[(6-溴-1,3-苯并间二氧杂环戊烯-5-基)硫]-3-[2-(四氢-2H-吡喃-4-基)乙基]-3H-嘌呤-6-胺。TOF LC-MS $[M+H]^+$ 478.1
351		8-[(6-溴-1,3-苯并间二氧杂环戊烯-5-基)硫]-3-[2-(2,2,6,6-四甲基哌啶-4-基)乙基]-3H-嘌呤-6-胺。^{1}H NMR (DMSO-d_6) δ 7.56-7.52 (m, 3H), 6.11 (s, 2H), 4.34-4.33 (m, 2H), 1.87-1.80 (m, 5H), 1.32 (s, 6H), 1.29 (s, 6H), 1.14-1.12 (m, 2H); TOF LC-MS $[M+H]^+$ 533.1
352		8-[(6-溴-1,3-苯并间二氧杂环戊烯-5-基)硫]-3-[2-(1-甲基吡咯烷-2-基)乙基]-3H-嘌呤-6-胺。LC-MS $[M-H]^+$ 475.4.

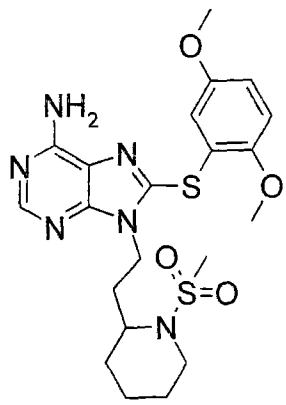
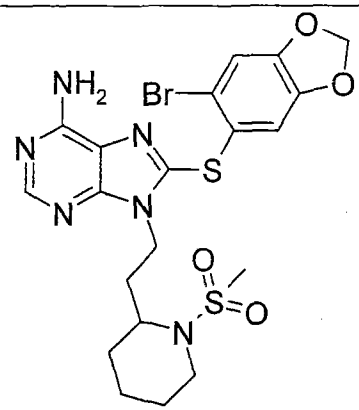
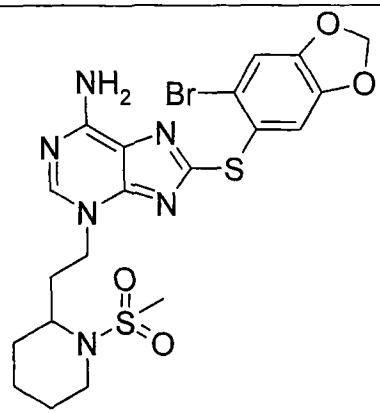
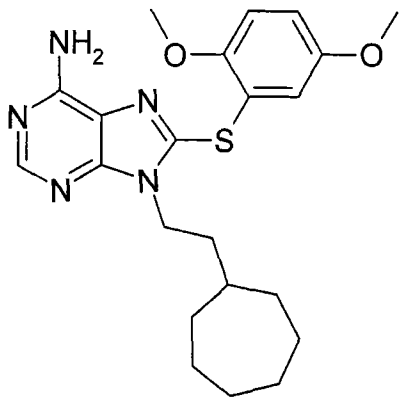
353		8-[(6-溴-1,3-苯并间二氧杂环戊烯-5-基)硫]-9-[2-(四氢-2H-吡喃-4-基)乙基]-9H-嘌呤-6-胺。^{1}H NMR (DMSO-d_6) δ 8.19 (s, 1H), 7.39 (s, 1H), 6.83 (s, 1H), 6.09 (s, 2H), 4.18 (t, J= 8.0 Hz, 2H), 3.78 (d, J=8.0, 2H), 3.20-3.14 (m, 3H), 1.62-1.56 (m, 4H), 1.16-1.14 (m, 2H); TOF LC-MS $[M+H]^+$ 478.1
354		8-[(6-溴-1,3-苯并间二氧杂环戊烯-5-基)硫]-9-[2-(2,2,6,6-四甲基哌啶-4-基)乙基]-9H-嘌呤-6-胺。^{1}H NMR (DMSO-d_6) δ 8.19 (s, 1H), 7.40 (s, 1H), 6.82 (s, 1H), 6.09 (s, 2H), 4.20 (t, J= 7.6 Hz, 2H), 1.81-1.78 (m, 3H), 1.62-1.60 (m, 2H), 1.31 (s, 6H), 1.26 (s, 6H), 1.10 (d, J= 7.6Hz, 2H); TOF LC-MS $[M+H]^+$ 533.1
355		8-[(6-溴-1,3-苯并间二氧杂环戊烯-5-基)硫]-9-[2-(1-甲基吡咯烷-2-基)乙基]-9H-嘌呤-6-胺。^{1}H NMR (DMSO-d_6) δ 8.42 (s, 1H), 6.60-6.50 (m, 2H), 6.10 (s, 2H), 4.40-4.20 (m, 2H), 3.07-2.99 (m, 2H), 2.77-1.78 (m, 5H), 2.52-2.48 (m, 5H); LC-MS $[M+H]^+$ 477.3。
356		9-[2-(1-金刚烷)乙基]-8-[(6-溴-1,3-苯并间二氧杂环戊烯-5-基)硫]-9H-嘌呤-6-胺。 LC-MS $[M+H]^+$ 528.4

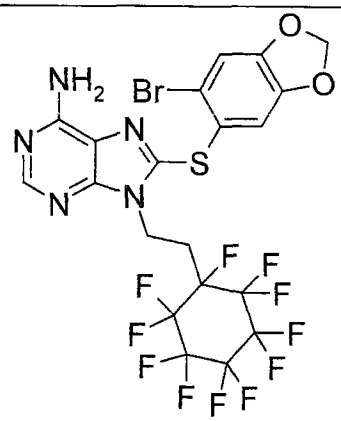
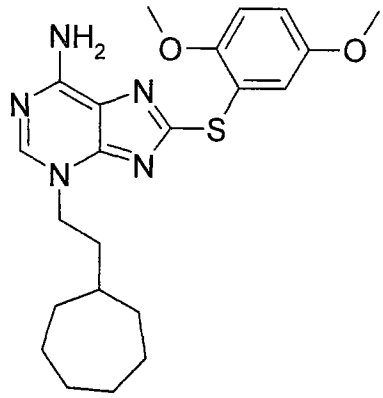
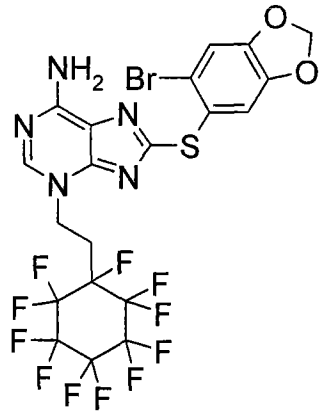
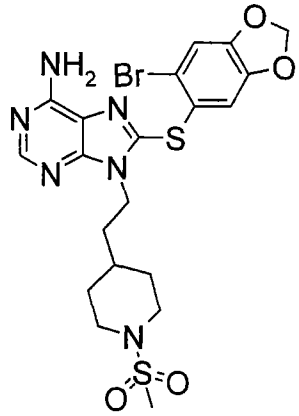
357		3-[2-(1-金刚烷)乙基]-8-[(6-溴-1,3-苯并间二氧杂环戊烯-5-基)硫]-3H-嘌呤-6-胺。LC-MS [M+H]$^+$ 528.4
358		4-(2-{6-氨基-8-[(2,5-二甲氧基苯基)硫]-9H-嘌呤-9-基}乙基)哌啶-1-甲醛。 LC-MS [M+H]$^+$ 443.5。
359		4-(2-{6-氨基-8-[(2,5-二甲氧基苯基)硫]-3H-嘌呤-3-基}乙基)哌啶-1-甲醛。 LC-MS [M+H]$^+$ 443.5
360		8-[(2,5-二甲氧基苯基)硫]-3-[2-(2,2,6,6-四甲基哌啶-4-基)乙基]-3H-嘌呤-6-胺。TOF LC-MS [M+H]$^+$ 471.2

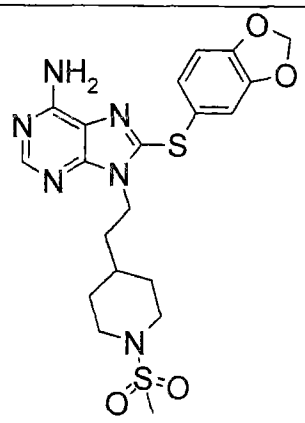
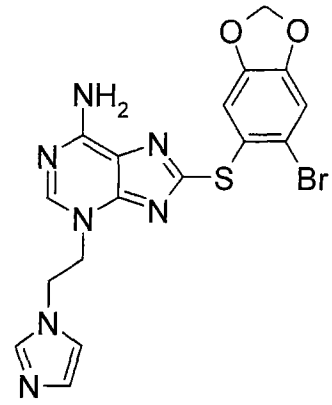
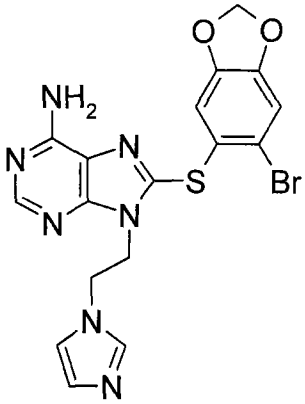
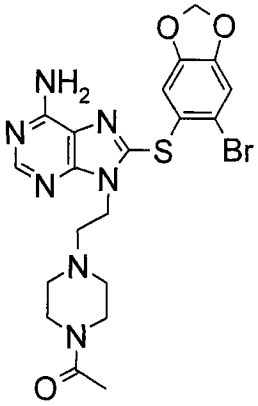
361		8-[(2,5-二甲氧基苯基)硫]-9-[2-(2,2,6,6-四甲基哌啶-4-基)乙基]-9H-嘌呤-6-胺。^{1}H NMR δ (DMSO-d_6) 8.19 (s, 1H), 7.05 (d, J=8.8 Hz, 1H), 6.80 (dd, J=8.8, 3.2Hz, 1H), 6.46 (d, J=3.2Hz, 1H), 4.22-4.20 (m, 2H), 3.77 (s, 3H), 3.62 (s, 3H), 2.46-2.45 (m, 2H), 1.76-1.73 (m, 2H), 1.59-1.57 (m, 2H), 1.29 (s, 6H), 1.23 (s, 6H), 1.10-1.00 (m, 1H); TOF LC-MS $[M+H]^+$ 471.3
362		4-(2-{6-氨基-8-[(2,5-二乙氧基苯基)硫]-9H-嘌呤-9-基}乙基)哌啶-1-羧酸叔丁酯。^{1}H NMR (DMSO-d_6) δ 8.16 (s, 1H), 6.99 (d, J=9.2 Hz, 1H), 6.82 (dd, J=9.2, 2.8 Hz, 1H), 6.45 (d, J=2.8 Hz, 1H), 4.2-4.16 (m, 4H), 4.0-3.97 (m, 3H), 3.87-3.84 (m, 6H), 2.52-2.49 (m, 4H), 1.37 (s, 9H) 1.23-1.17 (m, 6H); LC-MS $[M+H]^+$ 543.2。
363		4-(2-{6-氨基-8-[(6-溴-1,3-苯并间二氧杂环戊烯-5-基)硫]-9H-嘌呤-9-基}乙基)哌啶-1-甲醛。^{1}H NMR (DMSO-d_6) δ 8.21 (s, 1H), 7.94 (s, 1H), 7.40 (s, 1H), 6.85 (s, 1H), 6.09 (s, 2H), 4.34 (t, J= 6.8 Hz, 2H), 4.12-4.00 (m, 1H), 3.70-3.60 (m, 4H), 2.95-2.90 (m, 2H), 1.75-1.70 (m, 4H); LC/MS TOF $[M+H]^+$ 505.1

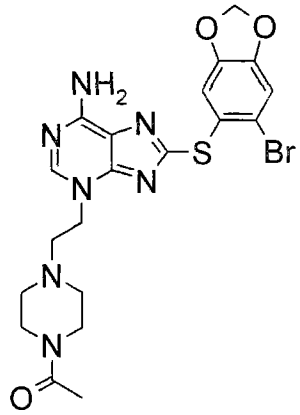
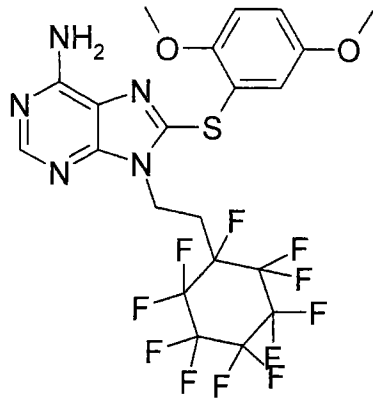
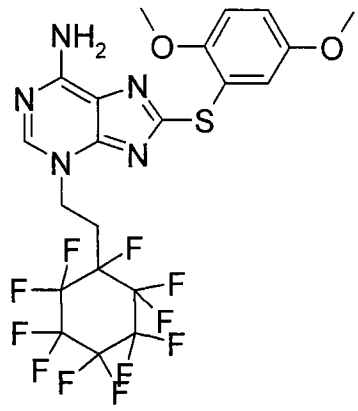
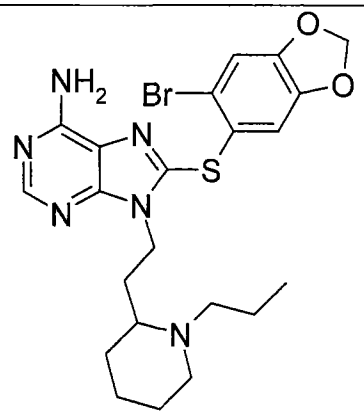
364		9-[2-(1-乙酰基哌啶-4-基)乙基]-8-[(6-溴-1,3-苯并间二氧杂环戊烯-5-基)硫]-9H-嘌呤-6-胺。 LC-MS [M+H]$^+$ 519.0
365		3-[2-(1-乙酰基哌啶-4-基)乙基]-8-[(6-溴-1,3-苯并间二氧杂环戊烯-5-基)硫]-3H-嘌呤-6-胺。 LC-MS [M+H]$^+$ 519.0
366		8-[(6-溴-1,3-苯并间二氧杂环戊烯-5-基)硫]-3-{2-[1-(甲磺酰)哌啶-4-基]乙基}-3H-嘌呤-6-胺。 LC-MS [M+H]$^+$ 557.0
367		2-(2-{6-氨基-8-[(6-溴-1,3-苯并间二氧杂环戊烯-5-基)硫]-9H-嘌呤-9-基}乙基)吗啉-4-羧酸叔丁酯。 ^{1}H NMR (丙酮-d_6) δ 8.36 (s, 1H), 7.26 (s, 1H), 7.05 (s, 1H), 6.14 (s, 2H), 4.47 (t, J=6.4 Hz, 2H), 3.85-3.80 (m, 4H), 3.41 (t, J=6.4 Hz, 2H), 3.20-2.70 (m, 3H), 1.41 (s, 9H); TOF LC-MS [M+H]$^+$ 579.1

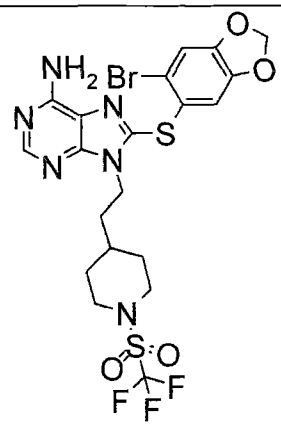
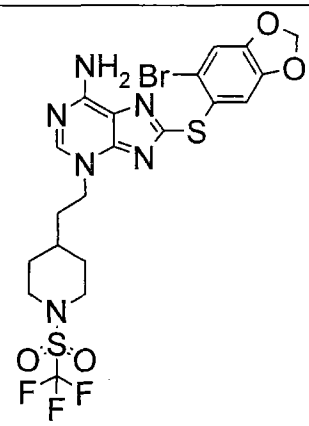
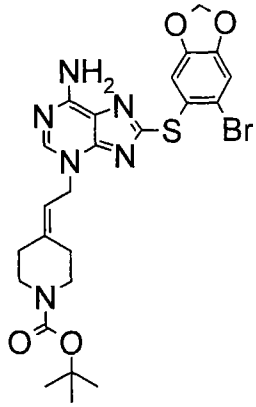
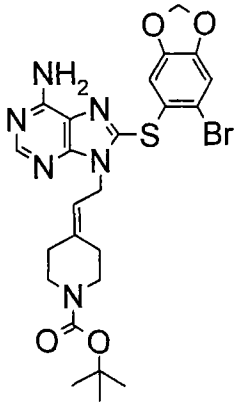
368		2-(2-{6-氨基-8-[(6-溴-1,3-苯并间二氧杂环戊烯-5-基)硫]-3H-嘌呤-3-基}乙基)吗啉-4-羧酸叔丁酯。 ^{1}H NMR (丙酮-d_6) δ 8.55 (s, 1H), 7.34 (s, 1H), 7.28 (s, 1H), 6.17 (s, 2H), 4.54 (t, J=6.0 Hz, 2H), 3.79-3.76 (m, 4H), 3.42-3.33 (m, 2H), 3.10-2.80 (m, 3H), 1.42 (s, 9H); TOF LC-MS $[M+H]^+$ 579.1
369		8-[(6-溴-1,3-苯并间二氧杂环戊烯-5-基)硫]-9-{2-[1-(甲磺酰)哌啶-3-基]乙基}-9H-嘌呤-6-胺。^{1}H NMR (CD_3OD) δ 8.20 (s, 1H), 7.3 (s, 1H), 7.10 (s, 1H), 6.08 (s, 2H), 4.33 (t, J= 6 Hz, 2H), 3.61-3.60 (m, 2H), 3.14-3.12 (m, 2H), 2.80 (s, 3H), 1.90-1.89 (m, 1H), 1.81-1.75 (m, 4H), 1.75-1.62 (m, 2H); LC-MS $[M+H]^+$ 555.1
370		8-[(6-溴-1,3-苯并间二氧杂环戊烯-5-基)硫]-3-{2-[1-(甲磺酰)哌啶-3-基]乙基}-3H-嘌呤-6-胺。^{1}H NMR (CD_3OD) δ 8.53 (s, 1H), 8.28 (s, 1H), 7.40 (s, 1H), 6.05 (s, 2H), 4.47 (t, J= 6 Hz, 2H), 3.52-3.40 (m, 2H), 3.14-3.12 (m, 2H), 2.80 (s, 3H), 1.96-1.84 (m, 1H), 1.82-1.80 (m, 4H), 1.70-1.54 (m, 2H); LC-MS $[M+H]^+$ 555.1

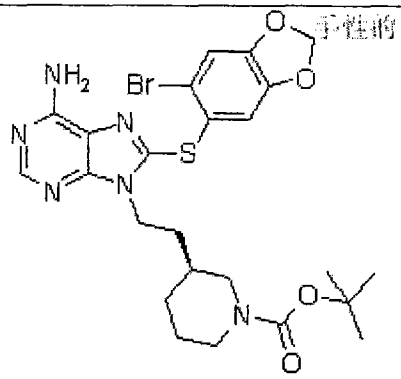
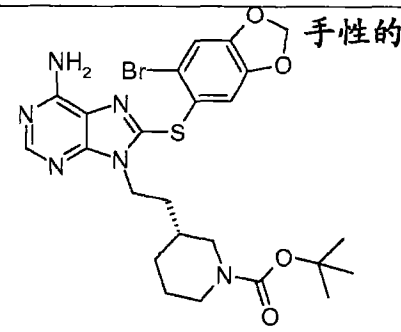
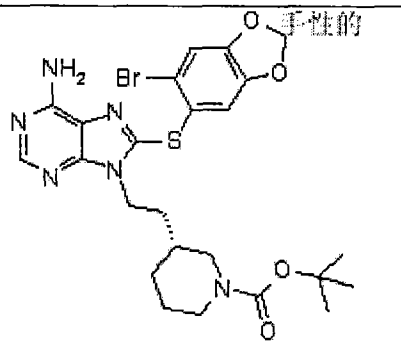
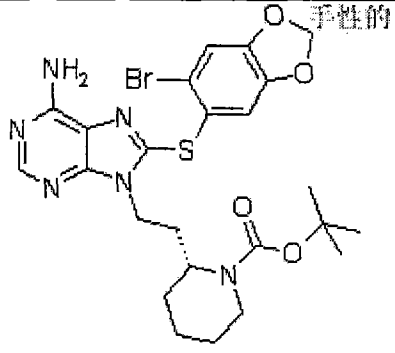
371		8-[(2,5-二甲氧基苯基)硫]-9-{2-[1-(甲磺酰)哌啶-2-基]乙基}-9H-嘌呤-6-胺。LC-MS $[M+H]^+$ 493.2
372		8-[(6-溴-1,3-苯并间二氧杂环戊烯-5-基)硫]-9-{2-[1-(甲磺酰)哌啶-2-基]乙基}-9H-嘌呤-6-胺。 ^1H NMR (CD_3OD) δ 8.31 (s, 1H), 7.27 (s, 1H), 7.20 (s, 1H), 6.09 (s, 2H), 4.35 (t, J= 8.4 Hz, 2H), 3.30-3.20 (m, 2H), 3.00 (s, 3H), 2.48-2.30 (m, 2H), 2.03-2.00 (m, 2H), 1.70-1.62 (m, 5H); LC-MS $[M+H]^+$ 555.1
373		8-[(6-溴-1,3-苯并间二氧杂环戊烯-5-基)硫]-3-{2-[1-(甲磺酰)哌啶-2-基]乙基}-3H-嘌呤-6-胺。LC-MS $[M+H]^+$ 555.1
374		9-(2-环庚基乙基)-8-[(2,5-二甲氧基苯基)硫]-9H-嘌呤-6-胺。 ^1H NMR (DMSO-d_6) δ 8.23 (s, 1H), 7.30 (d, J= 9.2 Hz, 1H), 6.87 (dd, J=9.2, 3.2 Hz, 1H), 6.50 (d, J= 3.2 Hz, 1H), 4.15 (t, J=6.8 Hz, 2H), 3.76 (s, 3H), 3.75-3.71 (m, 2H), 3.60 (s, 3H), 1.63-1.42 (m, 13H); TOF LC-MS $[M+H]^+$ 427.3

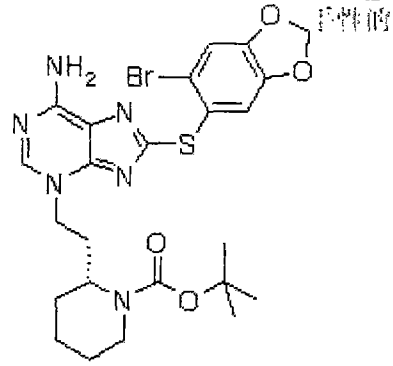
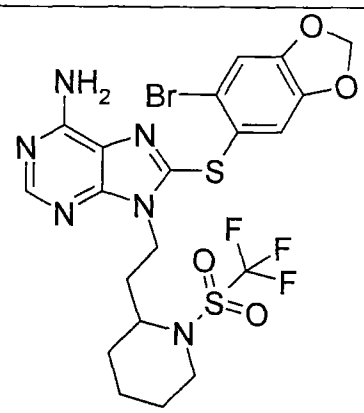
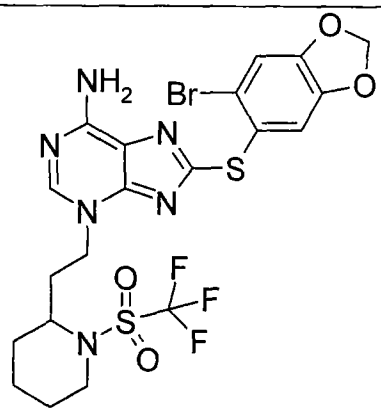
375		8-[(6-溴-1,3-苯并间二氧杂环戊烯-5-基)硫]-9-[2-(十一氟环己基)乙基]-9H-嘌呤-6-胺。TOF LC-MS $[M+H]^+$ 674.0
376		3-(2-环庚基乙基)-8-[(2,5-二甲氧基苯基)硫]-3H-嘌呤-6-胺。TOF LC-MS $[M+H]^+$ 427.3
377		8-[(6-溴-1,3-苯并间二氧杂环戊烯-5-基)硫]-3-[2-(十一氟环己基)乙基]-3H-嘌呤-6-胺。TOF LC-MS $[M+H]^+$ 674.0.
378		8-[(6-溴-1,3-苯并间二氧杂环戊烯-5-基)硫]-9-{2-[1-(甲磺酰)哌啶-4-基]乙基}-9H-嘌呤-6-胺。^1H NMR (CD_3OD) δ 8.20 (s, 1H), 7.30 (s, 1H), 7.10 (s, 1H), 6.08 (s, 2H), 4.32 (t, J= 7.2 Hz, 2H), 3.70-3.69 (m, 2H), 3.25-3.12 (m, 2H), 2.81 (s, 3H), 1.93-1.91 (m, 2H), 1.82-1.76 (m, 2H), 1.44-1.30 (m, 3H); LC-MS $[M+H]^+$ 555.3

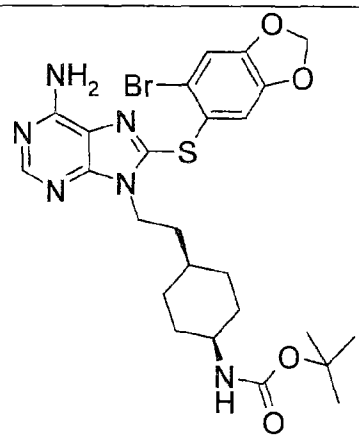
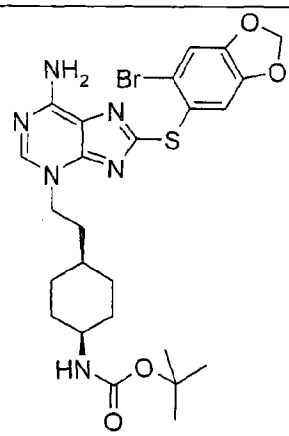
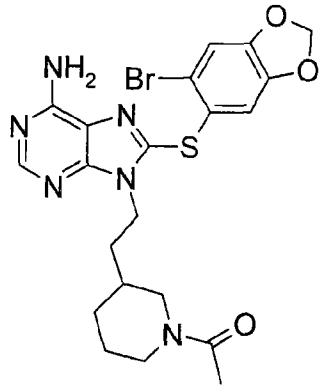
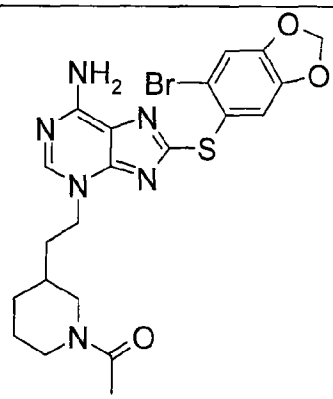
379		8-(1,3-苯并间二氧杂环戊烯-5-基硫)-9-{2-[1-(甲磺酰)哌啶-4-基]乙基}-9H-嘌呤-6-胺。 LC-MS $[M+H]^+$ 555.0
380		8-[(6-溴-1,3-苯并间二氧杂环戊烯-5-基)硫]-3-[2-(1H-咪唑-1-基)乙基]-3H-嘌呤-6-胺。^{1}H NMR (CD_3OD) δ 8.90 (s, 1H), 8.39 (s, 1H), 7.54 (br s, 2H), 7.36 (s, 1H), 7.30 (s, 1H), 6.15 (s, 2H), 4.90-4.80 (m, 4H); TOF LC-MS $M+H]^+$ 460.1
381		8-[(6-溴-1,3-苯并间二氧杂环戊烯-5-基)硫]-9-[2-(1H-咪唑-1-基)乙基]-9H-嘌呤-6-胺。^{1}H NMR (CD_3OD) δ 8.92 (t, J = 1.2 Hz, 1H), 8.24 (s, 1H), 7.56-7.53 (m, 2H), 7.26 (s, 1H), 7.13 (s, 1H), 6.09 (s, 2H), 4.80 (s, 4H); TOF LC-MS $[M+H]^+$ 460.5
382		9-[2-(4-乙酰基哌嗪-1-基)乙基]-8-[(6-溴-1,3-苯并间二氧杂环戊烯-5-基)硫]-9H-嘌呤-6-胺。^{1}H NMR (CD_3OD) δ 8.33 (s, 1H), 7.27 (s, 1H), 7.22 (s, 1H), 6.08 (s, 2H), 4.66 (t, J = 5.6 Hz, 2H), 3.79-3.66 (m, 3H), 3.36 (m, 1H), 3.17-3.11 (m, 4H), 3.30 (br t, J = 5.6 Hz, 2H), 2.12 (s, 3H); TOF LC-MS $[M+H]^+$ 520.1

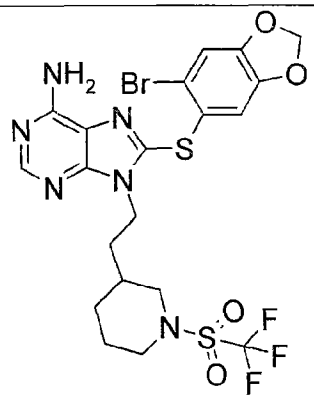
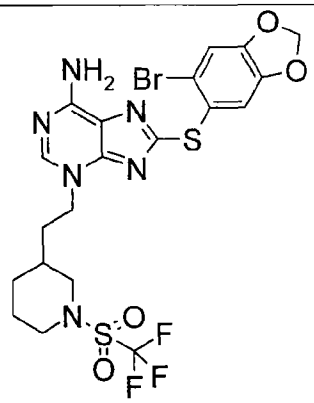
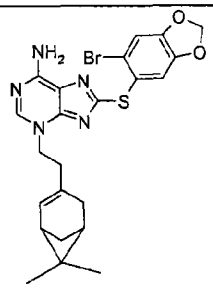
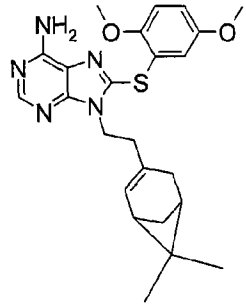
383		3-[2-(4-乙酰基哌嗪-1-基)乙基]-8-[(6-溴-1,3-苯并间二氧杂环戊烯-5-基)硫]-3H-嘌呤-6-胺。^{1}H NMR (CD_3OD) δ 8.53 (s, 1H), 7.38 (s, 1H), 7.37 (s, 1H), 6.16 (s, 2H), 4.67 (t, J = 4.8 Hz, 2H), 3.70-3.61 (m, 4H), 3.30 (t, J = 4.8 Hz, 2H), 3.00-2.94 (m, 4H), 2.12 (s, 3H); TOF LC-MS $[M+H]^+$ 520.1
384		8-[(2,5-二甲氧基苯基)硫]-9-[2-(十一氟环己基)乙基]-9H-嘌呤-6-胺。^{1}H NMR (丙酮-d_6) δ 8.65 (s, 1H), 7.27 (d, J= 3.2 Hz, 1H), 7.07-7.02 (m, 2H), 4.80 (t, J= 8.0 Hz, 2H), 3.78 (s, 3H), 3.75 (s, 3H), 2.15 (t, J= 8.0 Hz, 2H); TOF LC-MS $[M+H]^+$ 612.1
385		8-[(2,5-二甲氧基苯基)硫]-3-[2-(十一氟环己基)乙基]-3H-嘌呤-6-胺。^{1}H NMR (丙酮-d_6) δ 8.38 (s, 1H), 7.06 (d, J= 8.8 Hz, 1H), 6.95 (dd, J=8.8, 2.8 Hz, 1H), 6.86 (d, J=2.8 Hz, 1H), 4.70 (t, J= 8.4 Hz, 2H), 3.80 (s, 3H), 3.71 (s, 3H), 2.94 (d, J= 8.4 Hz, 2H); TOF LC-MS $[M+H]^+$ 612.1
386		8-[(6-溴-1,3-苯并间二氧杂环戊烯-5-基)硫]-9-[2-(1-丙基哌啶-2-基)乙基]-9H-嘌呤-6-胺。^{1}H NMR (CD_3OD) δ 8.34 (s, 1H), 7.30 (s, 1H), 7.22 (s, 1H), 6.10 (s, 2H), 4.46-4.14 (m, 2H), 2.57-2.50 (m, 2H), 2.35-2.26 (m, 3H), 2.20-2.14 (m, 2H), 2.01-1.84 (m, 3H), 1.80-1.60 (m, 5H), 1.01 (t, J= 7.7 Hz, 3H); LC-MS $[M+H]^+$ 519.0

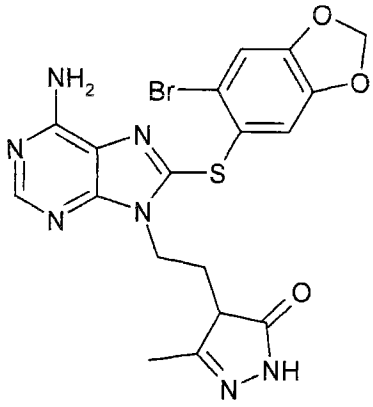
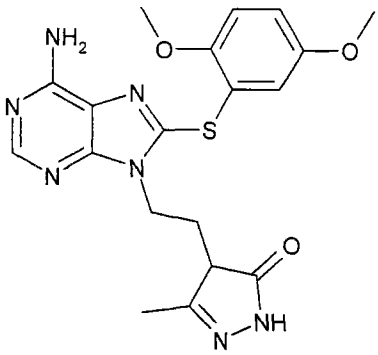
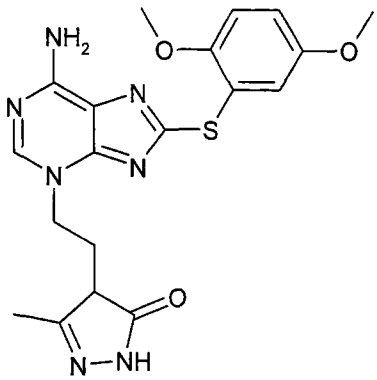
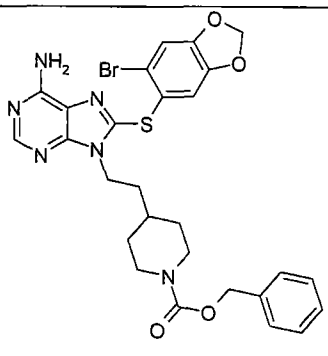
387		8-[(6-溴-1,3-苯并间二氧杂环戊烯-5-基)硫]-9-(2-{1-[(三氟甲基)磺酰基]哌啶-4-基}乙基)-9H-嘌呤-6-胺。LC-MS [M+H]$^+$ 609.3
388		8-[(6-溴-1,3-苯并间二氧杂环戊烯-5-基)硫]-3-(2-{1-[(三氟甲基)磺酰基]哌啶-4-基}乙基)-3H-嘌呤-6-胺。LC-MS [M+H]$^+$ 609.0
389		4-(2-{6-氨基-8-[(6-溴-1,3-苯并间二氧杂环戊烯-5-基)硫]-3H-嘌呤-3-基}亚乙基)哌啶-1-羧酸叔丁酯。^{1}H NMR (CD_3OD) δ 8.45 (s, 1H), 7.38 (s, 1H), 7.37 (s, 1H), 6.16 (s, 2H), 5.23 (s, 1H), 4.48(t, J = 6.8 Hz, 2H), 3.69 (brs, 2H), 3.49-3.44 (m, 2H), 2.62(t, J = 6.8 Hz, 2H), 2.18-2.13 (m, 2H), 1.46 (s, 9H); LC-MS [M+H]$^+$ 575.5
390		4-(2-{6-氨基-8-[(6-溴-1,3-苯并间二氧杂环戊烯-5-基)硫]-9H-嘌呤-9-基}亚乙基)哌啶-1-羧酸叔丁酯。^{1}H NMR (CD_3OD) δ 8.18 (s, 1H), 7.24 (s, 1H), 7.01 (s, 1H), 6.07 (s, 2H), 5.17 (s, 1H), 4.36 (t, J = 6.4 Hz, 2H), 3.69 (s, 2H), 3.52-3.44 (m, 2H), 2.53 (t, J =

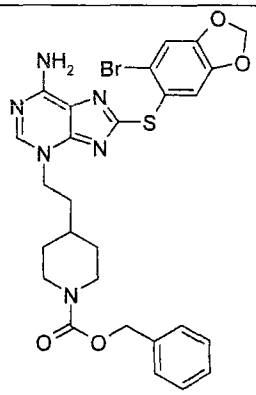
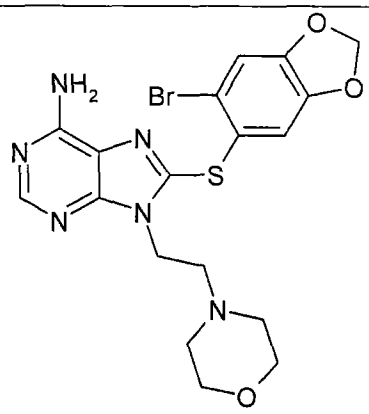
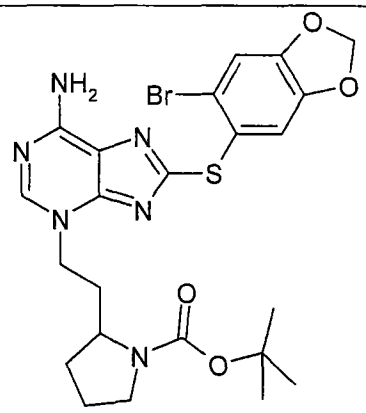
		6.4 Hz, 2H), 2.24-2.18(m, 2H), 1.44 (s, 9H); LC-MS $[M+H]^+$ 575.0
391		(3*S*)-3-(2-{6-氨基-8-[(6-溴-1,3-苯并间二氧杂环戊烯-5-基)硫]-9H-嘌呤-9-基}乙基)哌啶-1-羧酸叔丁酯。LC-MS $[M+H]^+$ 577.3
392		(3*R*)-3-(2-{6-氨基-8-[(6-溴-1,3-苯并间二氧杂环戊烯-5-基)硫]-9H-嘌呤-9-基}乙基)哌啶-1-羧酸叔丁酯. ^{1}H NMR (丙酮-d_6) δ 8.32 (s, 1H), 7.26 (s, 1H), 6.98 (s, 1H), 6.12 (s, 2H), 4.36 (t, J=7.2 Hz, 2H), 3.85-3.80 (m, 2H), 2.86 (t, J=6.4 Hz, 2H), 2.00-1.60 (m, 4H), 1.50-1.20 (m, 3H), 1.41 (s, 9H); TOF LC-MS $[M+H]^+$ 577.3
393		(3*R*)-3-(2-{6-氨基-8-[(6-溴-1,3-苯并间二氧杂环戊烯-5-基)硫]-3H-嘌呤-3-基}乙基)哌啶-1-羧酸叔丁酯。^{1}H NMR (丙酮-d_6) δ 8.61 (s, 1H), 7.36 (s, 1H), 7.30 (s, 1H), 6.17 (s, 2H), 4.48 (t, J=6.4 Hz, 2H), 3.83-3.76 (m, 3H), 3.62-3.59 (m, 1H), 2.90-2.79 (m, 3H), 1.91-1.84 (m, 4H), 1.45 (s, 9H); TOF LC-MS $[M+H]^+$ 577.3。
394		(2*R*)-2-(2-{6-氨基-8-[(6-溴-1,3-苯并间二氧杂环戊烯-5-基)硫]-9H-嘌呤-9-基}乙基)哌啶-1-羧酸叔丁酯。^{1}H NMR (丙酮-d_6) δ 8.30 (s, 1H), 7.25 (s, 1H), 6.87 (s, 1H), 6.10 (s, 2H), 4.40-4.00 (m, 2H), 3.70-3.60 (m, 2H), 2.10-1.80 (m, 5H), 1.70-1.50 (m,

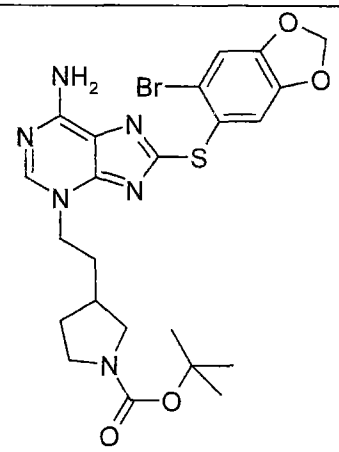
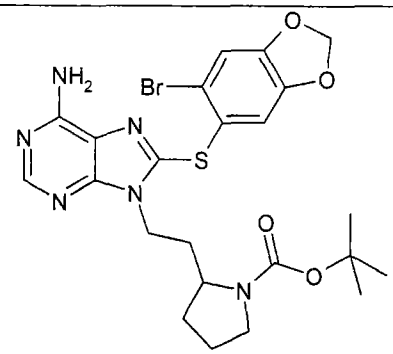
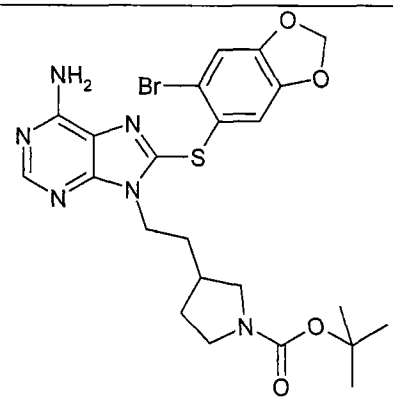
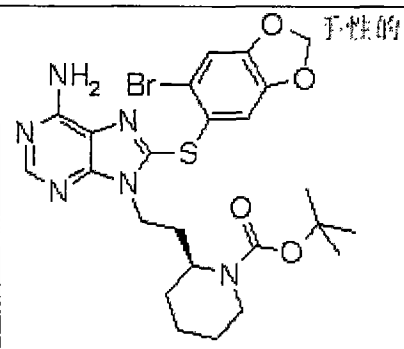
		6H), 1.90-1.50 (m, 9H), 1.40 (s, 9H); TOF LC-MS $[M+H]^+$ 577.4
395		(2*R*)-2-(2-{6-氨基-8-[(6-溴-1,3-苯并间二氧杂环戊烯-5-基)硫]-3H-嘌呤-3-基}乙基)哌啶-1-羧酸叔丁酯。^{1}H NMR (丙酮-d_6) δ 8.45 (s, 1H), 7.36 (s, 1H), 7.30 (s, 1H), 6.19 (s, 2H), 4.42 (d, J= 7.6 Hz, 2H), 2.75-2.6 (m, 6H), 2.42-2.40 (m, 2H), 2.20-2.00 (m, 3H), 1.35 (s, 9H); TOF LC-MS $[M+H]^+$ 579.4。
396		8-[(6-溴-1,3-苯并间二氧杂环戊烯-5-基)硫]-9-(2-{1-[(三氟甲基)磺酰基]哌啶-2-基}乙基)-9H-嘌呤-6-胺。LC-MS $[M+H]^+$ 609.1
397		8-[(6-溴-1,3-苯并间二氧杂环戊烯-5-基)硫]-3-(2-{1-[(三氟甲基)磺酰基]哌啶-2-基}乙基)-3H-嘌呤-6-胺。LC-MS $[M+H]^+$ 609.1

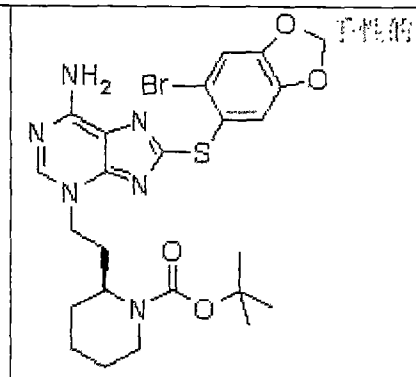
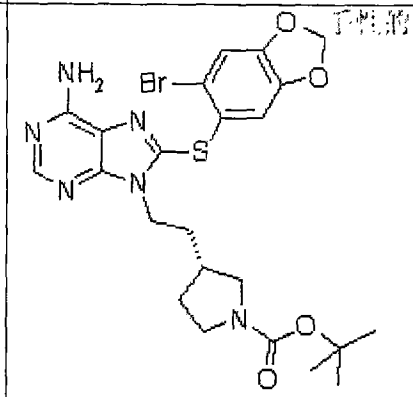
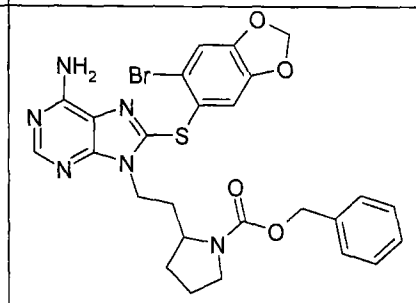
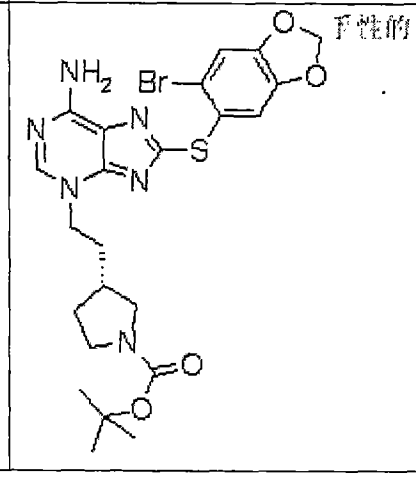
398		[*顺*-4-(2-{6-氨基-8-[(6-溴-1,3-苯并间二氧杂环戊烯-5-基)硫]-9H-嘌呤-9-基}乙基)环己基]氨基甲酸叔丁酯。^{1}H NMR (丙酮-d_6) δ 8.3 (s, 1H), 7.25 (s, 1H), 6.94 (s, 1H), 6.12 (s, 2H), 4.31 (t, J = 7.2 Hz, 2H), 1.80-1.50 (m, 12H), 1.39 (s, 9H); LC-MS [M+H]$^+$ 591.5
399		[*顺*-4-(2-{6-氨基-8-[(6-溴-1,3-苯并间二氧杂环戊烯-5-基)硫]-3H-嘌呤-3-基}乙基)环己基]氨基甲酸叔丁酯。^{1}H NMR (丙酮-d_6) δ 8.29 (s, 1H), 7.25 (s, 1H), 6.93 (s, 1H), 6.11 (s, 2H), 4.31 (t, J = 7.2 Hz, 2H), 1.76-1.50 (m, 12H), 1.39 (s, 9H); LC-MS [M+H]$^+$ 591.5
400		9-[2-(1-乙酰基哌啶-3-基)乙基]-8-[(6-溴-1,3-苯并间二氧杂环戊烯-5-基)硫]-9H-嘌呤-6-胺。^{1}H NMR (CD_3OD) δ 8.16 (d, J= 2.8 Hz, 1H), 7.26 (d, J=2.0 Hz, 1H), 7.07 (d, J=6.8 Hz, 1H), 6.08 (s, 2H), 4.38-3.90 (m, 2H), 3.47-3.36 (m, 2H), 3.15-3.11 (m, 3H), 2.70 (s, 3H), 2.09-2.07 (m, 2H), 1.78-1.69 (m, 2H), 1.35 (s, 2H); LC-MS [M+H]$^+$ 519.0
401		3-[2-(1-乙酰基哌啶-3-基)乙基]-8-[(6-溴-1,3-苯并间二氧杂环戊烯-5-基)硫]-3H-嘌呤-6-胺。LC-MS [M+H]$^+$ 519.0

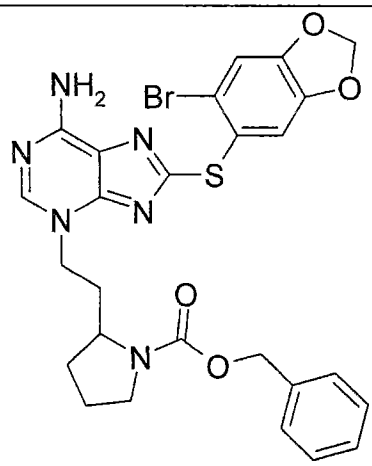
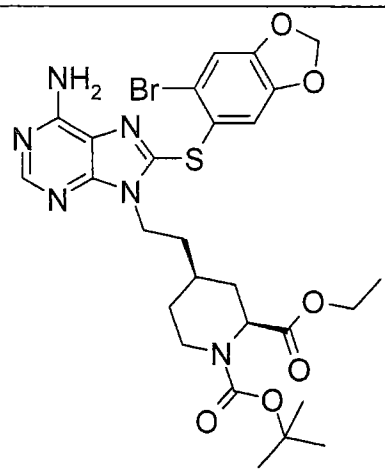
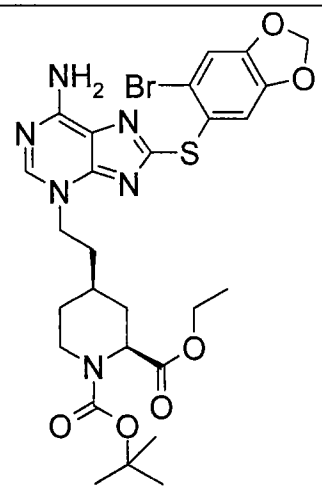
402		8-[(6-溴-1,3-苯并间二氧杂环戊烯-5-基)硫]-9-(2-{1-[(三氟甲基)磺酰基]哌啶-3-基}乙基)-9H-嘌呤-6-胺。 1H NMR δ (CD3OD), 8.17 (s, 1H), 7.25 (s, 1H), 7.06 (s, 1H), 6.07 (s, 2H), 4.33-4.29 (m, 2H), 3.83-3.70 (m, 2H), 3.50-3.48 (m, 2H), 3.14-3.12 (m, 2H), 1.99-1.93 (m, 1H), 1.79-1.78 (m, 2H), 1.61-1.59 (m, 2H); LC-MS $[M+H]^+$ 609.1
403		8-[(6-溴-1,3-苯并间二氧杂环戊烯-5-基)硫]-3-(2-{1-[(三氟甲基)磺酰基]哌啶-3-基}乙基)-3H-嘌呤-6-胺。 LC-MS $[M+H]^+$ 609.0
404		8-[(6-溴 1,3-苯并间二氧杂环戊烯-5-基)硫]-3-[2-(6,6-二甲基双环[3.1.1]庚-2-烯-3-基)乙基]-3H-嘌呤-6-胺。TOF LC-MS $[M+H]^+$ 514.1
405		8-[(2,5-二甲氧基苯基)硫]-9-[2-(6,6-二甲基双环[3.1.1]庚-2-烯-3-基)乙基]-9H-嘌呤-6-胺。 ^{1}H NMR (DMSO-d_6) δ 8.20 (s, 1H), 7.05 (d, J= 9.2Hz, 1H), 6.80 (dd, J=9.2, 2.8 Hz, 1H), 6.50 (d, J= 2.8Hz, 1H), 5.20 (s, 1H), 4.12-4.10 (m, 2H), 3.77 (s, 3H), 3.60 (s, 3H), 2.32-1.98 (m, 6H), 1.24 (s, 3H),

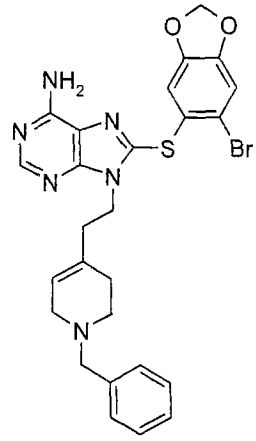
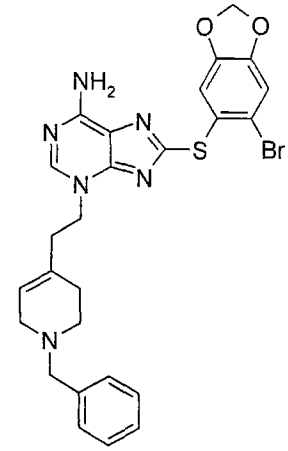
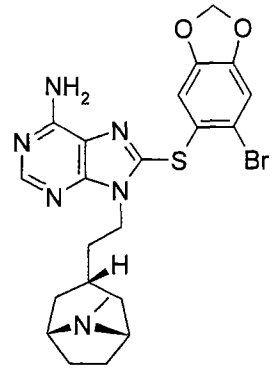
		0.96-0.94 (m, 2H), 0.86 (s, 3H); LC-MS $[M+H]^+$ 452.5
406		4-(2-{6-氨基-8-[(6-溴-1,3-苯并间二氧杂环戊烯-5-基)硫]-9H-嘌呤-9-基}乙基)-5-甲基-2,4-二氢-3H-吡唑-3-酮。^{1}H NMR (丙酮-d_6) δ 8.35 (s, 1H), 7.36 (s, 1H), 7.29 (s, 1H), 6.18 (s, 2H), 4.52-4.48 (m, 2H), 2.96-2.92 (m, 2H), 2.03 (m, 1H), 1.33 (s, 3H); LC-MS $[M+H]^+$ 490.2
407		4-(2-{6-氨基-8-[(2,5-二甲氧基苯基)硫]-9H-嘌呤-9-基}乙基)-5-甲基-2,4-二氢-3H-吡唑-3-酮。^{1}H NMR (DMSO-d_6) δ 8.31 (s, 1H), 7.25 (d, J= 3.2Hz, 1H), 7.19 (d, J= 9.2 Hz, 1H), 7.12 (dd, J= 9.2, 3.2 Hz, 1H), 4.40-4.30 (m, 2H), 3.74 (s, 3H), 3.72 (s, 3H), 2.78-2.70 (m, 2H), 1.87 (s, 3H), 0.95-0.87 (m, 1H); LC-MS $[M+H]^+$ 428.2
408		4-(2-{6-氨基-8-[(2,5-二甲氧基苯基)硫]-3H-嘌呤-3-基}乙基)-5-甲基-2,4-二氢-3H-吡唑-3-酮。LC-MS $[M+H]^+$ 428.2
409		4-(2-{6-氨基-8-[(6-溴-1,3-苯并间二氧杂环戊烯-5-基)硫]-9H-嘌呤-9-基}乙基)哌啶-1-羧酸苄酯。^{1}H NMR (DMSO-d_6) δ 8.18 (s, 1H), 7.39-7.31 (m, 6H), 6.82 (s, 1H), 6.08 (s, 2H), 5.05 (s, 2H), 4.18 (m, J=7.2 Hz, 2H), 3.97-3.93 (m,

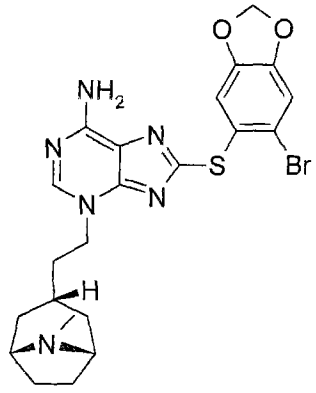
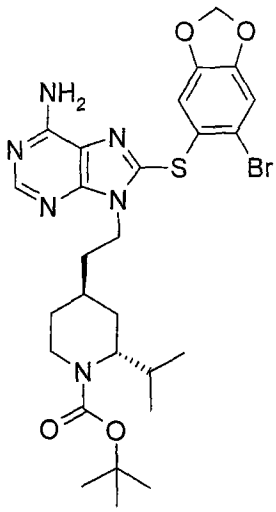
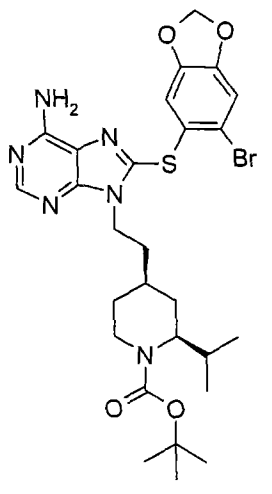
		2H), 1.70-1.20 (m, 9H); LC-MS $[M+H]^+$ 611.1
410		4-(2-{6-氨基-8-[(6-溴-1,3-苯并间二氧杂环戊烯-5-基)硫]-3H-嘌呤-3-基}乙基)哌啶-1-羧酸苄酯。^{1}H NMR (DMSO-d_6) δ 8.63 (s, 1H), 7.47 (s, 1H), 7.39-7.25 (m, 6H), 6.14 (s, 2H), 5.06 (s, 2H), 4.31 (m, J=7.2 Hz, 2H), 3.97-3.93 (m, 2H), 1.70-1.20 (m, 9H); LC-MS $[M+H]^+$ 611.1
411		8-[(6-溴-1,3-苯并间二氧杂环戊烯-5-基)硫]-9-(2-吗啉-4-基乙基)-9H-嘌呤-6-胺。^{1}H NMR (DMSO-d_6) δ 8.30(s, 1H), 7.39 (s, 1H), 6.90 (s, 1H), 6.10 (s, 2H), 4.58 (t, J = 6.0 Hz, 2H), 3.60-3.50 (m, 4H), 3.40-3.30 (m, 4H), 2.55-2.50 (m, 2H); LC-MS $[M+H]^+$ 479.3。
412		2-(2-{6-氨基-8-[(6-溴-1,3-苯并间二氧杂环戊烯-5-基)硫]-3H-嘌呤-3-基}乙基)吡咯烷-1-羧酸叔丁酯。^{1}H NMR (DMSO-d_6) δ 8.63 (s, 1H), 7.48 (s, 1H), 7.34 (s, 1H), 6.16 (s, 2H), 4.30-4.20 (m, 2H), 3.30-3.20 (m, 2H), 1.89-1.50 (m, 7H), 1.24 (s, 9H); TOF LC-MS $[M+H]^+$ 563.0

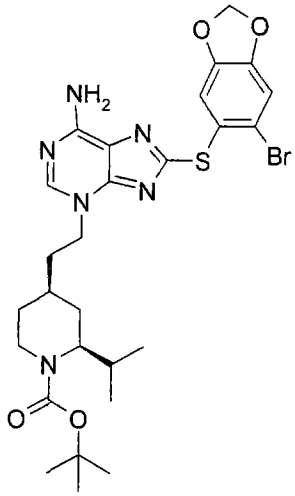
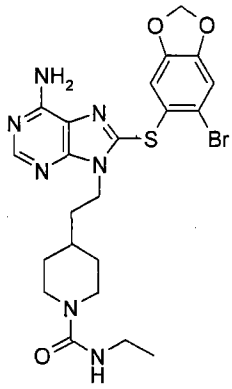
413		3-(2-{6-氨基-8-[(6-溴-1,3-苯并间二氧杂环戊烯-5-基)硫]-3H-嘌呤-3-基}乙基)吡咯烷-1-羧酸叔丁酯。LC-MS TOF $[M+H]^+$ 563.0
414		2-(2-{6-氨基-8-[(6-溴-1,3-苯并间二氧杂环戊烯-5-基)硫]-9H-嘌呤-9-基}乙基)吡咯烷-1-羧酸叔丁酯。TOF LC-MS $[M+H]^+$ 563.0
415		3-(2-{6-氨基-8-[(6-溴-1,3-苯并间二氧杂环戊烯-5-基)硫]-9H-嘌呤-9-基}乙基)吡咯烷-1-羧酸叔丁酯。^{1}H NMR (DMSO-d_6) δ 8.22 (s, 1H), 7.39 (s, 1H), 6.88 (s, 1H), 6.09 (s, 2H), 4.20-4.10 (m, 2H), 3.30-3.20 (m, 2H), 2.70-1.80 (m, 7H), 1.37 (s, 9H); TOF LC-MS $[M+H]^+$ 563.0
416		(2*S*)-2-(2-{6-氨基-8-[(6-溴-1,3-苯并间二氧杂环戊烯-5-基)硫]-9H-嘌呤-9-基}乙基)哌啶-1-羧酸叔丁酯。^{1}H NMR (DMSO-d_6) δ 8.21 (s, 1H), 7.38 (s, 1H), 6.73 (s, 1H), 6.08 (s, 2H), 4.20-3.80 (m, 2H), 2.51-2.45 (m, 2H), 1.60-1.20 (m, 9H), 1.30 (s, 9H); LC-MS $[M+H]^+$ 577.1

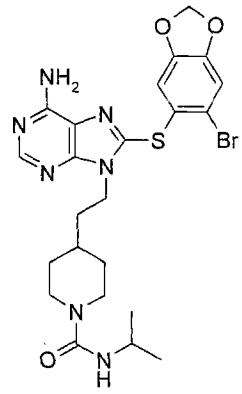
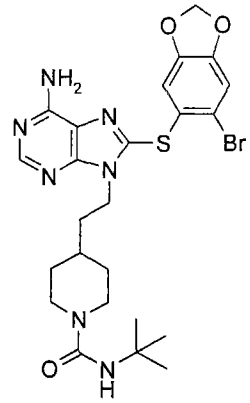
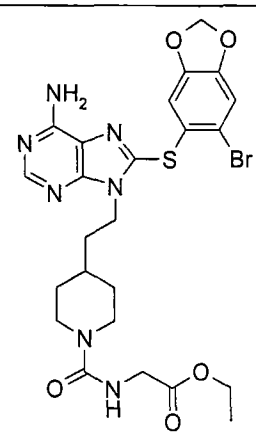
417		(2*S*)-2-(2-{6-氨基-8-[(6-溴-1,3-苯并间二氧杂环戊烯-5-基)硫]-3H-嘌呤-3-基}乙基)哌啶-1-羧酸叔丁酯。^{1}H NMR (DMSO-d_6) δ 8.49 (s, 1H), 7.41 (s, 1H), 7.29 (s, 1H), 6.11 (s, 2H), 4.25-4.15 (m, 2H), 3.27-3.15 (m, 2H), 1.60-1.20 (m, 9H), 1.32 (s, 9H); LC-MS $[M+H]^+$ 577.1
418		(3*R*)-3-(2-{6-氨基-8-[(6-溴-1,3-苯并间二氧杂环戊烯-5-基)硫]-9H-嘌呤-9-基}乙基)吡咯烷-1-羧酸叔丁酯。^{1}H NMR (DMSO-d_6) δ 8.24 (s, 1H), 7.37 (s, 1H), 6.89 (s, 1H), 6.08 (s, 2H), 4.20-4.14 (m, 2H), 3.33-3.28 (m, 3H), 2.00-1.70 (m, 6H), 1.35 (s, 9H); LC-MS $[M+H]^+$ 564.8
419		2-(2-{6-氨基-8-[(6-溴-1,3-苯并间二氧杂环戊烯-5-基)硫]-9H-嘌呤-9-基}乙基)吡咯烷-1-羧酸苄酯。^{1}H NMR (DMSO-d_6) δ 8.24 (s, 1H), 7.36 (s, 1H), 7.32 (s, 1H), 7.30-7.18 (m, 3H), 6.88-6.82 (m, 2H), 6.07 (s, 2H), 5.00 (s, 2H), 4.20-4.10 (m, 2H), 3.33-3.28 (m, 3H), 2.20-1.70 (m, 6H); LC-MS $[M+Na]^+$ 599.1
420		(3*S*)-3-(2-{6-氨基-8-[(6-溴-1,3-苯并间二氧杂环戊烯-5-基)硫]-3H-嘌呤-3-基}乙基)吡咯烷-1-羧酸叔丁酯。^{1}H NMR (DMSO-d_6) δ 8.60 (s, 1H), 7.45 (s, 1H), 7.12 (s, 1H), 6.14 (s, 2H), 4.28 (t, J=7.2Hz, 2H), 3.40-3.30 (m, 3H), 2.00-1.80 (m, 6H), 1.36 (s, 9H); LC-MS $[M+H]^+$ 563.1。

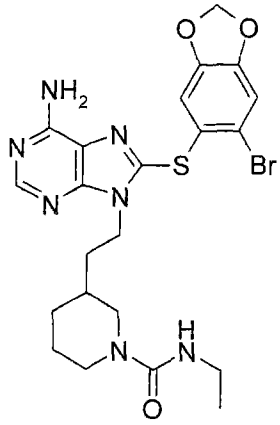
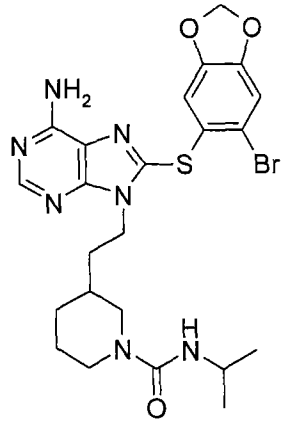
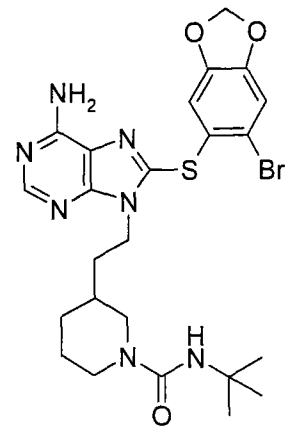
421		2-(2-{6-氨基-8-[(6-溴-1,3-苯并间二氧杂环戊烯-5-基)硫]-3H-嘌呤-3-基}乙基)吡咯烷-1-羧酸苄酯。^{1}H NMR (DMSO-d_6) δ 8.67 (s, 1H), 7.47 (s, 1H), 7.32 (s, 1H), 7.40-7.18 (m, 5H), 6.14 (s, 2H), 5.00 (s, 2H), 4.29-4.27 (m, 2H), 3.78-3.28 (m, 3H), 2.20-1.70 (m, 6H); LC-MS $[M+Na]^+$ 599.1
422		1-叔丁基 2-乙基 *顺*-4-(2-{6-氨基-8-[(6-溴-1,3-苯并间二氧杂环戊烯-5-基)硫]-9H-嘌呤-9-基}乙基)哌啶-1,2-二羧酸酯。^{1}H NMR (CD_3OD) δ 8.31 (s, 1H), 7.28 (s, 1H), 7.17 (s, 1H), 6.09 (s, 2H), 4.35-4.32 (m, 3H), 4.17 (t, J=7.2Hz, 2H), 3.68-3.60 (m, 1H), 2.10-2.05 (m, 1H), 1.92-1.80 (m, 4H), 1.75-1.65 (m, 1H), 1.42 (s, 9H), 1.30-1.28 (m, 2H), 1.23 (t, J=7.2Hz, 3H); LC-MS $[M+H]^+$ 649.1
423		1-叔丁基 2-乙基 *顺*-4-(2-{6-氨基-8-[(6-溴-1,3-苯并间二氧杂环戊烯-5-基)硫]-3H-嘌呤-3-基}乙基)哌啶-1,2-二羧酸酯。^{1}H NMR (CD_3OD) δ 8.48 (s, 1H), 7.37 (s, 1H), 7.34 (s, 1H), 6.15 (s, 2H), 4.40-4.35 (m, 3H), 4.18 (q, J=7.2Hz, 2H), 3.68-3.60 (m, 1H), 3.27-3.25 (m, 2H), 2.20-1.70 (m, 6H), 1.44 (s, 9H), 1.26 (t, J=7.2Hz, 3H); LC-MS $[M+H]^+$ 649.1

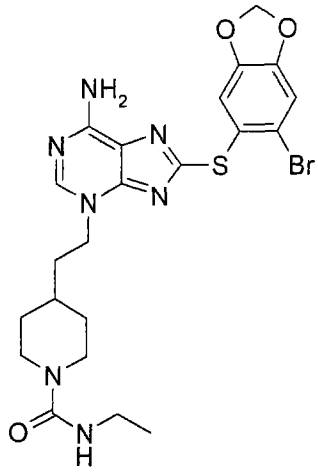
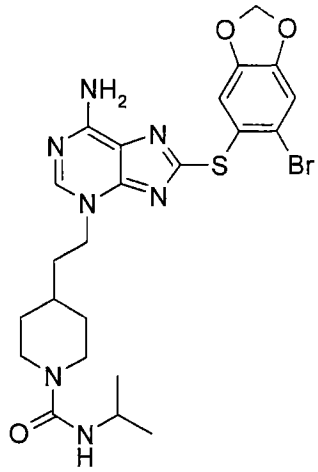
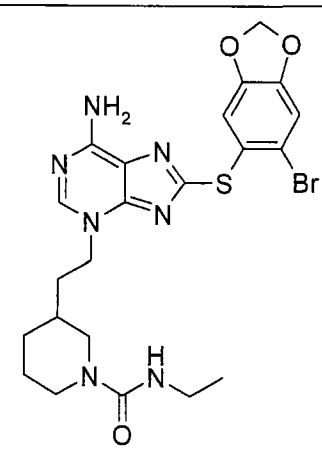
424		9-[2-(1-苄基-1,2,3,6-四氢吡啶-4-基)乙基]-8-[(6-溴-1,3-苯并间二氧杂环戊烯-5-基)硫]-9H-嘌呤-6-胺。^{1}HNMR (CD_3OD) δ 8.23 (s, 1H), 7.52-7.45 (m, 5H), 7.27 (s, 1H), 7.16 (s, 1H), 6.01 (s, 2H), 5.26 (s, 1H), 4.60-4.30 (m, 4H), 3.67-3.56 (m, 3H), 3.50 (m, 1H), 2.72-2.52 (m, 4H); LC-MS $[M+H]^+$ 565.8
425		3-[2-(1-苄基-1,2,3,6-四氢吡啶-4-基)乙基]-8-[(6-溴-1,3-苯并间二氧杂环戊烯-5-基)硫]-3H-嘌呤-6-胺。^{1}H NMR (CD_3OD) δ 8.49 (s, 1H), 7.51-7.49 (m, 5H), 7.36 (s, 1H), 7.32 (s, 1H), 6.13 (s, 2H), 5.42 (s, 1H), 4.50 (brt, J = 6.4 Hz, 2H), 4.39-4.43 (m, 2H), 3.64-3.56 (m, 3H), 3.21(m, 1H), 2.72 (brt, J = 6.4 Hz, 2H), 2.57-2.52 (m, 2H); LC-MS $[M+H]^+$ 565.3
426		8-[(6-溴-1,3-苯并间二氧杂环戊烯-5-基)硫]-9-{2-[(3-内式)-8-甲基-8-氮杂双环[3.2.1]辛-3-基]乙基}-9H-嘌呤-6-胺。^{1}H NMR (CD_3OD) δ 8.26 (s, 1H), 7.28 (s, 1H), 7.15 (s, 1H), 6.09 (s, 2H), 4.34 (t, J = 7.6 Hz, 2H), 3.88-3.84 (m, 2H), 2.77 (s, 3H), 2.37-2.29 (m, 4H), 2.22-2.29 (m, 4H), 1.97-1.88(m, 3H); LC-MS $[M+H]^+$ 517.1.

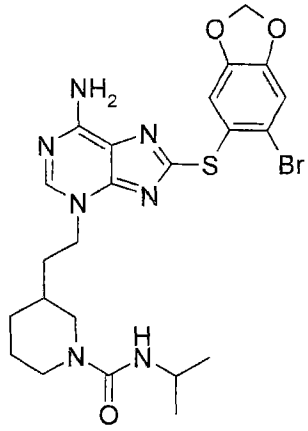
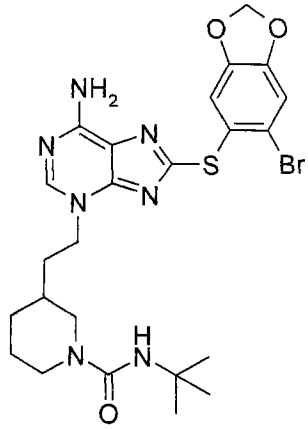
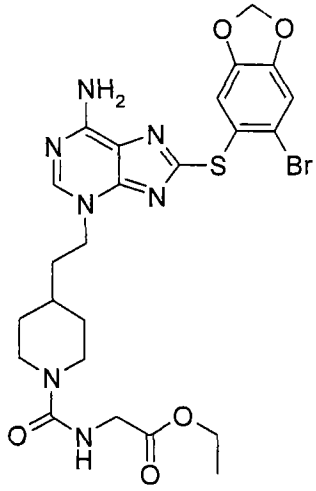
427		8-[(6-溴-1,3-苯并间二氧杂环戊烯-5-基)硫]-3-{2-[(3-内式)-8-甲基-8-氮杂双环[3.2.1]辛-3-基]乙基}-3H-嘌呤-6-胺。^{1}H NMR (CD_3OD) δ 8.52 (s, 1H), 7.39 (s, 1H), 7.36 (s, 1H), 6.16 (s, 2H), 4.40 (m, 2H), 3.89-3.85 (m, 2H), 2.78 (s, 3H), 2.37-2.30 (m, 4H), 2.25 (q, J = 7.6 Hz, 2 H), 2.15-2.13 (m, 2H), 1.94(brd, J =14.8 Hz, 2H), 1.90 (m, 1H); LC-MS $[M+H]^+$ 517.1
428		反-4-(2-{6-氨基-8-[(6-溴-1,3-苯并间二氧杂环戊烯-5-基)硫]-9H-嘌呤-9-基}乙基)-2-异丙基哌啶-1-羧酸叔丁酯。^{1}H NMR (CD_3OD) δ 8.18 (s, 1H), 7.25 (s, 1H), 7.06 (s, 1H), 6.07 (s, 2H), 4.29 (td, J = 7.6, 2.8 Hz, 2H), 3.75 (dd, J = 13.6, 7.6 Hz, 1H), 3.52 (q, J = 8.8 Hz, 1H), 2.91 (ddd, J = 13.6, 11.2, 6.8 Hz, 1H), 1.96 (m, 1H), 1.89-1.76 (m, 4H), 1.40 (s, 9H), 1.32 (m, 1H), 1.23-1.14 (m, 2H), 0.91 (d, J = 6.8 Hz, 3H), 0.86 (d, J = 6.8 Hz, 3H); LC-MS $[M+H]^+$ 619.1
429		*顺*-4-(2-{6-氨基-8-[(6-溴-1,3-苯并间二氧杂环戊烯-5-基)硫]-9H-嘌呤-9-基}乙基)-2-异丙基哌啶-1-羧酸叔丁酯。^{1}H NMR (CD_3OD) δ 8.17 (s, 1H), 7.25 (s, 1H), 7.06 (s, 1H), 6.07 (s, 2H), 4.33-4.25 (m, 2H), 3.99 (brt, J = 13.6Hz, 1H), 3.76 (m, 1H), 2.75 and 2.67 (two brt, J = 14 and 13.6 Hz, 1H), 1.96-1.89 (m, 2H),

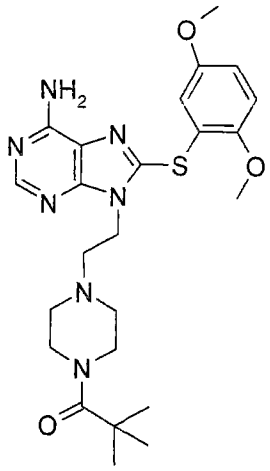
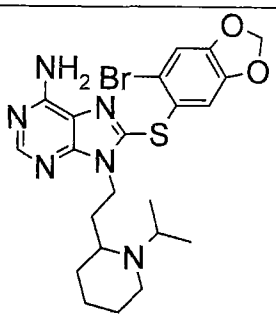
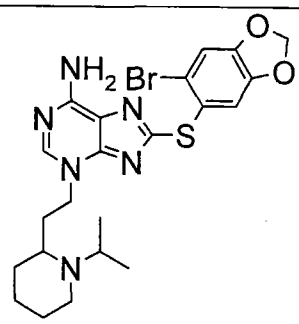
		1.79-1.61 (m, 4H), 1.44 (s, 9H), 1.19-1.02 (m, 2H), 0.92-0.88 (m, 3H), 0.81 and 0.78 (two d, J = 6.4 and 6.8 Hz, 3H); LC-MS $[M+H]^+$ 619.1
430		*顺*-4-(2-{6-氨基-8-[(6-溴-1,3-苯并间二氧杂环戊烯-5-基)硫]-3H-嘌呤-3-基}乙基)-2-异丙基哌啶-1-羧酸叔丁酯。^{1}H NMR (CD_3OD) δ 8.52 (s, 1H), 7.36 (s, 1H), 7.35 (s, 1H), 6.15 (s, 2H), 4.41 (t, J = 7.6 Hz, 2H), 4.05 (brt, J = 12.8Hz, 1H), 3.78 (m, 1H), 2.81 and 2.72 (two brt, J = 12.8 and 12.4 Hz, 1H), 2.03 (m, 1H), 1.93 (brd, J = 12.4 Hz, 1H), 1.83-1.72 (m, 4H), 1.46 (s, 9H), 1.22-1.04 (m, 2H), 0.95-0.92 (m, 3H), 0.84 and 0.81 (two d, J = 6.8 and 6.8 Hz, 3H); LC-MS $[M+H]^+$ 619.1
431		4-(2-{6-氨基-8-[(6-溴-1,3-苯并间二氧杂环戊烯-5-基)硫]-9H-嘌呤-9-基}乙基)-N-乙基哌啶-1-甲酰胺。^{1}H NMR (CD_3OD) δ 8.29 (s, 1H), 7.28 (s, 1H), 7.18 (s, 1H), 6.08 (s, 2H), 4.36 (t, J = 7.4 Hz, 2H) 3.97 (br d, J = 13.2 Hz, 2H), 3.16 (q, J = 7.0 Hz, 2H), 2.69 (t, J = 10.5 Hz, 2H), 1.85-1.76 (m, 4H), 1.58-1.46 (m, 1H), 1.22-1.13 (m, 2H), 1.09 (t, 7.03 Hz, 3H); TOF LC-MS $[M+H]^+$ 548.1

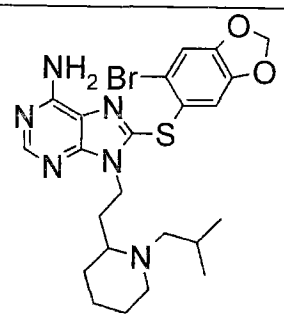
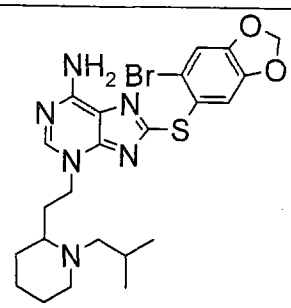
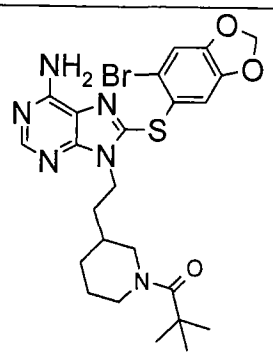
432		4-(2-{6-氨基-8-[(6-溴-1,3-苯并间二氧杂环戊烯-5-基)硫]-9H-嘌呤-9-基}乙基)-N-异丙基哌啶-1-甲酰胺。^{1}H NMR (CD_3OD) δ 8.31 (s, 1H), 7.28 (s, 1H), 7.2 (s, 1H), 6.09 (s, 2H), 4.36 (t, J = 7.4 Hz, 2H), 4.01 (br d, J = 13.2 Hz, 2H), 3.87 (q, J = 6.2 Hz, 1H), 2.70 (t, J = 10.9 Hz, 2H), 1.84-1.76 (m, 4H), 1.68-1.46 (m, 1H), 1.20-1.00 (m, 8H); TOF LC-MS $[M+H]^+$ 562.1
433		4-(2-{6-氨基-8-[(6-溴-1,3-苯并间二氧杂环戊烯-5-基)硫]-9H-嘌呤-9-基}乙基)-N-(叔丁基)哌啶-1-甲酰胺。^{1}H NMR (CD_3OD) δ 8.30 (s, 1H), 7.28 (s, 1H), 7.19 (s, 1H), 6.08 (s, 2H), 4.36 (t, J = 7.4 Hz, 2H), 3.95 (broad d, J = 13.6 Hz, 2H), 2.67 (dt, J = 2.3, 12.8 Hz, 2H), 1.85-1.75 (m, 4H), 1.59-1.43 (m, 1H), 1.31 (s, 9H), 1.22-1.05 (m, 2H); TOF LC-MS $[M+H]^+$ 576.1
434		N-{[4-(2-{6-氨基-8-[(6-溴-1,3-苯并间二氧杂环戊烯-5-基)硫]-9H-嘌呤-9-基}乙基)哌啶-1-基]羰基}氨基乙酸乙酯。^{1}H NMR (CD_3OD) δ 8.33 (s, 1H), 7.28 (s, 1H), 7.21 (s, 1H), 6.09 (s, 2H), 4.37 (t, J = 7.0 Hz, 2H), 4.16 (q, J = 7.0 Hz, 2H), 4.01 (broad d, J = 13.2 Hz, 2H), 3.83 (s, 2H), 2.78 (t, J = 12.1 Hz, 2H), 1.86-1.79 (m, 4H), 1.61-1.48 (m, 1H), 1.33-1.18 (m, 5H); TOF LC-MS

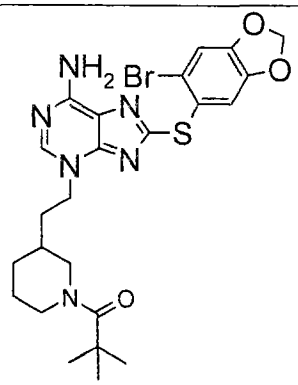
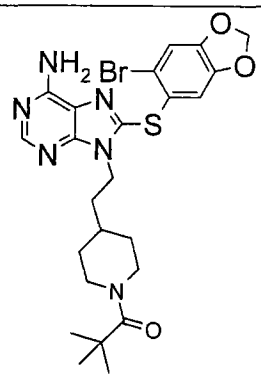
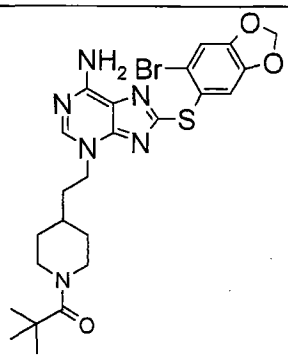
		$[M+H]^+$ 606.1
435		3-(2-{6-氨基-8-[(6-溴-1,3-苯并间二氧杂环戊烯-5-基)硫]-9H-嘌呤-9-基}乙基)-N-乙基哌啶-1-甲酰胺。^{1}H NMR (CD_3OD) δ 8.31 (s, 1H), 7.27 (s, 1H), 7.22 (s, 1H), 6.09 (s, 2H), 4.38 (t, J = 7.4 Hz, 2H), 3.97-3.89 (m, 1H), 3.78 (d, J = 7.0 Hz, 1H), 3.16 (q, J = 7.0 Hz, 2H), 2.85 (dt, J = 11.3, 2.7 Hz, 1H), 2.61 (dd, J = 13.2, 10.1 Hz, 1H), 2.05-1.96 (m, 1H), 1.86 (sext, J = 7.4 Hz, 1H), 1.78-1.62 (m, 2H), 1.60-1.20 (m, 3H), 1.08 (t, J = 7.0 Hz, 3H); TOF LC-MS $[M+H]^+$ 548.1
436		3-(2-{6-氨基-8-[(6-溴-1,3-苯并间二氧杂环戊烯-5-基)硫]-9H-嘌呤-9-基}乙基)-N-异丙基哌啶-1-甲酰胺。^{1}H NMR (CD_3OD) δ 8.30 (s, 1H), 7.28 (s, 1H), 7.22 (s, 1H), 6.09 (s, 2H), 4.38 (t, J = 7.4 Hz, 2H), 3.97-3.77 (m, 3H), 2.84 (dd, J = 11.3, 3.1 Hz, 1H), 2.60 (dd, J = 13.2, 10.1 Hz, 1H), 2.04-1.97 (m, 1H), 1.92-1.82 (m, 1H), 1.78-1.63 (m, 3H), 1.59-1.40 (m, 2H), 1.12 (dd, J = 6.6, 2.7 Hz, 6H); TOF LC-MS $[M+H]^+$ 562.1
437		3-(2-{6-氨基-8-[(6-溴-1,3-苯并间二氧杂环戊烯-5-基)硫]-9H-嘌呤-9-基}乙基)-N-(叔丁基)哌啶-1-甲酰胺。^{1}H NMR (CD_3OD) δ 8.30 (s, 1H), 7.28 (s, 1H), 7.22(s, 1H), 6.09 (s, 2H), 4.38 (t, J = 7.0 Hz, 2H), 3.92-3.86 (m, 1H), 3.79-3.72 (m, 1H), 2.81 (dt, J =

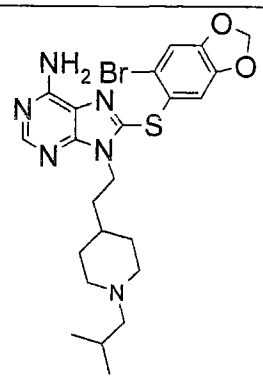
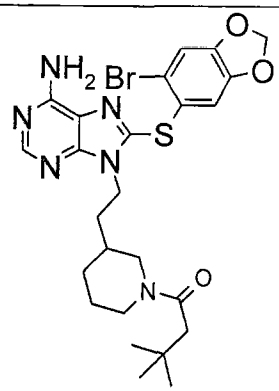
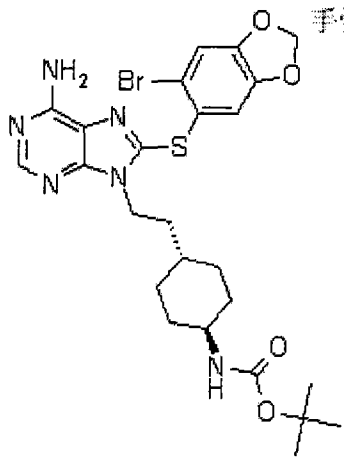
		14.0, 3.1 Hz, 1H), 2.55 (dd, J = 13.2, 10.1 Hz, 1H), 2.04-1.95 (m, 1H), 1.85 (p, J = 5.8 Hz, 1H), 1.75-1.64 (m, 2H), 1.54-1.40 (m, 2H), 1.31-1.18 (m, 10 H); TOF LC-MS $[M+H]^+$ 576.1
438		4-(2-{6-氨基-8-[(6-溴-1,3-苯并间二氧杂环戊烯-5-基)硫]-3H-嘌呤-3-基}乙基)-N-乙基哌啶-1-甲酰胺。TOF LC-MS $[M+H]^+$ 548.1
439		4-(2-{6-氨基-8-[(6-溴-1,3-苯并间二氧杂环戊烯-5-基)硫]-3H-嘌呤-3-基}乙基)-N-异丙基哌啶-1-甲酰胺。^{1}H NMR (CD_3OD) δ 8.52 (s, 1H), 7.37 (s, 1H), 7.35 (s, 1H), 6.15 (s, 2H), 4.42 (t, J = 7.03 Hz, 2H), 4.01 (d, J = 12.8 Hz, 2H), 3.92-3.84 (m, 1H), 2.72 (t, J = 13.2 Hz, 2H), 1.92-1.83 (m, 2H), 1.80-1.70 (m, 2H), 1.68-1.48 (m, 3H), 1.43 (d, J = 6.6 Hz, 3H), 0.97 (d, J = 6.6 Hz, 3H); TOF LC-MS $[M+H]^+$ 562.1
440		3-(2-{6-氨基-8-[(6-溴-1,3-苯并间二氧杂环戊烯-5-基)硫]-3H-嘌呤-3-基}乙基)-N-乙基哌啶-1-甲酰胺。TOF LC-MS $[M+H]^+$ 548.1

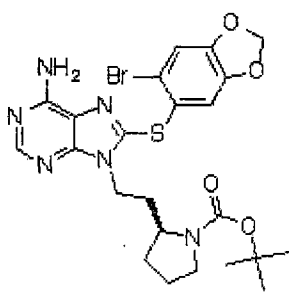
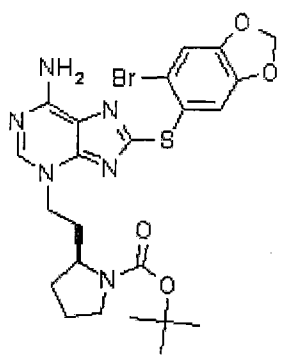
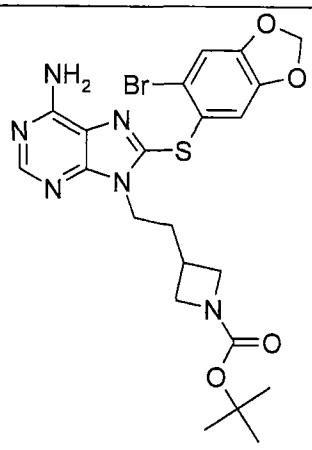
441		3-(2-{6-氨基-8-[(6-溴-1,3-苯并间二氧杂环戊烯-5-基)硫]-3H-嘌呤-3-基}乙基)-N-异丙基哌啶-1-甲酰胺。TOF LC-MS $[M+H]^+$ 562.1
442		3-(2-{6-氨基-8-[(6-溴-1,3-苯并间二氧杂环戊烯-5-基)硫]-3H-嘌呤-3-基}乙基)-N-(叔丁基)哌啶-1-甲酰胺。^{1}H NMR (CD_3OD) δ 8.53 (s, 1H), 7.37 (s, 1H), 7.36 (s, 1H), 6.14 (s, 2H), 4.43 (t, J = 7.8 Hz, 2H), 3.90-3.85 (m, 1H), 3.79-3.72 (m, 1H), 2.83 (tt, J = 10.9, 3.1 Hz, 1H), 2.54 (dd, J = 13.2, 10.1 Hz, 1H), 1.97-1.78 (m, 3H), 1.71-1.63 (m, 1H), 1.50-1.38 (m, 2H), 1.33-1.16 (m, 10 H); TOF LC-MS $[M+H]^+$ 576.1
443		N-{[4-(2-{6-氨基-8-[(6-溴-1,3-苯并间二氧杂环戊烯-5-基)硫]-3H-嘌呤-3-基}乙基)哌啶-1-基]羰基}氨基乙酸乙酯。 ^{1}H NMR (CD_3OD) δ 8.54 (s, 1H), 7.36 (s, 1H), 6.15 (s, 2H), 4.42 (t, J = 7.81 Hz, 2H), 4.16 (q, J = 7.0 Hz, 2H), 3.99 (broad d, J = 13.2 Hz, 2H), 3.84 (s, 2H), 2.79 (t, J = 11.3 Hz, 2H), 1.88 (q, J = 7.4 Hz, 2H), 1.76 (d, J = 12.5 Hz, 2H), 1.62-1.50 (m, 1H), 1.35-1.16 (m, 5H); TOF LC-MS $[M+H]^+$ 606.1

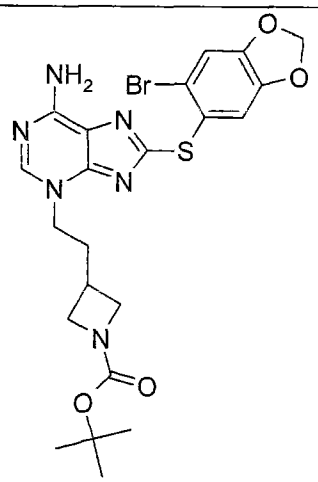
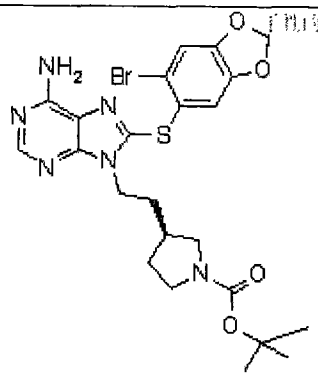
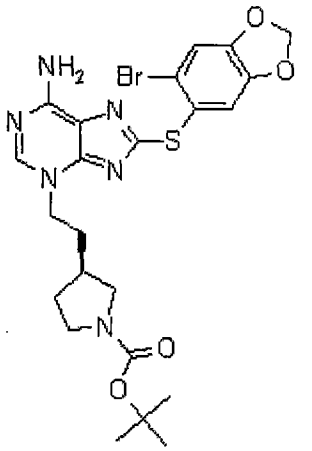
444		8-[(2,5-二甲氧基苯基)硫]-9-{2-[4-(2,2-二甲基丙酰基)哌嗪-1-基]乙基}-9H-嘌呤-6-胺。^{1}H NMR (CD_3OD) δ 8.32 (s, 1H), 7.07 (d, J = 2.8 Hz, 1H), 7.04 (s, 1H), 7.01 (dd, J = 14.4, 2.8 Hz, 1H), 4.70 (t, J = 6.0 Hz, 2H), 3.91-3.80 (m, 4H), 3.75 (s, 6H), 3.42 (t, J = 6.0 Hz, 2H), 3.24-3.180 (m, 4H), 1.29 (s, 9H); TOF LC-MS $[M+H]^+$ 500.3
445		8-[(6-溴-1,3-苯并间二氧杂环戊烯-5-基)硫]-9-[2-(1-异丙基哌啶-2-基)乙基]-9H-嘌呤-6-胺。^{1}H NMR (CD_3OD) δ 8.23 (s, 1H), 7.30 (s, 1H), 7.14 (s, 1H), 6.09 (s, 2H), 4.42-4.20 (m, 2H), 4.20-4.00 (m, 1H), 2.97-2.94 (m, 2H), 2.50-2.30 (m, 2H), 2.10-1.90 (m, 4H), 1.75-1.70 (m, 2H), 1.65-1.59 (m, 1H), 1.38 (d, J= 6.8 Hz, 3H). 1.21 (d, J=6.8 Hz, 3H); LC-MS $[M+H]^+$ 519.1
446		8-[(6-溴-1,3-苯并间二氧杂环戊烯-5-基)硫]-3-[2-(1-异丙基哌啶-2-基)乙基]-3H-嘌呤-6-胺。^{1}H NMR (CD_3OD) δ 8.51 (s, 1H), 7.40 (s, 1H), 7.31 (s, 1H), 6.09 (s, 2H), 4.52-4.45 (m, 2H), 4.10-4.00 (m, 1H), 3.60-3.50 (m, 2H), 2.97-2.92 (m, 2H), 2.24-2.20 (m, 2H), 2.00-1.90 (m, 2H), 1.76-1.71 (m, 2H), 1.62-1.60 (m, 1H), 1.40 (d, J= 6.4 Hz, 3H). 1.24 (d, J=6.8 Hz, 3H); LC-MS $[M+H]^+$ 519.1

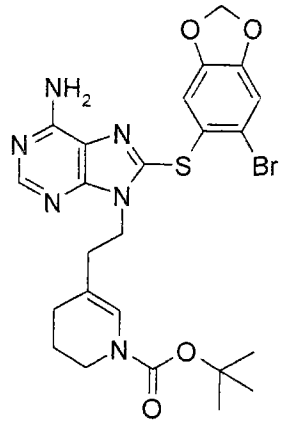
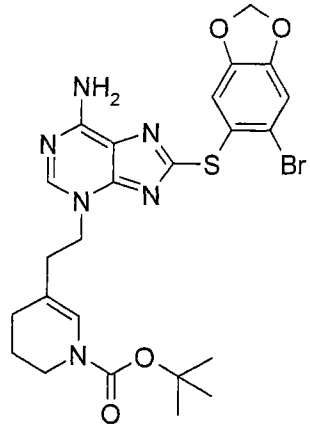
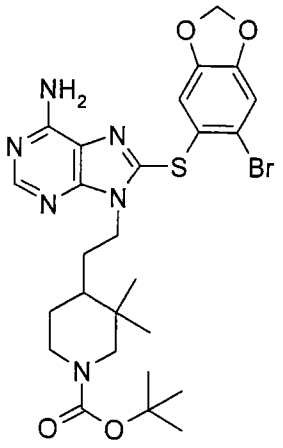
447		8-[(6-溴-1,3-苯并间二氧杂环戊烯-5-基)硫]-9-[2-(1-异丁基哌啶-2-基)乙基]-9H-嘌呤-6-胺。^{1}H NMR (CD_3OD) δ 8.28 (s, 1H), 7.30 (s, 1H), 7.20 (s, 1H), 6.10 (s, 2H), 4.80-4.30 (m, 2H), 3.65-3.62 (m, 1H), 3.12-3.11 (m, 2H), 2.93-2.87 (m, 2H), 2.32-2.10 (m, 2H), 2.10-1.90 (m, 4H), 1.81-1.72 (m, 2H), 1.67-1.61 (m, 1H). 1.07-1.02 (m, 6H); LC-MS $[M+H]^+$ 533.3
448		8-[(6-溴-1,3-苯并间二氧杂环戊烯-5-基)硫]-3-[2-(1-异丁基哌啶-2-基)乙基]-3H-嘌呤-6-胺。^{1}H NMR (CD_3OD) δ 8.52 (s, 1H), 7.40 (s, 1H), 7.30 (s, 1H), 6.20 (s, 2H), 4.47-4.45 (m, 2H), 3.48-3.43 (m, 1H), 3.30-3.10 (m, 2H), 3.00-2.90 (m, 2H), 2.65 (m, 1H), 2.32-2.30 (m, 2H), 2.20-2.10 (m, 2H), 1.90-1.80 (m, 2H), 1.62-1.60 (m, 2H). 1.11-1.10 (m, 6H); LC-MS $[M+H]^+$ 533.3
449		8-[(6-溴-1,3-苯并间二氧杂环戊烯-5-基)硫]-9-{2-[1-(2,2-二甲基丙酰基)哌啶-3-基]乙基}-9H-嘌呤-6-胺。^{1}H NMR (CD_3OD) δ 8.30 (s, 1H), 7.30 (s, 1H), 7.20 (s, 1H), 6.10 (s, 2H), 4.40 (t, J= 7.2 Hz, 2H), 4.20-4.10 (m, 2H), 3.10-3.00 (m, 1H), 2.80-2.70 (m, 2H), 2.10-1.90 (m, 2H), 1.80-1.70 (m, 2H), 1.53-1.50 (m, 2H), 1.24 (m, 9H); LC-MS $[M+H]^+$ 561.1

450		8-[(6-溴-1,3-苯并间二氧杂环戊烯-5-基)硫]-3-{2-[1-(2,2-二甲基丙酰基)哌啶-3-基]乙基}-3H-嘌呤-6-胺。^{1}H NMR (CD_3OD) δ 8.53 (s, 1H), 7.38 (s, 1H), 7.36 (s, 1H), 6.20 (s, 2H), 4.50 (t, J= 7.2 Hz, 2H), 4.20-4.10 (m, 2H), 3.14-3.12 (m, 2H), 2.80-2.70 (m, 2H), 2.00-1.93 (m, 1H), 1.93-1.90 (m, 2H), 1.50-1.49 (m, 2H), 1.30 (m, 9H); LC-MS $[MH]^+$ 561.1
451		8-[(6-溴-1,3-苯并间二氧杂环戊烯-5-基)硫]-9-{2-[1-(2,2-二甲基丙酰基)哌啶-4-基]乙基}-9H-嘌呤-6-胺。^{1}H NMR (CD_3OD) δ 8.20 (s, 1H), 7.30 (s, 1H), 7.10 (s, 1H), 6.10 (s, 2H), 4.40 (d, J = 14 Hz, 2H), 4.30 (t, J= 7.6 Hz, 2H), 2.80 (s, 2H), 1.90-1.84 (m, 2H), 1.80-1.70 (m, 2H), 1.64-1.60 (m, 1H), 1.30 (s, 9H), 1.20-1.10 (m, 2H); LC-MS $[M+H]^+$ 561.1
452		8-[(6-溴-1,3-苯并间二氧杂环戊烯-5-基)硫]-3-{2-[1-(2,2-二甲基丙酰基)哌啶-4-基]乙基}-3H-嘌呤-6-胺。^{1}H NMR (CD_3OD) δ 8.52 (s, 1H), 7.40 (s, 1H), 7.30 (s, 1H), 6.10 (s, 2H), 4.44-4.40 (m, 2H), 2.90-2.80 (m, 2H), 1.90-1.88 (m, 2H), 1.80-1.70 (m, 2H), 1.70-1.60 (m, 2H), 1.60-1.50 (m, 1H), 1.30 (s, 9H), 1.20-1.10 (m, 2H); LC-MS $[M+H]^+$ 561.1

453		8-[(6-溴-1,3-苯并间二氧杂环戊烯-5-基)硫]-9-[2-(1-异丁基哌啶-4-基)乙基]-9H-嘌呤-6-胺。^{1}H NMR (CD_3OD) δ 8.22 (s, 1H), 7.30 (s, 1H), 7.10 (s, 1H), 6.10 (s, 2H), 4.40 (t, J= 7.2 Hz, 2H), 3.60-3.58 (m, 2H), 3.00-2.90 (m, 2H), 2.15-2.10 (m, 2H), 2.00-1.90 (m, 2H), 1.90-1.80 (m, 2H), 1.60-1.50 (m, 2H), 1.30-1.20 (m, 2H), 1.10-1.00 (m, 6H); LC-MS [M+H]$^+$ 533.1
454		8-[(6-溴-1,3-苯并间二氧杂环戊烯-5-基)硫]-9-{2-[1-(3,3-二甲基丁酰基)哌啶-3-基]乙基}-9H-嘌呤-6-胺。^{1}H NMR (CD_3OD) δ 8.30 (s, 1H), 7.30 (s, 1H), 7.20 (s, 1H), 6.10 (s, 2H), 4.40-4.36 (m, 2H), 4.30-4.27 (m, 1H), 4.00-3.90 (m, 1H), 2.70-2.60 (m, 1H), 2.40-2.20 (m, 2H), 2.00-1.90 (m, 2H), 1.80-1.70 (m, 2H), 1.50-1.40 (m, 2H), 1.40-1.30 (m, 2H), 1.00-0.90 (m, 9H); LC-MS [M+H]$^+$ 575.1
455		[反-4-(2-{6-氨基-8-[(6-溴-1,3-苯并间二氧杂环戊烯-5-基)硫]-9H-嘌呤-9-基}乙基)环己基]氨基甲酸叔丁酯。^{1}H NMR (CD_3OD) δ 8.26 (s, 1H), 7.28 (s, 1H), 7.15 (s, 1H), 6.08 (s, 2H), 4.31 (t, J = 8.4 Hz, 2H), 3.35-3.25 (m, 2H), 1.91-0.83 (m, 19H). TOF-MS [M+H]$^+$ 591.1

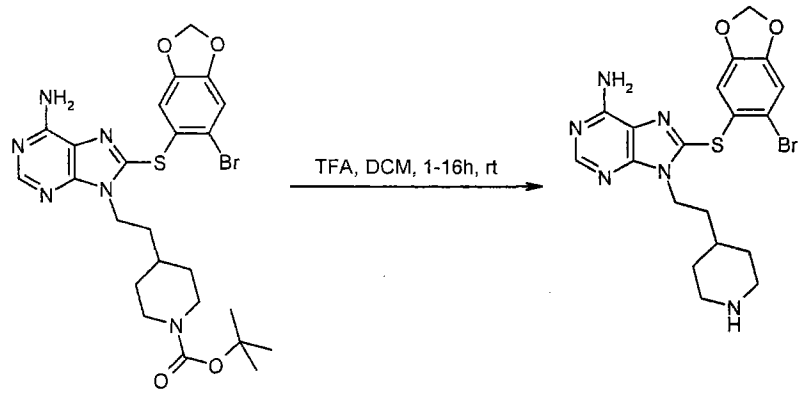
456	 手性的	(2*S*)-2-(2-{6-氨基-8-[(6-溴-1,3-苯并间二氧杂环戊烯-5-基)硫]-3H-嘌呤-3-基}乙基)吡咯烷-1-羧酸叔丁酯。^{1}H NMR (CD_3OD) δ 8.24 (s, 1H), 7.27 (s, 1H), 7.11 (s, 1H), 6.08 (s, 2H), 4.36-4.28 (m, 2H), 4.00-3.86 (m, 2H), 3.36-3.25 (m, 3H), 2.00-0.80 (m, 13H). TOF-MS $[M+H]^+$ 563.0
457	 手性的	(2*S*)-2-(2-{6-氨基-8-[(6-溴-1,3-苯并间二氧杂环戊烯-5-基)硫]-9H-嘌呤-9-基}乙基)吡咯烷-1-羧酸叔丁酯。^{1}H NMR (CD_3OD) δ 8.59 (s, 1H), 7.37 (s, 1H), 7.36 (s, 1H), 6.15 (s, 2H), 4.42-4.38 (m, 2H), 3.86-3.78 (m, 2H), 3.36-3.25 (m, 3H), 1.90-0.80 (m, 13H). TOF-MS $[M+H]^+$ 563.0
458		3-(2-{6-氨基-8-[(6-溴-1,3-苯并间二氧杂环戊烯-5-基)硫]-9H-嘌呤-9-基}乙基)吖丁啶-1-羧酸叔丁酯。^{1}H NMR ($DMSO-d_6$) δ 8.23 (s, 1H), 7.37 (s, 1H), 6.90 (s, 1H), 6.08 (s, 2H), 4.12 (t, J = 6.4 Hz, 2H), 3.80-3.60 (m, 2H), 3.55-3.46 (m, 1H), 2.50-2.45 (m, 2H), 2.00-1.96 (m, 2H), 1.33 (s, 9H); LC-MS $[M+H]^+$ 549.2

459		3-(2-{6-氨基-8-[(6-溴-1,3-苯并间二氧杂环戊烯-5-基)硫]-3H-嘌呤-3-基}乙基)吖丁啶-1-羧酸叔丁酯。^{1}H NMR (DMSO-d_6) δ 8.57 (s, 1H), 7.48 (s, 1H), 7.38 (s, 1H), 6.15 (s, 2H), 4.23 (t, J = 6.8 Hz, 2H), 3.90-3.80 (m, 2H), 3.66-3.60 (m, 1H), 2.50-2.45 (m, 2H), 2.11-2.00 (m, 2H), 1.34 (s, 9H). LC-MS [M+H]$^+$ 549.2
460		(3*S*)-3-(2-{6-氨基-8-[(6-溴-1,3-苯并间二氧杂环戊烯-5-基)硫]-9H-嘌呤-9-基}乙基)吡咯烷-1-羧酸叔丁酯。^{1}H NMR (DMSO-d_6) δ 8.23 (s, 1H), 7.37 (s, 1H), 6.86 (s, 1H), 6.08 (s, 2H), 4.20-4.10 (m, 2H), 3.20-3.00 (m, 2H), 2.50-2.00 (m, 4H), 2.00-1.70 (m, 3H), 1.35 (s, 9H). LC-MS [M+H]$^+$ 564.2
461		(3*R*)-3-(2-{6-氨基-8-[(6-溴-1,3-苯并间二氧杂环戊烯-5-基)硫]-3H-嘌呤-3-基}乙基)吡咯烷-1-羧酸叔丁酯。^{1}H NMR (DMSO-d_6) δ 8.62 (s, 1H), 7.47 (s, 1H), 7.35 (s, 1H), 6.15 (s, 2H), 4.35-4.20 (m, 2H), 3.20-3.00 (m, 2H), 2.80-2.70 (m, 2H), 2.00-0.80 (m, 14H). LC-MS [M+H]$^+$ 564.2

462		5-(2-{6-氨基-8-[(6-溴-1,3-苯并间二氧杂环戊烯-5-基)硫]-9H-嘌呤-9-基}乙基)-3,4-二氢吡啶-1(2H)-羧酸叔丁酯。^{1}H NMR (CD_3OD) δ 8.29 (s, 1H), 7.28 (s, 1H), 7.18 (s, 1H), 6.09 (s, 2H), 6.34 and 6.05 (s, 1H), 4.38 (m, 2H), 3.45-3.35 (m, 2H), 2.59-2.51 (m, 2H), 2.20-2.17 (m, 2H), 1.84-1.77 (m, 2H), 1.43 and 1.36 (s, 9H); LC-MS $[M+H]^+$ 575.6。
463		5-(2-{6-氨基-8-[(6-溴-1,3-苯并间二氧杂环戊烯-5-基)硫]-3H-嘌呤-3-基}乙基)-3,4-二氢吡啶-1(2H)-羧酸叔丁酯。^{1}H NMR (CD_3OD) δ 8.46 (s, 1H), 7.39 (s, 1H), 7.37 (s, 1H), 6.30 and 6.06 (s, 1H), 6.16 (s, 2H), 4.47 (t, J = 6.8 Hz, 2H), 3.45-3.36 (m, 2H), 2.62-2.52 (m, 2H), 2.16-2.09 (m, 2H), 1.80 (t, J = 6.8 Hz, 2H), 1.37 (s, 9H); LC-MS $[M+H]^+$ 575.0
464		4-(2-{6-氨基-8-[(6-溴-1,3-苯并间二氧杂环戊烯-5-基)硫]-9H-嘌呤-9-基}乙基)-3,3-二甲基哌啶-1-羧酸叔丁酯。^{1}H NMR ($CDC1_3$) δ 8.26 (s, 1H), 7.14 (s, 1H), 6.99 (s, 1H), 6.05 (s, 2H), 4.30-4.19 (m, 3H), 3.61 (m, 1H), 2.63 (m, 1H), 2.40 (m, 1H), 2.07 (m, 1H), 1.78 (m, 1H), 1.45 (s, 9H), 1.40-1.32 (m, 2H), 1.14 (m, 1H), 0.79 (s, 3H), 0.76 (s, 3H),; TOF-MS $[M+H]^+$ 605.15

实施例 465

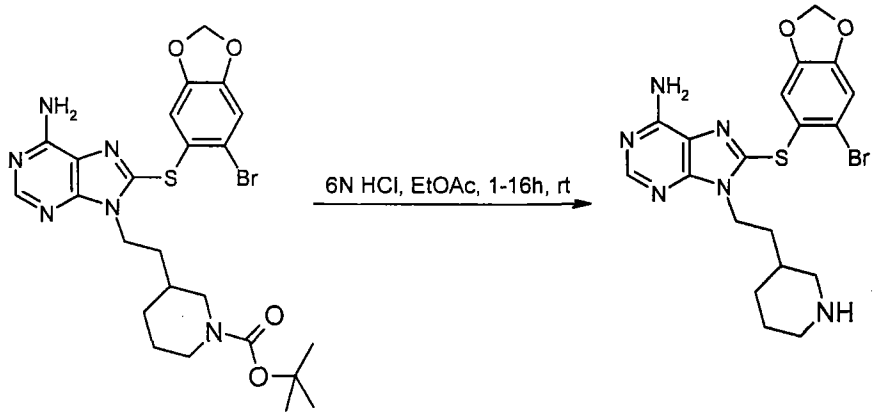
合成 8-[(6-溴-1,3-苯并间二氧杂环戊烯-5-基)硫]-9-(2-哌啶-4-基乙基)-9H-嘌呤-6-胺



在室温下，向 4-(2-{6-氨基-8-[(6-溴-1,3-苯并间二氧杂环戊烯-5-基)硫]-9H-嘌呤-9-基}乙基)哌啶-1-羧酸叔丁酯（0.030 g）的 DCM（10 mL）溶液中加入三氟乙酸（5 mL），并在室温下持续搅拌 1- 16 h。将所述溶剂和过量三氟乙酸蒸发至干。油性剩余物与甲苯（3 × 5 mL）共蒸发，得到三氟乙酸盐形式的所述标题产物。^{1}H NMR (DMSO-d_6) δ 8.21 (s, 1H), 7.40 (s, 1H), 6.85 (s, 1H), 6.10 (s, 2H), 4.19 (t, J= 7.6 Hz, 2H), 3.25-3.20 (m, 2H), 2.80-2.75 (m, 2H), 1.88-1.85 (m, 2H), 1.68-1.62 (m, 2H), 1.50-1.42 (M, 1H), 1.30-1.24 (m, 2H); LC-MS $[M+H]^+$ 477.1。

实施例 466

合成 8-[(6-溴-1,3-苯并间二氧杂环戊烯-5-基)硫]-9-(2-哌啶-3-基乙基)-9H-嘌呤-6-胺。

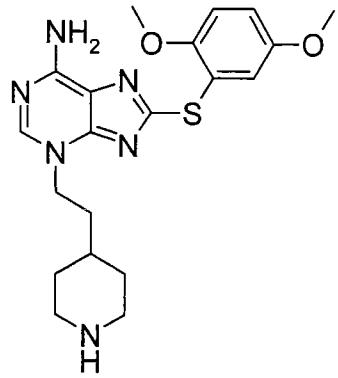
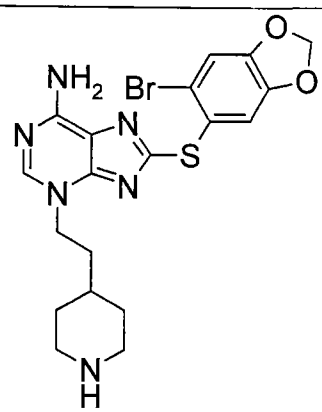


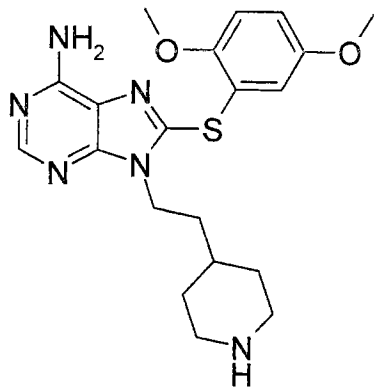
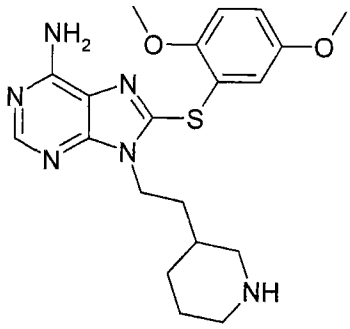
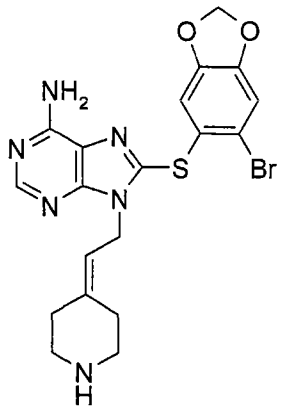
在室温下，向 3-(2-{6-氨基-8-[(6-溴-1,3-苯并间二氧杂环戊

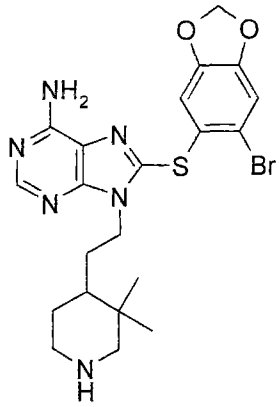
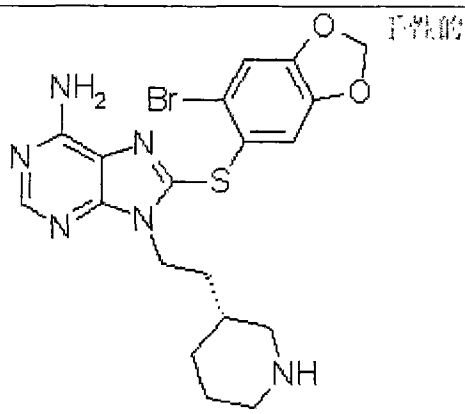
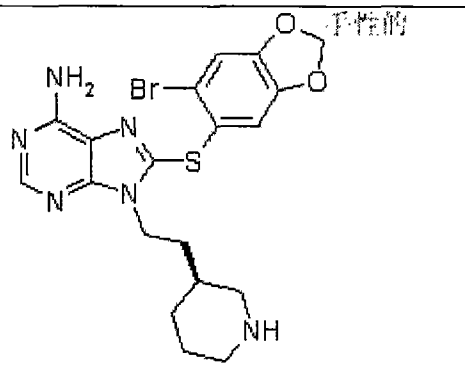
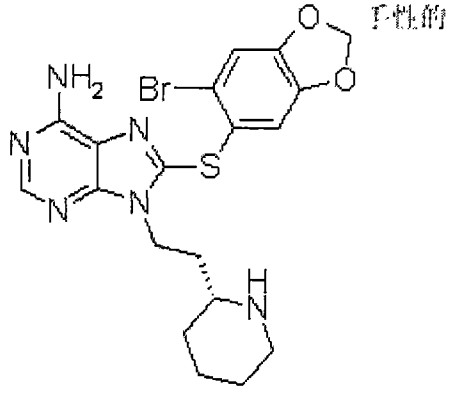
烯-5-基)硫]-9H-嘌呤-9-基}乙基)哌啶-1-羧酸叔丁酯（0.03 g）的乙酸乙酯（10 mL）悬浮液中加入6N HCl（5 mL），并在室温下持续搅拌1- 16 h。将所述溶剂和过量氢氯酸蒸发至干。油性剩余物与甲苯（3 × 5 mL）共蒸发，得到氢氯酸盐形式的所述标题产物。^{1}H NMR (CD_3OD) δ 8.38 (s, 1H), 7.29 (s, 1H), 7.26 (s, 1H), 6.10 (s, 2H), 4.43-4.41 (m, 2H), 3.49-3.46 (m, 1H), 2.95-2.92 (m, 1H), 2.80-2.65 (m, 2H), 1.92-1.76 (m, 4H), 1.39-1.23 (m, 4H); TOF LC-MS [M+H]$^+$] 477.1。

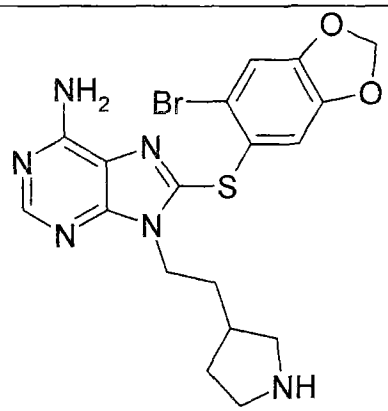
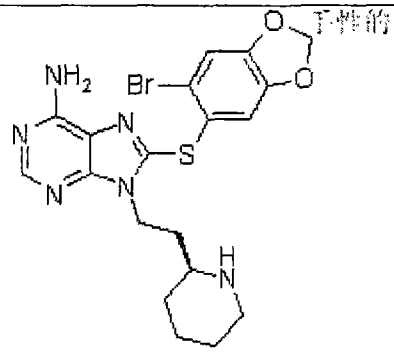
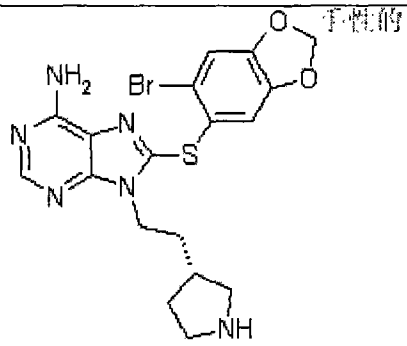
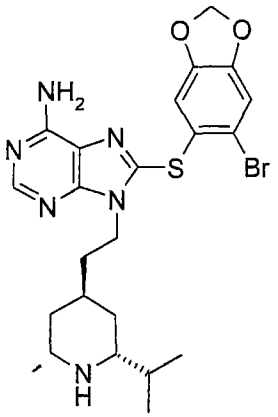
以类似于所述实施例465的步骤，使用表7中的合适原料合成实例467-472以及实例479和480，并将它们以三氟乙酸盐的形式分离出来，所述实例的分析数据总结于表8中。以类似于所述实施例466的步骤合成实例473 – 478以及实例481-484，并以HCl盐的形式分离出来，所述实例的分析数据总结于表8中。

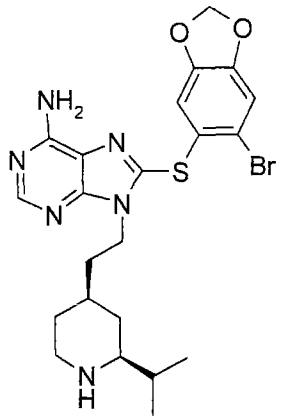
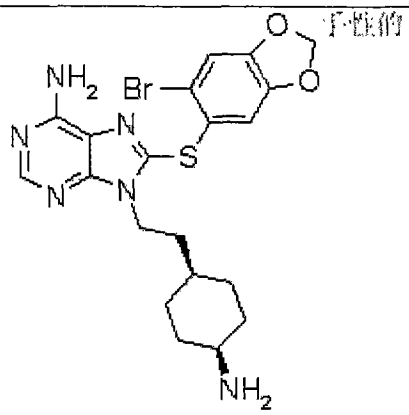
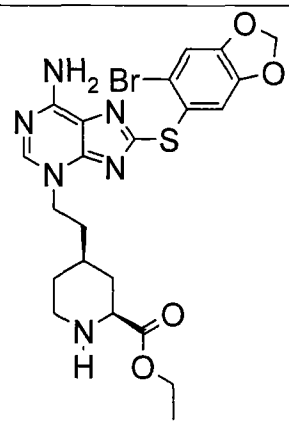
表8

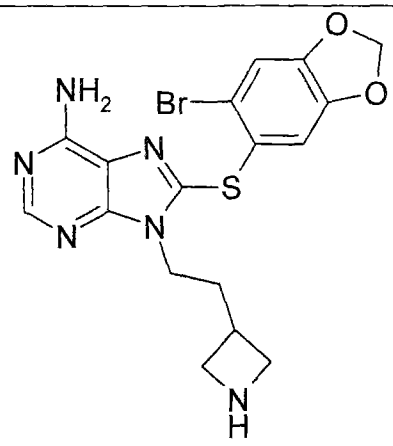
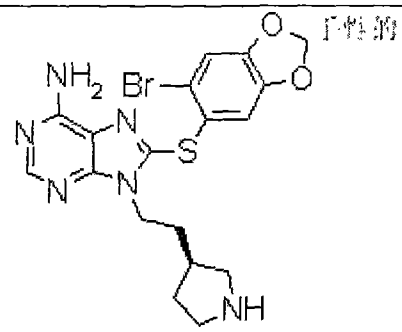
实例编号	结构	名称和分析数据
467		8-[(2,5-二甲氧基苯基)硫]-3-(2-哌啶-4-基乙基)-3H-嘌呤-6-胺。^{1}H NMR (DMSO-d_6) δ 8.60 (s, 1H), 8.40 (m, 1H), 8.20-8.10 (m, 2H), 4.34-4.32 (m, 2H), 3.76 (s, 3H), 3.71 (s, 3H), 3.60-3.30 (m, 4H), 3.27-3.23 (m, 3H), 1.90-1.80(m, 2H), 1.31-1.25 (m, 2H); LC-MS [M+H]$^+$ 415.1
468		8-[(6-溴-1,3-苯并间二氧杂环戊烯-5-基)硫]-3-(2-哌啶-4-基乙基)-3H-嘌呤-6-胺。^{1}H NMR (DMSO-d_6) δ 8.55 (s, 1H), 7.46 (s, 1H), 7.30 (s, 1H), 6.15 (s, 2H), 4.31 (t, J= 7.2 Hz, 2H), 3.26-3.23 (m, 2H), 2.90-2.80 (m, 2H), 1.88-1.81 (m, 4H), 1.30-1.20 (m, 3H); LC-MS [M+H]$^+$ 477.1

469		8-[(2,5-二甲氧基苯基)硫]-9-(2-哌啶-4-基乙基)-9H-嘌呤-6-胺。^{1}H NMR (DMSO-d_6) δ 8.23 (s, 1H), 7.04 (d, J=9.2 Hz, 1H), 6.88 (dd, J = 9.2, 2.8Hz, 1H), 6.48 (d, J = 2.8 Hz, 1H), 4.20 (t, J = 7.2Hz, 2H), 3.77 (s, 3H), 3.62 (s, 3H), 3.23-3.20 (m, 4H), 2.70-2.58 (m, 1H), 1.85-1.78 (m, 2H), 1.65-1.60 (m, 2H), 1.28-1.20 (m, 2H); LC-MS $[M+H]^+$ 415.1
470		8-[(2,5-二甲氧基苯基)硫]-9-(2-哌啶-3-基乙基)-9H-嘌呤-6-胺。^{1}H NMR (DMSO-d_6) δ 8.21 (s, 1H), 7.05 (d, J=8.8 Hz, 1H), 6.80 (dd, J = 8.8, 2.4Hz, 1H), 6.46 (d, J = 2.4Hz, 1H), 4.22-4.20 (m, 2H), 3.77 (s, 3H), 3.61 (s, 3H), 2.52-2.45 (m, 7H), 1.70-1.30 (m, 4H); LC-MS $[M+H]^+$ 415.1
471		8-[(6-溴-1,3-苯并间二氧杂环戊烯-5-基)硫]-9-(2-哌啶-4-亚基乙基)-9H-嘌呤-6-胺。^{1}H NMR (CD_3OD) δ 8.35 (s, 1H), 7.29 (s, 1H), 7.25 (s, 1H), 6.10 (s, 2H), 5.39 (s, 1H), 4.47 (t, J = 7.2 Hz, 2H), 3.52 (brs, 2H), 3.35-3.30 (m, 2H), 2.66 (t, J = 7.2 Hz, 2H), 2.55-2.49 (m, 2H), 1.44 (s, 9H); LC-MS $[M+H]^+$ 475.0

472		8-[(6-溴-1,3-苯并间二氧杂环戊烯-5-基)硫]-9-[2-(3,3-二甲基哌啶-4-基)乙基]-9H-嘌呤-6-胺 ^{1}H NMR ($CDCl_3$) δ 8.29 (s, 1H), 7.29 (s, 1H), 7.17 (s, 1H), 6.09 (s, 2H), 4.38-4.32 (m, 2H), 3.78 (m, 1H), 3.01 (d, J = 12.4 Hz, 1H), 2.91 (brt, J = 13.2 Hz, 1H), 2.74 (d, J = 12.4 Hz, 1H), 2.20 (m, 2H), 1.63 (m, 1H), 1.54-1.38 (m, 2H), 0.97 (s, 3H), 0.93 (s, 3H); TOF-MS $[M+H]^+$ 505.15
473		8-[(6-溴-1,3-苯并间二氧杂环戊烯-5-基)硫]-9-{2-[(3*R*)-哌啶-3-基]乙基}-9H-嘌呤-6-胺。 LC-MS $[M+H]^+$ 477.1
474		8-[(6-溴-1,3-苯并间二氧杂环戊烯-5-基)硫]-9-{2-[(3*S*)-哌啶-3-基]乙基}-9H-嘌呤-6-胺。 ^{1}H NMR (丙酮-d_6) δ 8.37 (s, 1H), 7.27 (s, 1H), 7.01 (s, 1H), 6.13 (s, 2H), 4.45-4.40 (m, 2H), 3.70-3.60 (m, 2H), 1.90-1.50 (m, 9H); TOF LC-MS $[M+H]^+$ 477.4
475		8-[(6-溴-1,3-苯并间二氧杂环戊烯-5-基)硫]-9-{2-[(2*R*)-哌啶-2-基]乙基}-9H-嘌呤-6-胺。TOF LC-MS $[M+H]^+$ 477.1

476		8-[(6-溴-1,3-苯并间二氧杂环戊烯-5-基)硫]-9-(2-吡咯烷-3-基乙基)-9H-嘌呤-6-胺。^{1}H NMR (DMSO-d_6) δ 8.33 (s, 1H), 7.42 (s, 1H), 6.97 (s, 1H), 6.12 (s, 2H), 4.22 (t, J = 7.6 Hz, 2H), 3.18-3.14 (m, 2H), 1.56-1.23 (m, 7H).
477		8-[(6-溴-1,3-苯并间二氧杂环戊烯-5-基)硫]-9-{2-[(2*S*)-哌啶-2-基]乙基}-9H-嘌呤-6-胺。^{1}H NMR (CD_3OD) δ 8.40 (s, 1H), 7.29 (s, 1H), 7.27 (s, 1H), 6.10 (s, 2H), 4.55-4.44 (m, 2H), 3.10-2.90 (m, 2H), 2.30-1.50 (m, 8H); LC-MS $[M+H]^+$ 477.1
478		8-[(6-溴-1,3-苯并间二氧杂环戊烯-5-基)硫]-9-{2-[(3*R*)-吡咯烷-3-基]乙基}-9H-嘌呤-6-胺。^{1}H NMR (CD_3OD) δ 8.37 (s, 1H), 7.30 (s, 1H), 7.27 (s, 1H), 6.10 (s, 2H), 4.41 (t, J= 6.8Hz, 2H), 3.58-3.48 (m, 2H), 3.33-3.28 (m, 1H), 2.95-2.90 (m, 2H), 2.35-2.30 (m, 2H), 2.13-2.01 (m, 2H), 1.74-1.72 (m, 2H); LC-MS $[M+Na]^+$ 480.0
479		8-[(6-溴-1,3-苯并间二氧杂环戊烯-5-基)硫]-9-{2-[反式-2-异丙基哌啶-4-基]乙基}-9H-嘌呤-6-胺。^{1}H NMR (CD_3OD) δ 8.32 (s, 1H), 7.29 (s, 1H), 7.21 (s, 1H), 6.10 (s, 2H), 4.29 (td, J = 7.6, 3.2 Hz, 2H), 3.41 (ddd, J = 13.2, 4.0, 2.0 Hz, 1H), 2.99 (td, J = 13.2, 3.2 Hz, 1H), 2.90 (ddd, J = 12.0, 5.6, 2.8, 2H), 2.18 (br

		d, J = 14.0 Hz, 1H), 2.08 (br d, J = 14.4 Hz, 1H), 1.97-1.83 (m, 3H), 1.63 (m, 1H), 1.41 (qd, J = 13.2, 4.4 1H), 1.16 (q, J = 12.4 Hz, 1H), 1.05 (d, J = 6.8 Hz, 3H), 1.03 (d, J = 6.8 Hz, 3H); LC-MS $[M+H]^+$ 519.3
480		8-[(6-溴-1,3-苯并间二氧杂环戊烯-5-基)硫]-9-{2-[*顺*-2-异丙基哌啶-4-基]乙基}-9H-嘌呤-6-胺。^{1}H NMR (CD_3OD) δ 8.29(s, 1H), 7.29 (s, 1H), 7.18 (s, 1H), 6.09 (s, 2H), 4.36 (m, 2H), 3.23-3.19 (m, 2H), 3.10 (m, 1H), 2.02-1.91 (m, 5H), 1.83-1.74 (m, 3H), 1.04 (d, J = 6.8 Hz, 3H), 1.01 (d, J = 6.4 Hz, 3H); LC-MS $[M+H]^+$ 519.3
481		9-[2-(*顺*-4-氨基环己基)乙基]-8-[(6-溴-1,3-苯并间二氧杂环戊烯-5-基)硫]-9H-嘌呤-6-胺。^{1}H NMR (DMSO-d_6) δ 8.17 (s, 1H), 7.37 (s, 1H), 6.83 (s, 1H), 6.08 (s, 2H), 4.15 (t, J = 7.2 Hz, 2H), 3.20-3.10 (m, 2H), 2.50-2.40 (m, 2H), 1.70-1.35 (m, 10H). TOF-MS $[M+H]^+$ 491.0
482		*顺*-4-(2-{6-氨基-8-[(6-溴-1,3-苯并间二氧杂环戊烯-5-基)硫]-3H-嘌呤-3-基}乙基)哌啶-2-羧酸乙酯。^{1}H NMR (CD_3OD) δ 8.56 (s, 1H), 7.39 (s, 1H), 7.37 (s, 1H), 6.16 (s, 2H), 4.48 (t, J = 6.8 Hz, 2H), 4.33 (q, J = 7.2 Hz, 2H), 4.05-4.00 (m, 1H), 3.55-3.46 (m, 1H), 3.12-3.00 (m, 1H), 2.55-2.44 (m, 1H), 2.14-1.70 (m, 4H), 1.50-1.30 (m,

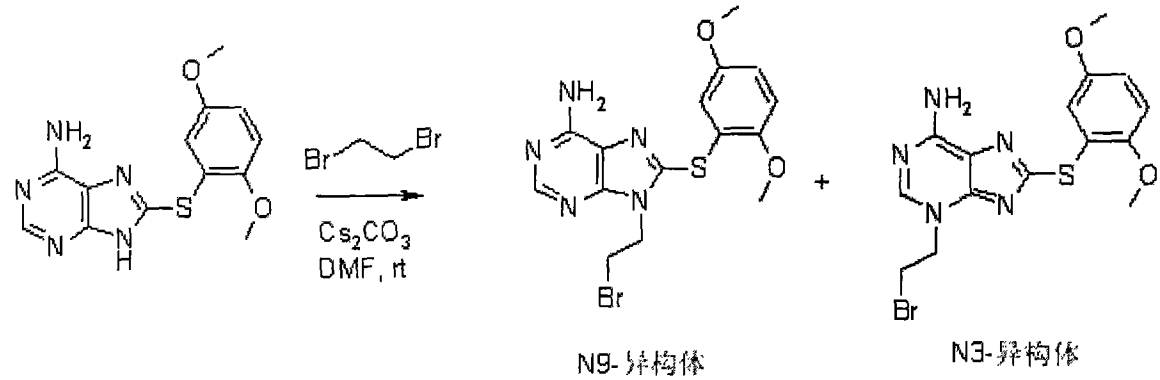
		2H), 1.34 (t, J = 7.2 Hz, 3H). LC-MS $[M+H]^+$ 549.1
483		9-(2-吖丁啶-3-基乙基)-8-[(6-溴-1,3-苯并间二氧杂环戊烯-5-基)硫]-9H-嘌呤-6-胺。 ^{1}H NMR (CD3OD) δ 9.19 (s, 1H), 8.21 (s, 1H), 7.82 (s, 1H), 6.02 (s, 2H), 4.96 (t, J = 7.2 Hz, 2H), 4.70-4.60 (m, 2H), 3.55-3.46 (m, 1H), 3.35-3.25 (m, 2H), 2.92-2.87 (m, 2H). LC-MS $[M+H]^+$ 449.3
484		8-[(6-溴-1,3-苯并间二氧杂环戊烯-5-基)硫]-9-{2-[(3*S*)-吡咯烷-3-基]乙基}-9H-嘌呤-6-胺。 ^{1}H NMR (DMSO-d_6) δ 8.29 (s, 1H), 7.39 (s, 1H), 6.93 (s, 1H), 6.10 (s, 2H), 4.19 (t, J = 8.4 Hz, 2H), 3.60-3.00 (m, 6H), 2.50-2.00 (m, 3H). LC-MS $[M+H]^+$ 464.92

实施例 485 和 486

1-(2-{6-氨基-8-[(2,5-二甲氧基苯基)硫]-9H-嘌呤-9-基}乙基)哌啶-2,6-二酮和 8-(2,5-二甲氧基-苯磺酰基)-9-乙烯基-9H-嘌呤-6-基胺。

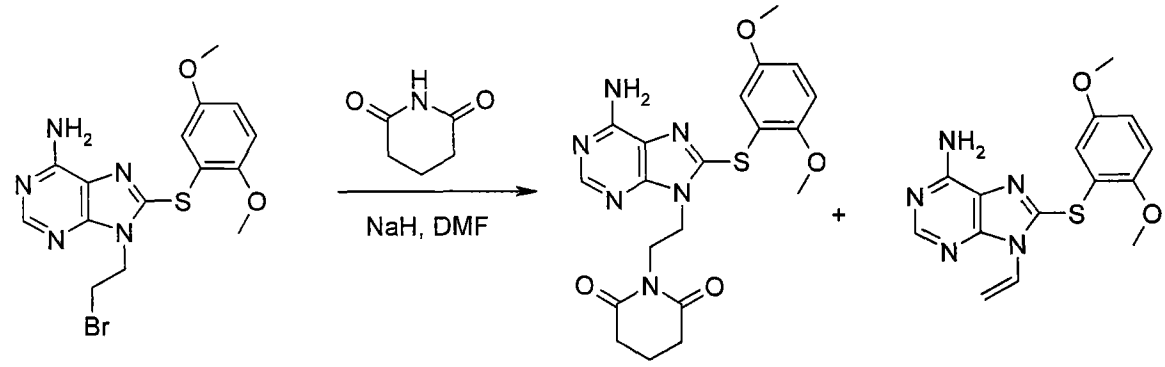
以下述的 2 个连续反应步骤制备标题化合物:

步骤 1: 合成 9-(溴-乙基)-8-(2,5-二甲氧基-苯基硫基)-9H-嘌呤-6-基胺:



在室温下，将 8-(2,5-二甲氧基苯基硫)-9*H*-嘌呤-6-胺（1.00 g，3.30 mmol）、1,3-二溴乙烷（1.42 mL，16.48 mmol）和 Cs_2CO_3（1.29 g，3.96 mmol）在 DMF（11 mL）中的混合物搅拌 1 - 2 天。然后所述反应混合物经 CH_2Cl_2 稀释、盐水洗涤、干燥（Na_2SO_4）、过滤并在真空中浓缩。放置 10 h 后，所述混合物经 CH_2Cl_2 处理。所产生的固体物经过滤、EtOAc 洗涤并经空气干燥以得到所述产物(274 mg,20%)。合并的滤液浓缩并经柱色谱法纯化（CH_2Cl_2/EtOAc/MeOH = 1/1/0.1 至 1/1/0.5）得到另外的产物（200 mg，15%）：^{1}H NMR (DMSO) δ 8.18 (s, 1H), 7.95 (brs, 2H), 7.02 (d, J = 8.8 Hz, 1H), 6.87 (dd, J = 8.8, 3.2 Hz, 1H), 6.57 (d, J = 3.2 Hz, 1H), 4.61 (t, J = 6.0 Hz, 2H), 3.86 (t, J = 6.0 Hz, 2H), 3.76 (s, 3H), 3.62 (s, 3H); TOF LC-MS $[M+H]^+$ 410.0。如果在除 85-90 ℃的高温之外其他反应条件都相同的情况下进行所述反应，则得到 1:1 的 N9 和 N3 异构体的混合物。

步骤 2: 偶联步骤 1 产物与戊二酰亚胺（gultaimide）



在室温下，将戊二酰亚胺（10 mg，0.091 mmol）的 DMF（0.5 mL）溶液用 NaH（4.3 mg，0.11 mmol）处理。搅拌 15 min 后，将步骤 1 中间体（N-9）（34 mg，0.083 mmol）的 DMF（1 mL）溶液逐滴添加至戊二酰亚胺阴离子溶液中。将所形成的混合物在 60 ℃下加热 10 h，冷却至室温并经 AcOH（10 μL）骤冷。所述反应混合物经 EtOAc 萃取、盐水洗涤、干燥（Na_2SO_4）、过滤并在真空中浓缩。所述粗物质经制备型 HPLC 纯化以得到所需化合物（8 mg），并伴随有消去产物 8-(2,5-二甲氧基-苯磺酰基)-9-乙烯基-9H-嘌呤-6 基胺（10 mg）。1-(2-{6-氨基-8-[(2,5-二甲氧基苯基)硫]-9H-嘌呤-9-基}乙基)哌

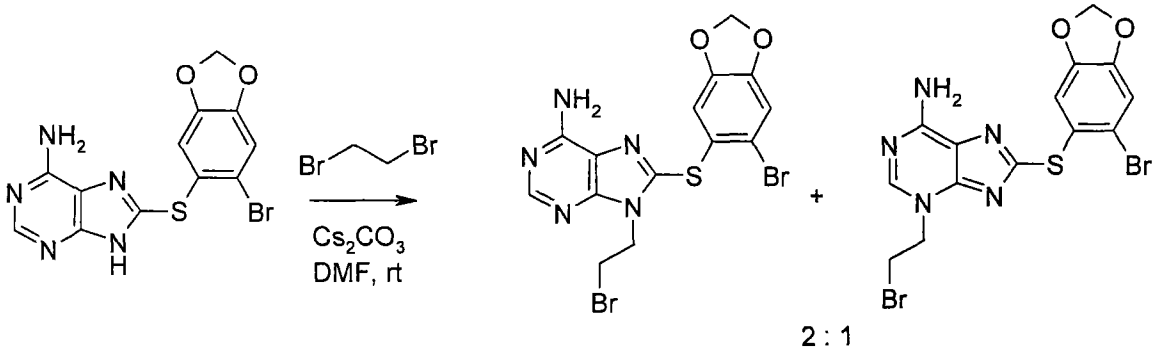
啶-2,6-二酮。^{1}H NMR (CD_3OD) δ 8.30 (s, 1H), 7.10 (d, J = 2.8 Hz, 1H), 7.06 (d, J = 8.8 Hz, 1H), 7.02 (dd, J = 8.8, 2.8 Hz, 12H), 4.54-4.50 (m, 2H), 4.24-4.22 (m, 2H), 3.78 (s, 3H), 3.75 (s, 3H), 2.57 (t, J = 6.8 Hz, 4H), 1.89 (quintet, J = 6.8 Hz, 2H); TOF-MS $[M+H]^+$ 443.1。8-(2,5-二甲氧基-苯磺酰基)-9-乙烯基-9H-嘌呤-6-基胺。^{1}H NMR (DMSO-d_6) δ 8.24 (s, 1H), 7.57 (dd, J = 15.6, 8.8 Hz, 1H), 7.03 (d, J = 9.2 Hz, 1H), 6.87 (dd, J = 9.2, 3.2 Hz, 1H), 6.43 (d, J = 3.2 Hz, 1H), 6.39 (d, J = 15.6 Hz, 1H), 5.24 (d, J = 8.8 Hz, 1H), 3.76 (s, 3H), 3.61 (s, 3H)。

实施例 487 和 488

8-[(6-溴-1,3-苯并间二氧杂环戊烯-5-基)硫]-9-[2-(4-异丙基哌嗪-1-基)乙基]-9H-嘌呤-6-胺和 8-[(6-溴-1,3-苯并间二氧杂环戊烯-5-基)硫]-3-[2-(4-异丙基哌嗪-1-基)乙基]-3H-嘌呤-6-胺。

以下述的 2 步反应顺序制备标题化合物:

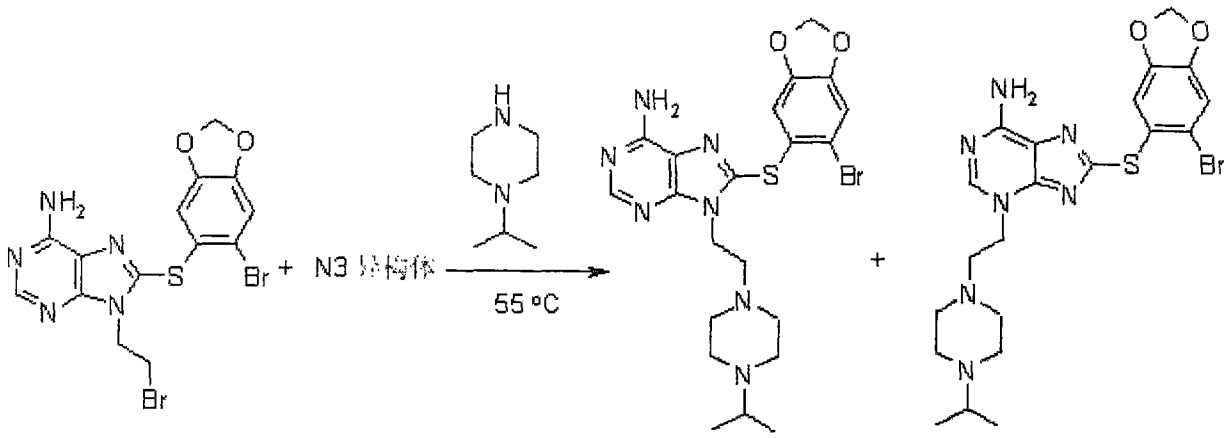
步骤 1: 合成 8-(6-溴-苯并[1,3]间二氧杂环戊烯-5-基磺酰基)-9-(2-溴-乙基)-9H-嘌呤-6-基胺和 8-(6-溴-苯并[1,3]间二氧杂环戊烯-5-基磺酰基)-3-(2-溴-乙基)-3H-嘌呤-6-基胺



依照所述实施例 485 和 486 步骤 1 的步骤使用 8-(6-溴-苯并[1,3]间二氧杂环戊烯-5-基磺酰基)-9H-嘌呤-6-基胺(200 mg, 0.546 mmol)得到标题化合物 8-(6-溴-苯并[1,3]间二氧杂环戊烯-5-基磺酰基)-9-(2-溴-乙基)-9H-嘌呤-6-基胺和 8-(6-溴-苯并[1,3]间二氧杂环戊烯-5-基磺酰基)-3-(2-溴-乙基)-3H-嘌呤-6-基胺 (112 mg, 43%)的 N9 和 N3 异构体之比为 2:1 的不可分离混合物。^{1}H NMR (DMSO) δ 8.17 (s, 1H), 7.48 (brs, 2H), 7.36 (s, 1H), 6.87 (s, 1H), 6.09 (s, 2H), 4.61 (t, J = 6.0 Hz, 2H), 3.89 (t, J = 6.0 Hz,

2H; TOF LC-MS $[M+H]^+$ 473.9。

步骤 2: 偶联步骤 1 产物与 1-异丙基哌嗪

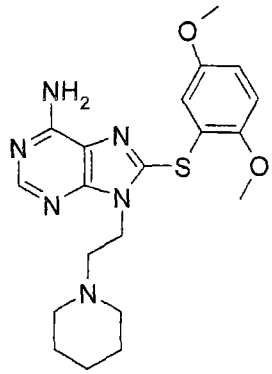
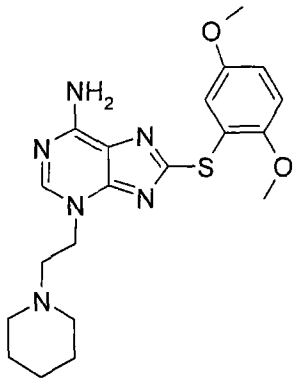
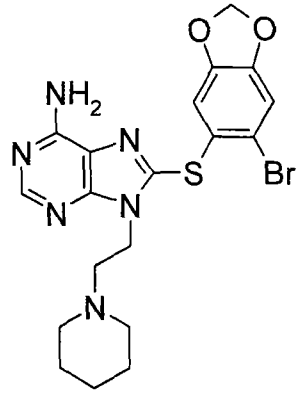


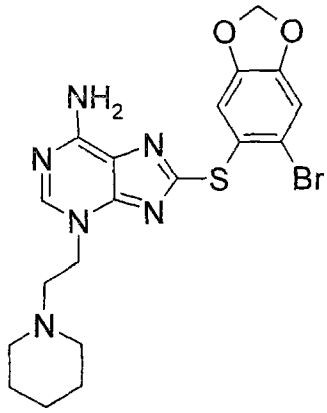
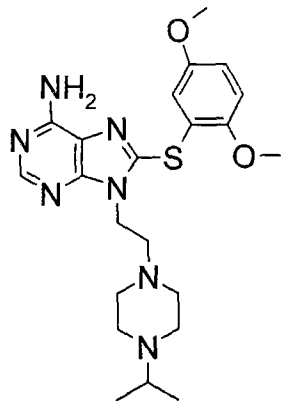
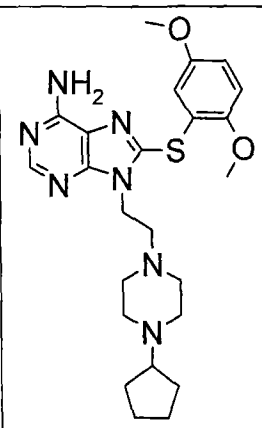
将上文步骤 1 的产物（50 mg，0.11 mmol）和 1-异丙基哌嗪（378 mg，2.64 mmol）的混合物在 55 ℃加热 10 h，并通过制备型 HPLC 纯化以得到 N9-异构体（8 mg）和 N3-异构体（17 mg）。8-[(6-溴-1,3-苯并间二氧杂环戊烯-5-基)硫]-9-[2-(4-异丙基哌嗪-1-基)乙基]-9H-嘌呤-6-胺。^{1}H NMR (CD_3OD) δ 8.32 (s, 1H), 7.27 (s, 1H), 7.22 (s, 1H), 6.09 (s, 2H), 4.48 (t, J = 5.6 Hz, 2H), 3.51-3.40 (m, 3H), 3.24-3.18 (m, 2H), 3.41-2.98 (br t, J = 10.8 Hz, 2H), 2.91 (t, J = 5.6 Hz, 2H), 2.58-2.49 (m, 2H), 1.32 (d, J = 6.4 Hz, 6H); TOF-MS $[M+H]^+$ 520.1。8-[(6-溴-1,3-苯并间二氧杂环戊烯-5-基)硫]-3-[2-(4-异丙基哌嗪-1-基)乙基]-3H-嘌呤-6-胺。^{1}H NMR (CD_3OD) δ 8.51 (s, 1H), 7.39 (s, 1H), 7.36 (s, 1H), 6.16 (s, 2H), 4.51 (t, J = 5.6 Hz, 2H), 3.48 (七重峰, J = 6.4 Hz, 1H), 3.45-3.40 (m, 2H), 3.19-3.14 (m, 2H), 3.00 (br d, J = 10.0 Hz, 2H), 2.95 (t, J = 5.6 Hz, 2H), 2.49 (br t, J = 11.2 Hz, 2H), 1.35 (d, J = 6.4 Hz, 6H); TOF LC-MS $[M+H]^+$ 520.1。

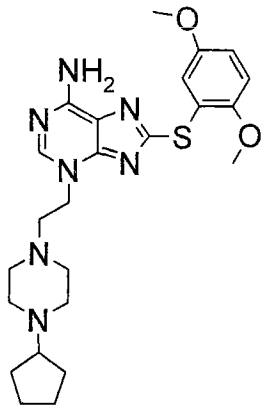
以类似于所述实施例 487 和 488 的步骤使用合适的原料合成实例 489-495，并且在制备型 HPLC 纯化后以三氟乙酸盐的形式分离出来。所述实例的分析数据总结于表 9 中。

表 9

实例编号	结构	名称和分析数据

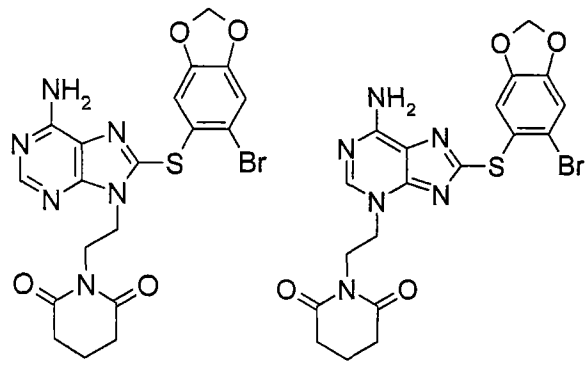
489		8-[(2,5-二甲氧基苯基)硫]-9-(2-哌啶-1-基乙基)-9H-嘌呤-6-胺。^{1}H NMR (CD_3OD) δ 8.34 (s, 1H), 7.11 (d, J = 2.4 Hz, 1H), 7.05 (d, J = 8.8 Hz, 1H), 7.02 (dd, J = 8.8, 2.4 Hz, 1H), 4.78 (t, J = 6.0 Hz, 2H), 3.85-3.78 (m, 2H), 3.75 (2s, 6H), 3.63 (t, J = 6.0 Hz, 2H), 3.11-2.99 (m, 2H), 2.05-1.72 (m, 5H), 1.55 (m, 1H); TOF LC-MS $[M+H]^+$ 415.2
490		8-[(2,5-二甲氧基苯基)硫]-3-(2-哌啶-1-基乙基)-3H-嘌呤-6-胺。^{1}H NMR (CD_3OD) δ 8.51 (s, 1H), 7.27 (t, J = 1.2 Hz, 1H), 7.17 (d, J = 1.2 Hz, 2H), 4.82 (t, J = 5.6 Hz, 2H), 3.80 (s, 3H), 3.798 (s, 3H), 3.70 (t, J = 5.6 Hz, 2H), 3.15-2.88 (m, 4H), 2.01-1.60 (m, 6H); TOF LC-MS $[M+H]^+$ 415.2
491		8-[(6-溴-1,3-苯并间二氧杂环戊烯-5-基)硫]-9-(2-哌啶-1-基乙基)-9H-嘌呤-6-胺 ^{1}H NMR (CD_3OD) δ 8.33 (s, 1H), 7.27 (s, 1H), 7.22 (s, 1H), 6.09 (s, 2H), 4.75 (t, J = 6.4 Hz, 2H), 3.88-3.78 (m, 2H), 3.65 (t, J = 6.4 Hz, 2H), 3.12-3.00 (m, 2H), 2.40-1.72 (m, 5H), 1.58 (m, 1H); TOF-MS $[M+H]^+$ 477.1

492		8-[(6-溴-1,3-苯并间二氧杂环戊烯-5-基)硫]-3-(2-哌啶-1-基乙基)-3H-嘌呤-6-胺。^{1}H NMR (CD_3OD) δ 8.47 (s, 1H), 7.35 (s, 1H), 7.30 (s, 1H), 6.13 (s, 2H), 4.81 (t, J = 6.0 Hz, 2H), 3.80-3.65 (m, 2H), 3.68 (t, J = 6.0 Hz, 2H), 3.14-2.94 (m, 2H), 2.10-1.51 (m, 6H); TOF LC-MS $[M+H]^+$ 477.1
493		8-[(2,5-二甲氧基苯基)硫]-9-[2-(4-异丙基哌嗪-1-基)乙基]-9H-嘌呤-6-胺。^{1}H NMR (CD_3OD) δ 8.29 (s, 1H), 7.04 (dt, J = 10.0 Hz, 2.0 Hz, 1H), 7.00 (s, 1H), 6.99 (dd, J =10.0, 2.4 Hz, 1H), 4.48 (t, J = 5.2 Hz, 2H), 3.75 (s, 3H), 3.73 (s, 3H), 3.55 (s, 1H), 3.48-3.42 (m, 2H), 3.20-3.13 (m, 2H), 2.95 (br t, J = 11.6 Hz, 2H), 2.48 (br t, J = 11.6 Hz, 2 H), 1.31 (d, J = 6.4 Hz, 6H); TOF LC-MS $[M+H]^+$ 458.2
494		9-[2-(4-环戊基哌嗪-1-基)乙基]-8-[(2,5-二甲氧基苯基)硫]-9H-嘌呤-6-胺。^{1}H NMR (CD_3OD) δ 8.29 (s, 1H), 7.03 (dt, J = 10.0, 1.6 Hz, 1H), 7.01 (s, 1H), 7.00 (dd, J = 10.0, 3.2 Hz, 1H), 4.49 (t, J = 5.2 Hz, 2H), 3.75 (2s, 6H), 3.55-3.50 (m, 2H), 3.47 (m, 1H), 3.19-3.14 (m,

		2H), 2.97-2.93 (m, 2H), 2.88 (t, J = 5.2 Hz, 2H), 2.44 (br t, J =12.8 Hz, 2H), 2.18-2.10 (m, 2H), 1.88-1.78 (m, 2H), 1.72-1.60 (m, 4H); TOF LC-MS $[M+H]^+$ 484.3
495		3-[2-(4-环戊基哌嗪-1-基)乙基]-8-[(2,5-二甲氧基苯基)硫]-3H-嘌呤-6-胺。^{1}H NMR (CD_3OD) δ 8.52 (s, 1H), 7.22-7.10 (m, 2H), 4.52 (t, J = 5.6 Hz, 2H), 3.80 (2s, 6H), 3.58-3.44 (m, 3H), 3.18-3.10 (m, 2H), 3.10-2.96 (m, 2H), 2.94 (t, J = 5.6 Hz, 2H), 2.57-2.44 (m, 2H), 2.19-2.08 (m, 2H), 1.88-1.78 (m, 2H), 1.72-1.64 (m, 4H); TOF LC-MS $[M+H]^+$ 484.2

实施例 496 和 497

合成 1-(2-{6-氨基-8-[(6-溴-1,3-苯并间二氧杂环戊烯-5-基)硫]-9H-嘌呤-9-基}乙基)哌啶-2,6-二酮和 1-(2-{6-氨基-8-[(6-溴-1,3-苯并间二氧杂环戊烯-5-基)硫]-3H-嘌呤-3-基}乙基)哌啶-2,6-二酮。



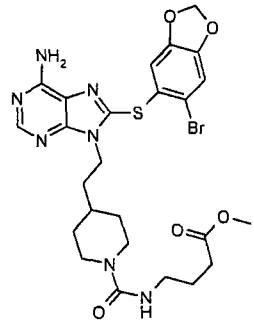
依照所述实施例 485 和 486 的步骤使用戊二酰亚胺从实施例 487

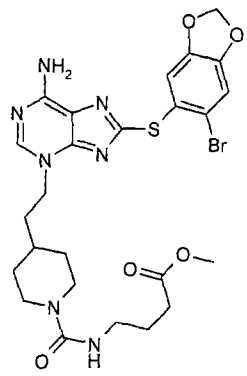
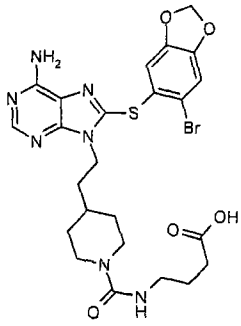
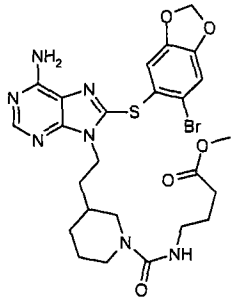
和 488 步骤 1 的产物制备标题实例。1-(2-{6-氨基-8-[(6-溴-1,3-苯并间二氧杂环戊烯-5-基)硫]-9H-嘌呤-9-基}乙基)哌啶-2,6-二酮 ^{1}H NMR (CD_3OD) δ 8.30 (s, 1H), 7.26 (s, 1H), 7.23 (s, 1H), 6.08 (s, 2H), 4.53-4.49 (m, 2H), 4.26-4.23 (m, 2H), 2.55 (t, J = 6.8 Hz, 4H), 1.86 (五重峰, J = 6.8 Hz, 2H); TOF LC-MS $[M+H]^+$ 505.0。1-(2-{6-氨基-8-[(6-溴-1,3-苯并间二氧杂环戊烯-5-基)硫]-3H-嘌呤-3-基}乙基)哌啶-2,6-二酮。TOF LC-MS $[M+H]^+$ 505.0。

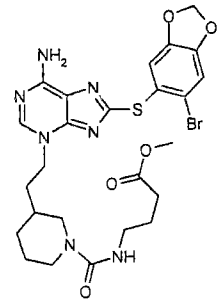
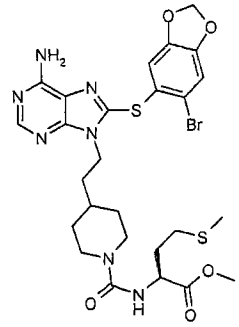
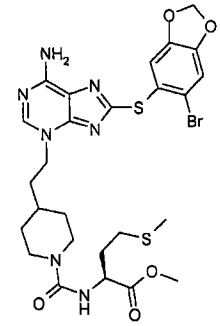
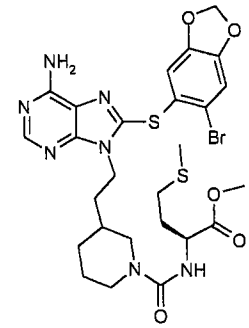
还分离出来了伴随于所需产物的相应的消去产物。8-(6-溴-苯并[1,3]间二氧杂环戊烯-5-基硫基)-9-乙烯基-9H-6-基胺(实例 498) ^{1}H NMR (CD_3OD) δ 8.26 (s, 1H), 7.27 (s, 1H), 7.21 (dd, J = 15.6, 9.6 Hz, 1H), 7.16 (s, 1H), 6.27 (dd, J = 15.6, 1.2 Hz, 1H), 6.09 (s, 2H), 5.47 (dd, J = 9.6, 1.2 Hz, 1H); LC-MS $[M+H]^+$ 392.0。8-(6-溴-苯并[1,3]间二氧杂环戊烯-5-基硫基)-3-乙烯基-3H-6-基胺(实例 499)。^{1}H NMR (CD_3OD) δ 8.68 (s, 1H), 7.363 (s, 1H), 7.362 (dd, J = 15.6, 9.2 Hz, 1H), 7.35 (s, 1H), 6.27 (dd, J = 15.6, 2.0 Hz, 1H), 6.15 (s, 2H), 5.51 (dd, J = 9.2, 2.0 Hz, 1H); LC-MS $[M+H]^+$ 392.1。

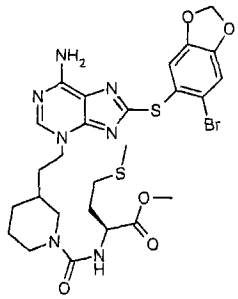
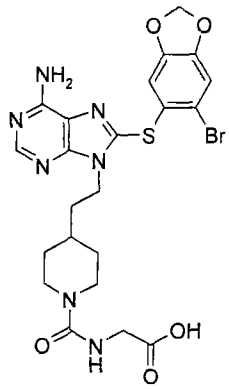
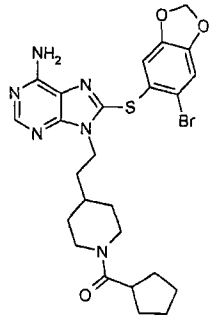
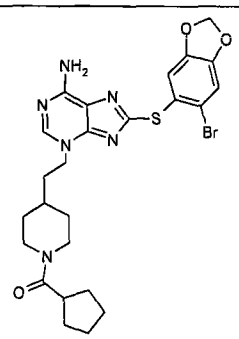
依照所述实施例 337 和 338 的步骤制备总结于表 10 中的实例 500 - 645，并且在制备型 HPLC 纯化后以三氟乙酸盐的形式分离出来。

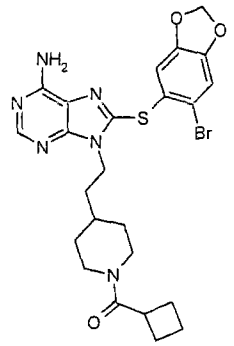
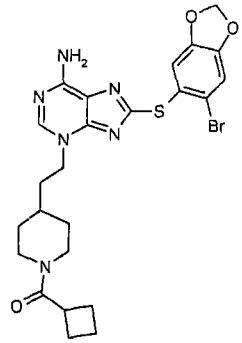
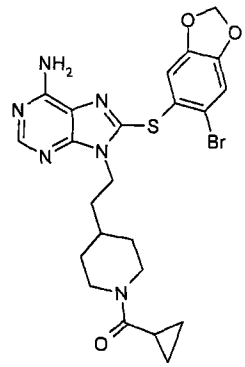
表 10

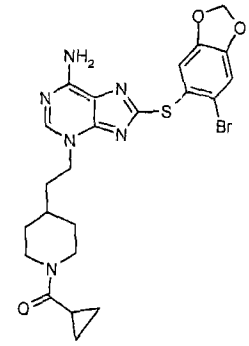
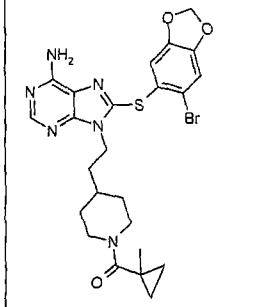
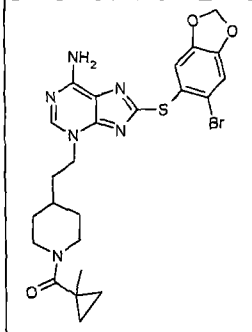
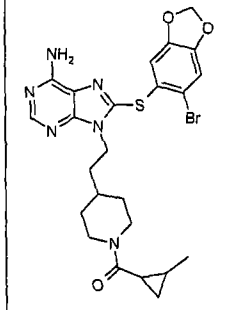
实例	结构	名称和分析数据
500		4-({[4-(2-{6-氨基-8-[(6-溴-1,3-苯并间二氧杂环戊烯-5-基)硫]-9H-嘌呤-9-基}乙基)哌啶-1-基]羰基}氨基)丁酸甲酯。^{1}H NMR (DMSO-d_6) δ 8.26 (s, 1H), 7.40 (s, 1H), 6.88 (s, 1H), 6.45-6.40 (m, 1H), 6.10 (s, 2H), 4.20 (t, J = 7.8 Hz, 2H), 3.87 (d, J = 14.0 Hz, 2H), 3.57 (s, 3H), 2.99 (q, J = 6.2 Hz, 2H), 2.60-2.40 (m, 2H), 2.27 (t, J = 7.4 Hz, 2H), 1.70-1.55 (m, 6H), 1.40 -1.25(m, 1H), 1.05-0.90(m,

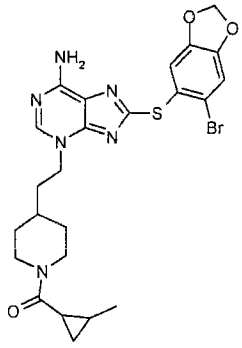
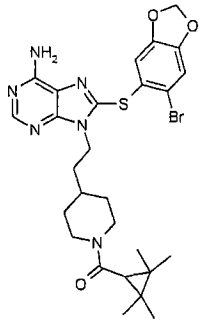
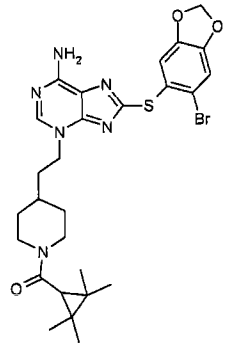
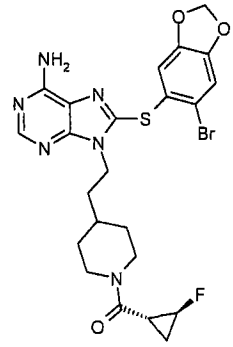
		2H); TOF-MS [M+H]$^+$ 620.12
501		4-({[4-(2-{6-氨基-8-[(6-溴-1,3-苯并间二氧杂环戊烯-5-基)硫]-3H-嘌呤-3-基}乙基)哌啶-1-基]羰基}氨基)丁酸甲酯。TOF-MS [M+H]$^+$ 620.12
502		4-({[4-(2-{6-氨基-8-[(6-溴-1,3-苯并间二氧杂环戊烯-5-基)硫]-9H-嘌呤-9-基}乙基)哌啶-1-基]羰基}氨基)丁酸。^{1}H NMR (DMSO-D_6) δ 12.03 (s, 1H), 8.16 (s, 1H), 7.55-7.42 (broad s, 2H), 7.39 (s, 1H), 6.8 (s, 1H), 6.45-6.40 (m, 1H), 6.09 (s, 2H), 4.17 (t, J = 7.8 Hz, 2H), 3.88 (d, J = 13.2 Hz, 2H), 2.99 (q, J = 5.8 Hz, 2H), 2.60-2.40 (m, 2H), 2.18 (t, J = 7.4 Hz, 2H), 1.65-1.55(m, 6H), 1.40-1.20 (m, 1H), 1.00-0.90 (m, 2H); TOF-MS [M+H]$^+$ 606.10
503		4-({[3-(2-{6-氨基-8-[(6-溴-1,3-苯并间二氧杂环戊烯-5-基)硫]-9H-嘌呤-9-基}乙基)哌啶-1-基]羰基}氨基)丁酸甲酯。^{1}H NMR (CD_3OD) δ 8.25 (s, 1H), 7.26 (s, 1H), 7.17 (s, 1H), 6.08 (s, 2H), 4.35 (t, J = 7.4 Hz, 2H), 3.95 -3.75(m, 2H), 3.68 (s, 3H), 3.50-3.10 (m, 2H), 2.90-2.80 (m, 1H), 2.63 (dd, J = 13.6, 10.5 Hz, 1H), 2.37 (t, J = 7.4 Hz, 2H), 2.04-1.92(m, 1H), 1.88-1.66 (m, 5H), 1.56-1.36 (m, 2H), 1.30-1.20 (m, 1H); TOF-MS [M+H]$^+$ 620.12

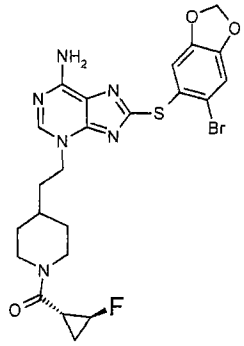
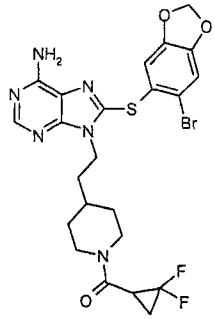
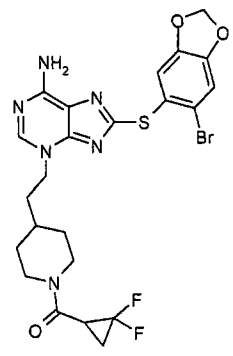
504		4-({[3-(2-{6-氨基-8-[(6-溴-1,3-苯并间二氧杂环戊烯-5-基)硫]-3H-嘌呤-3-基}乙基)哌啶-1-基]羰基}氨基)丁酸甲酯。TOF-MS [M+H]$^+$ 620.12
505		N-{[4-(2-{6-氨基-8-[(6-溴-1,3-苯并间二氧杂环戊烯-5-基)硫]-9H-嘌呤-9-基}乙基)哌啶-1-基]羰基}-*L*-蛋氨酸甲酯。^{1}H NMR (DMSO-D_6) δ 8.30 (s, 1H), 7.38 (s, 1H), 6.90 (s, 1H), 6.65 (d, J = 7.8 Hz, 1H), 6.08 (s, 2H), 4.26-4.10 (m, 4H), 3.95-3.85 (m, 3H), 3.57 (s, 3H), 2.60-2.38 (m, 2H), 2.00 (s, 3H), 1.86 (q, J = 7.8 Hz, 2H), 1.66-1.55 (m, 4H), 1.40-1.28 (m, 1H), 1.02-0.88 (m, 2H); TOF-MS [M+H]$^+$ 666.10
506		N-{[4-(2-{6-氨基-8-[(6-溴-1,3-苯并间二氧杂环戊烯-5-基)硫]-3H-嘌呤-3-基}乙基)哌啶-1-基]羰基}-*L*-蛋氨酸甲酯。LC-MS [M+H]$^+$ 666.1
507		N-{[3-(2-{6-氨基-8-[(6-溴-1,3-苯并间二氧杂环戊烯-5-基)硫]-9H-嘌呤-9-基}乙基)哌啶-1-基]羰基}-*L*-蛋氨酸甲酯。^{1}H NMR (DMSO-D_6) δ 8.30 (s, 1H), 7.40 (s, 1H), 6.95 (s, 1H), 6.74-6.65(m, 1H), 6.11 (s, 2H), 4.30-4.10 (m, 3H), 3.88-3.70 (m, 2H), 3.59 (s, 3H), 2.80-2.60 (m, 1H), 2.62-2.40 (m, 1H), 2.30-2.20 (m, 1H), 2.02 (s, 3H), 95-1.80 (m,

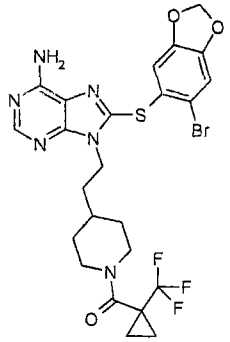
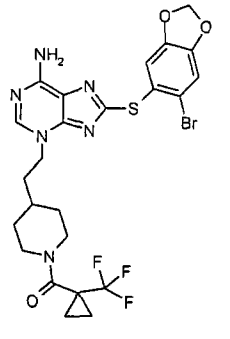
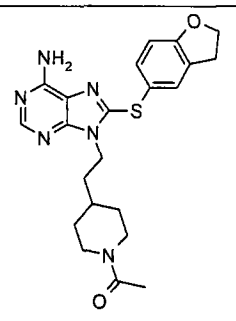
		3H), 1.73-1.50 (m, 3H), 1.40-1.05 (m, 4H); TOF-MS [M+H]$^+$ 666.12
508		N-{[3-(2-{6-氨基-8-[(6-溴-1,3-苯并间二氧杂环戊烯-5-基)硫]-3H-嘌呤-3-基}乙基)哌啶-1-基]羰基}-*L*-蛋氨酸甲酯。LC-MS [M+H]$^+$ 666.1
509		N-{[4-(2-{6-氨基-8-[(6-溴-1,3-苯并间二氧杂环戊烯-5-基)硫]-9H-嘌呤-9-基}乙基)哌啶-1-基]羰基}甘氨酸。LC-MS [M+H]$^+$ 578.0
510		8-[(6-溴-1,3-苯并间二氧杂环戊烯-5-基)硫]-9-{2-[1-(环戊基羰基)哌啶-4-基]乙基}-9H-嘌呤-6-胺。^{1}H NMR (DMSO-D_6) δ 8.16 (s, 1H), 7.49 (s, 1H), 7.05 (s, 1H), 6.06 (s, 2H), 4.5 (d, J = 13.2 Hz, 1H), 4.29 (t, J = 7.2 Hz, 2H), 4.07 (d, J = 14.0 Hz, 1H), 3.07-2.98 (m, 2H), 2.57 (dd, J = 12.89, 3.1 Hz, 1H), 1.92-1.50 (m, 9H), 1.38-1.25(m, 4H), 1.22-1.00 (m, 2H); TOF-MS [M+H]$^+$ 573.11
511		8-[(6-溴-1,3-苯并间二氧杂环戊烯-5-基)硫]-3-{2-[1-(环戊基羰基)哌啶-4-基]乙基}-3H-嘌呤-6-胺。LC-MS [M+H]$^+$ 573.2

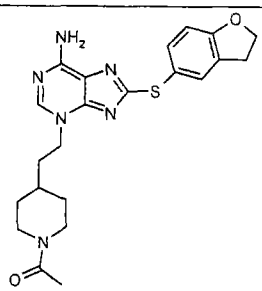
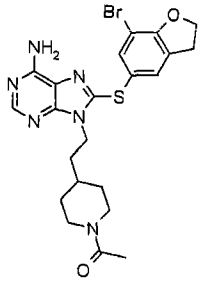
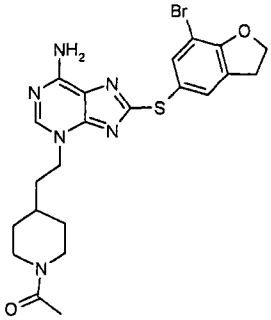
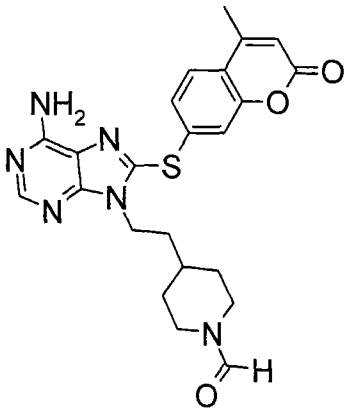
512		8-[(6-溴-1,3-苯并间二氧杂环戊烯-5-基)硫]-9-{2-[1-(环丁基羰基)哌啶-4-基]乙基}-9H-嘌呤-6-胺。^{1}H NMR (CDCl$_3$) δ 8.19 (s, 1H), 7.16 (s, 1H), 7.09 (s, 1H), 6.08 (s, 2H), 4.62 (d, J = 13.6 Hz, 1H), 4.29 (t, J = 8.2 Hz, 2H), 3.72 (d, J = 14.8 Hz, 1H), 3.60-3.40 (m, 1H), 2.9 (t, J = 12.5 Hz, 1H), 2.52 (t, J = 12.5 Hz, 1H), 2.40-2.28 (m, 2H), 2.18-2.14 (m, 2H), 1.9-2.0 (m, 1H), 1.9-1.75 (m, 5H), 1.6-1.5 (m, 1H), 1.1-1.28 (m, 2H); TOF-MS [M+H]$^+$ 559.11
513		8-[(6-溴-1,3-苯并间二氧杂环戊烯-5-基)硫]-3-{2-[1-(环丁基羰基)哌啶-4-基]乙基}-3H-嘌呤-6-胺。TOF-MS [M+H]$^+$ 559.11
514		8-[(6-溴-1,3-苯并间二氧杂环戊烯-5-基)硫]-9-{2-[1-(环丙基羰基)哌啶-4-基]乙基}-9H-嘌呤-6-胺。^{1}H NMR (CDCl$_3$) δ 8.32 (s, 1H), 7.09 (s, 1H), 6.84 (s, 1H), 6.00 (s, 2H), 6.00-5.85 (宽 s, 2H), 4.58 (d, J = 13.6 Hz, 1H), 4.27 (t, J = 7.4 Hz, 2H), 4.21 (d, J = 13.6 Hz, 1H), 3.03 (t, J = 12.1 Hz, 1H), 2.53 (t, J = 10.5 Hz, 1H), 1.93 -1.70(m, 5H), 1.60-1.48 (m, 1H), 1.30-1.10 (m, 2H), 0.99 -0.96(m, 2H), 0.73 (dd, J = 8.2, 2.7 Hz, 2H); TOF-MS [M+H]$^+$ 545.09

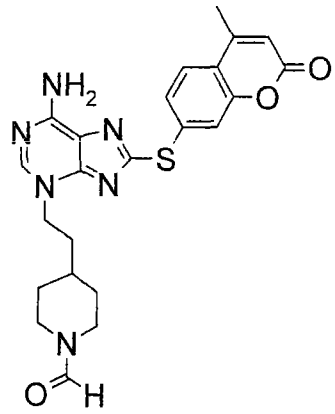
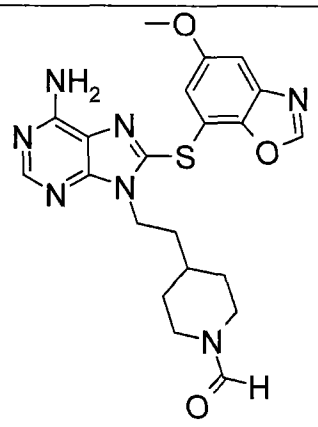
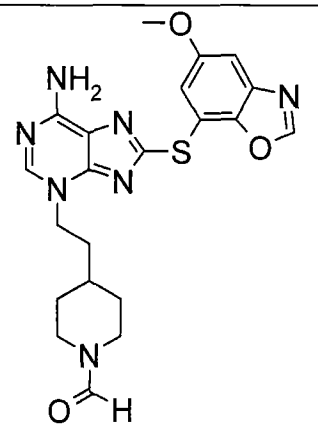
515		8-[(6-溴-1,3-苯并间二氧杂环戊烯-5-基)硫]-3-{2-[1-(环丙基羰基)哌啶-4-基]乙基}-3H-嘌呤-6-胺。TOF-MS [M+H]$^+$ 545.09
516		8-[(6-溴-1,3-苯并间二氧杂环戊烯-5-基)硫]-9-(2-{1-[(1-甲基环丙基)羰基]哌啶-4-基}乙基)-9H-嘌呤-6-胺。^{1}H NMR (CD_3OD) δ 8.32 (s, 1H), 7.28 (s, 1H), 7.21 (s, 1H), 6.09 (s, 2H), 4.45-4.34 (m, 4H), 3.00-2.50 (宽峰, 2H), 1.95 -1.85(m, 4H), 1.68-1.56 (m, 1H), 1.28 (s, 3H), 1.26 -1.10(m, 2H), 0.90-0.84 (m, 2H), 0.64 -0.60(m, 2H); TOF-MS [M+H]$^+$ 559.01
517		8-[(6-溴-1,3-苯并间二氧杂环戊烯-5-基)硫]-3-(2-{1-[(1-甲基环丙基)羰基]哌啶-4-基}乙基)-3H-嘌呤-6-胺。LC-MS [M+H]$^+$ 559.01
518		8-[(6-溴-1,3-苯并间二氧杂环戊烯-5-基)硫]-9-(2-{1-[(2-甲基环丙基)羰基]哌啶-4-基}乙基)-9H-嘌呤-6-胺。^{1}H NMR (CD_3OD) δ 8.26 (s, 1H), 7.27 (s, 1H), 7.16 (s, 1H), 6.08 (s, 2H), 4.5-4.4 (m, 1H), 4.35 (t, J = 7.0 Hz, 2H), 4.33-4.25 (m, 1H), 3.15-3.03 (m, 1H), 2.65-2.55 (m, 1H), 2.00-1.75 (m, 4H), 1.70-1.58 (m, 2H), 1.30-1.19

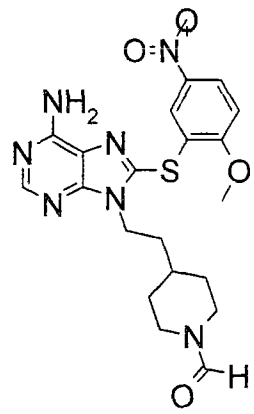
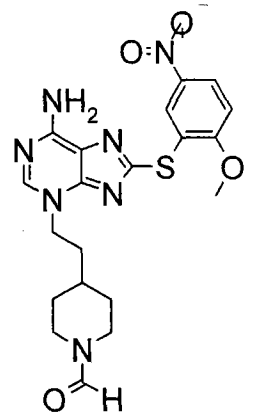
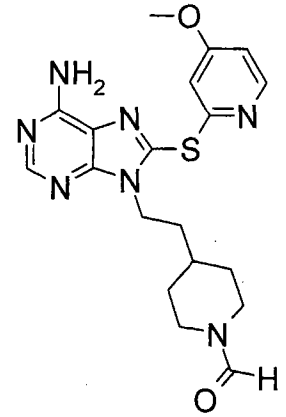
		(m, 2H), 1.18-1.02 (m, 5H), 0.66-0.58 (m, 1H); TOF-MS $[M+H]^+$ 559.10
519		8-[(6-溴-1,3-苯并间二氧杂环戊烯-5-基)硫]-3-(2-{1-[(2-甲基环丙基)羰基]哌啶-4-基}乙基)-3H-嘌呤-6-胺。LC-MS $[M+H]^+$ 559.1
520		8-[(6-溴-1,3-苯并间二氧杂环戊烯-5-基)硫]-9-(2-{1-[(2,2,3,3-四甲基环丙基)羰基]哌啶-4-基}乙基)-9H-嘌呤-6-胺。^{1}H NMR (CD_3OD) δ 8.19 (s, 1H), 7.25 (s, 1H), 7.08 (s, 1H), 6.07 (s, 2H), 4.45 (d, J = 13.6 Hz, 1H), 4.31 (t, J = 7.8 Hz, 2H), 4.04 (d, J = 13.6 Hz, 1H), 3.03 (t, J = 12.1 Hz, 1H), 2.56 (t, J = 12.8 Hz, 1H), 1.96-1.70 (m, 5H), 1.68-1.50 (m, 1H), 1.25-1.00 (m, 14H); TOF-MS $[M+H]^+$ 601.14
521		8-[(6-溴-1,3-苯并间二氧杂环戊烯-5-基)硫]-3-(2-{1-[(2,2,3,3-四甲基环丙基)羰基]哌啶-4-基}乙基)-3H-嘌呤-6-胺。LC-MS $[M+H]^+$ 601.1
522		8-[(6-溴-1,3-苯并间二氧杂环戊烯-5-基)硫]-9-[2-(1-{[(2*S*)-2-氟环丙基]羰基}哌啶-4-基)乙基]-9H-嘌呤-6-胺。^{1}H NMR (CD_3OD) δ 8.25 (s, 1H), 7.9 (s, 2H), 7.27 (s, 1H), 7.15 (s, 1H), 6.08 (s, 2H), 4.44 (d, J = 12.5 Hz, 1H), 4.35 (t, J = 8.2 Hz, 2H), 4.28 (d, J = 12.15

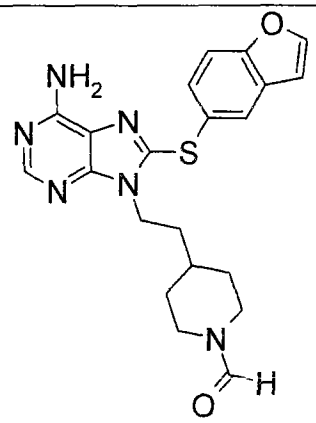
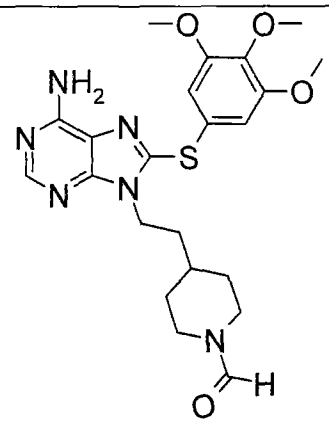
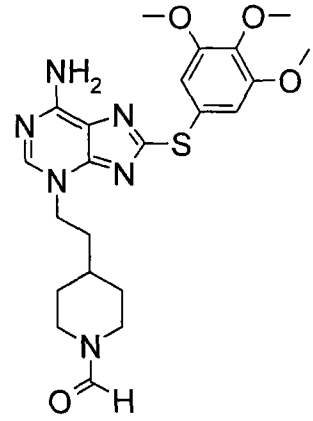
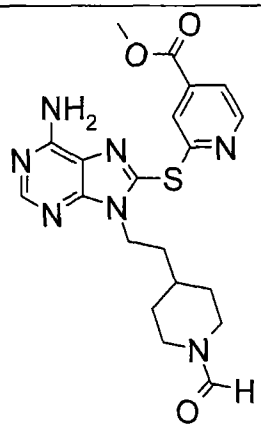
		Hz, 1H), 3.20-3.05 (m, 1H), 2.65-2.40(m, 2H), 2.00-1.75(m, 4H), 1.70-1.55 (m, 1H), 1.50-1.20 (m, 5H); TOF-MS $[M+H]^+$ 563.07
523		8-[(6-溴-1,3-苯并间二氧杂环戊烯-5-基)硫]-3-[2-(1-{[(2*S*)-2-氟环丙基]羰基}哌啶-4-基)乙基]-3H-嘌呤-6-胺。 LC-MS $[M+H]^+$ 563.1
524		8-[(6-溴-1,3-苯并间二氧杂环戊烯-5-基)硫]-9-(2-{1-[(2,2-二氟环丙基)羰基]哌啶-4-基}乙基)-9H-嘌呤-6-胺。^{1}H NMR ($CDCl_3$) δ 8.28 (s, 1H), 7.1 (s, 1H), 6.90 (s, 1H), 6.00(s, 2H), 4.57 (dd, J = 25.7, 13.2 Hz, 1H), 4.27 (t, J = 7.4 Hz, 2H), 4.03 (d, J = 13.2 Hz, 1H), 3.08 (t, J = 12.5 Hz, 1H), 2.70-2.47 (m, 2H), 2.18-2.08 (m, 1H), 2.00-1.48 (m, 6H), 1.30-1.10 (m, 2H); TOF-MS $[M+H]^+$ 581.08
525		8-[(6-溴-1,3-苯并间二氧杂环戊烯-5-基)硫]-3-(2-{1-[(2,2-二氟环丙基)羰基]哌啶-4-基}乙基)-3H-嘌呤-6-胺。 ^{1}H NMR ($CDCl_3$) δ 10.59 (s, 1H), 8.06 (s, 1H), 7.21 (s, 1H), 7.17 (s, 1H), 6.09 (s, 2H), 4.56 (dd, J = 33.5, 15.2 Hz, 1H), 4.40-4.30(m, 2H), 4.04 (d, J = 14.4 Hz, 1H), 3.16-3.05 (m, 1H), 2.74-2.48 (m, 3H), 2.20-2.08 (m, 1H), 1.98-1.48 (m, 4H), 1.30-1.10 (m, 3H); TOF-MS $[M+H]^+$ 581.08

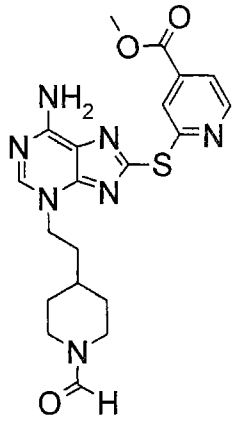
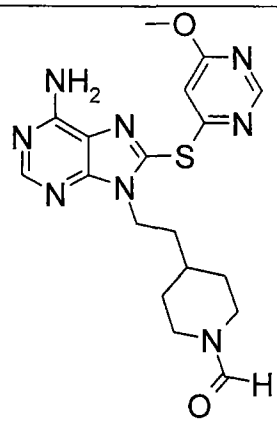
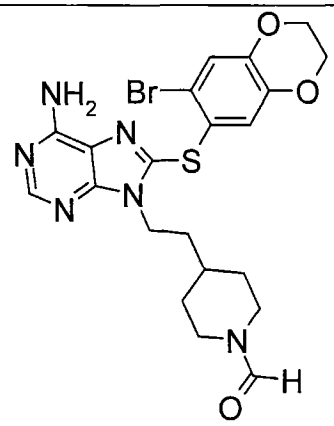
526		8-[(6-溴-1,3-苯并间二氧杂环戊烯-5-基)硫]-9-[2-(1-{[1-(三氟甲基)环丙基]羰基}哌啶-4-基)乙基]-9H-嘌呤-6-胺。^{1}H NMR (CDCl$_3$) δ 8.3 (s, 1H), 7.08 (s, 1H), 6.86 (s, 1H), 5.99 (s, 2H), 4.65-4.27 (m, 4H), 2.50-3.10 (2个宽峰, 2H), 1.86 (d, J = 13.6 Hz, 2H), 1.74 (q, J = 7.0 Hz, 2H), 1.57-1.48 (m, 1H), 1.20-1.35 (m, 4H), 1.20-1.10 (m, 2H); TOF-MS [M+H]$^+$ 613.07
527		8-[(6-溴-1,3-苯并间二氧杂环戊烯-5-基)硫]-3-[2-(1-{[1-(三氟甲基)环丙基]羰基}哌啶-4-基)乙基]-3H-嘌呤-6-胺。^{1}H NMR (CDCl$_3$) δ 8.06 (s, 1H), 7.21 (s, 1H), 7.17 (s, 1H), 6.10 (s, 2H), 4.70-4.20 (m, 4H), 2.5-3.1 (2 broad peaks, 2H), 1.9 (q, J = 7.0 Hz, 1H), 1.82 (d, J = 11.3 Hz, 1H), 1.48-1.58 (m, 1H), 1.12-1.38 (m, 6H); TOF-MS [M+H]$^+$ 613.07
528		9-[2-(1-乙酰基哌啶-4-基)乙基]-8-(2,3-二氢-1-苯并呋喃-5-基硫)-9H-嘌呤-6-胺。^{1}H NMR (CD$_3$OD) δ 8.28 (d, J = 3.1 Hz, 1H), 7.49 (s, 1H), 7.40 (dd, J = 3.1, 8.2 Hz, 1H), 6.84 (d, J = 8.2 Hz, 1H), 4.62 (t, J = 8.9 Hz, 2H), 4.50 (d, J = 13.2 Hz, 1H), 4.34 (t, J = 7.0 Hz, 2H), 3.91 (d, J = 13.6 Hz, 1H), 3.25 (t, J = 8.9 Hz, 2H), 3.07 (t, J = 12.5 Hz, 1H), 2.59 (t, J = 10.5 Hz, 1H), 2.08 (s, 3H), 1.93-1.70

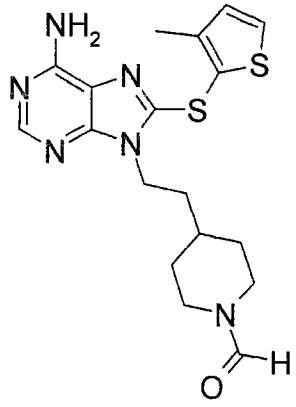
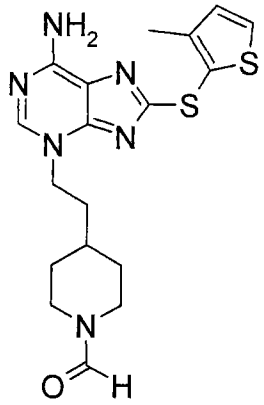
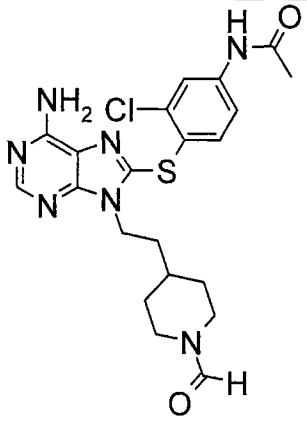
		(m, 4H), 1.68-1.50 (m, 1H), 1.30-1.08 (m, 2H); TOF-MS $[M+H]^+$ 439.19
529		3-[2-(1-乙酰基哌啶-4-基)乙基]-8-(2,3-二氢-1-苯并呋喃-5-基硫)-3H-嘌呤-6-胺。LC-MS $[M+H]^+$ 439.2
530		9-[2-(1-乙酰基哌啶-4-基)乙基]-8-[(7-溴-2,3-二氢-1-苯并呋喃-5-基)硫]-9H-嘌呤-6-胺。^{1}H NMR ($CDCl_3$) δ 8.23 (s, 1H), 7.54 (s, 1H), 7.31 (s, 1H), 4.72-4.60 (m, 3H), 4.25 (t, J = 7.8 Hz, 2H), 3.82 (d, J = 13.6 Hz, 1H), 3.33 (t, J = 8.5 Hz, 2H), 3.02 (t, J = 12.5 Hz, 1H), 2.52 (t, J = 12.8 Hz, 1H), 2.09 (s, 3H), 1.86 (t, J = 15.2 Hz, 2H), 1.76 (q, J = 7.4 Hz, 2H), 1.60-1.48 (m, 1H), 1.30-1.15 (m, 2H); TOF-MS $[M+H]^+$ 517.09
531		3-[2-(1-乙酰基哌啶-4-基)乙基]-8-[(7-溴-2,3-二氢-1-苯并呋喃-5-基)硫]-3H-嘌呤-6-胺。 LC-MS $[M+H]^+$ 517.2
532		4-(2-{6-氨基-8-[(4-甲基-2-氧代-2H-色烯-7-基)硫]-9H-嘌呤-9-基}乙基)哌啶-1-甲醛。^{1}H NMR (DMSO-d_6) δ 8.33 (s, 1H), 7.92 (s, 1H), 7.76 (d, J = 8.0 Hz, 1H), 7.37 (s, 1H), 7.28 (d, J = 8.0 Hz, 1H), 6.42 (s, 1H), 4.24 (t, J = 7.6 Hz, 2H), 4.10-4.00 (m, 1H), 3.60-3.56 (m, 1H), 2.91-2.84 (m, 1H), 2.53-2.45

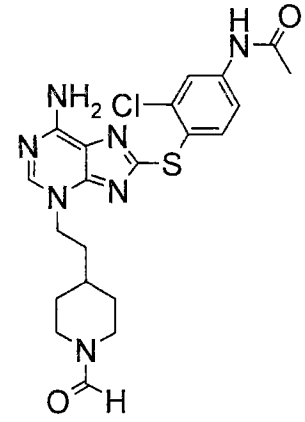
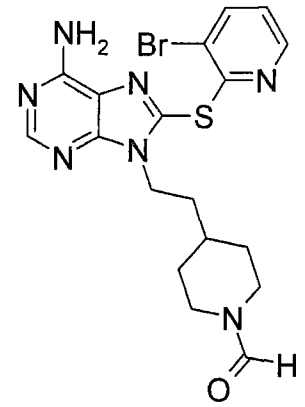
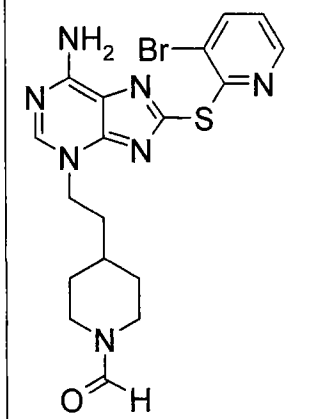
		(m, 2H), 2.40 (s, 3H), 1.75-1.60 (m, 3H), 1.50-1.40 (m, 1H), 1.00-0.85 (m, 2H). TOF-MS $[M+H]^+$ 465.1
533		4-(2-{6-氨基-8-[(4-甲基-2-氧代-2H-色烯-7-基)硫]-3H-嘌呤-3-基}乙基)哌啶-1-甲醛。^{1}H NMR (DMSO-d_6) δ 8.59 (s, 1H), 7.93 (s, 1H), 7.78 (d, J = 8.4 Hz, 1H), 7.64 (s, 1H), 7.50 (d, J = 8.4 Hz, 1H), 6.43 (s, 1H), 4.34 (t, J = 8.0 Hz, 2H), 4.10-4.00 (m, 1H), 3.65-3.56 (m, 1H), 2.96-2.84 (m, 1H), 2.53-2.45 (m, 2H), 2.43 (s, 3H), 1.86-1.71 (m, 3H), 1.55-1.45 (m, 1H), 1.10-0.85 (m, 2H). TOF-MS $[M+H]^+$ 465.1
534		4-(2-{6-氨基-8-[(5-甲氧基-1,3-苯并噁唑-7-基)硫]-9H-嘌呤-9-基}乙基)哌啶-1-甲醛。^{1}H NMR (DMSO-d_6) δ 8.30 (s, 1H), 8.26 (s, 1H), 7.93 (s, 1H), 7.55 (s, 1H), 6.42 (s, 1H), 4.30-4.20 (m, 2H), 4.15-4.05 (m, 1H), 3.59 (s, 3H), 3.65-3.50 (m, 1H), 2.95-2.85 (m, 1H), 2.50-2.45 (m, 2H), 1.75-1.35 (m, 4H), 1.00-0.85 (m, 2H). TOF-MS $[M+H]^+$ 454.0
535		4-(2-{6-氨基-8-[(5-甲氧基-1,3-苯并噁唑-7-基)硫]-3H-嘌呤-3-基}乙基)哌啶-1-甲醛。^{1}H NMR (DMSO-d_6) δ 8.35 (s, 1H), 8.12 (s, 1H), 7.96 (s, 1H), 7.87 (s, 1H), 6.88 (s, 1H), 4.33 (t, J = 7.2 Hz, 2H), 4.15-4.10 (m, 1H), 3.69 (s, 3H), 3.65-3.61 (m, 1H), 2.99-2.92 (m, 1H), 2.50-2.45 (m, 2H), 1.85-1.71

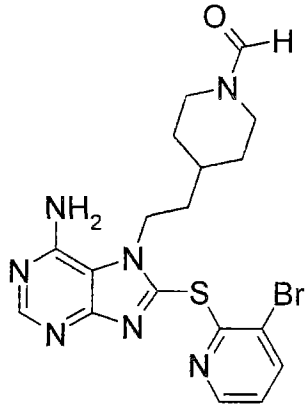
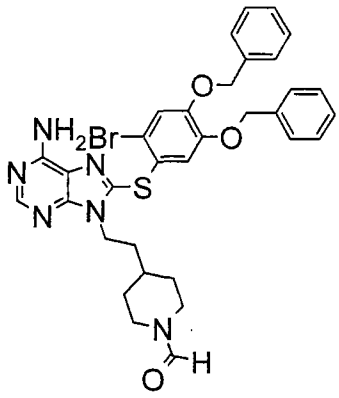
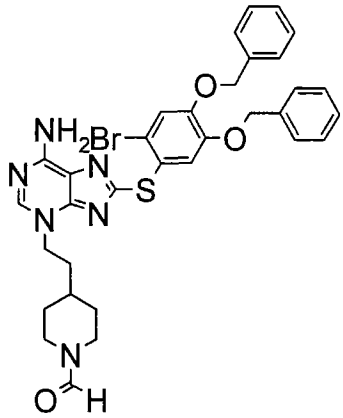
		(m, 3H), 1.60-1.45 (m, 1H), 1.10-0.9 (m, 2H). TOF-MS $[M+H]^+$ 454.0
536		4-(2-{6-氨基-8-[(2-甲氧基-5-硝基苯基)硫]-9H-嘌呤-9-基}乙基)哌啶-1-甲醛。^{1}H NMR (CD_3OD) δ 8.36 (d, J = 8.8 Hz, 1H), 8.33 (s, 1H), 8.29 (s, 1H), 7.97 (s, 1H), 7.31 (d, J = 8.8 Hz, 1H), 4.41 (t, J = 7.6 Hz, 2H), 3.96 (s, 3H), 3.74-3.68 (m, 1H), 3.13-3.04 (m, 2H), 2.67-2.60 (m, 2H), 1.93-1.80 (m, 3H), 1.70-1.55 (m, 1H), 1.22-1.09 (m, 2H). TOF-MS $[M+H]^+$ 458.0
537		4-(2-{6-氨基-8-[(2-甲氧基-5-硝基苯基)硫]-3H-嘌呤-3-基}乙基)哌啶-1-甲醛。^{1}H NMR (CD_3OD) δ 8.40-8.38 (m, 2H), 8.29 (d, J = 9.2 Hz, 1H), 7.97 (s, 1H), 7.27 (d, J = 9.2 Hz, 1H), 4.40 (t, J = 7.6 Hz, 2H), 3.99 (s, 3H), 2.96-2.84 (m, 2H), 1.93-1.00 (m, 5H). TOF-MS $[M+H]^+$ 458.0
538		4-(2-{6-氨基-8-[(4-甲氧基吡啶-2-基)硫]-9H-嘌呤-9-基}乙基)哌啶-1-甲醛。^{1}H NMR (CD_3OD) δ 8.25 (s, 1H), 8.20 (d, J = 5.2 Hz, 1H), 7.95 (s, 1H), 6.97 (s, 1H), 6.88 (d, J = 5.2 Hz, 1H), 4.35 (t, J = 7.6 Hz, 2H), 3.85 (s, 3H), 3.06-2.99 (m, 1H), 2.60-2.55 (m, 1H), 1.89-0.80 (m, 5H). TOF-MS $[M+H]^+$ 414.1

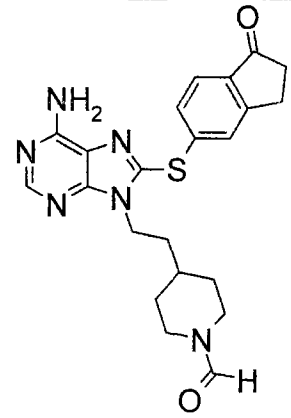
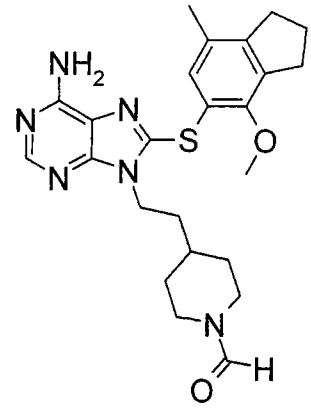
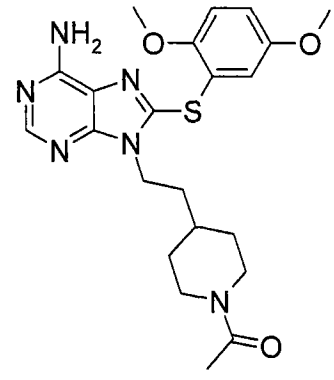
539		4-{2-[6-氨基-8-(1-苯并呋喃-5-基硫)-9H-嘌呤-9-基]乙基}哌啶-1-甲醛。^{1}H NMR (CD_3OD) δ 8.28 (s, 1H), 8.00-7.95 (m, 2H), 7.89-7.87 (m, 1H), 7.65-7.60 (m, 1H), 7.60-7.54 (m, 1H), 6.96 (s, 1H), 4.45-4.30 (m, 3H), 3.25-3.00 (m, 1H), 2.70-2.60 (m, 1H), 1.95-1.55 (m, 5H), 1.00-0.85 (m,1H). LC-MS $[M+H]^+$ 423.1
540		4-(2-{6-氨基-8-[(3,4,5-三甲氧基苯基)硫]-9H-嘌呤-9-基}乙基)哌啶-1-甲醛。LC-MS $[M+H]^+$ 473.2
541		4-(2-{6-氨基-8-[(3,4,5-三甲氧基苯基)硫]-3H-嘌呤-3-基}乙基)哌啶-1-甲醛。^{1}H NMR (DMSO-d_6) δ 8.64 (s, 1H), 7.96 (s, 1H), 7.06 (s, 2H), 4.35 (t, J = 7.2 Hz, 2H), 4.15-4.10 (m, 1H), 3.79 (s, 6H), 3.71 (s, 3H), 3.65-3.62 (m, 1H), 2.99-2.90 (m, 2H), 2.60-2.45 (m, 2H), 1.83-1.71 (m, 2H), 1.03-0.80 (m, 3H). LC-MS $[M+H]^+$ 473.2
542		2-({6-氨基-9-[2-(1-甲酰基哌啶-4-基)乙基]-9H-嘌呤-8-基}硫)异烟酸甲酯。^{1}H NMR (DMSO-d_6) δ 8.61 (d, J = 5.2 Hz, 1H), 8.28 (s, 1H), 7.91 (s, 1H), 7.70 (s, 1H), 7.68 (d, J = 5.2 Hz, 1H), 4.22 (t, J = 7.6 Hz, 2H), 4.07-4.03 (m, 1H), 3.86 (s, 3H), 3.59-3.56 (m, 1H), 2.90-2.82 (m, 1H), 2.50-2.45 (m,

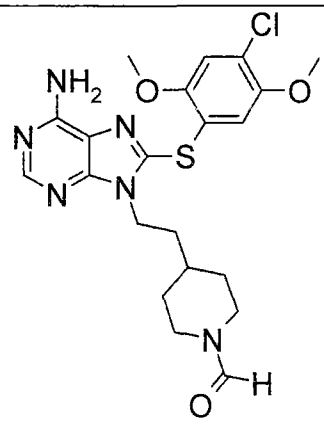
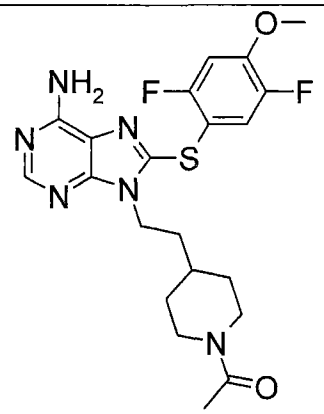
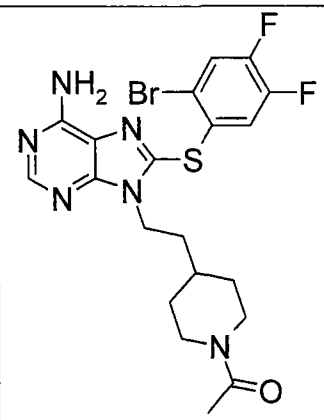
		2H), 1.70-1.60 (m, 3H), 1.48-1.35 (m, 1H), 0.97-0.83 (m, 2H). LC-MS $[M+H]^+$ 442.2
543		2-({6-氨基-3-[2-(1-甲酰基哌啶-4-基)乙基]-3H-嘌呤-8-基}硫)异烟酸甲酯。^{1}H NMR (DMSO-d_6) δ 8.69 (d, J = 4.8 Hz, 1H), 8.58 (s, 1H), 8.09 (s, 1H), 7.95 (s, 1H), 7.69 (d, J = 4.8 Hz, 1H), 4.36 (t, J = 7.2 Hz, 2H), 4.15-4.05 (m, 1H), 3.85 (s, 3H), 3.65-3.60 (m, 1H), 2.99-2.90 (m, 1H), 2.50-2.45 (m, 2H), 1.90-1.7 (m, 3H), 1.60-1.50 (m, 1H), 1.10-0.90 (m, 2H). LC-MS $[M+H]^+$ 442.2
544		4-(2-{6-氨基-8-[(6-甲氧基嘧啶-4-基)硫]-9H-嘌呤-9-基}乙基)哌啶-1-甲醛。^{1}H NMR (CD3OD) δ 8.50 (s, 1H), 8.33 (s, 1H), 7.95 (s, 1H), 6.79 (s, 1H), 4.35 (t, J = 7.2 Hz, 2H), 4.27-4.23 (m, 1H), 3.96 (s, 3H), 3.68-3.65 (m, 1H), 3.06-2.99 (m, 2H), 2.65-2.55 (m, 1H), 1.86-1.75 (m, 4H), 1.15-1.01 (m, 2H). LC-MS $[M+H]^+$ 415.2
545		4-(2-{6-氨基-8-[(7-溴-2,3-二氢-1,4-苯并二噁烯-6-基)硫]-9H-嘌呤-9-基}乙基)哌啶-1-甲醛。^{1}H NMR (DMSO-d_6) δ 8.17 (s, 1H), 7.93 (s, 1H), 7.28 (s, 1H), 6.96 (s, 1H), 4.25-4.05 (m, 3H), 3.65-3.55 (m, 1H), 2.95-2.85 (m, 1H), 2.50-2.45 (m, 4H), 1.75-1.35 (m, 6H), 1.00-0.85 (m, 2H).LC-MS $[M+H]^+$ 519.1

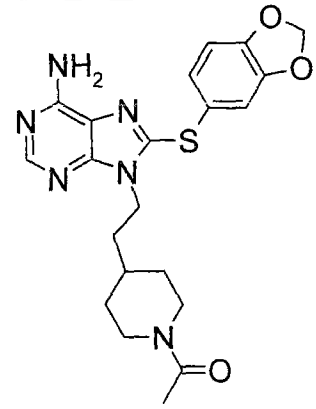
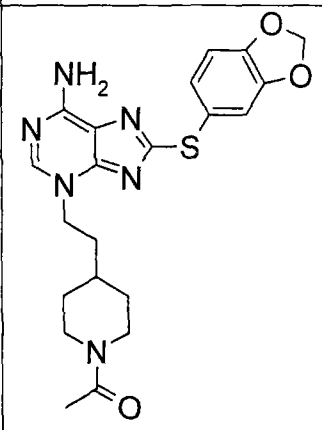
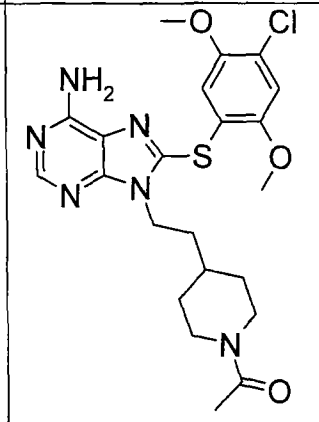
546		4-(2-{6-氨基-8-[(3-甲基-2-噻吩基)硫]-9H-嘌呤-9-基}乙基)哌啶-1-甲醛。^{1}H NMR (DMSO-d_6) δ 8.28 (s, 1H), 7.96 (s, 1H), 7.74 (d, J = 5.2 Hz, 1H), 7.10 (d, J = 5.2 Hz, 1H), 4.25 (t, J = 8.00 Hz, 2H), 4.14-4.10 (m, 2H), 3.16 (s, 3H), 3.00-2.90 (m, 2H), 1.60-0.80 (m, 7H). LC-MS $[M+H]^+$ 403.2
547		4-(2-{6-氨基-8-[(3-甲基-2-噻吩基)硫]-3H-嘌呤-3-基}乙基)哌啶-1-甲醛。^{1}H NMR (DMSO-d_6) δ 8.65 (s, 1H), 7.97 (s, 1H), 7.91 (d, J = 5.6, 1H), 7.23 (d, J = 5.6 Hz, 1H), 4.32 (t, J = 7.6 Hz, 2H), 4.13-4.09 (m, 2H), 2.98-2.91 (m, 1H), 2.57-2.50 (m, 2H), 2.30 (s, 3H), 1.60-0.80 (m, 6H). LC-MS $[M+H]^+$ 403.1
548		N-[4-({6-氨基-9-[2-(1-甲酰基哌啶-4-基)乙基]-9H-嘌呤-8-基}硫)-3-氯苯基]乙酰胺。^{1}H NMR (DMSO-d_6) δ 8.21 (s, 1H), 7.98 (s, 1H), 7.93 (s, 1H), 7.39 (d, J = 8.4 Hz, 1H), 7.21 (d, J = 8.4 Hz, 1H), 4.19 (t, J = 7.2 Hz, 2 H), 4.12-4.06 (m, 1H), 3.70-3.50 (m, 3H), 2.92-2.86 (m, 1H), 2.50-2.45 (m, 2H), 2.05 (s, 3H), 1.70-0.80 (m, 4H). LC-MS $[M+H]^+$ 474.2

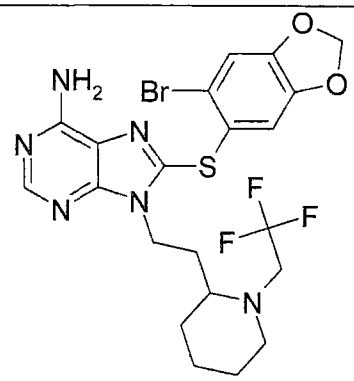
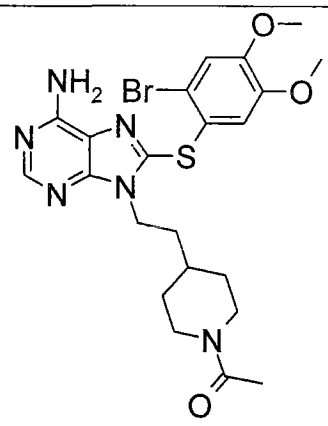
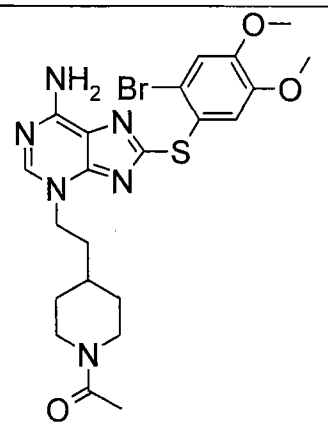
549		N-[4-({6-氨基-3-[2-(1-甲酰基哌啶-4-基)乙基]-3H-嘌呤-8-基}硫)-3-氯苯基]乙酰胺。^{1}H NMR (DMSO-d_6) δ 8.60 (s, 1H), 8.04 (s, 1H), 7.95 (s, 1H), 7.70-7.60 (m, 1H), 7.55-7.48 (m, 1H), 4.29 (t, J = 8.0 Hz, 2 H), 4.15-4.05 (m, 1H), 3.70-3.50 (m, 2H), 2.97-2.90 (m, 3H), 2.50-2.45 (m, 2H), 2.09 (s, 3H), 1.70-0.80 (m, 3H). LC-MS $[M+H]^+$ 474.1
550		4-(2-{6-氨基-8-[(3-溴吡啶-2-基)硫]-9H-嘌呤-9-基}乙基)哌啶-1-甲醛。^{1}H NMR (CD3OD) δ 8.41 (s, 1H), 8.22 (dd, J = 4.8, 1.6 Hz, 1H), 8.04 (dd, J = 8.0, 1.6 Hz, 1H), 7.95 (s, 1H), 7.17 (q, J = 8.0, 4.8 Hz, 1H), 4.33 (t, J = 8.4 Hz, 2H), 4.27-4.22 (m, 1H), 3.70-3.64 (m, 1H), 3.06-2.99 (m, 2H), 2.66-2.55 (m, 1H), 1.85-1.77 (m, 2H), 1.65-1.55 (m, 1H), 1.13-1.00 (m, 3H). TOF-MS $[M+H]^+$ 463.9
551		4-(2-{6-氨基-8-[(3-溴吡啶-2-基)硫]-3H-嘌呤-3-基}乙基)哌啶-1-甲醛。^{1}H NMR (CD_3OD) δ 8.64 (s, 1H), 8.61 (dd, J = 4.8, 1.6 Hz, 1H), 8.17 (dd, J = 8.0, 1.6 Hz, 1H), 7.99 (s, 1H), 7.36 (q, J = 8.0, 4.8 Hz, 1H), 4.51 (t, J = 8.0 Hz, 2H), 4.33-4.25 (m, 1H), 3.75-3.70 (m, 1H), 3.15-3.08 (m, 2H), 2.75-2.64 (m, 1H), 1.98-1.85 (m, 2H), 1.75-1.65 (m, 1H), 1.30-1.10 (m, 3H). TOF-MS $[M+H]^+$ 463.9

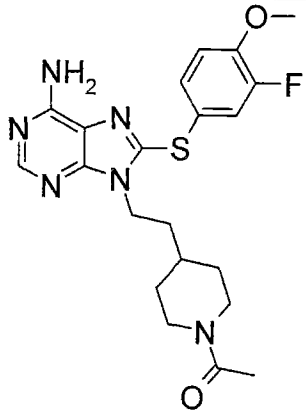
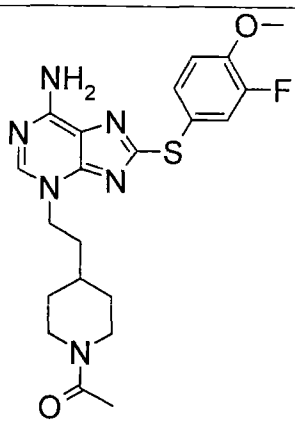
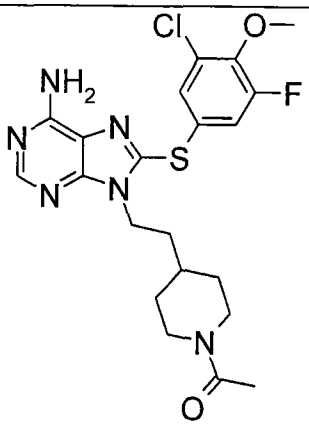
552		4-(2-{6-氨基-8-[(3-溴吡啶-2-基)硫]-7H-嘌呤-7-基}乙基)哌啶-1-甲醛。^{1}H NMR (CD_3OD) δ 8.46 (s, 1H), 8.27 (dd, J = 4.8, 1.6 Hz, 1H), 8.06 (dd, J = 8.0, 1.6 Hz, 1H), 7.94 (s, 1H), 7.20 (q, J = 8.0, 4.8 Hz, 1H), 4.55 (t, J = 8.0 Hz, 2H), 4.25-4.15 (m, 1H), 3.70-3.60 (m, 1H), 3.15-3.08 (m, 2H), 2.65-2.55 (m, 1H), 1.80-1.60 (m, 3H), 1.10-0.90 (m, 3H). TOF-MS $[M+H]^+$ 463.9
553		4-[2-(6-氨基-8-{[4,5-双(苄氧基)-2-溴苯基]硫}-9H-嘌呤-9-基)乙基]哌啶-1-甲醛。^{1}H NMR (CD_3OD) δ 8.21 (s, 1H), 7.94 (s, 1H), 7.47-7.30 (m, 6H), 7.12-7.01 (m, 5H), 6.86 (s, 1H), 5.15 (s, 2H), 5.07 (s, 2H), 4.25-4.18 (m, 1H), 4.11 (t, J= 7.6 Hz, 2H), 3.65-3.58 (m, 2H), 2.99-2.91 (m, 1H), 2.57-2.49 (m, 1H), 1.74-1.64 (m, 2H), 1.43-1.35 (m, 1H), 1.10-0.89 (m, 3H); TOF-MS $[M+H]^+$ 673.1
554		4-[2-(6-氨基-8-{[4,5-双(苄氧基)-2-溴苯基]硫}-3H-嘌呤-3-基)乙基]哌啶-1-甲醛。^{1}H NMR (CD_3OD) δ 8.26 (s, 1H), 7.95 (s, 1H), 7.47-7.14 (m, 12H), 5.15 (s, 2H), 5.05 (s, 2H), 4.33 (t, J = 7.6 Hz, 2H), 4.28-4.24 (m, 1H), 3.68-3.63 (m, 1H), 3.09-3.00 (m, 2H), 2.67-2.55 (m, 1H), 1.88-1.78 (m, 3H), 1.63-1.60 (m, 1H), 1.20-1.00 (m, 2H). TOF-MS $[M+H]^+$ 673.16

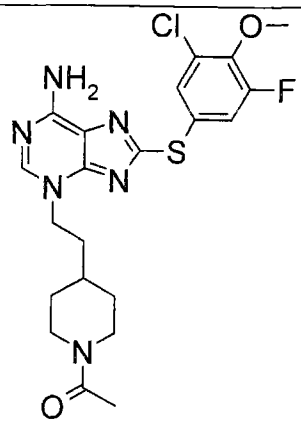
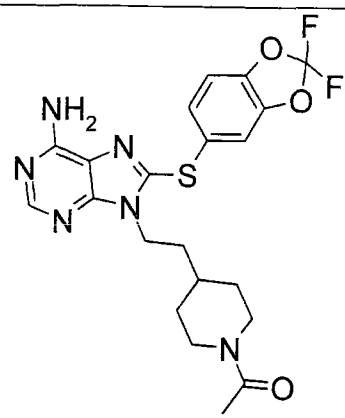
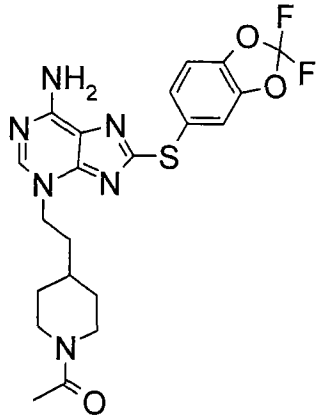
555		4-(2-{6-氨基-8-[(1-氧代-2,3-二氢-1H-茚-5-基)硫]-9H-嘌呤-9-基}乙基)哌啶-1-甲醛。^{1}H NMR (CD_3OD) δ 8.29 (s, 1H), 7.95 (s, 1H), 7.70 (d, J = 8.4 Hz, 1H), 7.36 (s, 1H), 7.45 (d, J = 8.4 Hz, 1H), 4.35 (t, J = 7.6 Hz, 2H), 4.28-4.24 (m, 1H), 3.70-3.64 (m, 1H), 3.17-3.00 (m, 6H), 2.75-2.57 (m, 4H), 1.85-1.70 (m, 3H). TOF-MS [M+H]$^+$ 437.18
556		4-(2-{6-氨基-8-[(4-甲氧基-7-甲基-2,3-二氢-1H-茚-5-基)硫]-9H-嘌呤-9-基}乙基)哌啶-1-甲醛。^{1}H NMR (CD_3OD) δ 8.28 (s, 1H), 7.98 (s, 1H), 7.16 (s, 1H), 4.36 (t, J = 7.6 Hz, 2H), 4.35-4.27 (m, 1H), 3.73 (s, 3H), 3.72-3.68 (m, 1H), 3.14-3.05 (m, 2H), 3.01 (t, J = 8.0 Hz, 2H), 2.86 (t, J = 7.6 Hz, 2H), 2.70-2.64 (m, 1H), 2.21 (s, 3H), 2.15-2.10 (m, 2H), 1.89-1.55 (m, 3H), 1.20-1.05 (m, 3H); TOF-MS [M+H]$^+$ 467.2
557		9-[2-(1-乙酰基哌啶-4-基)乙基]-8-[(2,5-二甲氧基苯基)硫]-9H-嘌呤-6-胺。 ^{1}H NMR (CD_3OD) δ 8.28 (s, 1H), 7.07-7.00 (m, 3H), 4.50-4.44 (m, 1H), 4.37 (t, J = 7.6 Hz, 2H), 3.94-3.85 (m, 1H), 3.74 (s, 6H), 3.13-3.04 (m, 2H), 2.60-2.52 (m, 1H), 2.08 (s, 3H), 1.90-1.74 (m, 3H), 1.60-1.55 (m, 1H), 1.24-1.06 (m, 2H). TOF-MS [M+H]$^+$ 457.2

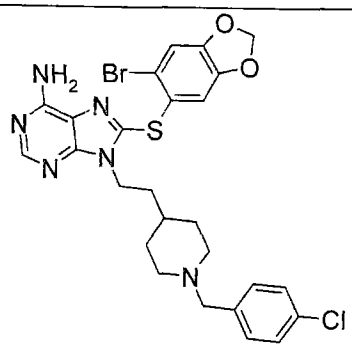
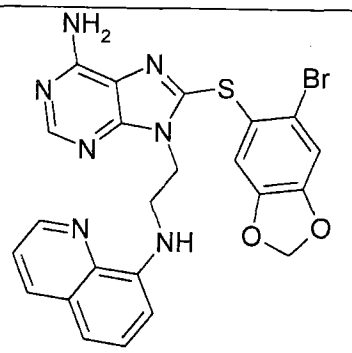
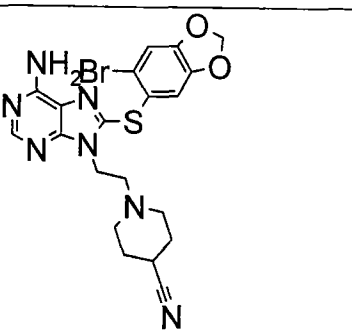
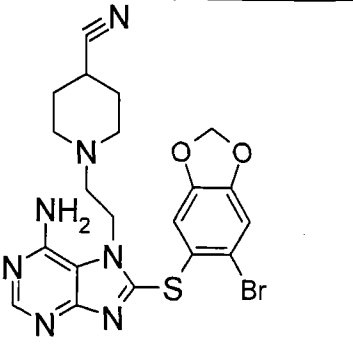
558		4-(2-{6-氨基-8-[(4-氯-2,5-二甲氧基苯基)硫]-9H-嘌呤-9-基}乙基)哌啶-1-甲醛。^{1}H NMR (CD_3OD) δ 8.31 (s, 1H), 7.98 (s, 1H), 7.33 (s, 1H), 7.22 (s, 1H), 4.40 (t, J = 7.6 Hz, 2H), 4.33-4.29 (m, 1H), 3.84 (s, 3H), 3.74 (s, 3H), 3.74-3.68 (m, 1H), 3.14-3.06 (m, 2H), 2.69-2.62 (m, 1H), 1.95-1.58 (m, 4H), 1.29-1.11 (m, 2H). TOF-MS $[M+H]^+$ 477.1
559		9-[2-(1-乙酰基哌啶-4-基)乙基]-8-[(2,5-二氟-4-甲氧基苯基)硫]-9H-嘌呤-6-胺。 ^{1}H NMR (CD_3OD) δ 8.28 (s, 1H), 7.51 (dd, J = 10.4, 3.2 Hz, 1H), 7.17 (dd, J = 10.4, 3.2 Hz, 1H), 4.53-4.48 (m, 1H), 4.38 (t, J = 7.6 Hz, 2H), 3.93 (s, 3H), 3.93-3.90 (m, 1H), 3.13-3.04 (m, 2H), 2.62-2.57 (m, 1H), 2.10-2.07 (m, 1H), 2.08 (s, 3H), 1.95-1.55 (m, 3H), 1.31-1.12 (m, 2H); TOF-MS $[M+H]^+$ 463.1
560		9-[2-(1-乙酰基哌啶-4-基)乙基]-8-[(2-溴-4,5-二氟苯基)硫]-9H-嘌呤-6-胺。 ^{1}H NMR (CD_3OD) δ 8.32 (s, 1H), 7.84 (dd, J = 10.0, 3.6 Hz, 1H), 7.69 (dd, J = 10.0, 3.6 Hz, 1H), 4.53-4.47 (m, 1H), 4.39 (t, J = 7.6 Hz, 2H), 3.93-3.88 (m, 1H), 3.13-3.00 (m, 2H), 2.65-2.52 (m, 1H), 2.10-2.07 (m, 1H), 2.08 (s, 3H), 1.90-1.56 (m, 3H), 1.30-1.08 (m, 2H). TOF-MS $[M+H]^+$ 511.0

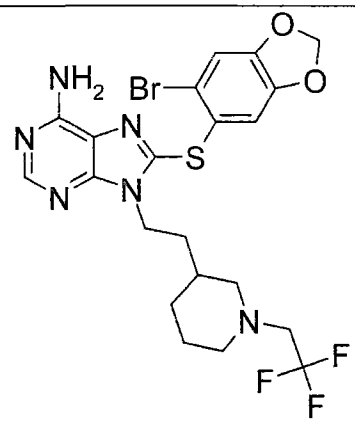
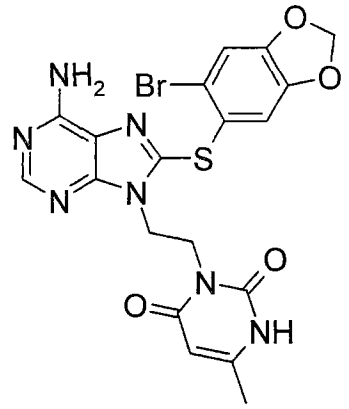
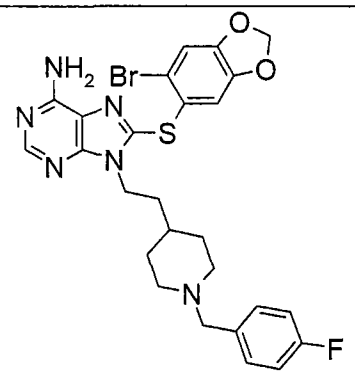
561		9-[2-(1-乙酰基哌啶-4-基)乙基]-8-(1,3-苯并间二氧杂环戊烯-5-基硫)-9H-嘌呤-6-胺。^{1}H NMR (CD_3OD) δ 8.28 (s, 1H), 7.19-7.11 (m, 2H), 6.93 (d, J = 7.6 Hz, 1H), 6.04 (s, 2H), 4.52-4.48 (m, 1H), 4.33 (t, J = 8.4 Hz, 2H), 3.95-3.86 (m, 1H), 3.13-3.04 (m, 2H), 2.62-2.52 (m, 1H), 2.08 (s, 3H), 1.95-1.50 (m, 3H), 1.26-1.18 (m, 3H). TOF-MS $[M+H]^+$ 441.16
562		3-[2-(1-乙酰基哌啶-4-基)乙基]-8-(1,3-苯并间二氧杂环戊烯-5-基硫)-3H-嘌呤-6-胺。^{1}H NMR (CD_3OD) δ 8.54 (s, 1H), 7.29 (dd, J = 8.4, 1.6 Hz, 1H), 7.23 (d, J = 1.6 Hz, 1H), 7.03 (d, J= 8.4 Hz, 1H), 6.11 (s, 2H), 4.51-4.41 (m, 1H), 4.13 (t, J = 7.2 Hz, 2H), 3.95-3.86 (m, 1H), 3.13-3.04 (m, 2H), 2.64-2.55 (m, 1H), 2.10-2.02 (m, 1H), 2.03 (s, 3H), 1.92-1.50 (m, 3H), 1.20-1.10 (m, 2H). TOF-MS $[M+H]^+$ 441.16
563		9-[2-(1-乙酰基哌啶-4-基)乙基]-8-[(4-氯-2,5-二甲氧基苯基)硫]-9H-嘌呤-6-胺。 ^{1}H NMR (CD_3OD) δ 8.29 (s, 1H), 7.32 (s, 1H), 7.22 (s, 1H), 4.52-4.47 (m, 1H), 4.38 (t, J = 8.0 Hz, 2H), 3.94-3.88 (m, 1H), 3.84 (s, 3H), 3.74 (s, 3H), 3.14-3.02 (m, 2H), 2.69-2.55 (m, 1H), 2.09 (s, 3H), 1.95-1.78 (m, 2H), 1.60-1.55 (m, 2H), 1.29-1.11 (m, 2H). TOF-MS $[M+H]^+$ 491.15

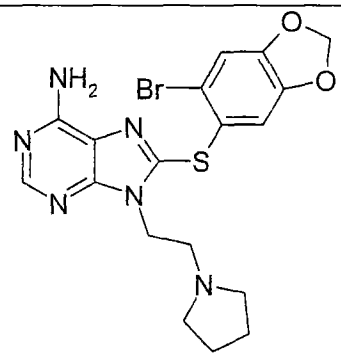
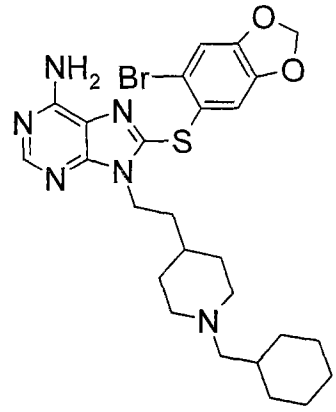
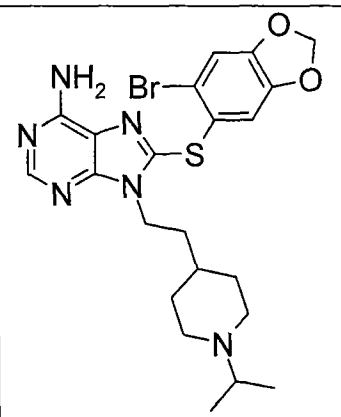
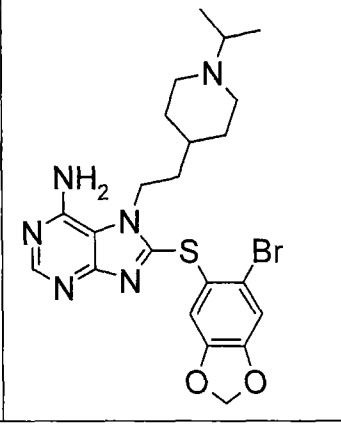
564		8-[(6-溴-1,3-苯并间二氧杂环戊烯-5-基)硫]-9-{2-[1-(2,2,2-三氟乙基)哌啶-2-基]乙基}-9H-嘌呤-6-胺。^{1}H NMR (CD_3OD) δ 8.27 (s, 1H), 7.19 (s, 1H), 7.08 (s, 1H), 6.04 (s, 2H), 4.40-4.28 (m, 2H), 4.08-4.04 (m, 1H), 3.72-3.60 (m, 1H), 3.18-3.10 (m, 2H), 2.96 (s, 2H), 2.95-2.92 (m, 1H), 2.6-2.52 (m, 1H), 2.1-2.00 (m, 1H), 1.82-1.74 (m, 1H), 1.68-1.50 (m, 3H). TOF-MS $[M+H]^+$ 557.98
565		9-[2-(1-乙酰基哌啶-4-基)乙基]-8-[(2-溴-4,5-二甲氧基苯基)硫]-9H-嘌呤-6-胺。^{1}H NMR (CD_3OD) δ 8.32 (s, 1H), 7.35 (s, 1H), 7.34 (s, 1H), 4.52-4.47 (m, 1H), 4.39 (t, J = 7.6 Hz, 2H), 3.95-3.87 (m, 1H), 3.88 (s, 3H), 3.82 (s, 3H), 3.12-3.03 (m, 2H), 2.63-2.55 (m, 1H), 2.09 (s, 3H), 1.94-1.50 (m, 4H), 1.23-1.08 (m, 3H). TOF-MS $[M+H]^+$ 535.1
566		3-[2-(1-乙酰基哌啶-4-基)乙基]-8-[(2-溴-4,5-二甲氧基苯基)硫]-3H-嘌呤-6-胺。^{1}H NMR (CD_3OD) δ 8.53 (s, 1H), 7.45 (s, 1H), 7.43 (s, 1H), 4.52-4.47 (m, 1H), 4.42 (t, J = 8.0 Hz, 2H), 3.95-3.87 (m, 1H), 3.92 (s, 3H), 3.86 (s, 3H), 3.12-3.03 (m, 2H), 2.64-2.56 (m, 1H), 2.10 (s, 3H), 1.94-1.50 (m, 4H), 1.23-1.08 (m, 3H). TOF-MS $[M+H]^+$ 535.1

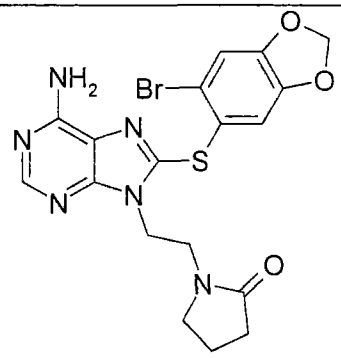
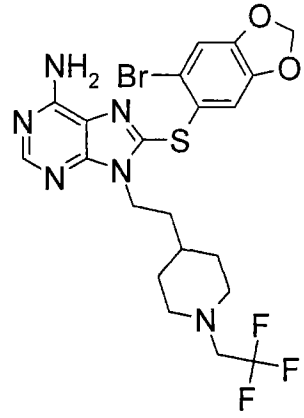
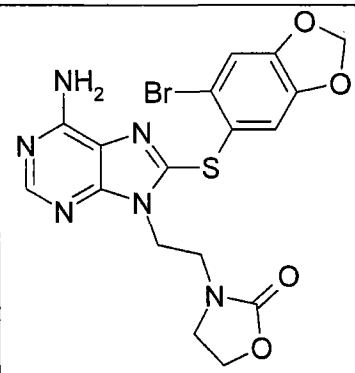
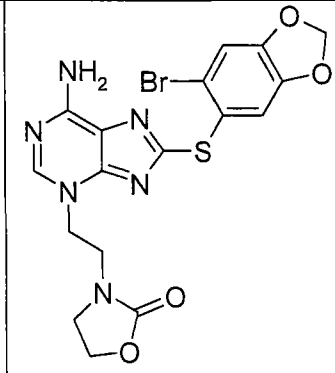
567		9-[2-(1-乙酰基哌啶-4-基)乙基]-8-[(3-氟-4-甲氧基苯基)硫]-9H-嘌呤-6-胺。^{1}H NMR (CD_3OD) δ 8.19 (s, 1H), 7.43-7.37 (m, 2H), 7.23-7.17 (m, 1H), 4.52-4.44 (m, 1H), 4.31 (t, J = 8.0 Hz, 2H), 3.95-3.87 (m, 1H), 3.91 (s, 3H), 3.14-3.00 (m, 2H), 2.62-2.53 (m, 1H), 2.08 (s, 3H), 1.89-1.50 (m, 4H), 1.23-1.08 (m, 2H). TOF-MS $[M+H]^+$ 445.17
568		3-[2-(1-乙酰基哌啶-4-基)乙基]-8-[(3-氟-4-甲氧基苯基)硫]-3H-嘌呤-6-胺。 ^{1}H NMR (CD_3OD) δ 8.53 (s, 1H), 7.58-7.50 (m, 2H), 7.32-7.28 (m, 1H), 4.52-4.44 (m, 1H), 4.41 (t, J = 7.6 Hz, 2H), 3.97 (s, 3H), 3.93-3.86 (m, 1H), 3.13-3.03 (m, 2H), 2.64-2.54 (m, 1H), 2.09 (s, 3H), 1.89-1.50 (m, 4H), 1.23-1.08 (m, 2H). TOF-MS $[M+H]^+$ 445.17。
569		9-[2-(1-乙酰基哌啶-4-基)乙基]-8-[(3-氯-5-氟-4-甲氧基苯基)硫]-9H-嘌呤-6-胺。^{1}H NMR (CD_3OD) δ 8.26 (s, 1H), 7.51-7.49 (m, 1H), 7.46-7.42 (m, 1H), 4.52-4.45 (m, 1H), 4.34 (t, J = 7.6 Hz, 2H), 3.98 (s, 3H), 3.94-3.87 (m, 1H), 3.14-3.00 (m, 2H), 2.61-2.53 (m, 1H), 2.08 (s, 3H), 1.89-1.50 (m, 4H), 1.23-1.08 (m, 2H). TOF-MS $[M+H]^+$ 479.15

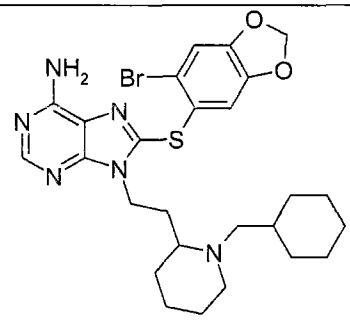
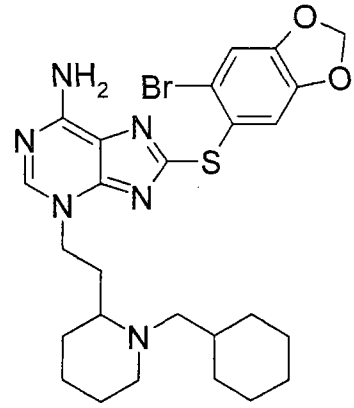
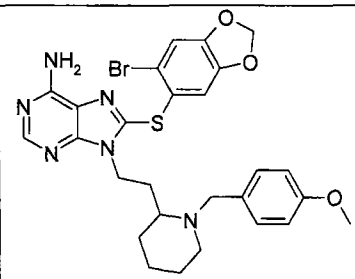
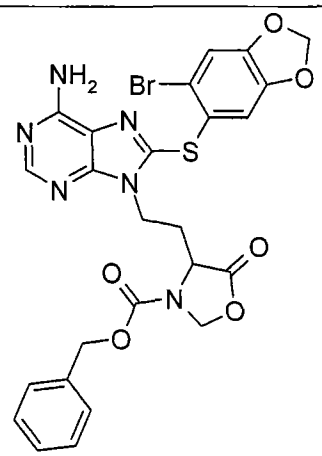
570		3-[2-(1-乙酰基哌啶-4-基)乙基]-8-[(3-氯-5-氟-4-甲氧基苯基)硫]-3H-嘌呤-6-胺。^{1}H NMR (CD_3OD) δ 8.46 (s, 1H), 7.60-7.59 (m, 1H), 7.55-7.50 (m, 1H), 4.51-4.46 (m, 1H), 4.40 (t, J = 7.2 Hz, 2H), 4.02 (s, 3H), 3.94-3.86 (m, 1H), 3.16-3.02 (m, 2H), 2.62-2.55 (m, 1H), 2.09 (s, 3H), 1.89-1.50 (m, 4H), 1.30-1.10 (m, 2H). TOF-MS $[M+H]^+$ 479.15
571		9-[2-(1-乙酰基哌啶-4-基)乙基]-8-[(2,2-二氟-1,3-苯并间二氧杂环戊烯-5-基)硫]-9H-嘌呤-6-胺。^{1}H NMR (CD_3OD) δ 8.33 (s, 1H), 7.62 (d, J = 1.6 Hz, 1H), 7.50 (dd, J = 8.4, 1.6 Hz, 1H), 7.34 (d, J = 8.4 Hz, 1H), 4.52-4.75 (m, 1H), 4.37 (t, J = 7.6 Hz, 2H), 3.93-3.88 (m, 1H), 3.11-3.02 (m, 2H), 2.62-2.55 (m, 1H), 2.10-2.06 (m, 1H), 2.08 (s, 3H), 1.92-1.50 (m, 3H), 1.20-1.10 (m, 2H). TOF-MS $[M+H]^+$ 477.15
572		3-[2-(1-乙酰基哌啶-4-基)乙基]-8-[(2,2-二氟-1,3-苯并间二氧杂环戊烯-5-基)硫]-3H-嘌呤-6-胺。^{1}H NMR (CD3OD) δ 8.54 (s, 1H), 7.70 (d, J = 1.6 Hz, 1H), 7.60 (dd, J = 8.4, 1.6 Hz, 1H), 7.42 (d, J = 8.4 Hz, 1H), 4.51-4.46 (m, 1H), 4.41 (t, J = 7.6 Hz, 2H), 3.95-3.86 (m, 1H), 3.13-3.04 (m, 2H), 2.64-2.55 (m, 1H), 2.10-2.02 (m, 4H), 1.92-1.50 (m, 3H), 1.20-1.10 (m, 2H). TOF-MS $[M+H]^+$ 477.15

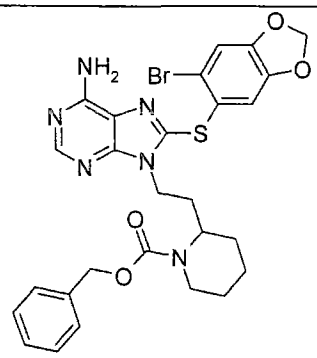
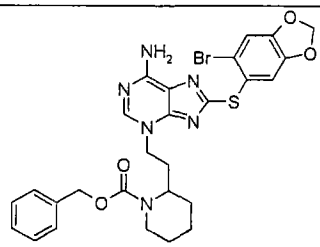
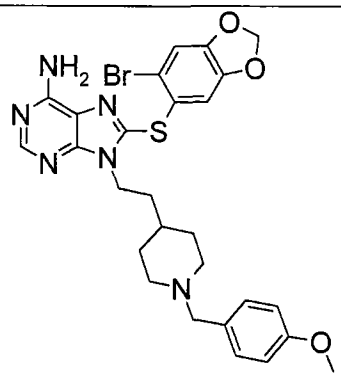
573		8-[(6-溴-1,3-苯并间二氧杂环戊烯-5-基)硫]-9-{2-[1-(4-氯苄基)哌啶-4-基]乙基}-9H-嘌呤-6-胺。^{1}H NMR (CD_3OD) δ 8.20 (s, 1H), 7.55-7.47 (m, 4H), 7.27 (s, 1H), 7.12 (s, 1H), 6.08 (s, 2H), 4.35-4.25 (m, 3H), 3.10-2.80 (m, 2H), 2.15-1.8 (m, 3H), 2.05 (s, 2H), 1.60-0.80 (m, 5H). TOF-MS $[M+H]^+$ 601.0
574		N-(2-{6-氨基-8-[(6-溴-1,3-苯并间二氧杂环戊烯-5-基)硫]-9H-嘌呤-9-基}乙基)喹啉-8-胺。^{1}H NMR (CD_3OD) δ 8.63 (dd, J = 4.0, 1.6 Hz, 1H), 8.17 (s, 1H), 8.11 (d, J = 8.4 Hz, 1H), 7.40 (dd, J = 8.4, 4.0 Hz, 1H), 7.27 (t, J = 8.0 Hz, 1H), 7.12 (s, 1H), 7.04 (d, J = 8.4 Hz, 1H), 6.83 (s, 1H), 6.69 (d, 8.0 Hz, 1H), 5.99 (s, 2H), 4.62 (t, J = 5.6 Hz, 2H), 3.92 (t, J = 5.6 Hz, 2H). TOF-MS $[M+H]^+$ 536.0
575		1-(2-{6-氨基-8-[(6-溴-1,3-苯并间二氧杂环戊烯-5-基)硫]-9H-嘌呤-9-基}乙基)哌啶-4-甲腈。^{1}H NMR (CD_3OD) δ 8.35 (s, 1H), 7.29 (s, 1H), 7.27 (s, 1H), 6.10 (s, 2H), 4.46-4.41 (m, 2H), 2.96-2.90 (m, 2H), 1.90-1.50 (m, 9H). TOF-MS $[M+H]^+$ 502.0
576		1-(2-{6-氨基-8-[(6-溴-1,3-苯并间二氧杂环戊烯-5-基)硫]-7H-嘌呤-7-基}乙基)哌啶-4-甲腈。^{1}H NMR (CD_3OD) δ 8.49(s, 1H), 7.36 (s, 1H), 7.34 (s, 1H), 6.14 (s, 2H), 4.78-4.70 (m, 2H), 3.62-3.58 (m, 2H), 1.90-1.50 (m, 9H). TOF-MS

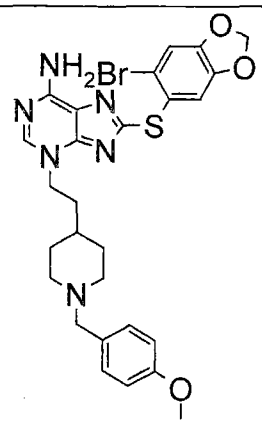
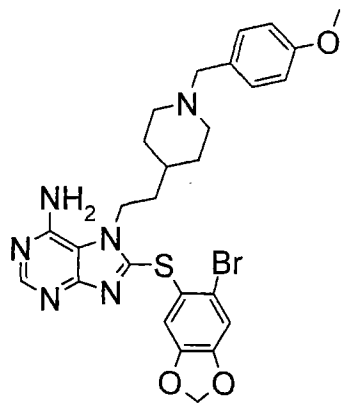
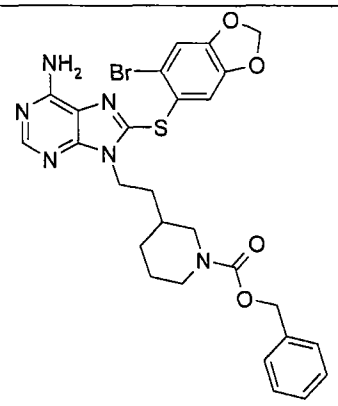
		$[M+H]^+$ 502.0
577		8-[(6-溴-1,3-苯并间二氧杂环戊烯-5-基)硫]-9-{2-[1-(2,2,2-三氟乙基)哌啶-3-基]乙基}-9H-嘌呤-6-胺。^{1}H NMR (CD_3OD) δ 8.27 (s, 1H), 7.28 (s, 1H), 7.18 (s, 1H), 6.09 (s, 2H), 4.37 (t, J = 7.2 Hz, 2H), 3.59-3.50 (m, 2H), 2.84-2.76 (m, 1H), 2.79 (s, 2H), 2.58-2.50 (m, 1H), 1.94-1.50 (m, 7H). TOF-MS $[M-H]^+$ 557.04
578		3-(2-{6-氨基-8-[(6-溴-1,3-苯并间二氧杂环戊烯-5-基)硫]-9H-嘌呤-9-基}乙基)-6-甲基嘧啶-2,4(1H,3H)-二酮。^{1}H NMR (CD_3OD) δ 8.26 (s, 1H), 7.25 (s, 1H), 7.15 (s, 1H), 6.08 (s, 2H), 5.40 (s, 1H), 4.65-4.60 (m, 2H), 4.38-4.36 (m, 2H), 2.07 (s, 3H). LC-MS $[M-H]^+$ 517.8
579		8-[(6-溴-1,3-苯并间二氧杂环戊烯-5-基)硫]-9-{2-[1-(4-氟苄基)哌啶-4-基]乙基}-9H-嘌呤-6-胺。^{1}H NMR (CD_3OD) δ 8.18 (s, 1H), 7.55-7.50 (m, 2H), 7.27-7.22 (m, 3H), 7.09 (s, 1H), 6.08 (s, 2H), 4.31 (t, J = 7.2 Hz, 2H), 4.27 (s, 2H), 3.50-3.47 (m, 2H), 2.99-2.91 (m, 2H), 2.16-2.10 (m, 2H), 1.90-1.40 (m, 5H). TOF-MS $[M+H]^+$ 585.1

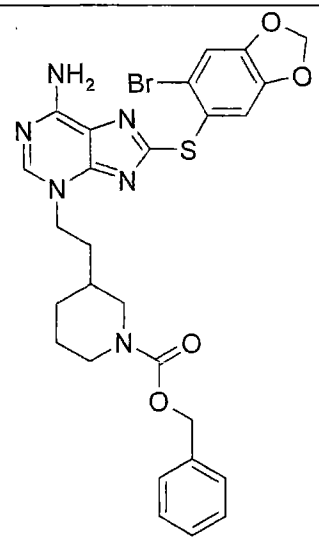
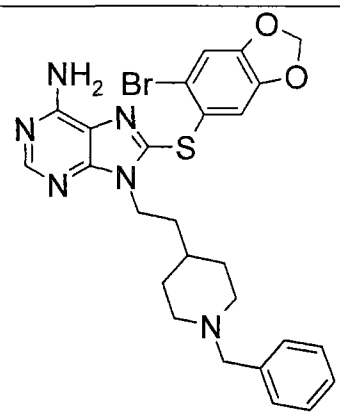
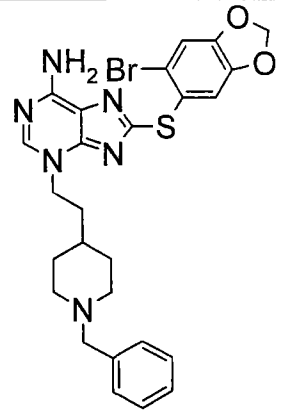
580		8-[(6-溴-1,3-苯并间二氧杂环戊烯-5-基)硫]-9-(2-吡咯烷-1-基乙基)-9H-嘌呤-6-胺。^{1}H NMR (CD_3OD) δ 8.30 (s, 1H), 7.27 (s, 1H), 7.19 (s, 1H), 6.08 (s, 2H), 4.70 (t, J = 6.4 Hz, 2H), 3.78 (t, J = 6.4 Hz, 2H), 3.50-3.47 (m, 4H), 2.40-2.00 (m, 4H). LC-MS $[M+H]^+$ 463.3
581		8-[(6-溴-1,3-苯并间二氧杂环戊烯-5-基)硫]-9-{2-[1-(环己基甲基)哌啶-4-基]乙基}-9H-嘌呤-6-胺。^{1}H NMR (CD_3OD) δ 8.20 (s, 1H), 7.27 (s, 1H), 7.10 (s, 1H), 6.08 (s, 2H), 4.35-4.30 (m, 2H), 3.60-3.53 (m, 2H), 2.93-2.84 (m, 4H), 2.16-0.80 (m, 18H). TOF-MS $[M+H]^+$ 573.1
582		8-[(6-溴-1,3-苯并间二氧杂环戊烯-5-基)硫]-9-[2-(1-异丙基哌啶-4-基)乙基]-9H-嘌呤-6-胺。 ^{1}H NMR (CD_3OD) δ 8.23 (s, 1H), 7.27 (s, 1H), 7.13 (s, 1H), 6.08 (s, 2H), 4.38-4.30 (m, 2H), 3.62-3.52 (m, 2H), 3.36-3.26 (m, 1H) 3.05-2.98 (m, 2H), 2.96-2.84 (m, 2H), 1.8-0.80 (m, 11H). TOF-MS $[M+H]^+$ 519.1
583		8-[(6-溴-1,3-苯并间二氧杂环戊烯-5-基)硫]-7-[2-(1-异丙基哌啶-4-基)乙基]-7H-嘌呤-6-胺。^{1}H NMR (CD_3OD) δ 8.15 (s, 1H), 7.26 (s, 1H), 7.2 (s, 1H), 6.09 (s, 2H), 3.50-3.47 (m, 5H), 1.80-0.80 (m, 15H). TOF-MS $[M+H]^+$ 519.1

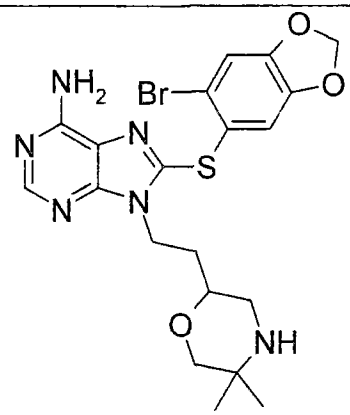
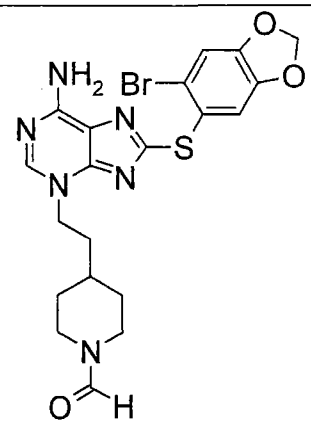
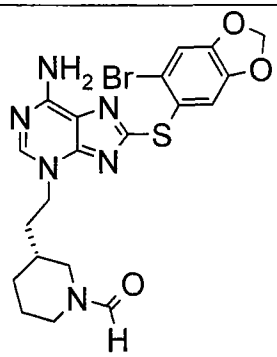
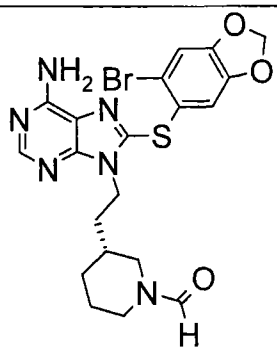
584		1-(2-{6-氨基-8-[(6-溴-1,3-苯并间二氧杂环戊烯-5-基)硫]-9H-嘌呤-9-基}乙基)吡咯烷-2-酮。^{1}H NMR ($CDCl_3$) δ 8.31 (s, 1H), 7.25 (s, 1H), 7.23 (s, 1H), 6.08 (s, 2H), 4.51-4.46 (m, 2H), 3.78-3.74 (m, 2H), 3.62-3.56 (m, 2H), 2.20-2.15 (m, 2H), 2.10-2.05 (m, 2H). TOF-MS $[M+H]^+$ 477.0
585		8-[(6-溴-1,3-苯并间二氧杂环戊烯-5-基)硫]-9-{2-[1-(2,2,2-三氟乙基)哌啶-4-基]乙基}-9H-嘌呤-6-胺。^{1}H NMR (CD_3OD) δ 8.29 (s, 1H), 7.28 (s, 1H), 7.18 (s, 1H), 6.09 (s, 2H), 4.35 (t, J = 7.2 Hz, 2H), 3.56-3.50 (m, 2H), 3.35 (s, 2H), 3.30-3.25 (m, 2H), 2.69-2.59 (m, 3H), 2.00-1.40 (m, 4H). TOF-MS $[M+H]^+$ 559.0
586		3-(2-{6-氨基-8-[(6-溴-1,3-苯并间二氧杂环戊烯-5-基)硫]-9H-嘌呤-9-基}乙基)-1,3-噁唑烷-2-酮。^{1}H NMR (CD_3OD) δ 8.31 (s, 1H), 7.27 (s, 1H), 7.22 (s, 1H), 6.08 (s, 2H), 4.52 (t, J = 7.6 Hz, 2H), 4.32 (t, J = 8.8 Hz, 2H), 3.81 (t, J = 8.8 Hz, 2H), 3.74 (t, J=7.6 Hz, 2H). TOF-MS $[M+H]^+$ 479.0
587		3-(2-{6-氨基-8-[(6-溴-1,3-苯并间二氧杂环戊烯-5-基)硫]-3H-嘌呤-3-基}乙基)-1,3-噁唑烷-2-酮。^{1}H NMR (CD_3OD) δ 8.55 (s, 1H), 7.38 (s, 1H), 7.37 (s, 1H), 6.15 (s, 2H), 4.58 (t, J = 9.2 Hz, 2H), 4.32 (t, J = 7.6 Hz, 2H), 3.80-3.75 (m, 4H). TOF-MS $[M+H]^+$ 479.0

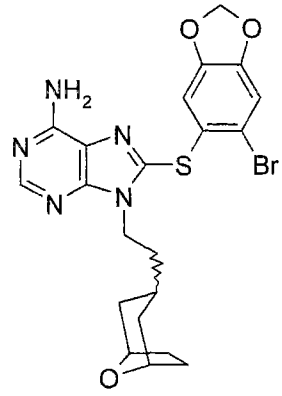
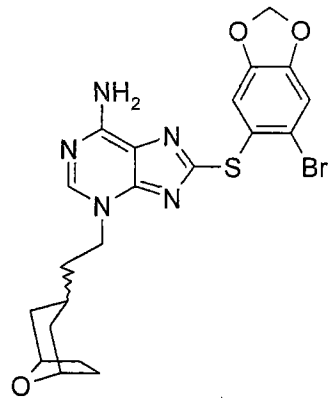
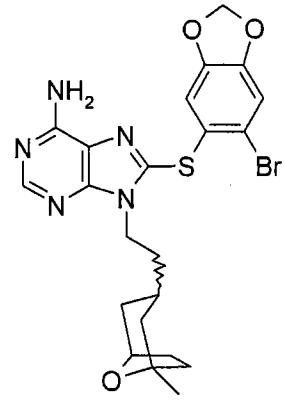
588		8-[(6-溴-1,3-苯并间二氧杂环戊烯-5-基)硫]-9-{2-[1-(环己基甲基)哌啶-2-基]乙基}-9H-嘌呤-6-胺。^{1}H NMR (丙酮 d_6) δ 8.36 (s, 1H), 7.27 (s, 1H), 7.01 (s, 1H), 6.13 (s, 2H), 4.50-4.48 (m, 2H), 3.70-3.50 (m, 5H), 3.30-3.20 (m, 2H), 2.10-0.80 (m, 17H). TOF-MS $[M+H]^+$ 573.1
589		8-[(6-溴-1,3-苯并间二氧杂环戊烯-5-基)硫]-3-{2-[1-(环己基甲基)哌啶-2-基]乙基}-3H-嘌呤-6-胺。TOF-MS $[M+H]^+$ 573.1
590		8-[(6-溴-1,3-苯并间二氧杂环戊烯-5-基)硫]-9-{2-[1-(4-甲氧基苄基)哌啶-2-基]乙基}-9H-嘌呤-6-胺。 ^{1}H NMR (CD_3OD) δ 8.30 (s, 1H), 7.41-7.15 (m, 4H), 6.98-6.84 (m, 2H), 6.10-6.03 (m, 2H), 4.80-4.60 (m, 2H), 3.85-3.78 (m, 6H), 2.10-1.50 (m, 10H). TOF-MS $[M-H]^+$ 597.0
591		4-(2-{6-氨基-8-[(6-溴-1,3-苯并间二氧杂环戊烯-5-基)硫]-9H-嘌呤-9-基}乙基)-5-氧代-1,3-噁唑烷-3-羧酸苯甲酯。^{1}H NMR (DMSO-d_6) δ 8.23 (s, 1H), 7.37-7.13 (m, 7H), 6.64 (s, 2H), 6.02 (s, 2H), 5.38 (s, 2H), 5.10-5.00 (m, 1H), 4.80-4.70 (m, 2H), 3.60-3.30 (m, 2H). TOF-MS $[M+H]^+$ 613.0

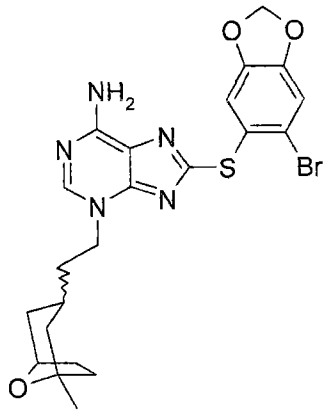
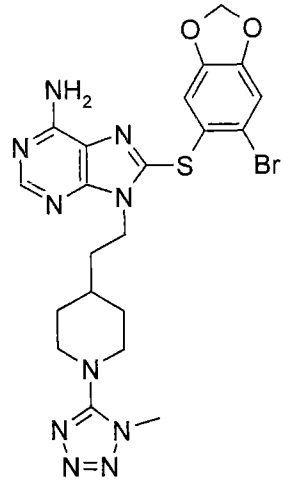
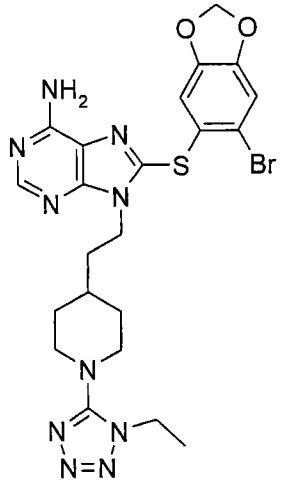
592		2-(2-{6-氨基-8-[(6-溴-1,3-苯并间二氧杂环戊烯-5-基)硫]-9H-嘌呤-9-基}乙基)哌啶-1-羧酸苯甲酯。^{1}H NMR (DMSO-d_6) δ 8.29 (s, 1H), 7.36 (s, 1H), 7.35-7.24 (m, 5H), 6.85 (s, 1H), 6.07 (s, 2H), 5.00 (s, 2H), 4.25-3.87 (m, 6H), 2.80-2.65 (m, 1H), 2.20-1.75 (m, 2H), 1.60-1.40 (m, 4H). TOF-MS $[M+H]^+$ 611.0
593		2-(2-{6-氨基-8-[(6-溴-1,3-苯并间二氧杂环戊烯-5-基)硫]-3H-嘌呤-3-基}乙基)哌啶-1-羧酸苯甲酯。^{1}H NMR (DMSO-d_6) δ 8.58 (s, 1H), 7.49 (s, 1H), 7.41-7.14 (m, 5H), 6.68 (s, 1H), 6.15 (s, 2H), 5.40 (s, 2H), 4.25-4.10 (m, 4H), 3.70-3.60 (m, 2H), 2.80-2.65 (m, 1H), 2.00-1.80 (m, 2H), 1.60-1.40 (m, 4H). TOF-MS $[M+H]^+$ 611.0
594		8-[(6-溴-1,3-苯并间二氧杂环戊烯-5-基)硫]-9-{2-[1-(4-甲氧基苄基)哌啶-4-基]乙基}-9H-嘌呤-6-胺。^{1}H NMR (CD_3OD) δ 8.29 (s, 1H), 7.40 (d, J = 6.8 Hz, 2H), 7.28 (s, 1H), 7.19 (s, 1H), 7.02 (d, J = 6.8 Hz, 2H), 6.09 (s, 2H), 4.36 (t, J = 7.6 Hz, 2H), 4.20 (s, 2H), 3.82 (s, 3H), 3.50-3.45 (m, 2H), 2.98-2.86 (m, 2H), 2.16-2.10 (m, 2H), 1.88-1.80 (m, 2H), 1.64-1.54 (m, 1H). TOF-MS $[M+H]^+$ 597.0

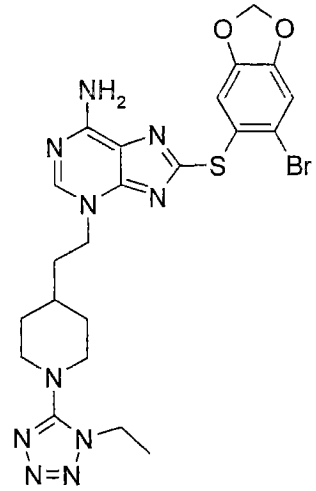
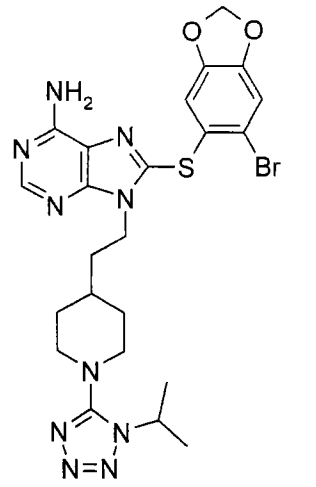
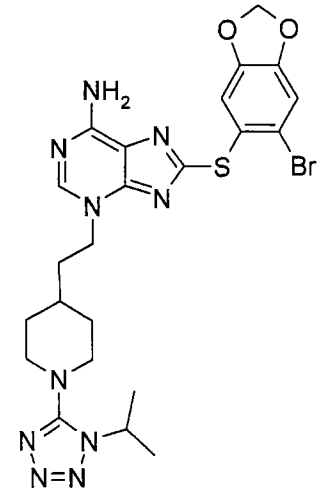
595		8-[(6-溴-1,3-苯并间二氧杂环戊烯-5-基)硫]-3-{2-[1-(4-甲氧基苄基)哌啶-4-基]乙基}-3H-嘌呤-6-胺。^{1}H NMR (DMSO-d_6) δ 8.56 (s, 1H), 7.46 (s, 1H), 7.37 (d, J = 8.8 Hz, 2H), 7.31 (s, 1H), 7.02 (d, J = 8.8 Hz, 2H), 6.11 (s, 2H), 4.27 (t, J = 7.2 Hz, 2H), 4.17 (s, 2H), 3.75 (s, 3H), 3.32-3.28 (m, 2H), 2.80-2.70 (m, 2H), 2.00-1.75 (m, 3H), 1.45-1.25 (m, 4H). TOF-MS $[M+H]^+$ 597.0
596		8-[(6-溴-1,3-苯并间二氧杂环戊烯-5-基)硫]-7-{2-[1-(4-甲氧基苄基)哌啶-4-基]乙基}-7H-嘌呤-6-胺。^{1}H NMR (CD_3OD) δ 8.19 (s, 1H), 7.54 (d, J = 9.2 Hz, 2H), 7.25 (s, 1H), 7.12 (s, 1H), 7.09 (d, J = 9.2 Hz, 2H), 6.09 (s, 2H), 4.35-4.25 (m, 3H), 3.86 (s, 3H), 3.50-3.12 (m, 4H), 2.10-1.80 (m, 4H), 1.48-1.25 (m, 4H). TOF-MS $[M+H]^+$ 597.0
597		3-(2-{6-氨基-8-[(6-溴-1,3-苯并间二氧杂环戊烯-5-基)硫]-9H-嘌呤-9-基}乙基)哌啶-1-羧酸苯甲酯。LC-MS $[M+H]^+$ 611.9

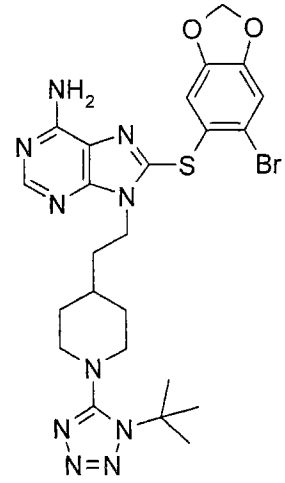
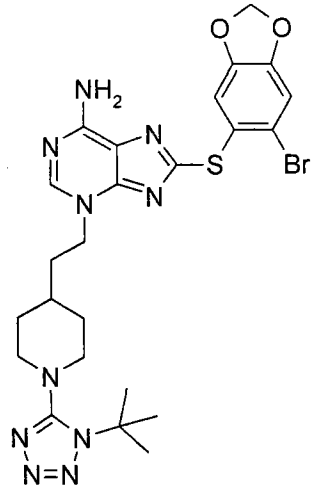
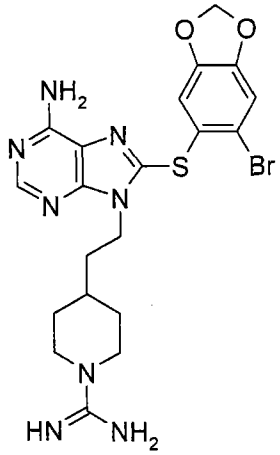
598		3-(2-{6-氨基-8-[(6-溴-1,3-苯并间二氧杂环戊烯-5-基)硫]-3H-嘌呤-3-基}乙基)哌啶-1-羧酸苯甲酯。LC-MS [M+H]$^+$ 611.9
599		9-[2-(1-苄基哌啶-4-基)乙基]-8-[(6-溴-1,3-苯并间二氧杂环戊烯-5-基)硫]-9H-嘌呤-6-胺。^{1}H NMR (CD_3OD) δ 8.18 (s, 1H), 7.51-7.49 (m, 5H), 7.26 (s, 1H), 7.09 (s, 1H), 6.07 (s, 2H), 4.34-4.28 (m, 2H), 4.27 (s, 2H), 3.54-3.48 (m, 2H), 3.00-2.90 (m, 2H), 2.18-2.10 (m, 4H), 1.85-1.80 (m, 3H). TOF-MS [M+H]$^+$ 567.1
600		3-[2-(1-苄基哌啶-4-基)乙基]-8-[(6-溴-1,3-苯并间二氧杂环戊烯-5-基)硫]-3H-嘌呤-6-胺。^{1}H NMR (CD_3OD) δ 8.48 (s, 1H), 7.51-7.49 (m, 5H), 7.34 (s, 1H), 7.31 (s, 1H), 6.11 (s, 2H), 4.43-4.38 (m, 2H), 4.29 (s, 2H), 3.54-3.48 (m, 2H), 3.00-2.90 (m, 2H), 2.00-0.80 (m, 7H). TOF-MS [M+H]$^+$ 567.1

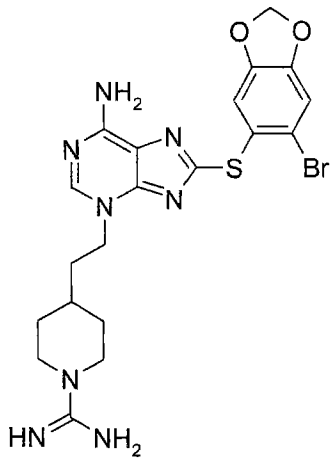
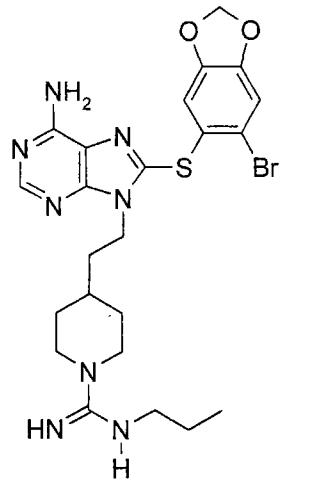
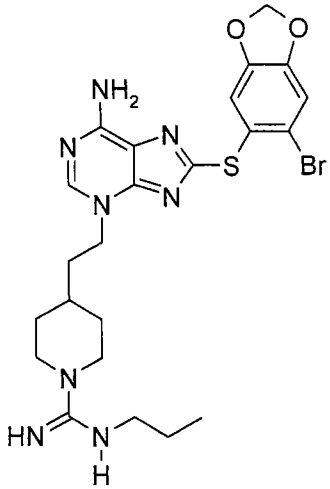
601		8-[(6-溴-1,3-苯并间二氧杂环戊烯-5-基)硫]-9-[2-(5,5-二甲基吗啉-2-基)乙基]-9H-嘌呤-6-胺。^{1}H NMR (丙酮 -d_6) δ 8.30 (s, 1H), 7.11 (s, 1H), 6.92 (s, 1H), 6.09 (s, 2H), 4.50-4.42 (m, 2H), 3.70-3.30 (m, 5H), 3.00-2.80 (m, 2H), 2.94(s, 6H). LC-MS [M+H]$^+$ 507.0
602		4-(2-{6-氨基-8-[(6-溴-1,3-苯并间二氧杂环戊烯-5-基)硫]-3H-嘌呤-3-基}乙基)哌啶-1-甲醛。^{1}H NMR (DMSO-d_6) δ 8.36 (s, 1H), 7.95 (s, 1H), 7.29 (s,1H), 7.10 (s, 1H), 6.06 (s, 2H), 4.29 (t, J = 7.6 Hz, 2H), 4.12-4.07 (m, 2H), 3.65-3.58 (m, 2H), 2.95-2.80 (m, 2H), 2.64-2.55 (m, 1H), 1.92-0.80 (m, 4H). TOF-MS [M+H]$^+$ 505.0
603		(3*R*)-3-(2-{6-氨基-8-[(6-溴-1,3-苯并间二氧杂环戊烯-5-基)硫]-3H-嘌呤-3-基}乙基)哌啶-1-甲醛。LC-MS [M+H]$^+$ 505
604		(3*R*)-3-(2-{6-氨基-8-[(6-溴-1,3-苯并间二氧杂环戊烯-5-基)硫]-9H-嘌呤-9-基}乙基)哌啶-1-甲醛。^{1}H NMR (CD_3OD) δ 8.30 (s, 1H), 8.01-7.98 (m, 1H), 7.30 (s, 1H), 7.20-7.10 (m, 1H), 6.10 (s, 2H), 4.40 (t, J = 7.2 Hz, 2H), 3.70-3.60 (m, 2H), 2.90-2.80 (m, 2H), 1.90-1.70 (m, 5H), 1.50-1.30 (m, 2H). LC-MS [M+H]$^+$ 505

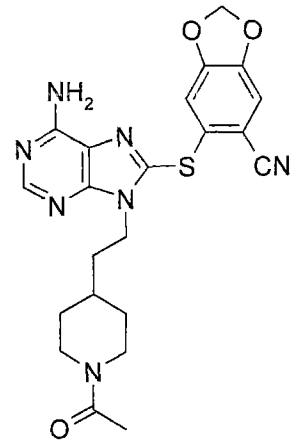
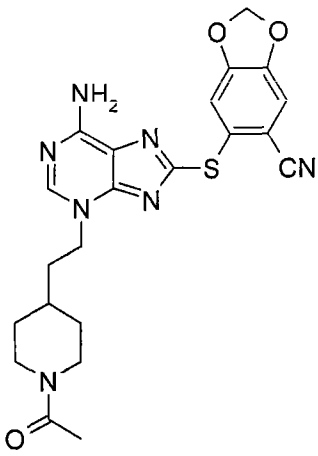
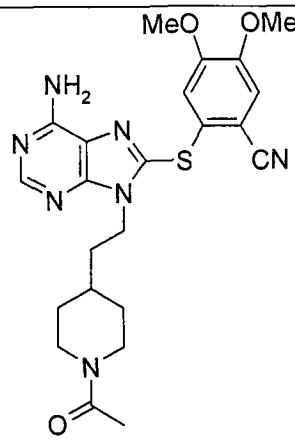
605		8-[(6-溴-1,3-苯并间二氧杂环戊烯-5-基)硫]-9-{2-[(8-氧杂双环[3.2.1]辛-3-基]乙基}-9H-嘌呤-6-胺。 ^{1}H NMR (CD_3OD) δ 8.202和8.199 (s, 1H), 7.265和7.262 (s, 1H), 7.092和7.077 (s, 1H), 6.08 (s, 2H), 4.37-4.30 (m, 2H), 4.29-4.24 (m, 2H), 2.17 (m, 1H), 2.02-1.75 (m, 5H), 1.74-1.62 (m, 3H), 1.43-1.34 (m, 2H); TOF-MS [M+ H]$^+$ 504.4
606		8-[(6-溴-1,3-苯并间二氧杂环戊烯-5-基)硫]-3-{2-[(8-氧杂双环[3.2.1]辛-3-基]乙基}-3H-嘌呤-6-胺。^{1}H NMR (CD_3OD) δ 8.512和8.509 (s, 1H), 7.384和7.376 (s, 1H), 7.364和7.363 (s, 1H), 6.16和6.153 (s, 2H), 4.39-4.30 (m, 4H), 2.19-2.06 (m, 2H), 1.95-1.88 (m, 2H), 1.83-1.79 (m, 2H), 1.78-1.72 (m, 2H), 1.62 (m, 1H), 1.44-1.32 (m, 2H); TOF-MS [M+1]$^+$ 503.8
607		8-[(6-溴-1,3-苯并间二氧杂环戊烯-5-基)硫]-9-{2-[1-甲基-8-氧杂双环[3.2.1]辛-3-基]乙基}-9H-嘌呤-6-胺。 ^{1}H NMR (CD_3OD) δ 8.251和8.248 (s, 1H), 7.271和7.269 (s, 1H), 7.124和7.112 (s, 1H), 6.08 (s, 2H), 4.38-4.27 (m, 3H), 2.12-2.0 (m, 3H), 1.94-1.77 (m, 3H), 1.74-1.48 (m, 4H), 1.35 (m, 1H), 1.29and 1.28 (s, 3H); TOF-MS [M+1]$^+$ 518.0

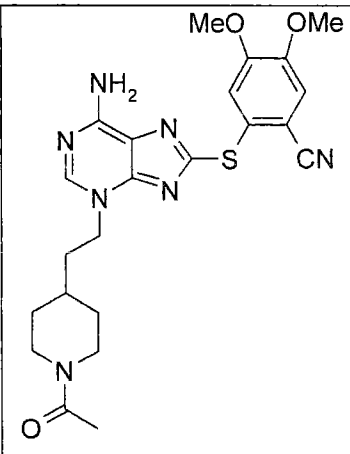
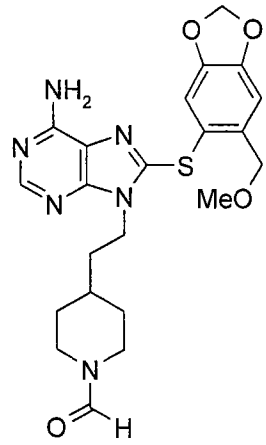
608		8-[(6-溴-1,3-苯并间二氧杂环戊烯-5-基)硫]-3-{2-[1-甲基-8-氧杂双环[3.2.1]辛-3-基]乙基}-3H-嘌呤-6-胺。^{1}H NMR (CD_3OD) δ 8.509和8.507 (s, 1H), 7.376和7.367 (s, 1H), 7.353 (s, 1H), 6.156和6.149 (s, 2H), 4.40-4.32 (m, 3H), 2.13-2.08 (m, 3H), 1.89-1.48 (m, 7H), 1.35 (m, 1H), 1.295和1.291 (s, 3H); TOF-MS $[M+1]^+$ 518.1
609		8-[(6-溴-1,3-苯并间二氧杂环戊烯-5-基)硫]-9-{2-[1-(1-甲基-1H-四唑-5-基)哌啶-4-基]乙基}-9H-嘌呤-6-胺。^{1}H NMR (DMSO-d_6) δ 8.20 (s, 1H), 7.65-7.50 (brs, 2H), 7.40 (s, 1H), 6.85 (s, 1H), 6.10 (s, 2H), 4.22 (t, J = 7.6 Hz, 2H), 3.85 (s, 3H), 3.55 (brd, J =12.8 Hz, 2H), 2.85 (t, J = 12.8 Hz, 2H), 1.78 (brd, J = 12.8 Hz, 2H), 1.70-1.62 (m, 2H), 1.43 (m, 1H), 1.35-1.22 (m, 2H); TOF-MS $[M+H]^+$ 559.10
610		8-[(6-溴-1,3-苯并间二氧杂环戊烯-5-基)硫]-9-{2-[1-(1-乙基-1H-四唑-5-基)哌啶-4-基]乙基}-9H-嘌呤-6-胺。^{1}H NMR (CD_3OD) δ 8.24 (s, 1H), 7.27 (s, 1H), 7.14 (s, 1H), 6.08 (s, 2H), 4.37 (t, J = 7.2 Hz, 2H), 4.25 (q, J = 7.6 Hz, 2H), 3.56 (brd, J =12.8 Hz, 2H), 2.98 (t, J = 11.6 Hz, 2H), 1.93 (brd, J = 12.8 Hz, 2H), 1.84 (brq, 2H), 1.57-1.42 (m, 3H), 1.51 (t, J = 7.6 Hz, 3H); TOF-MS $[M+H]^+$ 573.11

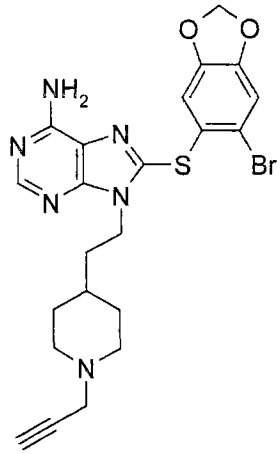
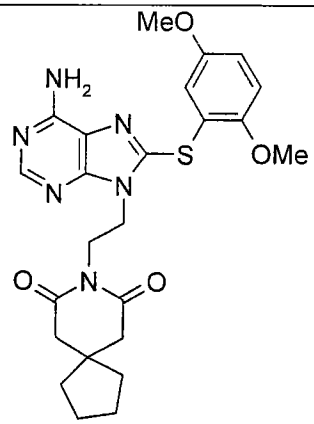
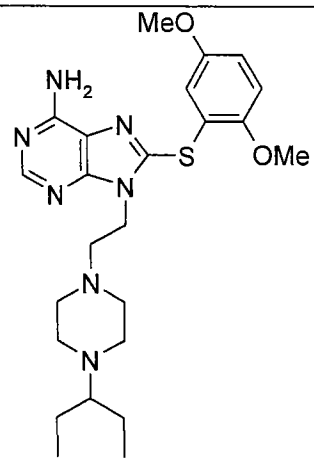
611		8-[(6-溴-1,3-苯并间二氧杂环戊烯-5-基)硫]-3-{2-[1-(1-乙基-1H-四唑-5-基)哌啶-4-基]乙基}-3H-嘌呤-6-胺。^{1}H NMR (CD_3OD) δ 8.54 (s, 1H), 7.36 (s, 1H), 7.45 (s, 1H), 6.13 (s, 2H), 4.45 (t, J = 7.6 Hz, 2H), 4.26 (q, J = 7.6 Hz, 2H), 3.56 (brd, J =12.8 Hz, 2H), 2.98 (t, J = 12.4 Hz, 2H), 1.96-1.86 (m, 4H), 1.61-1.44 (m, 3H), 1.52 (t, J = 7.6 Hz, 3H); TOF-MS $[M+H]^+$ 573.11
612		8-[(6-溴-1,3-苯并间二氧杂环戊烯-5-基)硫]-9-{2-[1-(1-异丙基-1H-四唑-5-基)哌啶-4-基]乙基}-9H-嘌呤-6-胺。^{1}H NMR (CD_3OD) δ 8.21 (s, 1H), 7.26 (s, 1H), 7.11 (s, 1H), 6.08 (s, 2H), 4.60 (sep, J = 6.8 Hz, 1H), 4.34 (t, J = 7.6 Hz, 2H), 3.45 (brd, J = 12.4 Hz, 2H), 2.96 (t, J = 12.4 Hz, 2H), 1.93 (brd, J = 10.8 Hz, 2H), 1.82 (brq, J = 6.4 Hz, 2H), 1.59-1.44 (m, 3H), 1.54 (d, J = 6.8 Hz, 6H); TOF-MS $[M+H]^+$ 587.13
613		8-[(6-溴-1,3-苯并间二氧杂环戊烯-5-基)硫]-3-{2-[1-(1-异丙基-1H-四唑-5-基)哌啶-4-基]乙基}-3H-嘌呤-6-胺。 ^{1}H NMR (CD_3OD) δ 8.55 (s, 1H), 7.370 (s, 1H), 7.366 (s, 1H), 6.14 (s, 2H), 4.61 (sep, J = 6.4 Hz, 1H), 4.45 (t, J = 7.6 Hz, 2H), 3.46 (brd, J = 12.0 Hz, 2H), 2.99 (t, J = 11.6 Hz, 2H), 1.97-1.86 (m, 4H), 1.56 (d, J = 6.4 Hz, 6H), 1.55-1.45 (m, 3H); TOF-MS

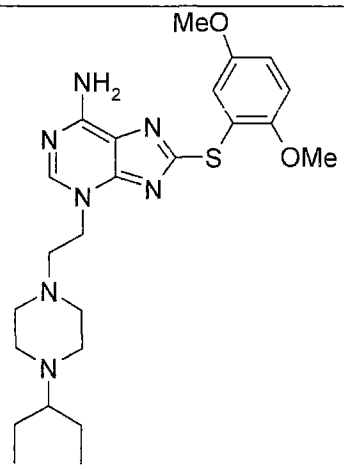
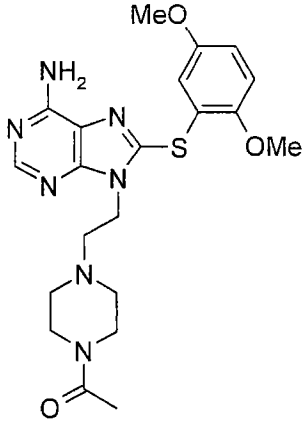
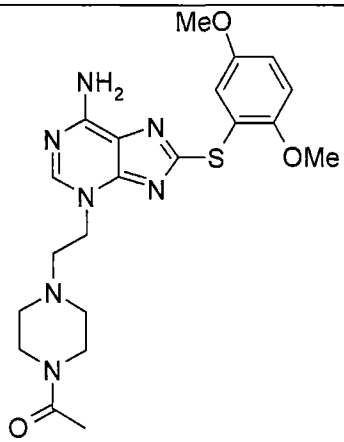
		$[M+H]^+$ 587.13
614		8-[(6-溴-1,3-苯并间二氧杂环戊烯-5-基)硫]-9-{2-[1-(1-叔丁基-1H-四唑-5-基)哌啶-4-基]乙基}-9H-嘌呤-6-胺。^{1}H NMR (CD_3OD) δ 8.21 (s, 1H), 7.27 (s, 1H), 7.10 (s, 1H), 6.08 (s, 2H), 4.35 (t, J = 7.6 Hz, 2H), 3.14 (brd, J = 12.4 Hz, 2H), 2.92 (t, J = 12.0 Hz, 2H), 1.92 (brd, J = 10.0 Hz, 2H), 1.83 (brq, J = 8.0 Hz, 2H), 1.73 (s, 9H), 1.58-1.42 (m, 3H); TOF-MS $[M+H]^+$ 601.1
615		8-[(6-溴-1,3-苯并间二氧杂环戊烯-5-基)硫]-3-{2-[1-(1-叔丁基-1H-四唑-5-基)哌啶-4-基]乙基}-3H-嘌呤-6-胺。^{1}H NMR (CD_3OD) δ 8.54 (s, 1H), 7.357 (s, 1H), 7.352 (s, 1H), 6.13 (s, 2H), 4.46 (t, J = 7.6 Hz, 2H), 3.16 (brd, J = 12.0 Hz, 2H), 2.95 (t, J = 11.6 Hz, 2H), 1.99-1.80 (m, 4H), 1.75 (s, 9H), 1.58-1.44 (m, 3H); TOF-MS $[M+H]^+$ 601.1
616		4-(2-{6-氨基-8-[(6-溴-1,3-苯并间二氧杂环戊烯-5-基)硫]-9H-嘌呤-9-基}乙基)哌啶-1-甲脒。^{1}H NMR (CD_3OD) δ 8.25 (s, 1H), 7.28 (s, 1H), 7.16 (s, 1H), 6.09 (s, 2H), 4.36 (t, J = 7.2 Hz, 2H), 3.87 (brd, J = 14.0 Hz, 2H), 3.04 (td, J = 14.0, 2.4 Hz, 2H), 1.94 (brd, J = 12.0 Hz, 2H), 1.84 (q, J = 7.6 Hz, 2H), 1.65 (m, 1H), 1.30 (brq, J = 12.0 Hz, 2H); TOF-MS $[M+H]^+$ 519.09

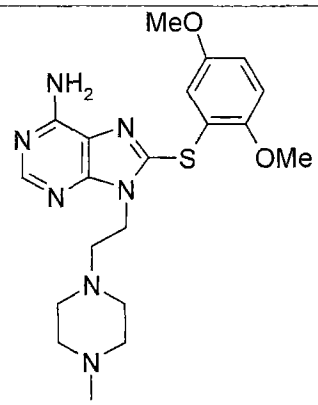
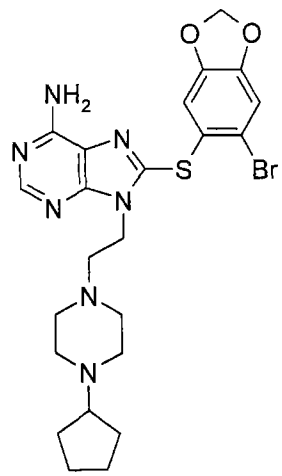
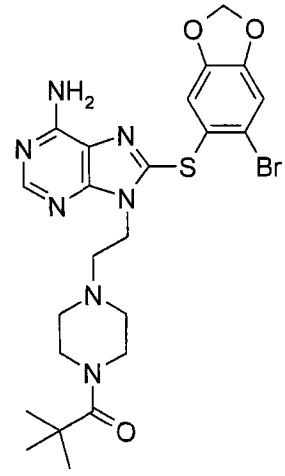
617		4-(2-{6-氨基-8-[(6-溴-1,3-苯并间二氧杂环戊烯-5-基)硫]-3H-嘌呤-3-基}乙基)哌啶-1-甲脒。TOF-MS $[M+H]^+$ 519.09
618		4-(2-{6-氨基-8-[(6-溴-1,3-苯并间二氧杂环戊烯-5-基)硫]-9H-嘌呤-9-基}乙基)-N-丙基哌啶-1-甲脒。^{1}H NMR (CD_3OD) δ 8.33 (s, 1H), 7.29 (s, 1H), 7.23 (s, 1H), 6.10 (s, 2H), 4.43-4.34 (m, 2H), 3.87 (brd, J = 12.8 Hz, 2H), 3.19 (t, J = 6.8 Hz, 2H), 3.02 (t, J = 12.0 Hz, 2H), 1.96-1.82 (m, 4H), 1.69-1.56 (m, 3H), 1.36-1.24 (m, 2H), 0.97 (t, J = 6.8 Hz, 3H); TOF-MS $[M+H]^+$ 561.14
619		4-(2-{6-氨基-8-[(6-溴-1,3-苯并间二氧杂环戊烯-5-基)硫]-3H-嘌呤-3-基}乙基)-N-丙基哌啶-1-甲脒。^{1}H NMR (CD_3OD) δ 8.55 (s, 1H), 7.37 (s, 2H), 6.15 (s, 2H), 4.44 (t, J = 7.2 Hz, 2H), 3.87 (d, J = 13.2 Hz, 2H), 3.20 (t, J = 7.6 Hz, 2H), 3.04 (t, J = 12.0 Hz, 2H), 1.96-1.84 (m, 4H), 1.68-1.58 (m, 3H), 1.35-1.24 (m, 2H), 0.97 (t, J = 7.6 Hz, 3H); TOF-MS $[M+H]^+$ 561.14

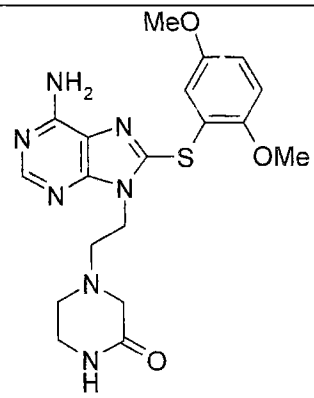
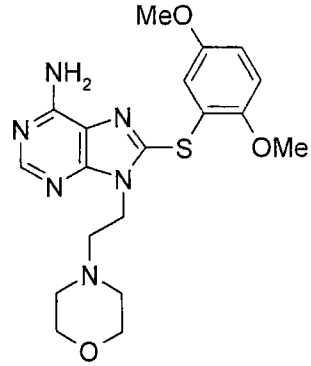
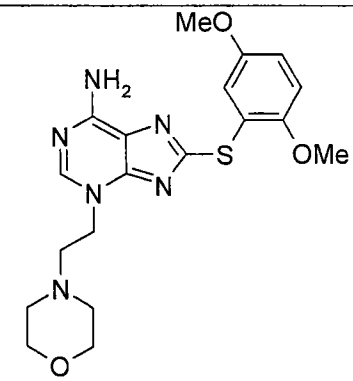
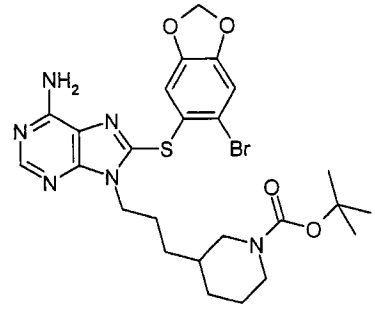
620		6-({9-[2-(1-乙酰基哌啶-4-基)乙基]-6-氨基-9H-嘌呤-8-基}硫)-1,3-苯并间二氧杂环戊烯-5-甲腈。 ^{1}H NMR (CD_3OD) δ 8.31 (s, 1H), 7.39 (s, 1H), 7.37 (s, 1H), 6.21 (s, 2H), 4.49 (d, J = 12.8 Hz, 1H), 4.40 (t, J = 6.8 Hz, 2H), 3.91 (d, J = 13.2 Hz, 1H), 3.08 (t, J = 12.8 Hz, 1H), 2.60 (t, J = 12.4 Hz, 1H), 2.09 (s, 3H), 1.95-1.83 (m, 4H), 1.62 (m, 1H), 1.27 (t, J = 12.4 Hz, 1H), 1.16 (t, J = 10.4 Hz, 1H); TOF-MS $[M+H]^+$ 466.16
621		6-({3-[2-(1-乙酰基哌啶-4-基)乙基]-6-氨基-3H-嘌呤-8-基}硫)-1,3-苯并间二氧杂环戊烯-5-甲腈。 TOF-MS $[M+H]^+$ 466.17。
622		2-({9-[2-(1-乙酰基哌啶-4-基)乙基]-6-氨基-9H-嘌呤-8-基}硫)-4,5-二甲氧基苯甲腈。 ^{1}H NMR (CD_3OD) δ 8.25 (s, 1H), 7.47 (s, 1H), 7.44 (s, 1H), 4.50 (brd, J = 13.6 Hz, 1H), 4.39 (t, J = 7.2 Hz, 2H), 3.92 (s, 3H), 3.91 (s, 3H), 3.90 (m, 1H), 3.09 (td, J = 13.6, 3.2 Hz, 1H), 2.60 (td, J = 12.4, 2.4 Hz, 1H), 2.09 (s, 3H), 1.95-1.83 (m, 4H), 1.62 (m, 1H), 1.25 (qd, J = 12.0, 4.0 Hz, 1H), 1.15 (qd, J = 11.6, 2.8 Hz, 1H); TOF-MS $[M+H]^+$ 482.20

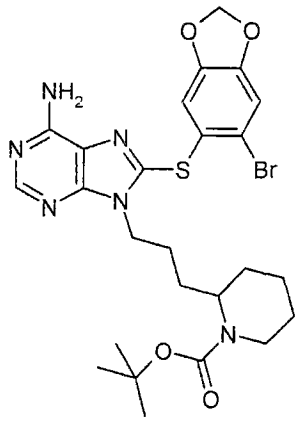
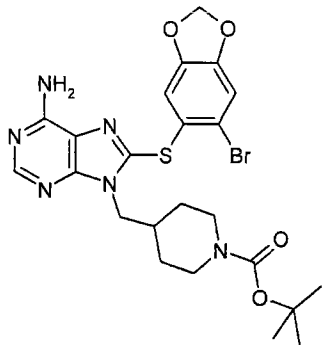
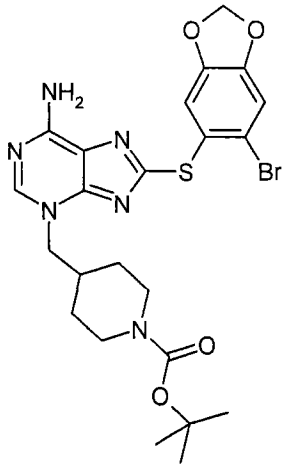
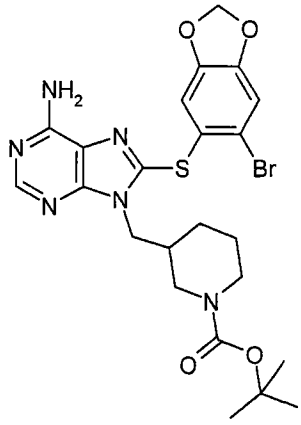
623		2-({3-[2-(1-乙酰基哌啶-4-基)乙基]-6-氨基-3H-嘌呤-8-基}硫)-4,5-二甲氧基苯甲腈。 ^{1}H NMR (CD_3OD) δ 8.53 (s, 1H), 7.53 (s, 1H), 7.50 (s, 1H), 4.52-4.43 (m, 1H), 4.39 (t, J = 7.6 Hz, 2H), 3.95 (s, 3H), 3.93 (s, 3H), 3.85 (brd, J = 12.8 Hz, 1H), 3.06 (td, J = 13.6, 2.8 Hz, 1H), 2.58 (td, J = 12.8, 2.4 Hz, 1H), 2.10 (s, 3H), 1.94-1.82 (m, 4H), 1.6-1.5 (m, 1H), 1.16 (qd, J = 12.4, 4.0 Hz, 1H), 1.06 (qd, J = 12.0, 4.0 Hz, 1H); TOF-MS $[M+H]^+$ 482.20
624		4-[2-(6-氨基-8-{[6-(甲氧基甲基)-1,3-苯并间二氧杂环戊烯-5-基]硫}-9H-嘌呤-9-基)乙基]哌啶-1-甲醛。 ^{1}H NMR (CD_3OD) δ 8.27 (s, 1H), 7.99 (s, 1H), 7.11 (s, 1H), 7.10 (s, 1H), 6.05 (s, 2H), 4.54 (s, 2H), 4.35 (t, J = 8.0 Hz, 2H), 4.31-4.27 (m, 1H), 3.76-3.69 (m, 1H), 3.30 (s, 3H), 3.14-3.07 (m, 1H), 2.66 (td, J = 12.8, 2.8 Hz, 1H), 1.91 (td, J = 14.4, 2H), 1.80 (q, J = 7.6 Hz, 2H), 1.62 (m, 1H), 1.22 (qd, J = 11.2, 3.6 Hz, 1H), 1.20 (qd, J = 12.4, 4.0 Hz, 1H); TOF-MS $[M+H]^+$ 471.21

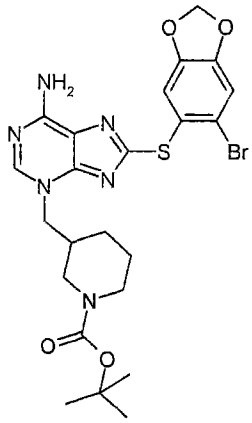
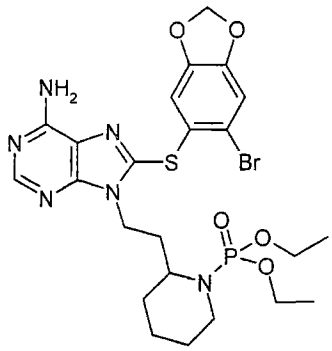
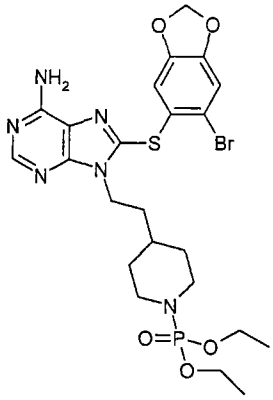
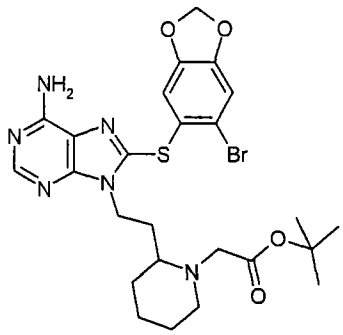
625		8-[(6-溴-1,3-苯并间二氧杂环戊烯-5-基)硫]-9-[2-(1-丙-2-炔-1-基哌啶-4-基)乙基]-9H-嘌呤-6-胺。^{1}H NMR (CD_3OD) δ 8.26 (s, 1H), 7.28 (s, 1H), 7.16 (s, 1H), 6.09 (s, 2H), 4.36 (t, J = 7.6 Hz, 2H), 4.1-4.02 (m, 2H), 3.68 (brd, J = 14.0 Hz, 2H), 3.02 (brt, J = 12.4 Hz, 2H), 2.66 (s, 1H), 2.21 (brd, J = 14.8, 2H), 1.9-1.81 (m, 2H), 1.62-1.60 (m, 1H), 1.56-1.44 (m, 2H); TOF-MS $[M+H]^+$ 515.08
626		8-(2-{6-氨基-8-[(2,5-二甲氧基苯基)硫]-9H-嘌呤-9-基}乙基)-8-氮杂螺[4.5]癸-7,9-二酮。^{1}H NMR (CD_3OD) δ 8.30 (s, 1H), 7.10 (d, J = 2.4 Hz, 1H), 7.06 (d, J = 8.8 Hz, 1H), 7.01 (dd, J = 8.8, 3.2 Hz, 1H), 4.53-4.50 (m, 2H), 4.25-4.23 (m, 2H), 3.77 (s, 3H), 3.75 (s, 3H), 2.53 (s, 4H), 1.70-1.66 (m, 4H), 1.46-1.42 (m, 4H); LC-MS $[M+H]^+$ 497.2
627		8-[(2,5-二甲氧基苯基)硫]-9-{2-[4-(1-乙基丙基)哌嗪-1-基]乙基}-9H-嘌呤-6-胺。^{1}H NMR (CD_3OD) δ 8.35 (s, 1H), 7.08-6.98 (m, 3H), 4.51 (t, J = 5.6 Hz, 2H), 3.80 (s, 3H), 3.76 (s, 3H), 3.50-3.36 (m, 2H), 3.24-3.12 (m, 2H), 3.09-2.98 (m, 3H), 2.92 (t, J = 5.6 Hz, 2H), 2.64-2.51 (m, 2H), 1.88-1.78 (m, 2H), 1.76-1.65 (m, 2H), 1.033 (t, J = 6.4 Hz, 6H); TOF-MS $[M+H]^+$ 486.27

628		8-[(2,5-二甲氧基苯基)硫]-3-{2-[4-(1-乙基丙基)哌嗪-1-基]乙基}-3H-嘌呤-6-胺 ^{1}H NMR (CD_3OD) δ 8.52 (s, 1H), 7.28 (dd, J = 2.4, 0.8 Hz, 1H), 7.23-7.18 (m, 2H), 4.52 (t, J = 5.6 Hz, 2H), 3.81 (s, 6H), 3.43 (brd, J = 11.2 Hz, 2H), 3.16 (brd, J = 12.0 Hz, 2H), 3.08-3.00 (m, 3H), 2.94 (t, J = 5.6 Hz, 2H), 2.54 (brt, J = 12.0 Hz, 2H), 1.89-1.79 (m, 2H), 1.76-1.68 (m, 2H), 1.05 (t, J = 7.2 Hz, 6H); TOF-MS $[M+H]^+$ 486.27
629		9-[2-(4-乙酰基哌嗪-1-基)乙基]-8-[(2,5-二甲氧基苯基)硫]-9H-嘌呤-6-胺。^{1}H NMR (CD_3OD) δ 8.21 (s, 1H), 6.98 (d, J = 8.8 Hz, 1H), 6.92 (d, J = 3.2 Hz, 1H), 6.88 (dd, J = 8.8, 3.2 Hz, 1H), 4.43 (t, J = 5.6 Hz, 2H), 3.77 (s, 3H), 3.70 (s, 3H), 3.49 (brt, J = 4.8 Hz, 2H), 3.43 (brt, J = 4.8 Hz, 2H), 2.85 (t, J = 5.6 Hz, 2H), 2.50 (t, J = 4.8 Hz, 2H), 2.46 (t, J = 4.8 Hz, 2H), 2.06 (s, 3H); TOF-MS $[M+H]^+$ 458.20
630		3-[2-(4-乙酰基哌嗪-1-基)乙基]-8-[(2,5-二甲氧基苯基)硫]-3H-嘌呤-6-胺。^{1}H NMR (CD_3OD) δ 8.41 (s, 1H), 7.19 (dd, J = 2.0, 1.2 Hz, 1H), 7.05-7.04 (m, 2H), 4.67 (t, J = 5.6 Hz, 2H), 3.77 (s, 3H), 3.73 (s, 3H), 3.59 (brt, J = 4.8 Hz, 2H), 3.56 (brt, J = 4.8 Hz, 2H), 2.90 (t, J = 5.6 Hz, 2H), 2.65 (t, J = 4.8 Hz, 2H), 2.59 (t, J =

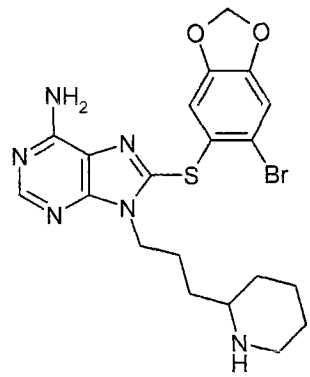
		4.8 Hz, 2H), 2.09 (s, 3H); TOF-MS $[M+H]^+$ 458.20
631		8-[(2,5-二甲氧基苯基)硫]-9-[2-(4-甲基哌嗪-1-基)乙基]-9H-嘌呤-6-胺。 ^{1}HNMR (CD_3OD) δ 8.32 (s, 1H), 7.06-6.98 (m, 3H), 4.49 (t, J = 5.6 Hz, 2H), 3.75 (s, 6H), 3.48-3.36 (m, 2H), 3.21-3.06 (m, 2H), 3.00-2.90 (m, 2H), 2.88 (t, J = 5.6 Hz, 2H), 2.84 (s, 3H), 2.56-2.40 (m, 2H); LC-MS $[M+H]^+$ 430.5
632		8-[(6-溴-1,3-苯并间二氧杂环戊烯-5-基)硫]-9-[2-(4-环戊基哌嗪-1-基)乙基]-9H-嘌呤-6-胺。 ^{1}H NMR (CD_3OD) δ 8.20 (s, 1H), 7.21 (s, 1H), 7.07 (s, 1H), 6.05 (s, 2H), 4.43 (t, J = 5.6 Hz, 2H), 4.60-3.65 (m, 4H), 3.10-2.42 (m, 5H), 2.91 (t, J = 5.6 Hz, 2H), 2.14-2.04 (m, 2H), 1.86-1.76 (m, 2H), 1.71-1.54 (m, 4H); TOF-MS $[M+H]^+$ 546.13
633		8-[(6-溴-1,3-苯并间二氧杂环戊烯-5-基)硫]-9-{2-[4-(2,2-二甲基丙酰基)哌嗪-1-基]乙基}-9H-嘌呤-6-胺。 TOF-MS $[M+H]^+$ 562.11

634		4-(2-{6-氨基-8-[(2,5-二甲氧基苯基)硫]-9H-嘌呤-9-基}乙基)哌嗪-2-酮。^{1}H NMR (CD_3OD) δ 8.33 (s, 1H), 7.07 (d, J = 3.2 Hz, 1H), 7.05 (d, J = 8.4 Hz, 1H), 7.01 (dd, J = 8.4, 2.8 Hz, 1H), 4.54 (t, J = 5.6 Hz, 2H), 3.75 (s, 3H), 3.74 (s, 3H), 3.28-3.24 (m, 2H), 3.25 (s, 2H), 2.98 (t, J = 5.6 Hz, 2H), 2.83 (t, J = 5.2 Hz, 2H); LC-MS $[M+H]^+$ 430.5
635		8-[(2,5-二甲氧基苯基)硫]-9-(2-吗啉-4-基乙基)-9H-嘌呤-6-胺。^{1}H NMR (CD_3OD) δ 8.40 (s, 1H), 7.17 (dd, J = 2.0, 1.6 Hz, 1H), 7.05-7.04 (m, 2H), 4.74 (t, J= 5.6 Hz, 2H), 3.78-3.75 (m, 7H), 3.73 (s, 3H), 3.06 (t, J = 5.6 Hz, 2H), 2.9-2.8 (m, 4H); LC-MS $[M+H]^+$ 417.5
636		8-[(2,5-二甲氧基苯基)硫]-3-(2-吗啉-4-基乙基)-3H-嘌呤-6-胺。LC-MS $[M+H]^+$ 417.5
637		3-(3-{6-氨基-8-[(6-溴-1,3-苯并间二氧杂环戊烯-5-基)硫]-9*H*-嘌呤-9-基}丙基)哌啶-1-羧酸叔丁酯。LC-MS $[M+H]^+$ 591.5

638		2-(3-{6-氨基-8-[(6-溴-1,3-苯并间二氧杂环戊烯-5-基)硫]-9*H*-嘌呤-9-基}丙基)哌啶-1-羧酸叔丁酯。 LC-MS [M+H]$^+$ 591.5
639		4-({6-氨基-8-[(6-溴-1,3-苯并间二氧杂环戊烯-5-基)硫]-9*H*-嘌呤-9-基}甲基)哌啶-1-羧酸叔丁酯。 LC-MS [M+H]$^+$ 563.4
640		4-({6-氨基-8-[(6-溴-1,3-苯并间二氧杂环戊烯-5-基)硫]-3*H*-嘌呤-3-基}甲基)哌啶-1-羧酸叔丁酯。 LC-MS [M+H]$^+$ 563.4
641		3-({6-氨基-8-[(6-溴-1,3-苯并间二氧杂环戊烯-5-基)硫]-9*H*-嘌呤-9-基}甲基)哌啶-1-羧酸叔丁酯。 LC-MS [M+H]$^+$ 563.4

642		3-({6-氨基-8-[(6-溴-1,3-苯并间二氧杂环戊烯-5-基)硫]-3*H*-嘌呤-3-基}甲基)哌啶-1-羧酸叔丁酯。LC-MS [M+H]$^+$ 563.4
643		[2-(2-{6-氨基-8-[(6-溴-1,3-苯并间二氧杂环戊烯-5-基)硫]-9*H*-嘌呤-9-基}乙基)哌啶-1-基]膦酸二乙酯。LC-MS [M+H]$^+$ 613.4
644		[4-(2-{6-氨基-8-[(6-溴-1,3-苯并间二氧杂环戊烯-5-基)硫]-9*H*-嘌呤-9-基}乙基)哌啶-1-基] 膦酸二乙酯。LC-MS [M+H]$^+$ 613.4
645		[2-(2-{6-氨基-8-[(6-溴-1,3-苯并间二氧杂环戊烯-5-基)硫]-9*H*-嘌呤-9-基}乙基)哌啶-1-基]乙酸叔丁酯。LC-MS [M+H]+ 591.4

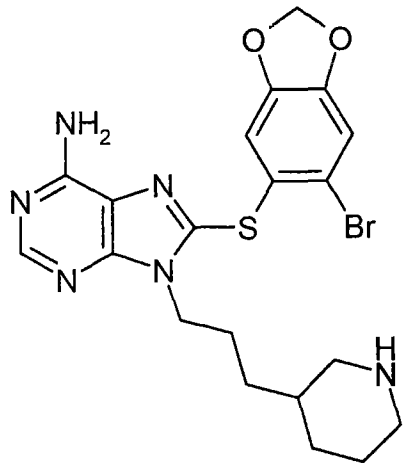
实施例 646



8-[(6-溴-1,3-苯并间二氧杂环戊烯-5-基)硫]-9-(3-哌啶-2-基丙基)-9*H*-嘌呤-6-胺

依照所述实施例465的步骤使用从实施例638得到的产物制备所述标题化合物。LC-MS $[M+H]^+$ 491.4。

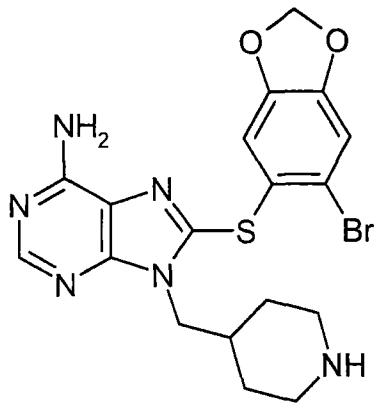
实施例647



8-[(6-溴-1,3-苯并间二氧杂环戊烯-5-基)硫]-9-(3-哌啶-3-基丙基)-9*H*-嘌呤-6-胺

依照所述实施例465的步骤使用从实施例637得到的产物制备所述标题化合物。LC-MS $[M+H]^+$ 491.4。

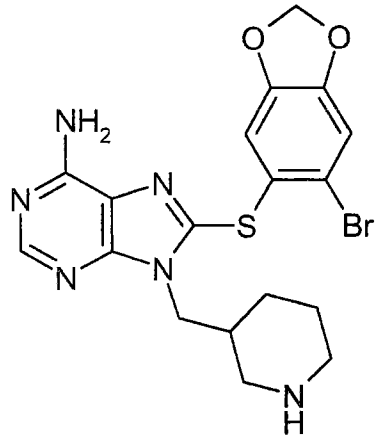
实施例648



8-[(6-溴-1,3-苯并间二氧杂环戊烯-5-基)硫]-9-(哌啶-4-基甲基)-9*H*-嘌呤-6-胺

依照所述实施例465的步骤使用从实施例639得到的产物制备所述标题化合物。LC-MS [M+H]$^+$ 463.3。

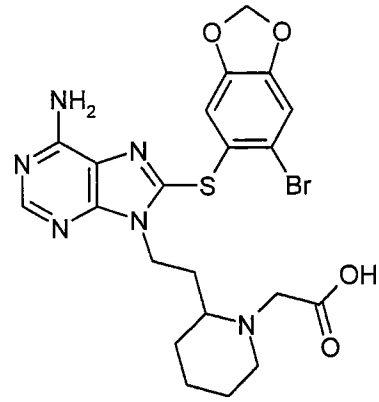
实施例649



8-[(6-溴-1,3-苯并间二氧杂环戊烯-5-基)硫]-9-(哌啶-3-基甲基)-9*H*-嘌呤-6-胺

依照所述实施例465的步骤使用从实施例641得到的产物制备所述标题化合物。LC-MS [M+H]$^+$ 463.3。

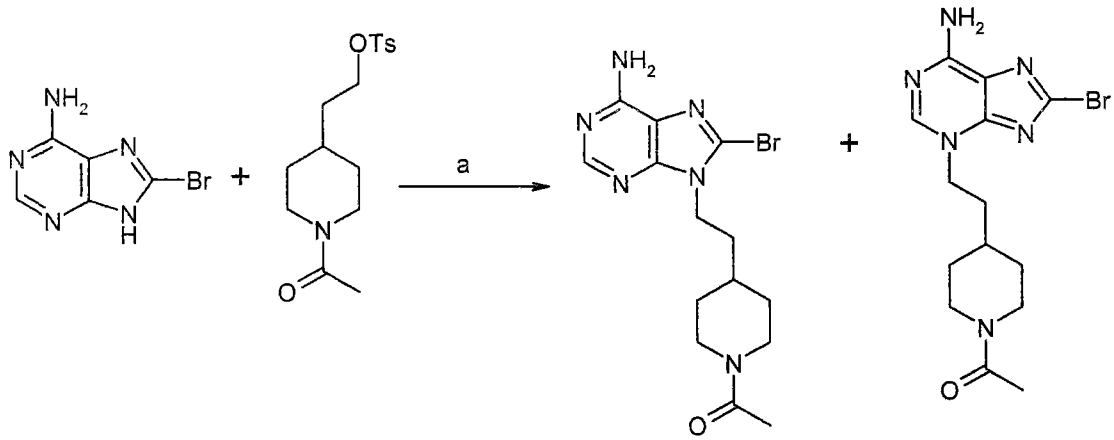
实施例650



[2-(2-{6-氨基-8-[(6-溴-1,3-苯并间二氧杂环戊烯-5-基)硫]-9*H*-嘌呤-9-基}乙基)哌啶-1-基]乙酸

依照所述实施例465的步骤使用从实施例645得到的产物制备所述标题产物。LC-MS [M+H]$^+$ 535.4。

实施例651

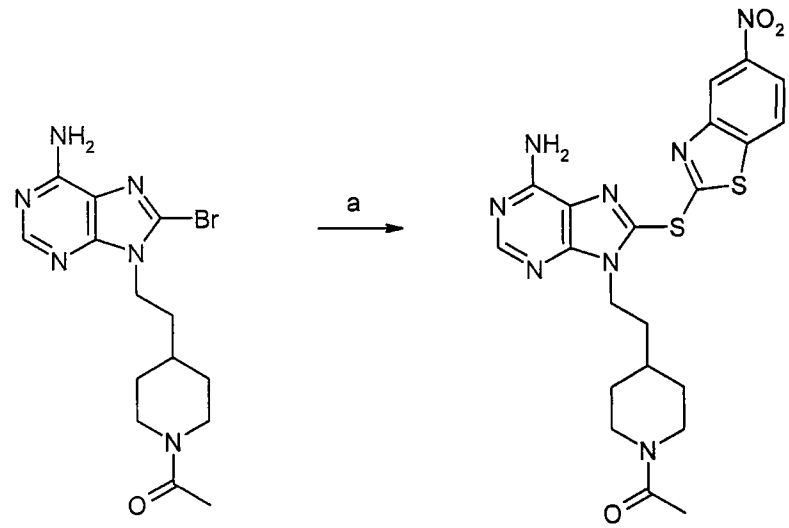


试剂：a）Barton碱，THF，100 ℃，MW，15 min；b）t-BuOK，DMF，90 - 100 ℃，6h

步骤 1：9-[2-(1-乙酰基哌啶-4-基)-乙基]-8-溴-9H-嘌呤-6-胺和 3-[2-(1-乙酰基哌啶-4-基)-乙基]-8-溴-3H-嘌呤-6-胺。

在室温下，向 8-溴代腺嘌呤（0.042 g，0.197 mmol）和甲苯-4-磺酸 2-(1-乙酰基-哌啶-4-基)-乙酯（0.077 g，0.237 mmol）在 THF 中的悬浮液中加入 Barton 碱（50 μl，0.237 mmol）。将所述反应混合液在微波反应器内在 100 ℃加热 15 min，在该阶段末期将反应物冷却至室温并通过 Isco 硅胶闪式柱使用二氯甲烷中 0-5%梯度的甲醇纯化粗产物，得到 0.030g（42%）的 9-[2-(1-乙酰基哌啶-4-基)-乙基]-8-溴-9H-嘌呤-6-胺，LC-MS $[M+H]^+$ 366.2，以及 0.015g（21%）的 3-[2-(1-乙酰基哌啶-4-基)-乙基]-8-溴-3H-嘌呤-6-胺，LC-MS $[M+H]^+$ 366.2。

步骤 2：9-[2-(1-乙酰基哌啶-4-基)乙基]-8-[(6-硝基-1,3-苯并噻唑-2-基)硫]-9H-嘌呤-6-胺。

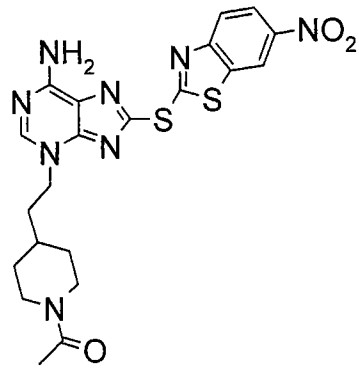


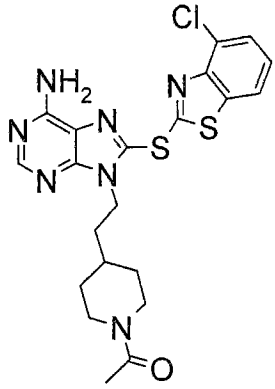
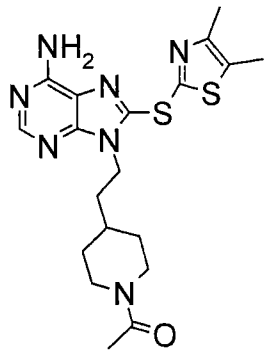
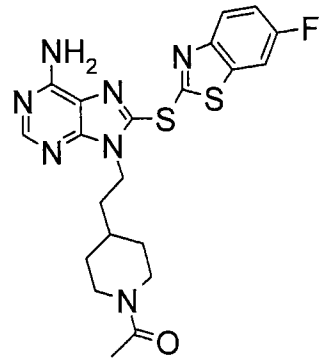
试剂：a）t-BuOK，5-硝基-2-巯基苯并噻唑，DMF，90 - 100 ℃，6h

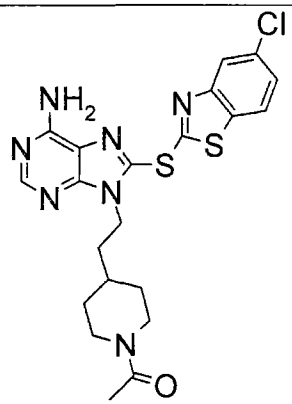
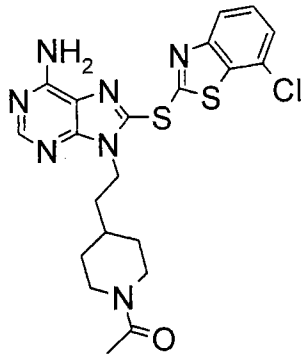
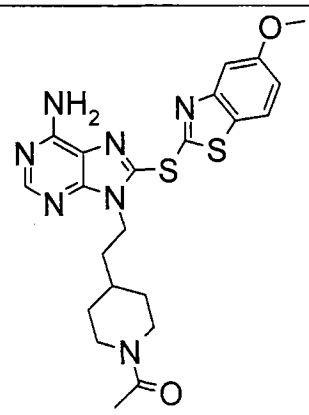
在室温下，向 5-硝基-2-巯基苯并噻唑（0.040 g，0.246 mmol）在 DMF（1.0 mL）中的悬浮液中加入 $(CH_3)_3COK$（0.028 g，0.246 mmol），并继续搅拌 30 min。在室温下，向上述反应混合物中加入 DMF（1 mL）中的 9-[2-(1-乙酰基哌啶-4-基)-乙基]-8-溴-9H-嘌呤-6-胺（0.030 g，0.082 mmol）。将所述反应混合物在 130 ℃加热 6h，并在该阶段末期将溶剂蒸发并通过制备型 HPLC[X-Terra prep-RP18 10 um，19×250 mm（水），流动相：溶剂 A：含 0.01% TFA 的 HPLC 级水，和 B：含 0.01% TFA 的乙腈，一般洗脱梯度 – 在 15 至 25 分钟的实验时间内溶剂 B 从 15%至 80%]纯化粗产物。HPLC 馏分经冷冻干燥后得到标题产物。9-[2-(1-乙酰基哌啶-4-基)乙基]-8-[(6-硝基-1,3-苯并噻唑-2-基)硫]-9H-嘌呤-6-胺。^{1}H NMR (CD_3OD) δ 8.80 (s, 1H), 8.30 (d, J = 2.4 Hz, 1H), 8.00 (d, J = 9.2 Hz, 1H), 7.84 (s, 1H), 4.80 (t, J = 7.6 Hz, 2H), 3.90-3.80 (m, 2H), 3.20-3.10 (m, 3H), 3.10-2.60 (m, 3H), 2.00 (s, 3H), 1.94-1.80 (m, 3H). LC-MS $[M+H]^+$ 499.13。

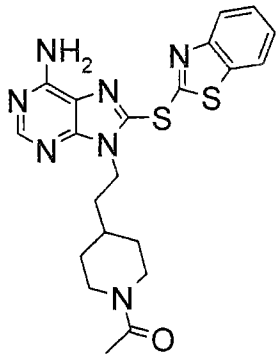
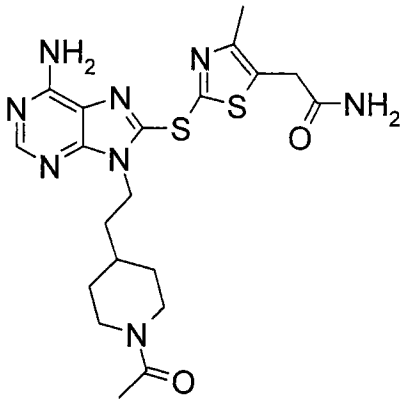
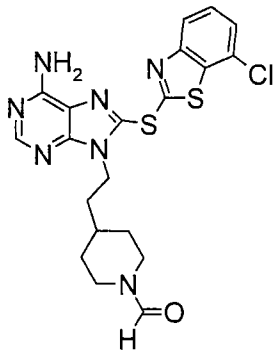
依照所述实施例 651 的步骤使用合适的原料制备实例 652- 661，所述实例的分析数据总结于表 11 中。所有这些化合物经制备型 HPLC 纯化后以三氟乙酸盐的形式分离出来。

表 11

实例	结构	名称和分析数据
652		3-[2-(1-乙酰基哌啶-4-基)乙基]-8-[(6-硝基-1,3-苯并噻唑-2-基)硫]-3H-嘌呤-6-胺。^{1}H NMR (CD_3OD) δ 8.90 (d, J = 2.4 Hz, 1H), 8.36 (dd, J = 8.8, 2.4 Hz, 1H), 8.30 (s, 1H), 8.01 (d, J = 8.8 Hz, 1H), 4.40 (t, J = 7.6 Hz, 2H), 3.90-3.80 (m, 2H), 3.00-2.91 (m, 2H), 2.51-2.43 (m, 2H), 2.02 (s,

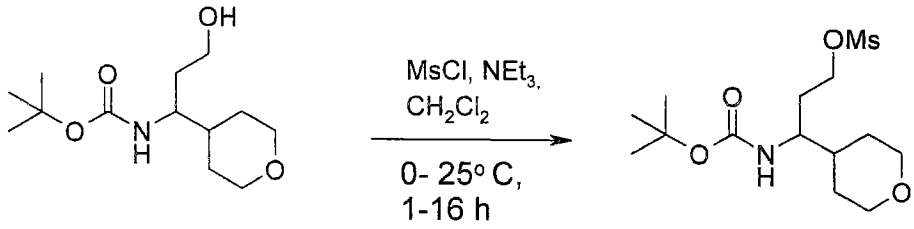
		3H), 1.82-1.72 (m, 3H), 1.55-1.49 (m, 2H). LC-MS [M+H]+ 499.13
653		9-[2-(1-乙酰基哌啶-4-基)乙基]-8-[(4-氯-1,3-苯并噻唑-2-基)硫]-9H-嘌呤-6-胺。 1H NMR (CD3OD) δ 8.30 (s, 1H), 7.80 (d, J = 8.8 Hz, 1H), 7.50 (d, J = 8.8 Hz, 1H), 7.40-7.30 (m, 1H), 4.40 (t, J = 7.6 Hz, 2H), 3.80-3.78 (m, 2H), 3.00-2.90 (m, 2H), 2.50-2.40 (m, 2H), 2.35-2.15 (m, 2H), 2.00 (s, 3H), 1.80-1.70 (m, 3H). LC-MS [M+H]+ 488.10
654		9-[2-(1-乙酰基哌啶-4-基)乙基]-8-[(4,5-二甲基-1,3-噻唑-2-基)硫]-9H-嘌呤-6-胺。 1H NMR (CD3OD) δ 8.50 (s, 1H), 4.40 (t, J = 7.2 Hz, 2H), 3.90-3.87 (m, 2H), 2.60-2.51 (m, 2H), 2.50 (s, 3H), 2.30 (s, 3H), 2.00 (s, 3H), 1.90-1.80 (m, 3H), 1.70-1.60 (m, 2H), 1.60-1.50 (m, 2H). LC-MS [M+H]+ 432.10
655		9-[2-(1-乙酰基哌啶-4-基)乙基]-8-[(6-氟-1,3-苯并噻唑-2-基)硫]-9H-嘌呤-6-胺。 1H NMR (CD3OD) δ 8.40 (s, 1H), 7.90-7.80 (m, 1H), 7.74-7.70 (m, 1H), 7.33-7.30 (m, 1H), 4.50 (t, J = 7.2 Hz, 2H),

		3.80-3.70 (m, 1H), 3.00-2.90 (m, 2H), 2.00 (s, 3H), 1.80-1.70 (m, 4H), 1.50-1.40 (m, 2H), 1.20-1.00 (m, 2H). LC-MS [M+H]$^+$ 472.14
656		9-[2-(1-乙酰基哌啶-4-基)乙基]-8-[(5-氯-1,3-苯并噻唑-2-基)硫]-9H-嘌呤-6-胺。 LC-MS [M+H]$^+$ 488.01
657		9-[2-(1-乙酰基哌啶-4-基)乙基]-8-[(7-氯-1,3-苯并噻唑-2-基)硫]-9H-嘌呤-6-胺。 ^{1}H NMR (CD_3OD) δ 8.30 (s, 1H), 7.85-7.83 (m, 1H), 7.50-7.40 (m, 2H), 4.50 (t, J = 7.2 Hz, 2H), 3.83-3.80 (m, 2H), 3.00-2.90 (m, 2H), 2.50-2.40 (m, 2H), 2.10 (s, 3H), 2.00-1.90 (m, 3H), 1.50-1.40 (m, 2H). LC-MS [M+H]$^+$ 488.12
658		9-[2-(1-乙酰基哌啶-4-基)乙基]-8-[(5-甲氧基-1,3-苯并噻唑-2-基)硫]-9H-嘌呤-6-胺。 ^{1}H NMR (CD_3OD) δ 8.30 (s, 1H), 7.70 (d, J = 8.8 Hz, 1H), 7.40 (d, J = 2.4 Hz, 1H), 7.00 (dd, J = 8.8, 2.4 Hz, J = 8.8 Hz, 1H), 4.40 (t, J = 7.6 Hz, 2H), 3.90 (s, 3H), 3.50-3.40 (m, 2H),

		3.14-3.12 (m, 2H), 2.20 (s, 3H), 1.72-1.70 (m, 3H), 1.30-1.20 (m, 4H). LC-MS $[M+H]^+$ 484.15
659		9-[2-(1-乙酰基哌啶-4-基)乙基]-8-(1,3-苯并噻唑-2-基硫)-9H-嘌呤-6-胺。^{1}H NMR (CD_3OD) δ 8.30 (s, 1H), 7.93-7.90 (m, 2H), 7.50-7.40 (m, 2H), 4.40 (t, J = 7.6 Hz, 2H), 3.81-3.80 (m, 2H), 3.14-3.12 (m, 2H), 3.00-2.90 (m, 2H), 2.20 (s, 3H), 1.80-1.70 (m, 2H), 1.50-1.40 (m, 3H). LC-MS $[M+H]^+$ 454.15
660		2-[2-({9-[2-(1-乙酰基哌啶-4-基)乙基]-6-氨基-9H-嘌呤-8-基}硫)-4-甲基-1,3-噻唑-5-基]乙酰胺。LC-MS $[M+H]^+$ 475.16。
661		4-(2-{6-氨基-8-[(7-氯-1,3-苯并噻唑-2-基)硫]-9H-嘌呤-9基}-乙基)-哌啶-1-甲醛。LC-MS $[M+H]^+$ 474.0

中间体 115

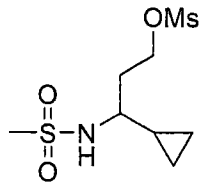
甲磺酸 3-叔丁氧羰基氨基-3-(四氢吡喃-4-基)-丙酯



在 0 ℃下，向[3-羟基-1-(四氢吡喃-4-基)-丙基]-氨基甲酸叔丁酯（0.200 g，0.770 mmol）和 NEt_3（192 μL，0.920 mmol）的 CH_2Cl_2（8 mL）溶液中加入 MsCl（72 μL，0.92 mmol），并且在室温下搅拌所述混合物 10 h。将溶剂蒸发至干并加入 EtOAC。乙酸乙酯层经 $NaHCO_3$ 水溶液洗涤、干燥（Na_2SO_4）、过滤并在减压状态下蒸发溶剂，得到甲磺酸 3-叔丁氧羰基氨基-3-(四氢吡喃-4-基)-丙酯（0.162g）。LC-MS [M+Na] 360.2。所述产物对于下一步而言是足够纯的，不经过进一步纯化而使用。

中间体 116

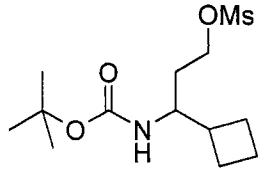
甲磺酸 3-环丙基-3-甲磺酰氨基-丙酯



依照所述中间体 115 的步骤从 N-(1-环丙基-3-羟基-丙基)-甲磺酰胺制备所述标题化合物（0.120 g）。所述产物不经过进一步纯化而用于下一步中。

中间体 117

甲磺酸 3-叔丁氧羰基氨基-3-环丁基-丙酯



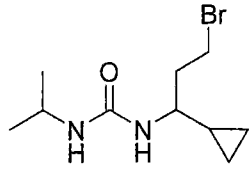
在 0 ℃下，向 3-叔丁氧羰基氨基-3-环丁基-丙酸（0.300 g，1.23 mmol）的 THF（12 mL）溶液中加入 BH_3-SMe_2（1.70 mL，3.33 mmol；在 THF 中 2.0 M 的溶液）。在室温下搅拌 10 h 后，所述反应混合物经饱和 $NaHCO_3$ 骤冷，EtOAc 萃取，盐水洗涤，干燥（Na_2SO_4）并在真空中浓缩，得到(1-环丁基-3-羟基-丙基)-氨基甲酸叔丁酯（0.100 g）；LC-MS $[M+H]^+$ 230.0。所述产物对于下一步是足够纯的，不经

过进一步纯化而用于下一步中。

通过类似于所述中间体 115 的步骤使用以上的醇制备所述标题产物（0.082 g）。LC-MS $[M+H]^+$ 308.3。

中间体 118

1-(3-溴-1-环丙基-丙基)-3-异丙基-脲

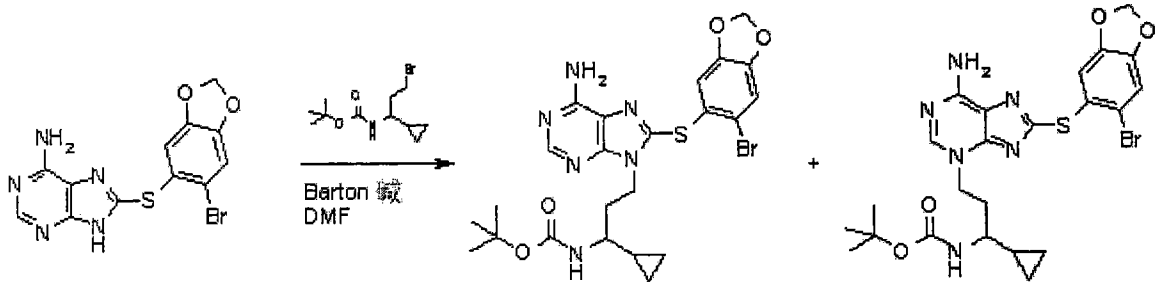


在 0 ℃下，向 3-氨基-3-环丙-1-醇盐酸盐（0.25 g，1.65 mmol）和 NEt_3（690 μL，4.95 mmol）的 CH_3CN（5 mL）溶液中加入 2-异氰酸根合丙烷（180 μL，1.80 mmol）。在室温下搅拌 10 h 后，所述反应混合物经 H_2O 骤冷、EtOAC 萃取、盐水洗涤、干燥（Na_2SO_4）、过滤并在真空中浓缩，得到 1-(1-环丙基-3-羟基-丙基)-3-异丙基-脲（0.189 g）。

然后将 1-(1-环丙基-3-羟基-丙基)-3-异丙基-脲（0.189 g，0.950 mmol）溶解于 CH_2Cl_2（10 mL）中并加入 CBr_4（0.477 g，1.40 mmol），将该混合物冷却至 0 ℃。向所述混合物中分批加入结合 PPh_3-聚合物的树脂（0.889 g，1.40 mmol；1.6 mmol/g）。在室温搅拌 3 h 后，所述混合物经 CH_2Cl_2（50 mL）稀释、过滤并经 CH_2Cl_2/MeOH/丙酮洗涤。在真空中浓缩合并的滤液以得到 1-(3-溴-1-环丙基-丙基)-3-异丙基-脲（0.212 g）。GC-MS m/z 262。

实施例 662 和 663

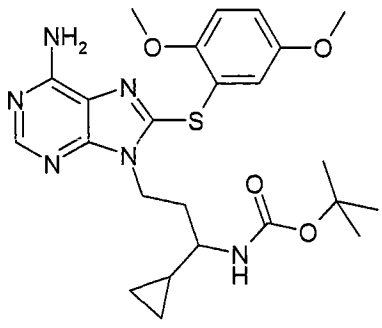
(3-{6-氨基-8-[(6-溴-1,3-苯并间二氧杂环戊烯-5-基)硫]-9H-嘌呤-9-基}-1-环丙基丙基)氨基甲酸叔丁酯和(3-{6-氨基-8-[(6-溴-1,3-苯并间二氧杂环戊烯-5-基)硫]-3H-嘌呤-3-基}-1-环丙基丙基)氨基甲酸叔丁酯

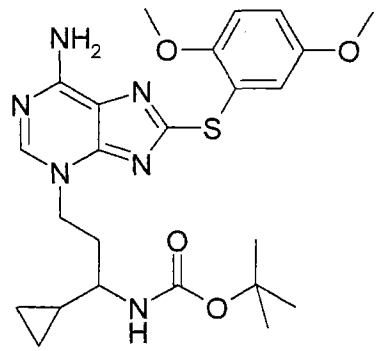
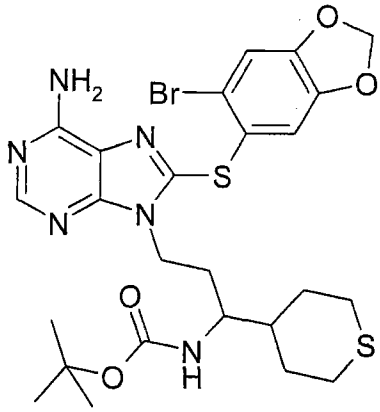
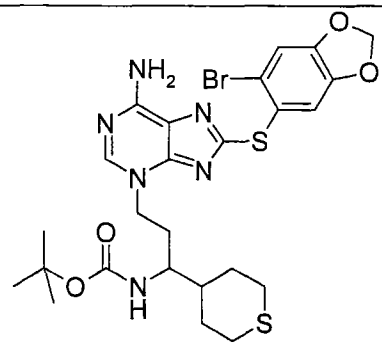
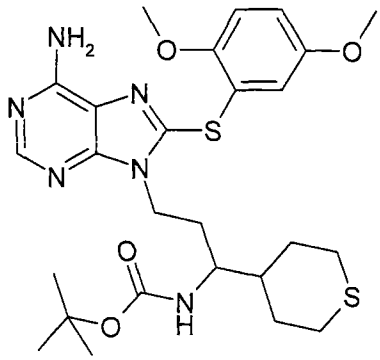


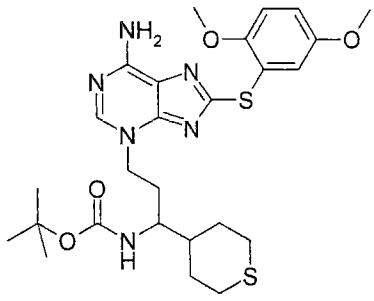
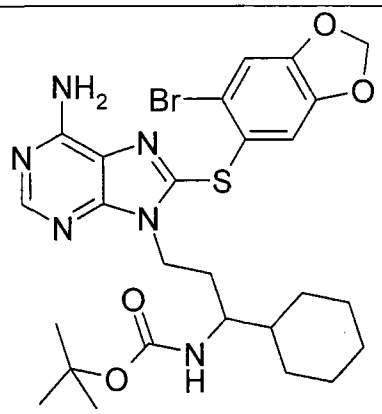
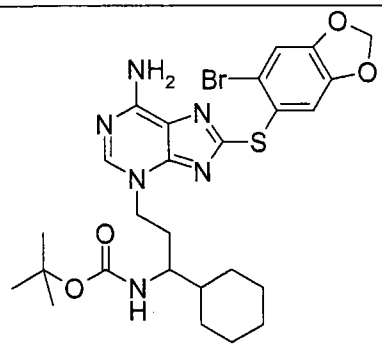
将 8-(6-溴-苯并[1,3]间二氧杂环戊烯-5-基硫基)-9H-嘌呤-6-基胺（0.145 g，0.396 mmol）、(3-溴-1-环丙基-丙基)-氨基甲酸叔丁酯（0.228 g，0.82 mmol）和 Barton 碱（0.140 g，0.82 mmol）在 DMF（4 mL）中的混合物在 80-100 ℃加热 6-15 h。冷却后将所述反应混合物在减压下浓缩。通过制备型 HPLC[X-Terra prep-RP18 10 um，19×250 mm（水），流动相：溶剂 A：含 0.01% TFA 的 HPLC 级水，和 B：含 0.01% TFA 的乙腈，一般洗脱梯度 – 在 15 至 25 分钟的实验时间内溶剂 B 从 15%至 80%]纯化所述剩余物。HPLC 馏分经冷冻干燥后分离出三氟乙酸盐形式的 N-9 异构体和 N-3 异构体。 (3-{6-氨基-8-[(6-溴-1,3-苯并间二氧杂环戊烯-5-基)硫]-9H-嘌呤-9-基}-1-环丙基丙基)氨基甲酸叔丁酯。^{1}H NMR (DMSO-d_6) δ 8.17 (s, 1H), 7.37 (s, 1H), 6.79 (s, 1H), 6.10 (s, 2H), 4.20-4.19 (m, 2H), 2.90-2.85 (m, 2H), 2.00-1.80 (m, 2H), 1.38 (s, 9H), 0.40-0.20 (m, 4H); LC-MS $[M+H]^+$ 563.10。(3-{6-氨基-8-[(6-溴-1,3-苯并间二氧杂环戊烯-5-基)硫]-3H-嘌呤-3-基}-1-环丙基丙基)氨基甲酸叔丁酯。^{1}H NMR (DMSO-d_6) δ 8.49 (s, 1H), 7.51 (s, 1H), 7.40 (s, 1H), 6.18 (s, 2H), 4.35-4.30 (m, 2H), 2.92-2.85 (m, 2H), 2.20-1.50 (m, 6H), 1.38 (s, 9H); LC-MS $[M+H]^+$ 563.10。

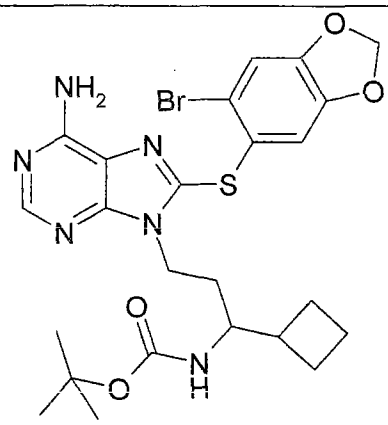
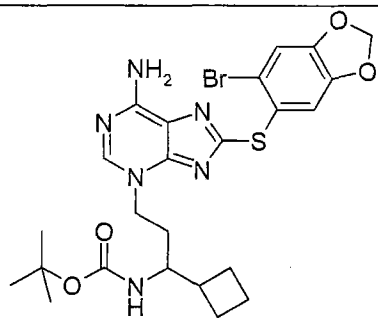
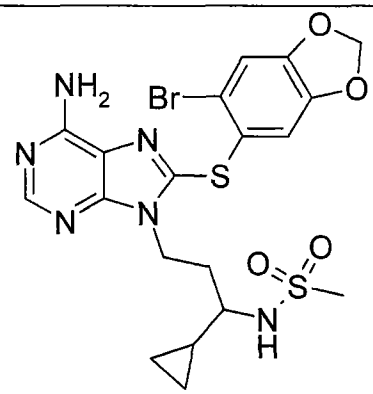
以类似于所述实施例 662 和 663 的步骤使用合适的原料合成实例 664 – 685，所述实例经制备型 HPLC 纯化后以三氟乙酸盐的形式分离出来。

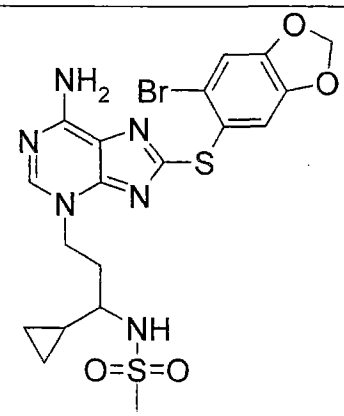
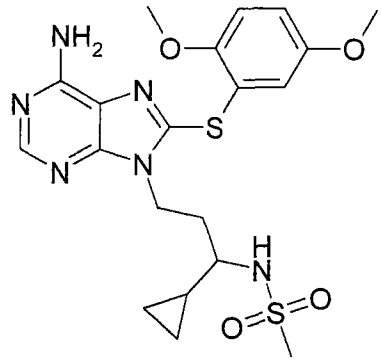
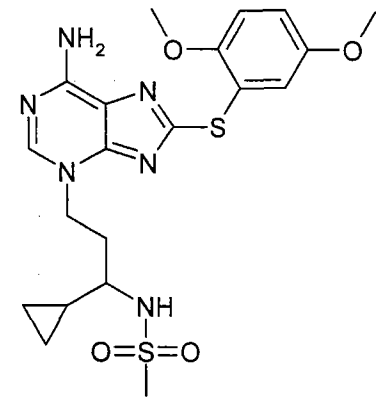
表 12

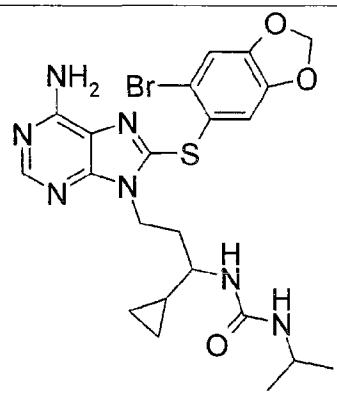
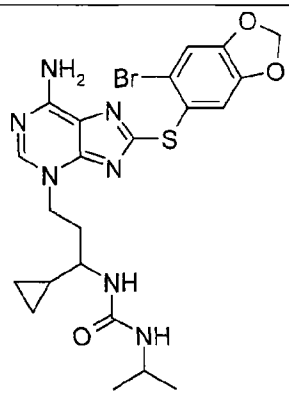
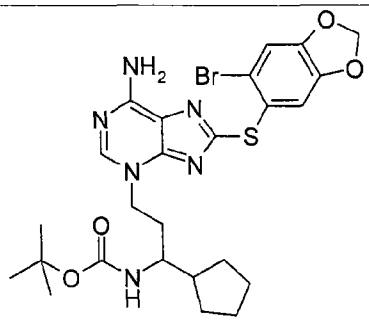
实例编号	结构	名称和分析数据
664		(3-{6-氨基-8-[(2,5-二甲氧基苯基)硫]-9H-嘌呤-9-基}-1-环丙基丙基)氨基甲酸叔丁酯。^{1}H NMR (DMSO-d_6) δ 8.26 (s, 1H), 7.03 (d, J= 9.2 Hz, 1H), 6.89-6.86 (m, 2H), 6.52 (s, 1H), 4.30-4.15 (m, 2H), 3.74 (s, 3H), 3.70-3.50 (m, 2H), 3.62 (s, 3H), 2.85-2.80 (m,

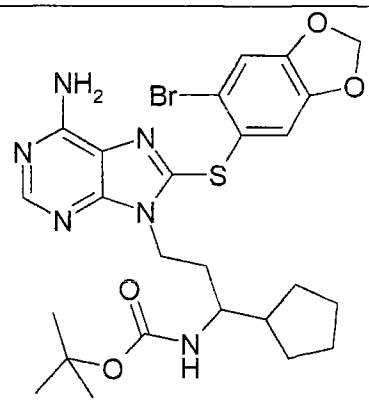
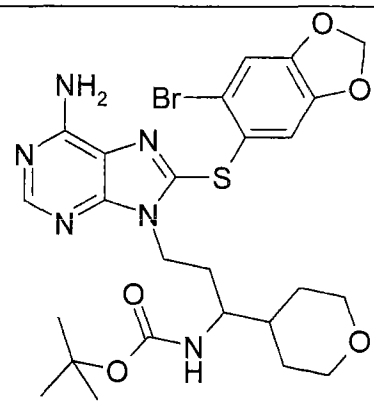
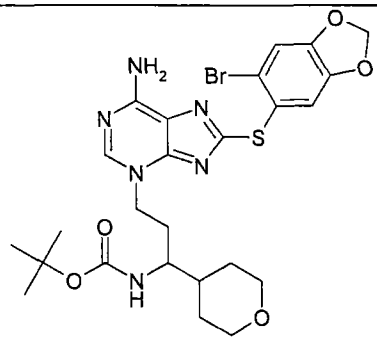
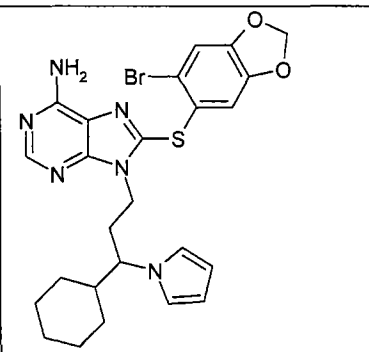
		1H), 2.05-1.85 (m, 1H), 1.36 (s, 9H), 0.40-0.20 (m, 4H); LC-MS $[M+H]^+$ 501.2.
665		(3-{6-氨基-8-[(2,5-二甲氧基苯基)硫]-3H-嘌呤-3-基}-1-环丙基丙基)氨基甲酸叔丁酯。LC-MS $[M+H]^+$ 501.2
666		[3-{6-氨基-8-[(6-溴-1,3-苯并间二氧杂环戊烯-5-基)硫]-9H-嘌呤-9-基}-1-(四氢-2H-噻喃-4-基)丙基]氨基甲酸叔丁酯。^{1}H NMR (DMSO-d_6) δ 8.26 (s, 1H), 7.39 (s, 1H), 6.81 (s, 1H), 6.09 (s, 2H), 4.20-4.10 (m, 2H), 3.45-3.30 (m, 2H), 2.54-2.49 (m, 2H), 1.90-1.70 (m, 4H), 1.38 (s, 9H), 1.30-1.10 (m, 4H); TOF LC-MS $[M+H]^+$ 623.1.
667		[3-{6-氨基-8-[(6-溴-1,3-苯并间二氧杂环戊烯-5-基)硫]-3H-嘌呤-3-基}-1-(四氢-2H-噻喃-4-基)丙基]氨基甲酸叔丁酯。LC-MS $[M+H]^+$ 623.1
668		[3-{6-氨基-8-[(2,5-二甲氧基苯基)硫]-9H-嘌呤-9-基}-1-(四氢-2H-噻喃-4-基)丙基]氨基甲酸叔丁酯。^{1}H NMR (丙酮-d_6) δ 8.35 (s, 1H), 7.06 (d, J=8.4 Hz, 1H), 6.93 (dd, J= 8.4 Hz, 2.8 Hz, 1H), 6.76 (d, J= 2.8 Hz, 1H), 4.40-4.30 (m, 2H), 3.83 (s, 3H), 3.69 (s, 3H), 3.50-3.40

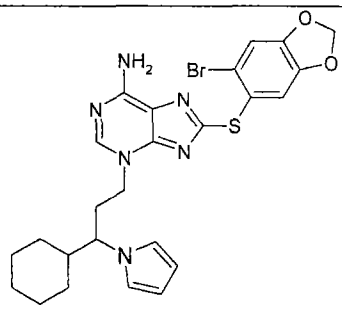
		(m, 1H), 2.65-2.50 (m, 5H), 2.10-1.80 (m, 4H), 1.41 (s, 9H); LC-MS $[M+H]^+$ 561.05.
669		[3-{6-氨基-8-[(2,5-二甲氧基苯基)硫]-3H-嘌呤-3-基}-1-(四氢-2H-噻喃-4-基)丙基]氨基甲酸叔丁酯。^{1}H. NMR (丙酮-d_6) δ 8.50 (s, 1H), 7.29 (d, J= 2.8 Hz, 1H), 7.01 (d, J= 8.8 Hz, 1H), 7.03 (dd, J= 8.8, 2.8 Hz, 1H), 4.50-4.39 (m, 2H), 3.81 (s, 3H), 3.79 (s, 3H), 3.58-3.50 (m, 4H), 2.65-2.50 (m, 3H), 2.10-1.80 (m, 5H), 1.41 (s, 9H); LC-MS $[M+H]^+$ 561.3.
670		(3-{6-氨基-8-[(6-溴-1,3-苯并间二氧杂环戊烯-5-基)硫]-9H-嘌呤-9-基}-1-环己基丙基)氨基甲酸叔丁酯。^{1}H NMR (DMSO-d_6) δ 8.18 (s, 1H), 7.37 (s, 1H), 6.70 (s, 1H), 6.08 (s, 2H), 4.17-4.15 (m, 2H), 3.30-3.20 (m, 2H), 2.50-2.40 (m, 2H), 1.80-1.50 (m, 6H), 1.38 (s, 9H), 1.20-0.80 (m, 4H); LC-MS $[M+H]^+$ 605.1.
671		(3-{6-氨基-8-[(6-溴-1,3-苯并间二氧杂环戊烯-5-基)硫]-3H-嘌呤-3-基}-1-环己基丙基)氨基甲酸叔丁酯。^{1}H NMR (DMSO-d_6) δ 8.46 (s, 1H), 7.50 (s, 1H), 7.38 (s, 1H), 6.18 (s, 2H), 4.33-4.22 (m, 2H), 3.27-3.15 (m, 2H), 2.50-2.40 (m, 2H), 1.80-1.50 (m, 6H), 1.39 (s, 9H), 1.20-0.80 (m, 4H); LC-MS

		$[M+H]^+$ 605.1.
672		(3-{6-氨基-8-[(6-溴-1,3-苯并间二氧杂环戊烯-5-基)硫]-9H-嘌呤-9-基}-1-环丁基丙基)氨基甲酸叔丁酯。^{1}H NMR (CD_3OD) δ 8.25 (s, 1H), 7.26 (s, 1H), 7.16 (s, 1H), 6.08 (s, 2H), 4.40-4.28 (m, 2H), 3.49-3.4 (m, 4H), 1.90-1.50 (m, 6H), 1.43 (s, 9H); LC-MS $[M+H]^+$ 577.1.
673		(3-{6-氨基-8-[(6-溴-1,3-苯并间二氧杂环戊烯-5-基)硫]-3H-嘌呤-3-基}-1-环丁基丙基)氨基甲酸叔丁酯。^{1}H NMR (CD_3OD) δ 8.41 (s, 1H), 7.35 (s, 1H), 7.30 (s, 1H), 6.14 (s, 2H), 4.40-4.28 (m, 2H), 3.57-3.52 (m, 4H), 1.90-1.60 (m, 6H), 1.43 (s, 9H); LC-MS $[M+H]^+$ 577.1
674		N-(3-{6-氨基-8-[(6-溴-1,3-苯并间二氧杂环戊烯-5-基)硫]-9H-嘌呤-9-基}-1-环丙基丙基)甲磺酰胺 ^{1}H NMR (丙酮-d_6) δ 8.39 (s, 1H), 7.27 (s, 1H), 7.05 (s, 1H), 6.14 (s, 2H), 4.54-4.40 (m, 2H), 3.30-3.20 (m, 1H), 3.02 (s, 3H), 2.98-2.87 (m, 3H), 2.20-2.19 (m, 2H), 2.08-2.04 (m, 2H); TOF LC-MS $[M+H]^+$ 541.4

675		N-(3-{6-氨基-8-[(6-溴-1,3-苯并间二氧杂环戊烯-5-基)硫]-3H-嘌呤-3-基}-1-环丙基丙基)甲磺酰胺。 ^{1}H NMR (丙酮-d_6) δ 8.56 (s, 1H), 7.34 (s, 1H), 7.28 (s, 1H), 6.17 (s, 2H), 4.59-4.50 (m, 2H), 3.30-3.20 (m, 1H), 3.10-3.04 (m, 6H), 3.01 (s, 3H), 2.98-2.87 (m, 1H); TOF LC-MS $[M+H]^+$ 541.4.
676		N-(3-{6-氨基-8-[(2,5-二甲氧基苯基)硫]-9H-嘌呤-9-基}-1-环丙基丙基)甲磺酰胺 ^{1}H NMR (丙酮-d6) δ 8.38 (s, 1H), 7.06 (d, J= 7.6Hz, 1H), 6.96 (d, J=7.6 Hz, 1H), 6.87 (s, 1H), 4.52-4.47 (m, 2H), 3.81 (s, 3H), 3.71 (s, 3H), 3.30 (s, 3H), 2.90-2.80 (m, 3H), 2.20-2.00 (m, 4H), 1.10-1.00 (m, 1H); LC-MS $[M+H]^+$ 479.4.
677		N-(3-{6-氨基-8-[(2,5-二甲氧基苯基)硫]-3H-嘌呤-3-基}-1-环丙基丙基)甲磺酰胺 ^{1}H NMR (丙酮-d_6) δ 8.56 (s, 1H), 7.26 (d, J= 2.8Hz, 1H), 7.08 (d, J=9.2 Hz, 1H), 7.01 (dd, J=9.2, 2.8Hz, 1H), 4.59-4.53 (m, 2H), 3.80 (s, 3H), 3.79 (s, 3H), 3.30-3.04 (m, 6H), 1.90-1.70 (m, 5H); LC-MS $[M+H]^+$ 479.4.

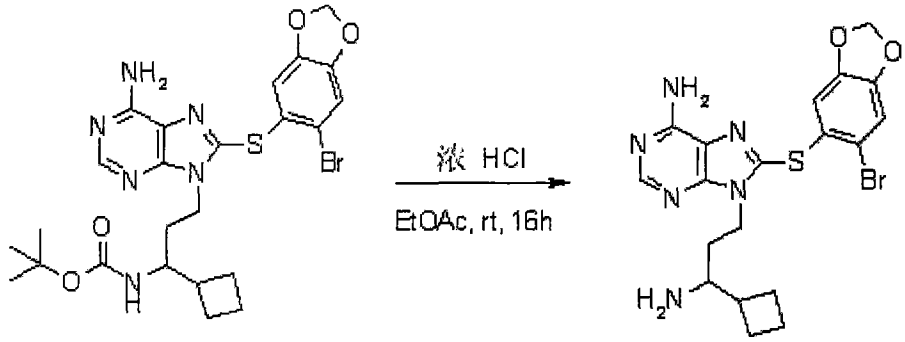
678		N-(3-{6-氨基-8-[(6-溴-1,3-苯并间二氧杂环戊烯-5-基)硫]-9H-嘌呤-9-基}-1-环丙基丙基)-N′-异丙脲 ^{1}H NMR (DMSO-d_6) δ 8.28 (s, 1H), 7.39 (s, 1H), 6.91 (s, 1H), 6.10 (s, 2H), 5.72-5.70 (m, 1H), 5.61-5.58 (m, 1H), 4.22 (t, J= 7.6 Hz, 2H), 3.11-3.08 (m, 2H), 1.94-1.84 (m 1H), 1.02-0.99 (m, 6H), 0.83-0.80(m, 2H), 0.40-0.11 (m, 4H); LC-MS $[M+H]^+$ 548.3
679		N-(3-{6-氨基-8-[(6-溴-1,3-苯并间二氧杂环戊烯-5-基)硫]-3H-嘌呤-3-基}-1-环丙基丙基)-N′-异丙脲。LC-MS $[M+H]^+$ 548.4
680		{3-[6-氨基-8-(6-溴-苯并[1,3]间二氧杂环戊烯-5-基硫基)-嘌呤-3-基]-1-环戊基-丙基}-氨基甲酸叔丁酯。^{1}H NMR (丙酮-d_6) δ 8.43 (s, 1H), 7.46 (s, 1H), 6.81 (s, 1H), 6.14 (s, 2H), 4.35-4.20 (m, 2H), 3.20-3.18 (m, 3H), 1.84-1.40 (m, 9H), 1.37 (s, 9H); LC-MS $[M+H]^+$ 591.1

681		{3-[6-氨基-8-(6-溴-苯并[1,3]间二氧杂环戊烯-5-基硫基)-嘌呤-9-基]-1-环戊基-丙基}-氨基甲酸叔丁酯。^{1}H NMR (丙酮-d_6) δ 8.16 (s, 1H), 7.34 (s, 1H), 6.74 (s, 1H), 6.06 (s, 2H), 4.17-4.10 (m, 2H), 3.38-3.20 (m, 3H), 1.80-1.40 (m, 9H), 1.36 (s, 9H); TOF LC-MS $[M+H]^+$ 591.14
682		[3-[6-氨基-8-(6-溴-苯并[1,3]间二氧杂环戊烯-5-基硫基)-嘌呤-9-基]-1-(四氢吡喃-4-基)-丙基]-氨基甲酸叔丁酯。^{1}H NMR (丙酮-d_6) δ 8.19 (s, 1H), 7.36 (s, 1H), 6.76 (s, 1H), 6.06 (s, 2H), 4.20-4.10 (m, 2H), 3.80-3.70 (m, 3H), 3.25-3.10 (m, 4H), 2.50-2.40 (m, 5H), 1.36 (s, 9H); LC-MS $[M+H]^+$ 607.1
683		[3-[6-氨基-8-(6-溴-苯并[1,3]间二氧杂环戊烯-5-基硫基)-9H-嘌呤-3-基]-1-(四氢吡喃-4-基)-丙基]-氨基甲酸叔丁酯。^{1}H NMR (丙酮-d_6) δ 8.45 (s, 1H), 7.48 (s, 1H), 6.81 (s, 1H), 6.15 (s, 2H), 4.35-4.20 (m, 2H), 3.80-3.70 (m, 3H), 3.25-3.10 (m, 4H), 2.50-2.40 (m, 5H), 1.37 (s, 9H); LC-MS $[M+H]^+$ 607.1
684		8-[(6-溴-1,3-苯并间二氧杂环戊烯-5-基)硫]-9-[3-环己基-3-(1*H*-吡咯-1-基)丙基]-9*H*-嘌呤-6-胺。^{1}H NMR (CD_3OD) δ 8.23 (s, 1H), 7.26 (s, 1H), 7.08 (s, 1H), 6.70-6.80 (m, 2H), 6.07 (s, 2H), 6.04-6.02 (m, 2H),

		4.23-4.16 (m, 2H), 3.95-3.85 (m, 1H), 3.78-3.70 (m, 2H), 2.38-2.38 (m, 2H), 1.80-1.70 (m, 3H), 1.68-1.55 (m, 4H), 1.30-1.10 (m, 2H); LC-MS $[M+H]^+$ 555.1
685		8-[(6-溴-1,3-苯并间二氧杂环戊烯-5-基)硫]-3-[3-环己基-3-(1*H*-吡咯-1-基)丙基]-3*H*-嘌呤-6-胺。^{1}H NMR (CD_3OD) δ 7.93 (s, 1H), 7.30 (s, 1H), 7.25 (s, 1H), 6.59 (m, 2H), 6.11 (s, 2H), 6.00-5.98 (m, 2H), 4.20—4.09 (m, 2H), 3.70-3.60 (m, 2H), 3.36 - 3.25 (m, 1H), 2.60-2.40 (m, 2H), 1.81-1.70 (m, 3H), 1.65-1.51 (m, 4H), 1.30-1.10 (m, 2H); LC-MS $[M+H]^+$ 555.1

实施例 686

9-(3-氨基-3-环丁基丙基)-8-[(6-溴-1,3-苯并间二氧杂环戊烯-5-基)硫]-9H-嘌呤-6-胺。

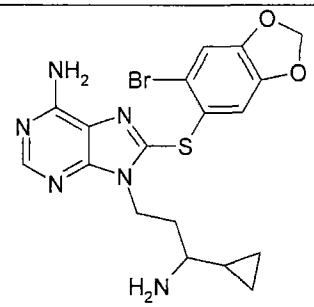
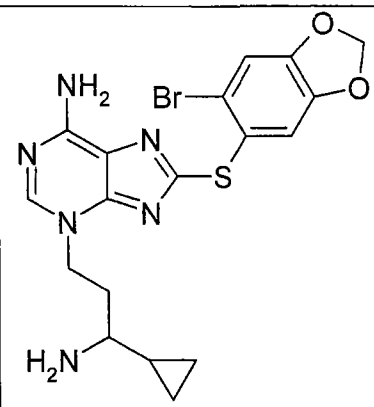
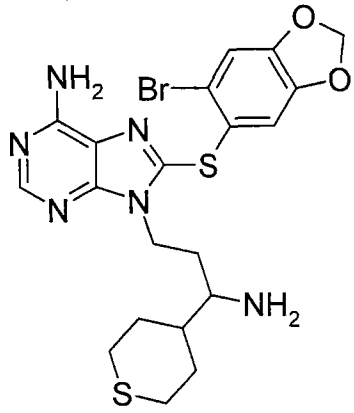


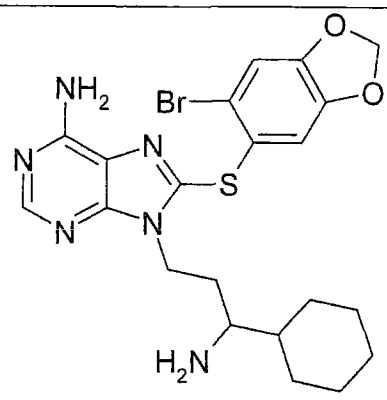
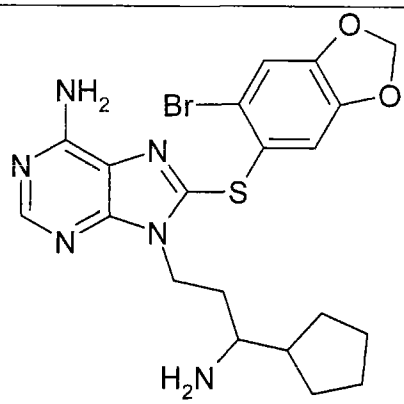
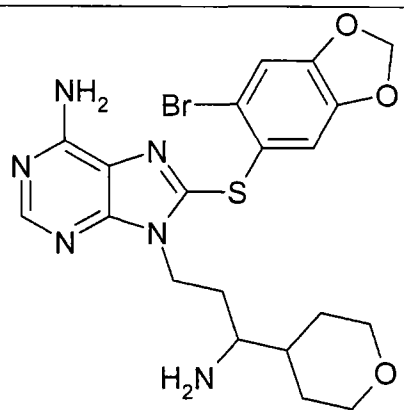
向(3-{6-氨基-8-[(6-溴-1,3-苯并间二氧杂环戊烯-5-基)硫]-9H-嘌呤-9-基}-1-环丁基丙基)氨基甲酸叔丁酯(0.015 g, 0.026 mmol)在EtOAc(2 mL)的溶液中逐滴添加浓HCl(1 mL),并将所形成的混合物在室温搅拌过夜。经减压条件下浓缩后,通过与甲苯共蒸发除去剩余HCl,得到盐酸盐形式的标题产物(0.005 g)。^{1}H MNR (CD_3OD) δ 8.33 (s, 1H), 7.29 (s, 1H), 7.19 (s, 1H), 6.09 (s,

2H), 4.40-4.28 (m, 2H), 3.49-3.40 (m, 4H), 2.50-1.70 (m, 6H); LC-MS $[M+23]^+$ 477.9。

以与所述实施例686相同的方式使用合适的原料合成实例687-692，并以盐酸盐的形式分离出来。

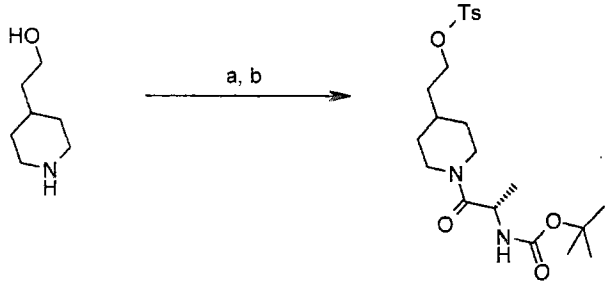
表13

实例	结构	分析数据
687		9-(3-氨基-3-环丙基丙基)-8-[(6-溴-1,3-苯并间二氧杂环戊烯-5-基)硫]-9H-嘌呤-6-胺。^{1}H NMR (DMSO-d_6) δ 8.30 (s, 1H), 7.41 (s, 1H), 6.93 (s, 1H), 6.11 (s, 2H), 4.35 (t, J= 7.6 Hz, 2H), 2.56-2.52 (m, 1H), 2.20-2.00 (m, 2H), 0.95-0.80 (m, 1H), 0.64-0.41 (m, 4H); LC-MS $[M+H]^+$ 463.0
688		3-(3-氨基-3-环丙基丙基)-8-[(6-溴-1,3-苯并间二氧杂环戊烯-5-基)硫]-3H-嘌呤-6-胺。^{1}H NMR (DMSO-d_6) δ 8.56 (s, 1H), 7.94 (s, 1H), 7.47 (s, 1H), 6.16 (s, 2H), 4.44 (t, J= 7.2 Hz, 2H), 2.51-2.49 (m, 1H), 2.32-2.29 (m, 2H), 0.95-0.84 (m, 1H), 0.59-0.40 (m, 4H); LC-MS $[M+H]^+$ 463.0
689		9-[3-氨基-3-(四氢-2H-噻喃-4-基)丙基]-8-[(6-溴-1,3-苯并间二氧杂环戊烯-5-基)硫]-9H-嘌呤-6-胺。^{1}H NMR (DMSO-d_6) δ 8.36 (s, 1H), 7.42 (s, 1H), 6.91 (s, 1H), 6.11 (s, 2H), 4.42-4.22 (m, 2H), 3.10-3.6 (m, 2H), 2.67-2.52 (m, 4H), 1.9-1.8 (m, 4H), 1.43-1.20 (m,

		2H); LC-MS $[M+H]^+$ 523.0
690		9-(3-氨基-3-环己基丙基)-8-[(6-溴-1,3-苯并间二氧杂环戊烯-5-基)硫]-9H-嘌呤-6-胺。^{1}H NMR δ (DMSO-d_6) 8.22 (s, 1H), 7.40 (s, 1H), 6.78 (s, 1H), 6.08 (s, 2H), 4.17-4.15 (m, 2H), 3.30-3.20 (m, 2H), 2.33-2.30 (m, 2H), 1.80-1.50 (m, 6H), 1.20-0.80 (m, 4H); LC-MS $[M+H]^+$ 505.1.
691		9-(3-氨基-3-环戊基-丙基)-8-(6-溴-苯并[1,3]间二氧杂环戊烯-5-基硫基)-9H-嘌呤-6-基胺。^{1}H NMR (丙酮-d_6) δ 8.18 (s, 1H), 7.36 (s, 1H), 6.77 (s, 1H), 6.07 (s, 2H), 4.35-4.25 (m, 2H), 3.38-3.20 (m, 3H), 1.70-1.50 (m, 9H); LC-MS $[M+H]^+$ 491
692		9-[3-氨基-3-(四氢吡喃-4-基)-丙基]-8-(6-溴-苯并[1,3]间二氧杂环戊烯-5-基硫基)-9H-嘌呤-6-基胺。^{1}H NMR (丙酮-d_6) δ 8.36 (s, 1H), 7.39 (s, 1H), 6.89 (s, 1H), 6.09 (s, 2H), 4.4-4.25 (m, 2H), 3.87-3.85 (m, 3H), 3.25-3.19 (m, 4H), 1.98-1.96 (m, 4H); LC-MS $[M+H]^+$ 507.0

中间体 119

甲苯-4-磺酸 2-[1-((*S*)-2-叔丁氧羰基氨基-丙酰基)-哌啶-4-基]-乙酯

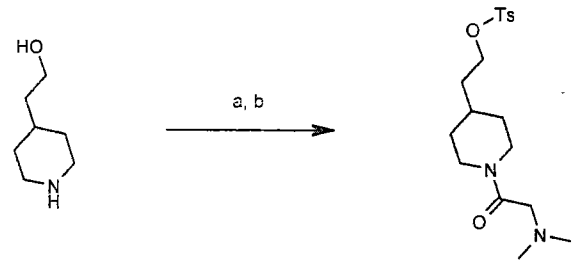


试剂：（a）N-boc-L-Ala-OSu，Et_3N，DMF，120 ℃，（b）*p*-TsCl，Et_3N，催化剂 DMAP，THF。

在室温下，向 4-哌啶乙醇（0.25 g，1.93 mmol）和 NEt_3（403 μL，2.89 mmol）在 DMF（3 mL）的溶液中加入 N-boc-L-Ala-Osu（0.553 g，193 mmol），并将所述混合物在 120 ℃温度下搅拌 10 h。所述反应混合物经 EtOAc（60 mL）稀释。乙酸乙酯层经 H_2O（60 mL）和盐水（60 mL）洗涤，经 Na_2SO_4 干燥、过滤并在减压条件下蒸发溶剂，得到{(S)-2-[4-(2-羟基-乙基)-哌啶-1-基]-1-甲基-2-氧代-乙基}-氨基甲酸叔丁酯（0.581 g）。LC-MS $[M+H]^+$ 301.0。所述产物对下一步是足够纯的，不经过进一步纯化而使用。在室温下，向乙醇（0.581 g，1.93 mmol）、三乙胺（808 μL，5.8 mmol）和 N,N-二甲基吡啶（10 mg）在 THF（10 mL）的混合物中加入对甲苯磺酰氯（*p*-TsCl）（0.479 g，2.51 mmol），并搅拌所述反应混合物 12 h。所述反应混合物在真空中浓缩，并且经 EtOAc（90 mL）稀释、饱和的 $NaHCO_3$ 水溶液（75 mL）、H_2O（75 mL）和盐水（75 mL）洗涤。EtOAc 层经 Na_2SO_4 干燥、过滤并在减压条件下蒸发溶剂以得到粗产物。通过 Isco 硅胶闪式柱使用己烷-EtOAc（1:3）纯化所述粗产物，得到纯的甲苯-4-磺酸 2-[1-((S)-2-叔丁氧羰基氨基-丙酰基)-哌啶-4-基]-乙酯（0.805 g）。^1H NMR ($CDCl_3$) δ 7.79 (d, J = 8.2 Hz, 2H), 7.36 (d, J = 8.2 Hz, 2H), 5.55 (d, J = 7.8 Hz, 1H), 4.62-4.50 (m, 2H), 4.06 (q, J = 6.2 Hz, 2H), 3.88-3.75 (m, 1H), 2.97 (q, J = 12.1 Hz, 1H), 2.53 (dt, J = 2.7, 12.8 Hz, 1H), 2.46 (s, 3H), 1.75-1.55 (m, 4H), 1.49-1.40 (m, 10 H), 1.27 (d, J = 7.0 Hz, 3H), 1.12-0.98 (m, 2H); LC-MS $[M+H]^+$ 455.2。

中间体 120

甲苯-4-磺酸 2-[1-(2-二甲基氨基-乙酰基)-哌啶-4-基]-乙酯

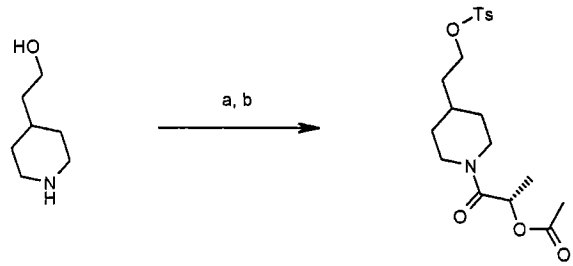


试剂：（a）Me_2NCH_2COOH，EDCI，DMAP，DMF。（b）对甲苯磺酰氯，Et_3N，催化剂 DMAP，THF

向 N,N-二甲基氨基吡啶（1.18 g，9.66 mmol）、EDCI（1.48 g，7.73 mmol）在 DMF（5 mL）的混合物中加入羧酸（0.398 g，3.86 mmol），然后加入 4-哌啶乙醇（0.5 g，3.86 mmol）。将所述反应混合物在室温搅拌 12 h。所述反应混合物经 EtOAc（75 mL）稀释并经盐水（60 mL）洗涤。所述 EtOAc 层经 Na_2SO_4 干燥、过滤并在减压条件下蒸发溶剂以得到粗酰胺。所述粗产物不经过进一步纯化而用于下一步甲苯磺酰化反应。在室温下，向上述粗产物（0.827 g，3.86 mmol）和三乙胺（3.22 mL，23.18 mmol）在 THF（20 mL）的混合物中加入对甲苯磺酰氯（2.21 g，11.59 mmol）并搅拌 12 h。在真空中浓缩所述反应混合物，并将粗产物溶解于 EtOAc（100 mL）中，用饱和的 $NaHCO_3$ 水溶液（90 mL）和盐水（90 mL）先后洗涤。EtOAc 层经 Na_2SO_4 干燥、过滤并在减压条件下蒸发溶剂以得到粗产物，所述粗产物通过 Isco 硅胶闪式柱使用己烷-EtOAc（1:9）纯化，得到 0.45 g 甲苯-4-磺酸 2-[1-(2-二甲基氨基-乙酰基)-哌啶-4-基]-乙酯。LC-MS $[M+H]^+$ 369.2。

中间体 121

乙酸(*S*)-1-甲基-2-氧代-2-{4-[2-(甲苯-4-磺酰氧)-乙基]-哌啶-1-基}-乙酯



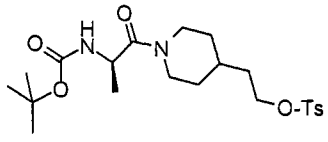
试剂：a）(*S*)-$CH_3CH(OCOCH_3)COCl$，NEt_3，THF；b）对甲苯磺酰

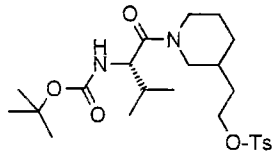
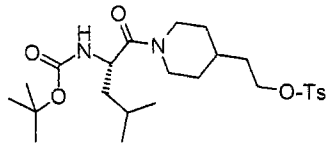
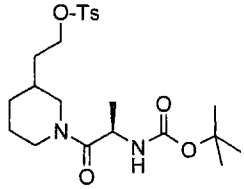
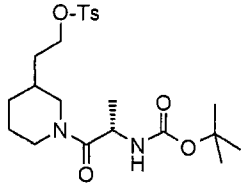
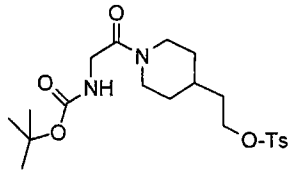
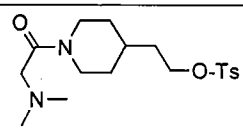
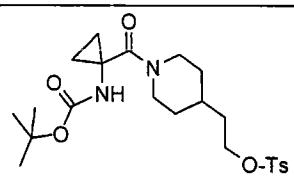
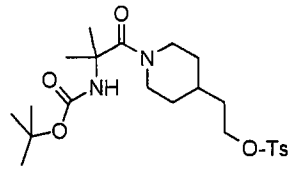
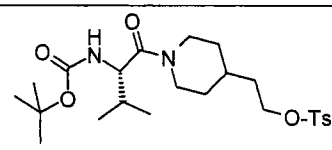
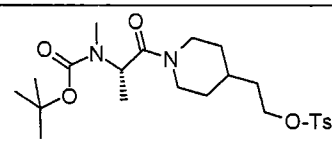
氯，Et_3N，催化剂 DMAP，THF

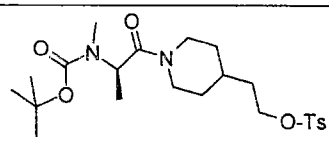
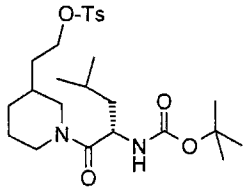
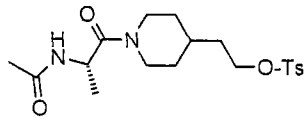
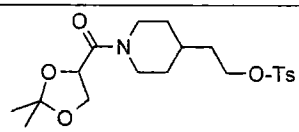
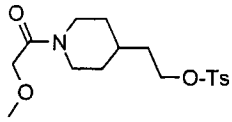
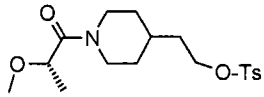
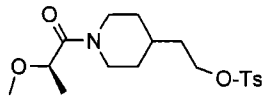
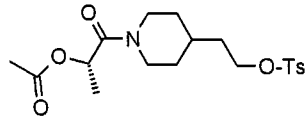
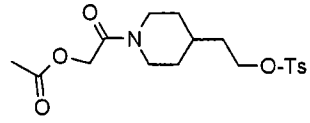
在室温下，向哌啶乙醇（2 g，15.5 mmol）和三乙胺（4.3 mL，31.0 mmol）在四氢呋喃（15 mL）中的混合物中逐滴添加乙酸(*S*)-1-氯羰基-乙酯（2.1 mL，17.0 mmol）。将所述反应混合物在室温下搅拌 8 h。将反应混合物溶解于乙酸乙酯（100 mL）中，用饱和的 $NaHCO_3$ 水溶液（90 mL）和盐水溶液（90 mL）先后洗涤。乙酸乙酯层经 Na_2SO_4 干燥、过滤并在减压条件下蒸发溶剂以得到粗产物（1.6 g），所述粗产物不经过进一步纯化而用于下一步甲苯磺酰化反应。将上步中得到的粗产物溶解于四氢呋喃（20 mL）中并在室温下加入三乙胺（2.28 mL，16.4 mmol）和 N,N-二甲基吡啶（20 mg），然后加入对甲苯磺酰氯（1.5 g，7.9 mmol），并将所述反应混合物搅拌 12 h。在真空中浓缩所述反应混合物并用 EtOAc（90 mL）稀释、用饱和的 $NaHCO_3$ 水溶液（75 mL）、H_2O（75 mL）和盐水（75 mL）洗涤。EtOAc 层经 Na_2SO_4 干燥、过滤并在减压条件下蒸发溶剂以得到粗产物。通过 Isco 硅胶闪式柱使用己烷-EtOAc（1:3）溶剂体系纯化所述粗产物，得到纯的乙酸(*S*)-1-甲基-2-氧代-2-{4-[2-(甲苯-4-磺酰氧)-乙基]-哌啶-1-基}-乙酯（2.3 g）。^1H NMR ($CDCl_3$) δ 7.79 (d, J = 8.2 Hz, 2H), 7.36 (d, J = 8.2 Hz, 2H), 5.37 (d, J = 6.6 Hz, 1H), 4.53 (t, J = 14.0 Hz, 1H), 4.14-4.00(m, 2H), 3.78 (t, J = 13.0 Hz, 1H), 3.10-2.92 (m, 1H), 2.60-2.40 (m, 4H), 2.12 (s, 3H), 1.80-1.50 (m, 5 H), 1.41 (d, J = 6.6 Hz, 3H), 1.20-1.00 (m, 2H); LC-MS $[M+H]^+$ 398.3。

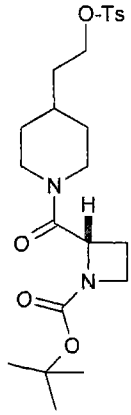
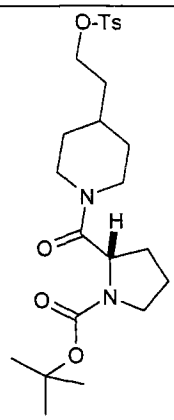
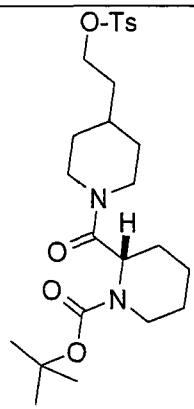
使用所述中间体 119-121 的方法中的一种制备总结于表 14 中的中间体 122-151。

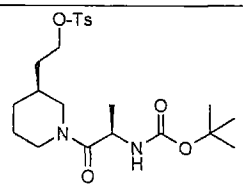
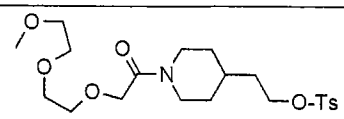
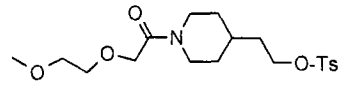
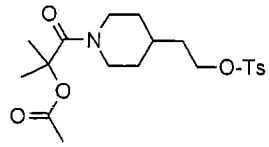
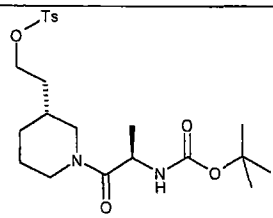
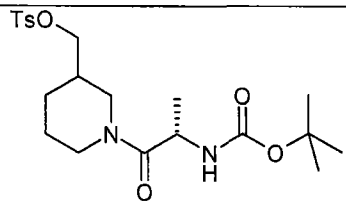
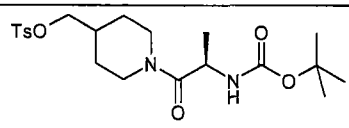
表 14

中间体	结构	名称和分析数据
122		甲苯-4-磺酸 2-[1-((*R*)-2-叔丁氧羰基氨基-丙酰基)-哌啶-4-基]-乙酯。LC-MS $[M+H]^+$ 455.2

123		甲苯-4-磺酸 2-[1-((*S*)-2-叔丁氧羰基氨基-3-甲基-丁酰)-哌啶-3-基]-乙酯。LC-MS $[M+H]^+$ 483.3
124		甲苯-4-磺酸 2-[1-((*S*)-2-叔丁氧羰基氨基-4-甲基-戊酰基)-哌啶-4-基]-乙酯。LC-MS $[M+H]^+$ 497.3
125		甲苯-4-磺酸 2-[1-((*R*)-2-叔丁氧羰基氨基-丙酰基)-哌啶-3-基]-乙酯。LC-MS $[M+H]^+$ 455.2
126		甲苯-4-磺酸 2-[1-((*S*)-2-叔丁氧羰基氨基-丙酰基)-哌啶-3-基]-乙酯。LC-MS $[M+H]^+$ 455.2
127		甲苯-4-磺酸 2-[1-(2-叔丁氧羰基氨基-乙酰基)-哌啶-4-基]-乙酯。LC-MS $[M+H]^+$ 441.3
128		甲苯-4-磺酸 2-[1-(2-二甲基氨基-乙酰基)-哌啶-4-基]-乙酯。LC-MS $[M+H]^+$ 369.2
129		甲苯-4-磺酸 2-[1-(1-叔丁氧羰基氨基-环丙羰基)-哌啶-4-基]-乙酯。LC-MS $[M+H]^+$ 467.4
130		甲苯-4-磺酸 2-[1-(2-叔丁氧羰基氨基-2-甲基-丙酰基)-哌啶-4-基]-乙酯。LC-MS $[M+H]^+$ 469.3
131		甲苯-4-磺酸 2-[1-((*S*)-2-叔丁氧羰基氨基-3-甲基-丁酰)-哌啶-4-基]-乙酯。LC-MS $[M+H]^+$ 483.2
132		甲苯-4-磺酸 2-{1[(*S*)-2-(叔丁氧羰基-甲基-氨基)-丙酰基]-哌啶-4-基}-乙酯。LC-MS

		$[M+H]^+$469.2
133		甲苯-4-磺酸 2-{1[(*R*)-2-(叔丁氧羰基-甲基-氨基)-丙酰基]-哌啶-4-基}-乙酯。LC-MS $[M+H]^+$ 469.3
134		甲苯-4-磺酸 2-[1-((*S*)-2-叔丁氧羰基氨基-4-甲基-戊酰基)-哌啶-4-基]-乙酯。LC-MS $[M+H]^+$ 497.4
135		甲苯-4-磺酸 2-[1-((*S*)-2-乙酰氨基-丙酰基)-哌啶-4-基]-乙酯。LC-MS $[M+H]^+$ 397.1
136		甲苯-4-磺酸 2-[1-(2, 2-二甲基-[1,3]二氧戊环-4-羰基)-哌啶-4-基]-乙酯。LC-MS $[M+H]^+$ 412.2
137		甲苯-4-磺酸 2-[1-(2-甲氧基-乙酰基)-哌啶-4-基]-乙酯。LC-MS $[M+H]^+$356.1
138		甲苯-4-磺酸 2-[1-((S)-2-甲氧基-丙酰基)-哌啶-4-基]-乙酯。LC-MS $[M+H]^+$ 370.2
139		甲苯-4-磺酸 2-[1-((*R*)-2-甲氧基-丙酰基)-哌啶-4-基]-乙酯。LC-MS $[M+H]^+$ 370.2
140		乙酸(*S*)-1-甲基-2-氧代-2-{4-[2-(甲苯-4-磺酰氧)-乙基]-哌啶-1-基}-乙酯。LC-MS $[M+H]^+$ 398.3
141		乙酸 2-氧代-2-{4-[2-(甲苯-4-磺酰氧)-乙基]-哌啶-1-基}-乙酯。LC-MS $[M+H]^+$ 384.2

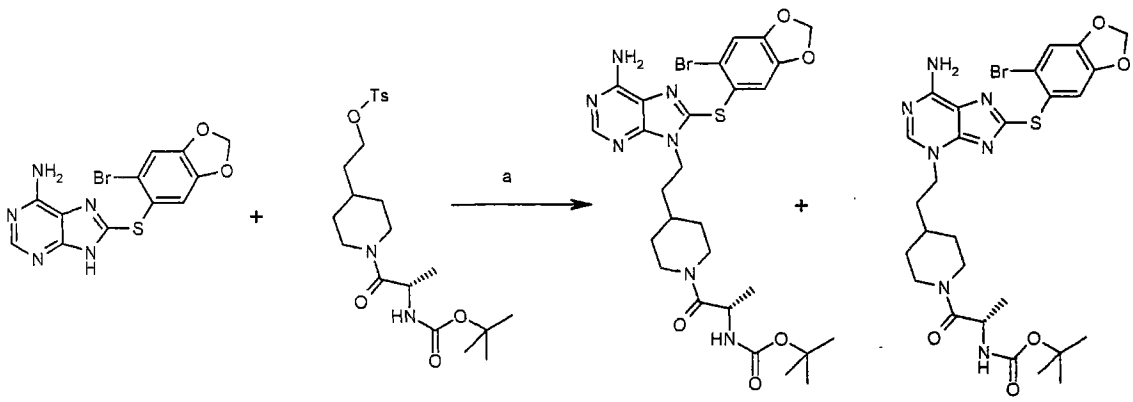
142		(*S*)-2-{4-[2-(甲苯-4-磺酰氧)-乙基]-哌啶-1-羰基}-吖丁啶-1 羧酸叔丁酯。^{1}H NMR ($CDCl_3$) δ 7.79 (d, J = 8.4 Hz, 2H), 7.36 (d, J = 8.4 Hz, 2H), 4.90 (m, 1H), 4.57 (m, 1H), 4.10-3.98 (m, 3H), 3.85 (m, 1H), 3.68 (m, 1H), 2.97 and 2.89 (td, J = 13.2, 2.4 Hz, and J = 14.0, 2.4 Hz, 1H), 2.51 (m, 1H), 2.46 (s, 3H), 2.12 (m, 1H), 1.73-1.56 (m, 6H), 1.43 (s, 9H), 1.15-0.97 (m, 2H);
143		(*S*)-2-{4-[2-(甲苯-4-磺酰氧)-乙基]-哌啶-1-羰基}-吡咯烷-1 羧酸叔丁酯。^{1}H NMR ($CDCl_3$) δ 7.79 (d, J = 8.4 Hz, 2H), 7.36 (d, J = 8.4 Hz, 2H), 4.67-4.50 (m, 2H), 4.10-4.05 (m, 2H), 3.86 (m, 1H), 3.62-3.38 (m, 2H), 3.04 and 2.93 (brt, J = 13.0 Hz, 1H), 2.41 (s, 3H), 2.40 (m, 1H), 2.15 (m, 1H), 2.09 (m, 1H), 1.88-1.76 (m, 2H), 1.71-1.52 (m, 5H), 1.45 and 1.39 (s, 9H), 1.12-0.96 (m, 2H)
144		(*S*)-2-{4-[2-(甲苯-4-磺酰氧)-乙基]-哌啶-1-羰基}-哌啶-1 羧酸叔丁酯。^{1}H NMR ($CDCl_3$) δ 7.79 (brd, J = 8.4 Hz, 2H), 7.36 (brd, J = 8.4 Hz, 2H), 5.01 (m, 1H), 4.51 (m, 1H), 4.09-4.04 (m, 2H), 3.88-3.78 (m, 2H), 3.27 (m, 1H), 2.91 (m, 1H), 2.46 (s, 3H), 2.42 (m, 1H), 1.82 (m, 1H),

		1.70-1.52 (m, 10H), 1.44 (s, 9H), 1.03 (m, 2H)
145		甲苯-4-磺酸 2-[(*S*)-1-((*R*)-2-叔丁氧羰基氨基-丙酰基)-哌啶-3-基]-乙酯。LC-MS $[M+H]^+$ 455.2
146		甲苯-4-磺酸 2-(1-{2-[2-(2-甲氧基-乙氧基)-乙氧基]-乙酰基}-哌啶-4-基)-乙酯。LC-MS $[M+H]^+$ 444.4
147		甲苯-4-磺酸 2-{1-[2-(2-甲氧基-乙氧基)-乙酰基]-哌啶-4-基}-乙酯。LC-MS $[M+H]^+$ 400.2
148		乙酸 1,1-二甲基-2-氧代-2-{4-[2-(甲苯-4-磺酰氧)-乙基]-哌啶-1-基}-乙酯。LC-MS $[M+H]^+$ 412.2
149		甲苯-4-磺酸 2[(*R*)-1-((*R*)-2-叔丁氧羰基氨基-丙酰基)-哌啶-3-基]-乙酯。LC-MS $[M+H]^+$ 455.2
150		甲苯-4-磺酸 1-((*S*)-2-叔丁氧羰基氨基-丙酰基)-哌啶-3-基甲酯。LC-MS $[M+23]^+$ 463.5
151		甲苯-4-磺酸 1-((*R*)-2-叔丁氧羰基氨基-丙酰基)-哌啶-4-基甲酯。LC-MS $[M+23]^+$ 463.2

实施例 693 和 694

[(*S*)-2-(4-{2-[6-氨基-8-(6-溴-苯并[1,3]间二氧杂环戊烯-5-基硫基)-嘌呤-9-基]-乙基}-哌啶-1-基)-1-甲基-2-氧代-乙基]-氨基甲酸叔丁酯和[(*S*)-2-(4-{2-[6-氨基-8-(6-溴-苯并[1,3]间二氧

杂环戊烯-5-基硫基)-嘌呤-3-基]-乙基}-哌啶-1-基)-1-甲基-2-氧代-乙基]-氨基甲酸叔丁酯。

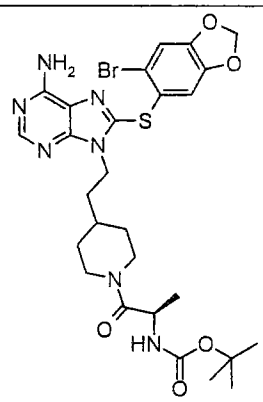
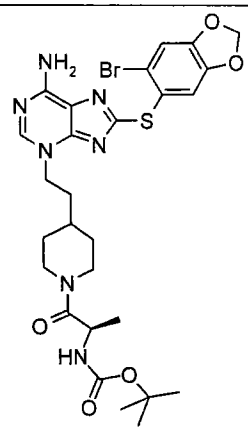
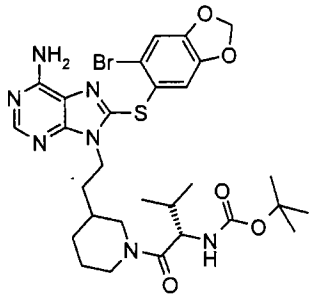


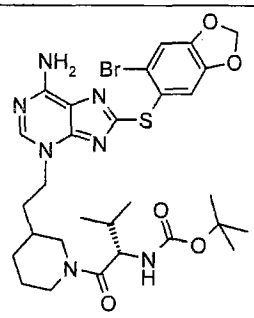
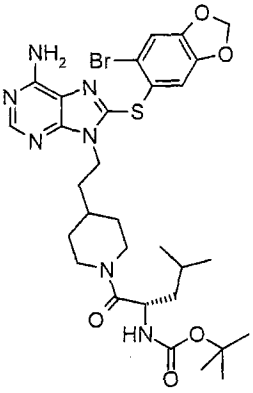
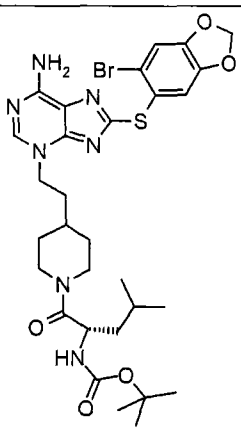
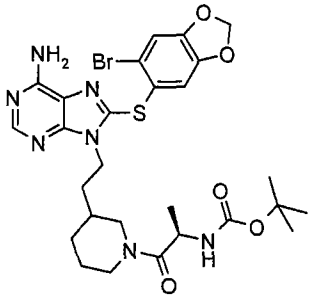
试剂：（a）Barton碱，DMF，90-100 ℃

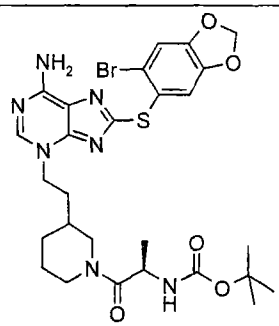
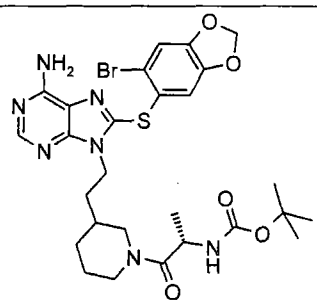
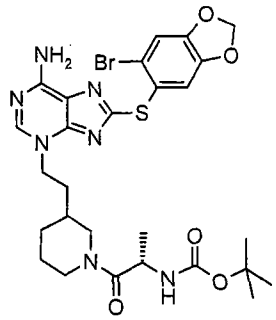
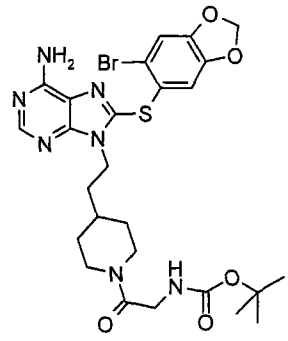
将甲苯-4-磺酸 2-[1-((*S*)-2-叔丁氧羰基氨基-丙酰基)-哌啶-4-基]-乙酯（0.223 g，0.49 mmol）、8-(6-溴-苯并[1,3]间二氧杂环戊烯-5-基硫基)-9H-嘌呤-6-基胺（0.075 g，0.20 mmol）和Barton碱（101 μL，0.49 mmol）在DMF（2.5 mL）中的混合物在90-100 ℃下加热15 h。冷却后，减压下浓缩所述反应混合物。通过制备型HPLC[X-Terra prep-RP18 10 um，19×250 mm（水），流动相：溶剂A：含0.01% TFA的HPLC级水，和溶剂B：含0.01% TFA的乙腈，一般洗脱梯度 – 在15至25分钟的实验时间内溶剂B从15%至80%]纯化所述剩余物。HPLC馏分经冷冻干燥后以三氟乙酸盐的形式分离出N-9异构体和N-3异构体。[(*S*)-2-(4-{2-[6-氨基-8-(6-溴-苯并[1,3]间二氧杂环戊烯-5-基硫基)-嘌呤-9-基]-乙基}-哌啶-1-基)-1-甲基-2-氧代-乙基]-氨基甲酸叔丁酯：^{1}H NMR (CDCl$_3$) δ 8.20 (s, 1H), 7.15 (s, 1H), 7.06 (s, 1H), 6.07 (s, 2H), 5.57 (d, J = 7.8 Hz, 1H), 4.68-4.55 (m, 2H), 4.29 (t, J = 7.4 Hz, 2H), 3.96-3.85 (m, 1H), 1.98-1.75 (m, 4H), 1.66-1.5 (m, 1H), 1.44 (s, 9H), 1.36 - 1.22 (m, 5H); TOF-MS $[M+H]^+$ 648.16。{(*S*)-2-(4-{2-[6-氨基-8-(6-溴-苯并[1,3]间二氧杂环戊烯-5-基硫基)-嘌呤-3-基]-乙基}-哌啶-1-基)-1-甲基-2-氧代-乙基]-氨基甲酸叔丁酯，TOF-MS $[M+H]^+$ 648.16。

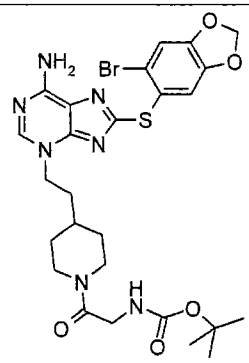
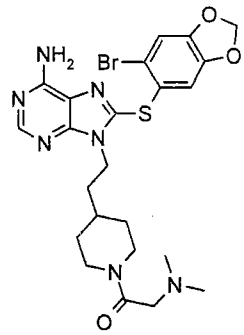
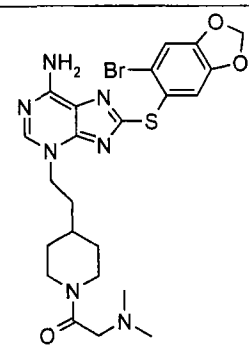
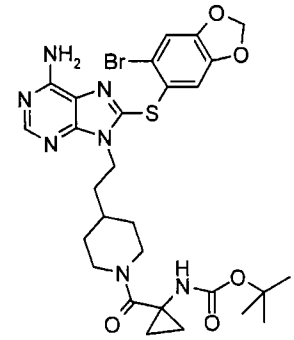
以与所述实施例693和694相同的方式使用合适的原料合成实例695-741，并经过制备型HPLC纯化后以三氟乙酸盐的形式分离出来。

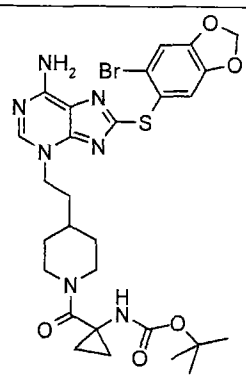
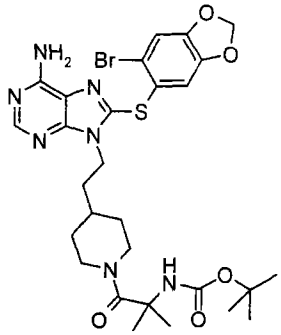
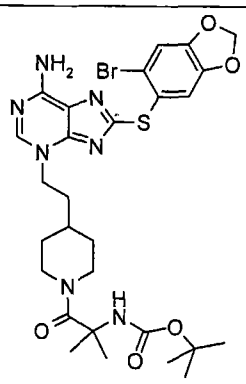
表 15

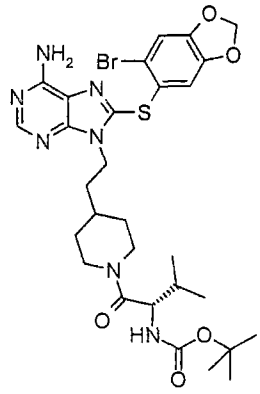
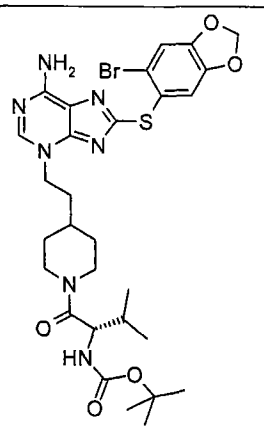
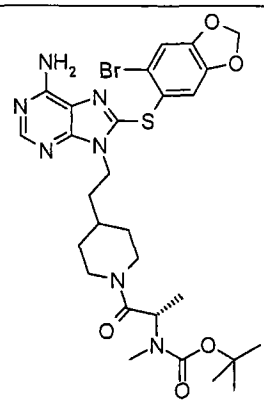
实例	结构	名称和分析数据
695		{(1*R*)-2-[4-(2-{6-氨基-8-[(6-溴-1,3-苯并间二氧杂环戊烯-5-基)硫]-9H-嘌呤-9-基}乙基)哌啶-1-基]-1-甲基-2-氧代乙基}氨基甲酸叔丁酯。^{1}H NMR (CDCl$_3$) δ 8.19 (s, 1H), 7.16 (s, 1H), 7.09 (s, 1H), 6.08 (s, 2H), 5.57 (d, J = 7.8 Hz, 1H), 4.5-4.68 (m, 2H), 4.3 (t, J = 7.4 Hz, 2H), 3.85-3.96 (m, 1H), 1.98-1.75 (m, 4H), 1.66-1.50 (m, 1H), 1.44 (s, 9H), 1.36-1.22 (m, 5H); TOF-MS [M+H]$^+$ 648.1
696		{(1*R*)-2-[4-(2-{6-氨基-8-[(6-溴-1,3-苯并间二氧杂环戊烯-5-基)硫]-3H-嘌呤-3-基}乙基)哌啶-1-基]-1-甲基-2-氧代乙基}-氨基甲酸叔丁酯。TOF-MS [M+H]$^+$ 648.1
697		((1*S*)-1-{[3-(2-{6-氨基-8-[(6-溴-1,3-苯并间二氧杂环戊烯-5-基)硫]-9H-嘌呤-9-基}乙基)哌啶-1-基]羰基}-2-甲基丙基)-氨基甲酸叔丁酯。^{1}H NMR (CDCl$_3$) δ 8.19 (s, 1H), 7.16 (s, 1H), 7.11 (s, 1H), 6.08 (s, 2H), 5.40-5.32 (m, 1H), 4.5-4.25 (m, 4H), 3.90-3.75 (m, 1H), 3.25-3.05 (m, 1H), 2.80-2.60 (m, 1H), 2.10-1.65 (m, 4H), 1.65-1.25 (m, 12H), 1.00-0.82 (m, 6H); TOF-MS [M+H]$^+$ 676.1

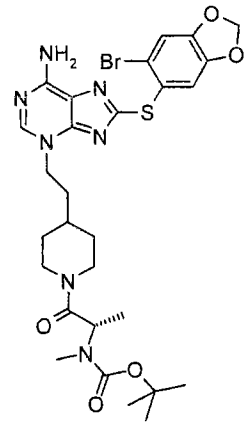
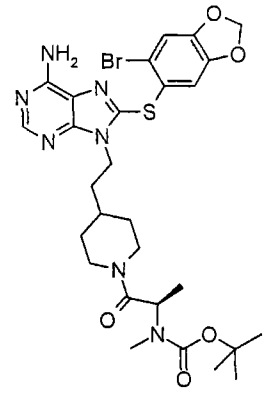
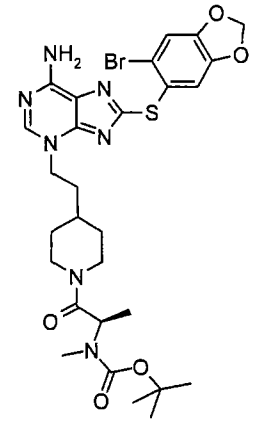
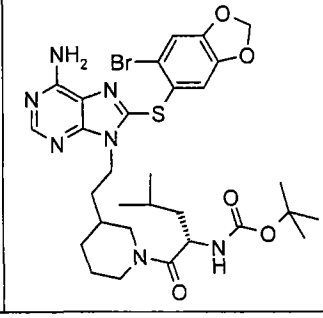
698		((1*S*)-1-{[3-(2-{6-氨基-8-[(6-溴-1,3-苯并间二氧杂环戊烯-5-基)硫]-3H-嘌呤-3-基}乙基)哌啶-1-基]羰基}-2-甲基丙基)氨基甲酸叔丁酯。TOF-MS [M+H]$^+$ 676.1
699		((1*S*)-1-{[4-(2-{6-氨基-8-[(6-溴-1,3-苯并间二氧杂环戊烯-5-基)硫]-9H-嘌呤-9-基}乙基)哌啶-1-基]羰基}-3-甲基丁基)氨基甲酸叔丁酯。^{1}H NMR (CDCl$_3$) δ 8.19 (s, 1H), 7.16 (s, 1H), 7.09 (s, 1H), 6.08 (s, 2H), 5.42-5.30 (m, 1H), 4.70-4.50 (m, 1H), 4.30 (t, J = 6.6 Hz, 2H), 4.00-3.85 (m, 1H), 3.03 (q, J = 12.1 Hz, 1H), 2.57 (q, J = 12.5 Hz, 1H), 1.98-1.65 (m, 6H), 1.60-1.20 (m, 13H), 1.02-0.90 (m, 6H); TOF-MS [M+H]$^+$ 690.2
700		((1*S*)-1-{[4-(2-{6-氨基-8-[(6-溴-1,3-苯并间二氧杂环戊烯-5-基)硫]-3H-嘌呤-3-基}乙基)哌啶-1-基]羰基}-3-甲基丁基)氨基甲酸叔丁酯。TOF-MS [M+H]$^+$ 690.2
701		{(1*R*)-2-[3-(2-{6-氨基-8-[(6-溴-1,3-苯并间二氧杂环戊烯-5-基)硫]-9H-嘌呤-9-基}乙基)哌啶-1-基]-1-甲基-2-氧代乙基}氨基甲酸叔丁酯。^{1}H NMR (CDCl$_3$) δ 8.19 (s, 1H), 7.15 (s, 1H), 7.10 (s, 1H), 6.08 (s, 2H), 5.55 (m, 1H), 4.70-4.55 (m, 1H), 4.38-4.25 (m, 3H), 6.82-3.65 (m, 1H), 3.20-3.05

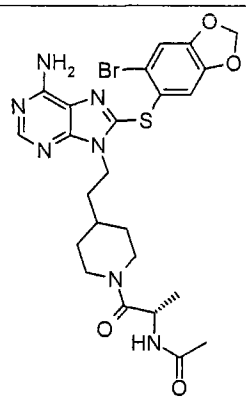
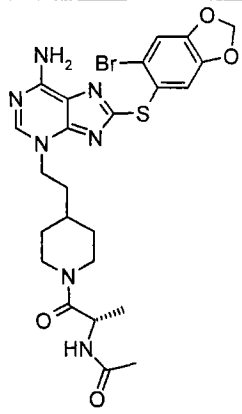
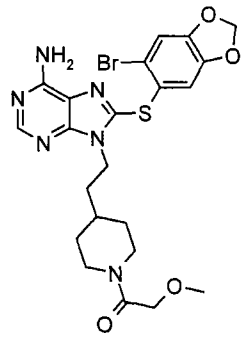
		(m, 1H), 2.85-2.70 (m, 1H), 2.10-1.95 (m, 1H), 1.95-1.65 (m, 3H), 1.62-1.48 (m, 2H), 1.43 (s, 9H), 1.29 (d, J =7.0 Hz, 3H); LC-MS $[M+H]^+$ 648.1
702		{(1*R*)-2-[3-(2-{6-氨基-8-[(6-溴-1,3-苯并间二氧杂环戊烯-5-基)硫]-3H-嘌呤-3-基}乙基)哌啶-1-基]-1-甲基-2-氧代乙基}氨基甲酸叔丁酯。LC-MS $[M+H]^+$ 648.1
703		{(1*S*)-2-[3-(2-{6-氨基-8-[(6-溴-1,3-苯并间二氧杂环戊烯-5-基)硫]-9H-嘌呤-9-基}乙基)哌啶-1-基]-1-甲基-2-氧代乙基}氨基甲酸叔丁酯。TOF-MS $[M+H]^+$ 648.1
704		{(1*S*)-2-[3-(2-{6-氨基-8-[(6-溴-1,3-苯并间二氧杂环戊烯-5-基)硫]-3H-嘌呤-3-基}乙基)哌啶-1-基]-1-甲基-2-氧代乙基}氨基甲酸叔丁酯。TOF-MS $[M+H]^+$ 648.1
705		{2-[4-(2-{6-氨基-8-[(6-溴-1,3-苯并间二氧杂环戊烯-5-基)硫]-9H-嘌呤-9-基}乙基)哌啶-1-基]-2-氧代乙基}氨基甲酸叔丁酯。^{1}H NMR ($CDCl_3$) δ 8.27 (s, 1H), 7.11 (s, 1H), 6.93 (s, 1H), 6.03 (s, 2H), 5.55 (bs, 1H), 4.58 (d, J = 13.2 Hz, 1H), 4.27 (t, J = 7.4 Hz, 2H), 3.94 (dq, J = 3.9, 16.8 Hz, 2H), 3.69 (d, J = 12.5 Hz, 1H), 2.95 (t, J = 11.3 Hz, 1H), 2.57 (t, J = 11.3 Hz, 1H), 1.92-1.70 (m, 4H), 1.60-1.48 (m, 1H), 1.44 (s, 9H),

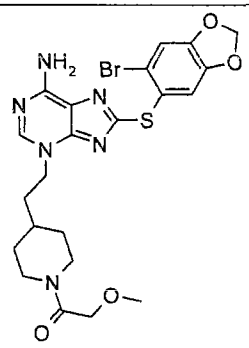
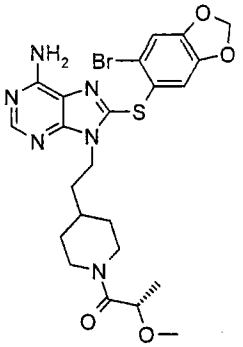
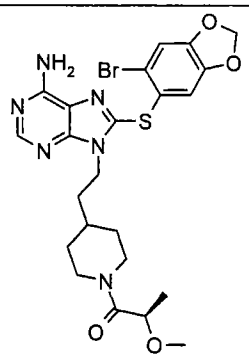
		1.35-1.10 (m, 2H); TOF-MS $[M+H]^+$ 634.1
706		{2-[4-(2-{6-氨基-8-[(6-溴-1,3-苯并间二氧杂环戊烯-5-基)硫]-3H-嘌呤-3-基}乙基)哌啶-1-基]-2-氧代乙基}氨基甲酸叔丁酯。TOF-MS $[M+H]^+$ 634.1
707		8-[(6-溴-1,3-苯并间二氧杂环戊烯-5-基)硫]-9-(2-{1-[(二甲基氨基)乙酰基]哌啶-4-基}乙基)-9H-嘌呤-6-胺。^{1}H NMR (CD_3OD) δ 8.26 (s, 1H), 7.28 (s, 1H), 7.16 (s, 1H), 6.08 (s, 2H), 4.55-4.45 (m, 1H), 4.35 (t, J = 7.8 Hz, 2H), 4.22 (q, J = 16.4 Hz, 2H), 3.70-3.62 (m, 1H), 3.12-3.01 (m, 1H), 2.92 (s, 6H), 2.74-2.65 (m, 1H), 1.96-1.75 (m, 4H), 1.69-1.48 (m, 1H), 1.25-1.10 (m, 2H); TOF-MS $[M+H]^+$ 562.1
708		8-[(6-溴-1,3-苯并间二氧杂环戊烯-5-基)硫]-3-(2-{1-[(二甲基氨基)乙酰基]哌啶-4-基}乙基)-3H-嘌呤-6-胺。LC-MS $[M+H]^+$ 562.8
709		(1-{[4-(2-{6-氨基-8-[(6-溴-1,3-苯并间二氧杂环戊烯-5-基)硫]-9H-嘌呤-9-基}乙基)哌啶-1-基]羰基}环丙基)氨基甲酸叔丁酯。^{1}H NMR ($CDC1_3$) δ 8.10 (s, 1H), 7.17 (s, 1H), 7.10 (s, 1H), 6.09 (s, 2H), 5.35-5.25 (m, 1H), 4.68-4.55 (m, 1H), 4.30 (t, J = 7.8 Hz, 2H),

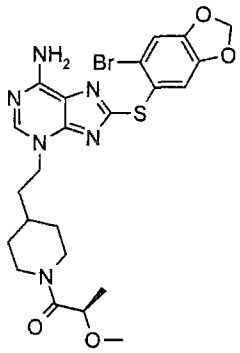
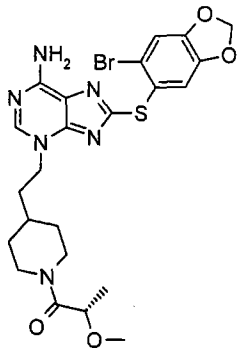
		2.86-2.7 (m, 2H), 1.87 (d, J = 13.2 Hz, 2H), 1.79 (q, J = 7.0 Hz, 2H), 1.65-1.50 (m, 1H), 1.42 (s, 9H), 1.30-1.10 (m, 6H); TOF-MS $[M+H]^+$ 660.1
710		(1-{[4-(2-{6-氨基-8-[(6-溴-1,3-苯并间二氧杂环戊烯-5-基)硫]-3H-嘌呤-3-基}乙基)哌啶-1-基]羰基}环丙基)氨基甲酸叔丁酯。LC-MS $[M+H]^+$ 660.1
711		{2-[4-(2-{6-氨基-8-[(6-溴-1,3-苯并间二氧杂环戊烯-5-基)硫]-9H-嘌呤-9-基}乙基)哌啶-1-基]-1,1-二甲基-2-氧代乙基}氨基甲酸叔丁酯。^{1}H NMR (CD_3OD) δ 8.19 (s, 1H), 7.26 (s, 1H), 7.10 (s, 1H), 6.07 (s, 2H), 4.60-4.50 (m, 1H), 4.36-4.28 (m, 2H), 3.50-3.46 (m, 1 H), 3.10-3.00 (m, 1H), 2.70-2.60 (m, 1H), 1.85-1.71 (m, 4H), 1.64-1.52 (m, 1H), 1.46-1.38 (m, 15 H), 1.28-1.10 (m, 2H); TOF-MS $[M+H]^+$ 662.1
712		{2-[4-(2-{6-氨基-8-[(6-溴-1,3-苯并间二氧杂环戊烯-5-基)硫]-3H-嘌呤-3-基}乙基)哌啶-1-基]-1,1-二甲基-2-氧代乙基}氨基甲酸叔丁酯。LC-MS $[M+H]^+$ 662.1

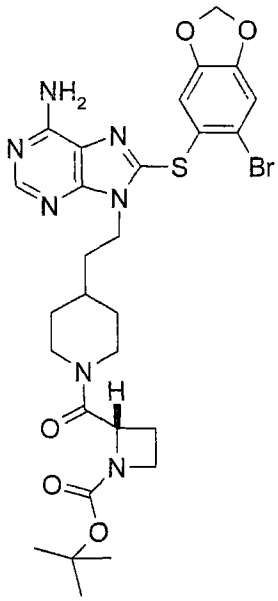
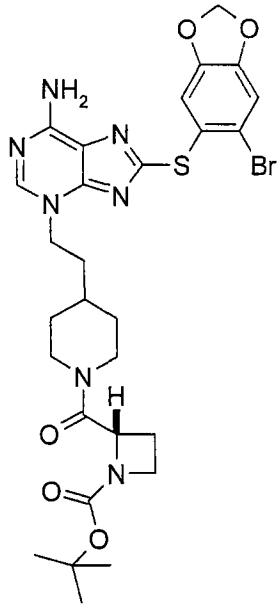
713		((1*S*)-1-{[4-(2-{6-氨基-8-[(6-溴-1,3-苯并间二氧杂环戊烯-5-基)硫]-9H-嘌呤-9-基}乙基)哌啶-1-基]羰基}-2-甲基丙基)氨基甲酸叔丁酯。^{1}H NMR (CD_3OD) δ 8.30 (s, 1H), 7.28 (s, 1H), 7.18 (d, J = 5.86 Hz, 1H), 6.08 (s, 2H), 4.55-4.44 (m, 1H), 4.40-4.32 (m, 3H), 4.58-4.06 (m, 1H), 3.15-3.05 (m, 1H), 2.69-2.59 (m, 1H), 2.00-1.72 (m, 5H), 1.68-1.56 (m, 1H), 1.43 (d, J = 3.9 Hz, 6 H), 1.28 (s, 9 H), 1.20-1.06 (m, 2H); TOF-MS $[M+H]^+$ 676.1
714		((1*S*)-1-{[4-(2-{6-氨基-8-[(6-溴-1,3-苯并间二氧杂环戊烯-5-基)硫]-3H-嘌呤-3-基}乙基)哌啶-1-基]羰基}-2-甲基丙基)氨基甲酸叔丁酯。LC-MS $[M+H]^+$ 676.1
715		{(1*S*)-2-[4-(2-{6-氨基-8-[(6-溴-1,3-苯并间二氧杂环戊烯-5-基)硫]-9H-嘌呤-9-基}乙基)哌啶-1-基]-1-甲基-2-氧代乙基}甲基氨基甲酸叔丁酯。^{1}H NMR ($CDCl_3$) δ 8.19 (s, 1H), 7.17 (s, 1H), 7.10 (s, 1H), 6.09 (s, 2H), 5.15-5.05 (m, 1H), 4.70-4.50 (m, 1H), 4.35-4.25 (m, 2H), 4.10-4.00 (m, 1H), 3.00-2.80 (m, 1H), 2.74 (s, 3H), 2.60-2.45 (m, 1H), 1.90-1.68 (m, 4H), 1.70-1.45 (m, 10H), 1.30-1.00 (m, 5H), TOF-MS $[M+H]^+$ 662.1

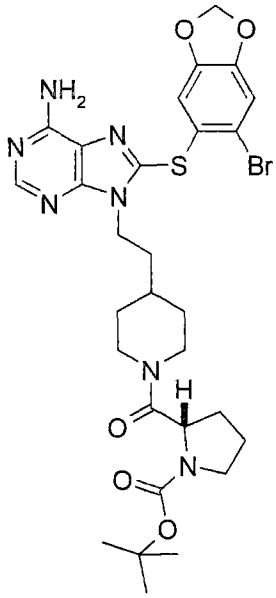
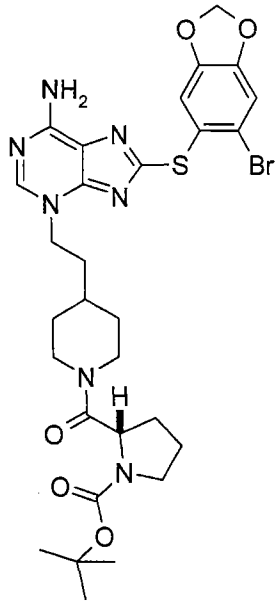
716		{(1*S*)-2-[4-(2-{6-氨基-8-[(6-溴-1,3-苯并间二氧杂环戊烯-5-基)硫]-3H-嘌呤-3-基}乙基)哌啶-1-基]-1-甲基-2-氧代乙基}甲基氨基甲酸叔丁酯。LC-MS [M+H]$^+$ 662.1
717		{(1*R*)-2-[4-(2-{6-氨基-8-[(6-溴-1,3-苯并间二氧杂环戊烯-5-基)硫]-9H-嘌呤-9-基}乙基)哌啶-1-基]-1-甲基-2-氧代乙基}甲基氨基甲酸叔丁酯。^{1}H NMR (CD_3OD) δ 8.28 (s, 1H), 7.27 (s, 1H), 7.20-7.14 (m, 1H), 6.08 (s, 2H), 5.10-4.99 (m, 1H), 4.51 (d, J = 11.3 Hz, 1H), 4.50-4.30 (m, 2H), 4.00-3.88 (m, 1H), 3.05-2.96 (m, 1H), 2.78-2.55 (m, 4H), 1.95-1.70 (m, 4H), 1.70-1.55 (m, 1H), 1.46 (s, 9H), 1.20-1.00 (m, 5 H); TOF-MS [M+H]$^+$ 662.1
718		{(1*R*)-2-[4-(2-{6-氨基-8-[(6-溴-1,3-苯并间二氧杂环戊烯-5-基)硫]-3H-嘌呤-3-基}乙基)哌啶-1-基]-1-甲基-2-氧代乙基}甲基氨基甲酸叔丁酯。LC-MS [M+H]$^+$ 662.1
719		((1*S*)-1-{[3-(2-{6-氨基-8-[(6-溴-1,3-苯并间二氧杂环戊烯-5-基)硫]-9H-嘌呤-9-基}乙基)哌啶-1-基]羰基}-3-甲基丁基)氨基甲酸叔丁酯。^{1}H NMR ($CDC1_3$) δ 8.23 (s, 1H), 7.80-7.15 (m, 1H), 7.13-7.10

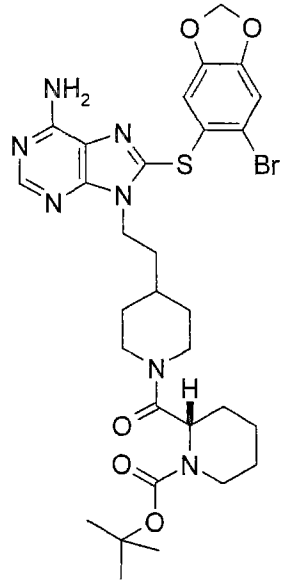
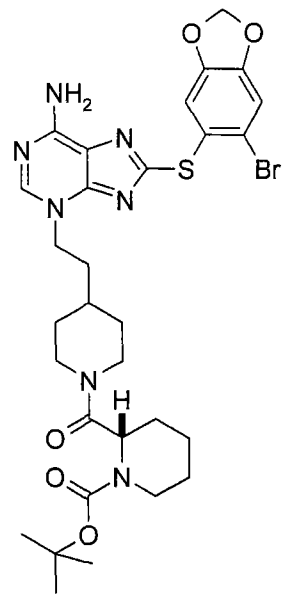
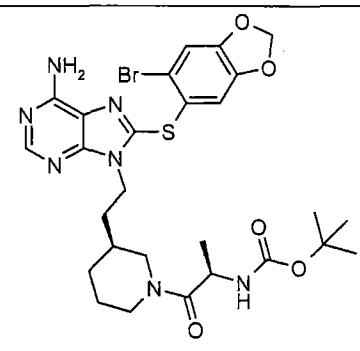
		(m, 1H), 6.73-6.62 (broad s, 1H), 6.09 (s, 2H), 5.48-5.35 (m, 1H), 4.70-4.60 (m, 1H), 4.40-4.10 (m, 3H), 3.90-3.70 (m, 1H), 3.30-3.00 (m, 1H), 2.90-2.60 (m, 1H), 2.10-1.20 (m, 24H); TOF-MS $[M+H]^+$ 690.2
720		*N*-{(1*S*)-2-[4-(2-{6-氨基-8-[(6-溴-1,3-苯并间二氧杂环戊烯-5-基)硫]-9*H*-嘌呤-9-基}乙基)哌啶-1-基]-1-甲基-2-氧代乙基}乙酰胺。LC-MS $[M+H]^+$ 590.1
721		*N*-{(1*S*)-2-[4-(2-{6-氨基-8-[(6-溴-1,3-苯并间二氧杂环戊烯-5-基)硫]-3*H*-嘌呤-3-基}乙基)哌啶-1-基]-1-甲基-2-氧代乙基}乙酰胺。LC-MS $[M+H]^+$ 590.1
722		8-[(6-溴-1,3-苯并间二氧杂环戊烯-5-基)硫]-9-{2-[1-(甲氧基乙酰基)哌啶-4-基]乙基}-9H-嘌呤-6-胺。^{1}H NMR (CD_3OD) δ 8.29 (s, 1H), 7.28 (s, 1H), 7.18 (s, 1H), 6.08 (s, 2H), 4.47 (d, J = 12.8 Hz, 1H), 4.36 (t, J = 7.42 Hz, 2H), 4.13 (q, J = 14.0 Hz, 2H), 3.83 (d, J = 13.6 Hz, 1H), 3.38 (s, 3H), 3.00 (dt, J = 2.3, 13.28 Hz, 1H), 2.61 (dt, J = 2.7, 12.8 Hz, 1H), 1.87 (d, J = 12.0 Hz, 2H), 1.81 (q, J = 7.0 Hz, 2H), 1.65-1.52 (m, 1H), 1.3-1.10 (m, 2H); TOF-MS $[M+H]^+$

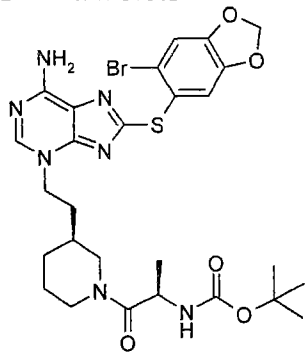
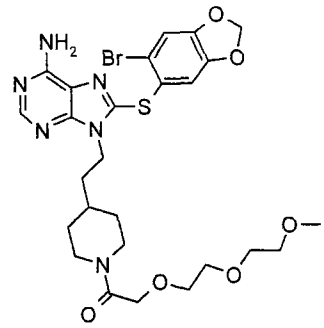
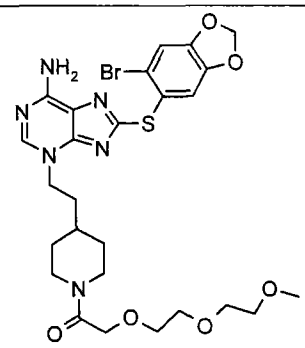
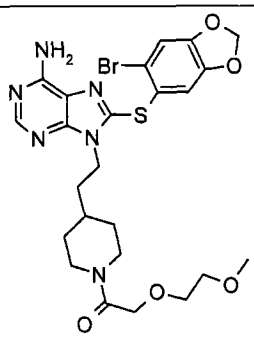
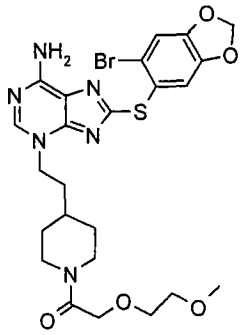
		549.0
723		8-[(6-溴-1,3-苯并间二氧杂环戊烯-5-基)硫]-3-{2-[1-(甲氧基乙酰基)哌啶-4-基]乙基}-3H-嘌呤-6-胺。TOF-MS [M+H]$^+$ 549.0
724		8-[(6-溴-1,3-苯并间二氧杂环戊烯-5-基)硫]-9-(2-{1-[(2*S*)-2-甲氧基丙酰基]哌啶-4-基}乙基)-9H-嘌呤-6-胺。^{1}H NMR (CDCl$_3$) δ 8.31 (s, 1H), 7.10 (s, 1H), 6.87 (s, 1H), 6.30-5.90 (在 6.01 处有宽单峰, 3H), 4.65-4.56 (m, 1H), 4.27 (t, J = 7.42 Hz, 2H), 4.22-4.10 (m, 2H), 3.33 (d, J = 7.8 Hz, 3H), 3.00-2.88 (m, 1H), 2.60-2.50 (m, 1H), 1.85 (d, J = 12.5 Hz, 2H), 1.74 (q, J = 6.2 Hz, 2H), 1.60-1.47 (m, 1H), 1.38 (d, J = 6.6 Hz, 3H), 1.30-1.10 (m, 2H); TOF-MS [M+H]$^+$ 563.11
725		8-[(6-溴-1,3-苯并间二氧杂环戊烯-5-基)硫]-9-(2-{1-[(2*R*)-2-甲氧基丙酰基]哌啶-4-基}乙基)-9H-嘌呤-6-胺。^{1}H NMR (CDCl$_3$) δ 8.22 (s, 1H), 7.14 (s, 1H), 7.03 (s, 1H), 6.06 (s, 2H), 4.65-4.56 (m, 1H), 4.27 (t, J = 7.42 Hz, 2H), 4.22-4.10 (m, 2H), 3.33 (d, J = 7.8 Hz, 3H), 3.00-2.88 (m, 1H), 2.60-2.50 (m, 1H), 1.85 (d, J = 12.5 Hz, 2H), 1.74 (q, J = 6.2 Hz, 2H), 1.60-1.47 (m, 1H), 1.38 (d, J = 6.6 Hz, 3H), 1.30-1.10 (m, 2H); TOF-MS [M+H]$^+$ 563.1

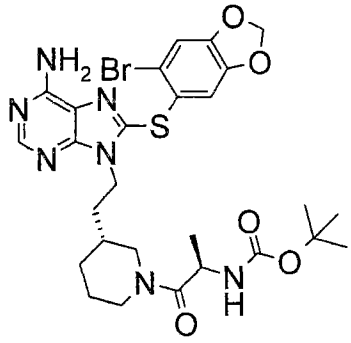
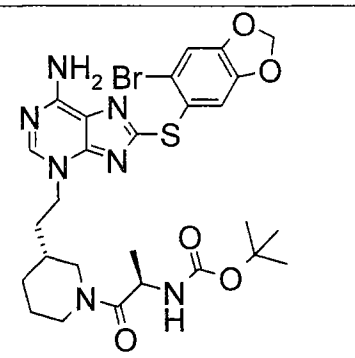
726		8-[(6-溴-1,3-苯并间二氧杂环戊烯-5-基)硫]-3-(2-{1-[(2*R*)-2-甲氧基丙酰基]哌啶-4-基}乙基)-3H-嘌呤-6-胺。^{1}H NMR (CDCl$_3$) δ 10.71 (s, 1H), 8.06 (s, 1H), 7.21 (s, 1H), 7.18 (s, 1H), 6.17 (s, 1H), 6.11 (s, 2H), 4.65-4.55 (m, 1H), 4.40-4.30 (m, 2H), 4.30-4.10 (m, 2H), 3.35 (d, J = 8.5 Hz, 3H), 3.02-2.9 (m, 1H), 2.60-2.50 (m, 1H), 1.89 (q, J = 7.0 Hz, 2H), 1.85-1.75 (m, 2H), 1.60-1.47 (m, 1H), 1.39 (d, J = 6.6 Hz, 3H), 1.30-1.10 (m, 2H); TOF-MS [M+H]$^+$ 563.1
727		8-[(6-溴-1,3-苯并间二氧杂环戊烯-5-基)硫]-3-(2-{1-[(2*S*)-2-甲氧基丙酰基]哌啶-4-基}乙基)-3H-嘌呤-6-胺。^{1}H NMR (CDCl$_3$) δ 10.62 (s, 1H), 8.07 (s, 1H), 7.21 (s, 1H), 7.18 (s, 1H), 6.11 (s, 2H), 4.65-4.55 (m, 1H), 4.40-4.30 (m, 2H), 4.30-4.10 (m, 2H), 3.35 (d, J = 8.5 Hz, 3H), 3.02-2.90 (m, 1H), 2.60-2.50 (m, 1H), 1.89 (q, J = 7.0 Hz, 2H), 1.85-1.75 (m, 2H), 1.60-1.47 (m, 1H), 1.39 (d, J = 6.6 Hz, 3H), 1.30-1.10 (m, 2H); TOF-MS [M+H]$^+$ 563.1

728		(2*S*)-2-{[4-(2-{6-氨基-8-[(6-溴-1,3-苯并间二氧杂环戊烯-5-基)硫]-9*H*-嘌呤-9-基}乙基)哌啶-1-基]羰基}吖丁啶-1-羧酸叔丁酯。^{1}H NMR (CD_3OD) δ 8.27 (s, 1H), 7.28 (s, 1H), 7.17 and 7.15 (s, 1H), 6.09 (s, 2H), 5.05 (m, 1H), 4.48 (m, 1H), 4.36 (t, J = 6.0 Hz, 2H), 3.93-3.87 (m, 2H), 3.76 (m, 1H), 3.02 (m, 1H), 2.66 (m, 1H), 2.56 (m, 1H), 1.42 (s, 9H), 2.07 (m, 1H), 1.87-1.77 (m, 5H), 1.62 (m, 1H), 1.17 (m, 1H); LC-MS $[M+H]^+$ 660.1
729		(2*S*)-2-{[4-(2-{6-氨基-8-[(6-溴-1,3-苯并间二氧杂环戊烯-5-基)硫]-3*H*-嘌呤-3-基}乙基)哌啶-1-基]羰基}吖丁啶-1-羧酸叔丁酯。LC-MS $[M+H]^+$ 660.1

730		(2*S*)-2-{[4-(2-{6-氨基-8-[(6-溴-1,3-苯并间二氧杂环戊烯-5-基)硫]-9*H*-嘌呤-9-基}乙基)哌啶-1-基]羰基}吡咯烷-1-羧酸叔丁酯。^{1}H NMR (CD_3OD) δ 8.30 and 8.29 (s, 1H), 7.29 and 7.286 (s, 1H), 7.20, 7.19, and 7.18 (s, 1H), 6.09 (s, 2H), 4.69 (m, 1H), 4.49 (m, 1H), 4.39-4.34 (m, 2H), 4.02 (m, 1H), 3.53-3.42 (m, 2H), 3.06 (m, 1H), 2.62 (m, 1H), 2.26 (m, 1H), 1.89-1.78 (m, 7H), 1.62 (m, 1H), 1.46, 1.45, 1.42, and 1.37 (s, 9H), 1.32-1.15 (m, 2H); LC-MS $[M+H]^+$ 674.2
731		(2*S*)-2-{[4-(2-{6-氨基-8-[(6-溴-1,3-苯并间二氧杂环戊烯-5-基)硫]-3*H*-嘌呤-3-基}乙基)哌啶-1-基]羰基}吡咯烷-1-羧酸叔丁酯。^{1}H NMR (CD_3OD) δ 8.55, 8.54, and 8.535 (s, 1H), 7.40,-7.37 (m, 2H), 6.17 and 6.16 (s, 2H), 4.69 (m, 1H), 4.48 (m, 1H), 4.43 (t, J = 7.2 Hz, 2H), 4.01 (m, 1H), 3.54-3.41 (m, 2H), 3.06 (m, 1H), 2.64 (m, 1H), 2.28 (m, 1H), 1.89-1.78 (m, 7H), 1.62 (m, 1H), 1.47, 1.46, 1.43, and 1.38 (s, 9H), 1.19 (m, 2H); LC-MS $[M+H]^+$ 674.2

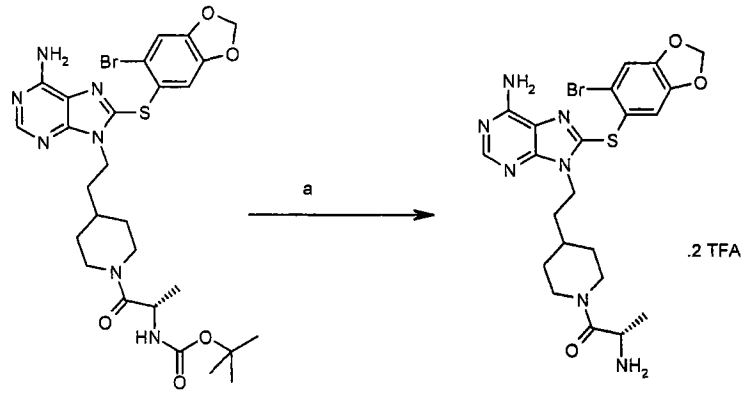
732		(2*S*)-2-{[4-(2-{6-氨基-8-[(6-溴-1,3-苯并间二氧杂环戊烯-5-基)硫]-9*H*-嘌呤-9-基}乙基)哌啶-1-基]羰基}哌啶-1-羧酸叔丁酯。^{1}H NMR (CD_3OD) δ 8.30 (s, 1H), 7.29 (s, 1H), 7.20 (s, 1H), 6.09 (s, 2H), 4.47 (m, 1H), 4.37 (t, J=7.2 Hz, 2H), 3.97-3.84 (m, 2H), 3.31-3.29 (m, 1H), 3.25 (m, 2H), 3.06 (m, 1H), 2.59 (m, 1H), 1.96-1.78 (m, 7H), 1.74-1.58 (m, 4H), 1.45 (s, 9H), 1.18 (m, 1H); LC-MS $[M+H]^+$ 688.2
733		(2*S*)-2-{[4-(2-{6-氨基-8-[(6-溴-1,3-苯并间二氧杂环戊烯-5-基)硫]-3*H*-嘌呤-3-基}乙基)哌啶-1-基]羰基}哌啶-1-羧酸叔丁酯。LC-MS $[M+H]^+$ 688.2
734		{(1*R*)-2-[(3*S*)-3-(2-{6-氨基-8-[(6-溴-1,3-苯并间二氧杂环戊烯-5-基)硫]-9H-嘌呤-9-基}乙基)哌啶-1-基]-1-甲基-2-氧代乙基}氨基甲酸叔丁酯。^{1}H NMR δ (CD_3OD), 8.18 (s, 1H), 7.30 (s, 1H), 7.10 (s, 1H), 6.10 (s, 2H), 4.30-4.20 (m, 2H), 3.60-3.50 (m, 2H), 3.20-3.14 (m, 2H), 3.10 (m, 2H), 2.80-2.70 (m, 2H), 2.40 (m, 2H), 1.60-1.50 (m, 2H), 1.43 (s,

		9H), 1.40 (s, 3H). LC-MS $[M+H]^+$ 648.2
735		{(1*R*)-2-[(3*S*)-3-(2-{6-氨基-8-[(6-溴-1,3-苯并间二氧杂环戊烯-5-基)硫]-3H-嘌呤-3-基}乙基)哌啶-1-基]-1-甲基-2-氧代乙基}氨基甲酸叔丁酯。LC-MS $[M+H]^+$ 648.2
736		8-[(6-溴-1,3-苯并间二氧杂环戊烯-5-基)硫]-9-[2-(1-{[2-(2-甲氧基乙氧基)-乙氧基]-乙酰基}-哌啶-4-基)-乙基]-9H-嘌呤-6-胺。 LC-MS $[M+H]^+$ 637.4
737		8-[(6-溴-1,3-苯并间二氧杂环戊烯-5-基)硫]-3-[2-(1-{[2-(2-甲氧基乙氧基)-乙氧基]-乙酰基}-哌啶-4-基)-乙基]-3H-嘌呤-6-胺。 LC-MS $[M+H]^+$ 637.4
738		8-[(6-溴-1,3-苯并间二氧杂环戊烯-5-基)硫]-9-(2-{1-[(2-甲氧基乙氧基)-乙酰基]-哌啶-4-基}-乙基)-9H-嘌呤-6-胺。 LC-MS $[M+H]^+$ 593.1
739		8-[(6-溴-1,3-苯并间二氧杂环戊烯-5-基)-硫]-3-(2-{1-[(2-甲氧基乙氧基)-乙酰基]-哌啶-4-基}-乙基)-3H-嘌呤-6-胺。 LC-MS $[M+H]^+$ 593.4

740		{(1*R*)-2-[(3*R*)-3-(2-{6-氨基-8-[(6-溴-1,3-苯并间二氧杂环戊烯-5-基)硫]-9*H*-嘌呤-9-基}乙基)哌啶-1-基]-1-甲基-2-氧代乙基}氨基甲酸叔丁酯。LC-MS $[M+H]^+$ 649.3
741		{(1*R*)-2-[(3*R*)-3-(2-{6-氨基-8-[(6-溴-1,3-苯并间二氧杂环戊烯-5-基)硫]-9*H*-嘌呤-9-基}乙基)哌啶-1-基]-1-甲基-2-氧代乙基}氨基甲酸叔丁酯。 LC-MS $[M+H]^+$ 649.3

实施例 742

9-(2-{1-[(2*S*)-2-氨基丙酰基]哌啶-4-基}乙基)-8-[(6-溴-1,3-苯并间二氧杂环戊烯-5-基)硫]-9H-嘌呤-6-胺



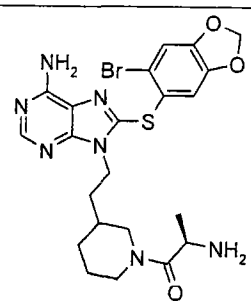
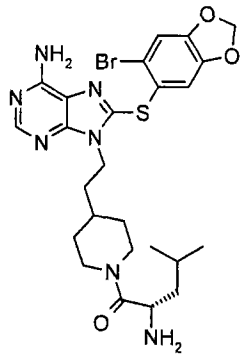
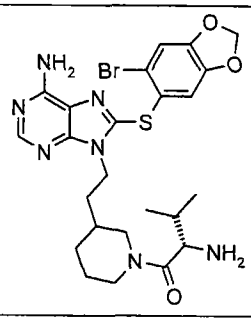
试剂：（a）TFA，DCM。

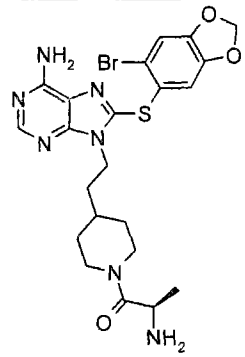
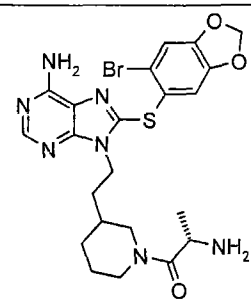
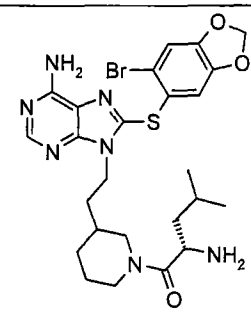
在室温下，向[(*S*)-2-(4-{2-[6-氨基-8-(6-溴-苯并[1,3]间二氧杂环戊烯-5-基硫基)-嘌呤-9-基]-乙基}-哌啶-1-基)-1-甲基-2-氧代-乙基]-氨基甲酸叔丁酯（0.014 g，0.021 mmol）的DCM（3 mL）溶液中逐滴添加TFA（100 μL），并在室温下搅拌所形成的混合物过夜。减压下浓缩后，除去剩余TFA得到TFA盐形式的标题化合物（0.015 g）。^{1}H NMR (CD_3OD) δ 8.34 (s, 1H), 7.28 (s, 1H), 7.23 (s, 1H), 6.09 (s, 2H), 4.54-4.44 (m, 2H), 4.39 (t, J = 7.42

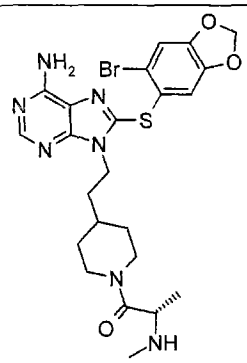
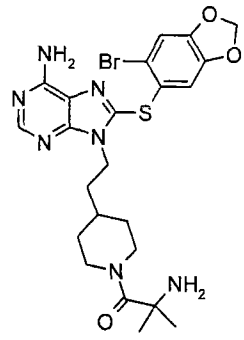
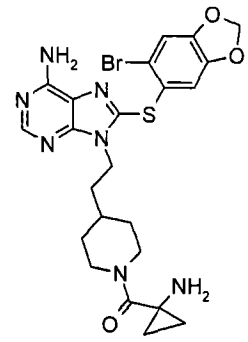
Hz, 2H), 3.85 (broad d, J = 13.2 Hz, 1H), 3.19-3.08 (m, 1H), 2.75-2.63 (m, 1H), 2.00-1.80 (m, 4H), 1.70-1.58 (m, 1H), 1.44 (dd, J = 14.8, 7.0 Hz, 3H), 1.35-1.13 (m, 2H); LC-MS $[M+H]^+$ 548.2。

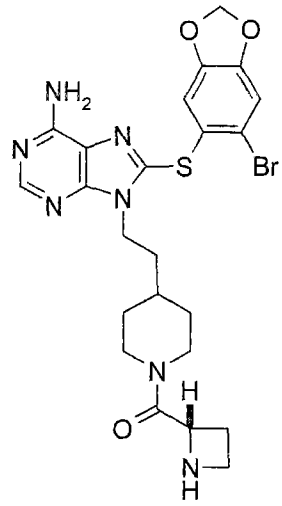
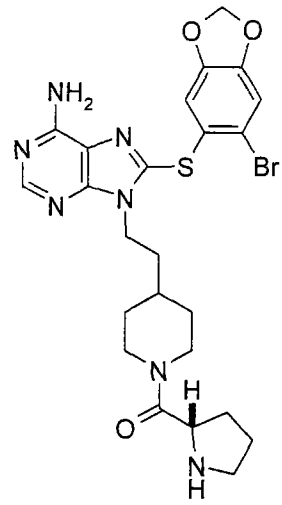
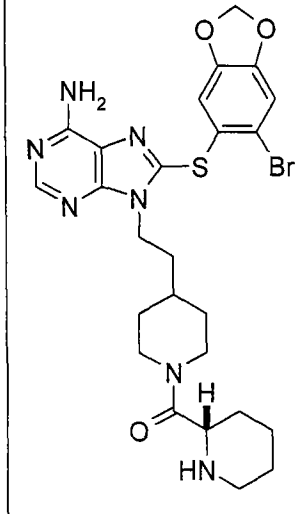
以与所述实施例 742 相同的方式使用合适的原料合成总结于表 16 中的实例 743 -755，并以三氟乙酸盐的形式分离出来。

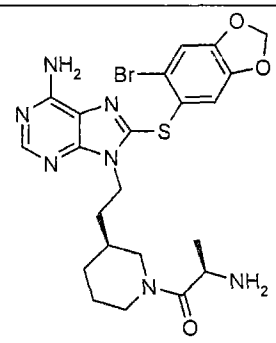
表 16

实例	结构	名称和分析数据
743		9-(2-{1-[(2*R*)-2-氨基丙酰基]哌啶-3-基}乙基)-8-[(6-溴-1,3-苯并间二氧杂环戊烯-5-基)硫]-9H-嘌呤-6-胺。^{1}H NMR (CD_3OD) δ 8.30 (s, 1H), 7.28 (s, 1H), 7.23 (s, 1H), 6.09 (s, 2H), 4.50-4.20 (m, 4H), 4.30-4.18 (m, 1H), 3.80-3.65 (m, 1H), 3.20-3.10 (m, 1H), 2.78-2.65 (m, 1H), 2.10-2.00 (m, 1H), 2.00-1.75 (m, 3H), 1.60-1.30 (m, 5H); LC-MS $[M+H]^+$ 548.1
744		9-(2-{1-[(2*S*)-2-氨基-4-甲基戊酰基]哌啶-4-基}乙基)-8-[(6-溴-1,3-苯并间二氧杂环戊烯-5-基)硫]-9H-嘌呤-6-胺。^{1}H NMR (CD_3OD) δ 8.34 (s, 1H), 7.28 (s, 1H), 7.22 (s, 1H), 6.09 (s, 2H), 4.58-4.28 (m, 4H), 3.79 (broad d, J = 13.2 Hz, 1H), 3.13 (t, J = 12.8 Hz, 1H), 2.76-2.62 (m, 1H), 2.00-1.50 (m, 7H), 1.35-1.10 (m, 3H), 1.08-0.95 (m, 6H); LC-MS $[M+H]^+$ 590.1
745		9-(2-{1-[(2*S*)-2-氨基-3-甲基丁酰基]哌啶-3-基}乙基)-8-[(6-溴-1,3-苯并间二氧杂环戊烯-5-基)硫]-9H-嘌呤-6-胺。TOF-MS $[M+H]^+$ 576.1

746		9-(2-{1-[(2*R*)-2-氨基丙酰基]哌啶-4-基}乙基)-8-[(6-溴-1,3-苯并间二氧杂环戊烯-5-基)硫]-9H-嘌呤-6-胺。^{1}H NMR (CD_3OD) δ 8.34 (s, 1H), 7.28 (s, 1H), 7.23 (s, 1H), 6.09 (s, 2H), 4.54-4.44 (m, 2H), 4.39 (t, J = 7.42 Hz, 2H), 3.85 (宽的 d, J - 13.2 Hz, 1H), 3.19-3.08 (m, 1H), 2.75-2.63 (m, 1H), 2.00-1.80 (m, 4H), 1.70-1.58 (m, 1H), 1.44 (dd, J = 14.8, 7.0 Hz, 3H), 1.35-1.13 (m, 2H); LC-MS $[M+H]^+$ 548.2
747		9-(2-{1-[(2*S*)-2-氨基丙酰基]哌啶-3-基}乙基)-8-[(6-溴-1,3-苯并间二氧杂环戊烯-5-基)硫]-9H-嘌呤-6-胺。^{1}H NMR (CD_3OD) δ 8.34 (s, 1H), 7.28 (s, 1H), 7.24 (s, 1H), 6.10 (s, 2H), 4.50-4.35 (m, 3H), 4.30-4.20 (m, 1H), 3.78-3.68 (m, 1H), 3.24-3.16 (m, 1H), 2.72 (dd, J = 10.1, 12.8 Hz, 1H), 2.10-2.00 (m, 1H), 2.00-1.75 (m, 3H), 1.60-1.30 (m, 6H); LC-MS $[M+H]^+$ 548.1
748		9-(2-{1-[(2*S*)-2-氨基-4-甲基戊酰基]哌啶-3-基}乙基)-8-[(6-溴-1,3-苯并间二氧杂环戊烯-5-基)硫]-9H-嘌呤-6-胺。^{1}H NMR (CD_3OD) δ 8.38-8.32 (m, 1H), 7.28 (s, 1H), 7.25-7.20 (m, 1H), 6.10 (s, 2H), 4.60-4.20 (m, 4H), 3.70-3.60 (m, 1H), 3.45-3.15 (m, 1H), 3.00-2.65 (m, 2H), 2.30-1.20 (m, 15H); LC-MS $[M+H]^+$ 590.2

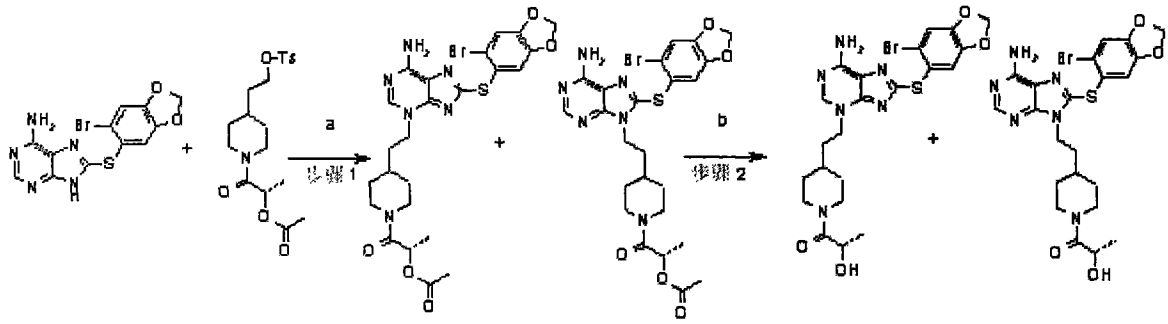
749		8-[(6-溴-1,3-苯并间二氧杂环戊烯-5-基)硫]-9-(2-{1-[(2*S*)-2-(甲基氨基)丙酰基]哌啶-4-基}乙基)-9H-嘌呤-6-胺。^{1}H NMR (CD_3OD) δ 8.34 (s, 1H), 7.29 (s, 1H), 7.23 (s, 1H), 6.09 (s, 2H), 4.50 (d, J = 13.2 Hz, 1H), 4.30-4.44 (m, 2H), 3.83 (d, J = 14.8 Hz, 1H), 3.08-3.20 (m, 2H), 2.62-2.76 (m, 4H), 1.80-2.00 (m, 4H), 1.55-1.70 (m, 1H), 1.46 (dd, J = 15.6, 7.0 Hz, 3H), 1.35-1.10 (m, 2H); LC-MS $[M+H]^+$ 562.1
750		9-{2-[1-(2-氨基-2-甲基丙酰基)哌啶-4-基]乙基}-8-[(6-溴-1,3-苯并间二氧杂环戊烯-5-基)硫]-9H-嘌呤-6-胺。^{1}H NMR (CD_3OD) δ 8.34 (s, 1H), 7.28 (s, 1H), 7.22 (s, 1H), 6.09 (s, 2H), 4.45-4.16 (m, 4H), 3.10-2.80 (m, 2H), 1.94 (d, J = 12.8 Hz, 2H), 1.84 (q, J = 7.0 Hz, 2H), 1.66 (s, 7H), 1.32-1.15 (m, 2H); TOF-MS $[M+H]^+$ 562.0
751		9-(2-{1-[(1-氨基环丙基)羰基]哌啶-4-基}乙基)-8-[(6-溴-1,3-苯并间二氧杂环戊烯-5-基)硫]-9H-嘌呤-6-胺。^{1}H NMR (CD_3OD) δ 8.27 (s, 1H), 7.28 (s, 1H), 7.18 (s, 1H), 6.09 (s, 2H), 4.36 (t, J = 7.42 Hz, 2H), 4.28 (d, J = 12.8 Hz, 2H), 2.95 (t, J = 12.1 Hz, 2H), 1.92 (d, J = 11.3 Hz, 2H), 1.83 (q, J = 7.03 Hz, 2H), 1.70-1.58 (m, 1H), 1.39-1.33 (m, 2H), 1.32-1.21 (m, 4H); TOF-MS $[M+H]^+$ 560.1

752		9-(2-{1-[(2*S*)-吖丁啶-2-基羰基]哌啶-4-基}乙基)-8-[(6-溴-1,3-苯并间二氧杂环戊烯-5-基)硫]-9H-嘌呤-6-胺。^{1}H NMR (CD_3OD) δ 8.30 (s, 1H), 7.29 (s, 1H), 7.20 和 7.19 (两个 s, 1H), 6.09 (s, 2H), 5.36 (m, 1H), 4.48 (m, 1H), 4.37 (t, J = 7.6 Hz, 2H), 4.11 (m, 1H), 3.90 (m, 1H), 3.41 (m, 1H), 3.30 (m, 1H), 2.89 (m, 1H), 2.75 (m, 1H), 2.56 (m, 1H), 1.96-1.88 (m, 3H), 1.86-1.81 (m, 2H), 1.33-1.19 (m, 2H); LC-MS $[M+H]^+$ 560.1
753		8-[(6-溴-1,3-苯并间二氧杂环戊烯-5-基)硫]-9-[2-(1-L-脯氨酰哌啶-4-基)乙基]-9H-嘌呤-6-胺。^{1}H NMR (CD_3OD) δ 8.31 (s, 1H), 7.29 (s, 1H), 7.21 和 7.20 (s, 1H), 6.09 (s, 2H), 4.66 和 4.62 (t, J = 8.4 和 7.2 Hz, 1H), 4.59 (m, 1H), 4.38 (t, J = 8.0 Hz, 2H), 3.87 (m, 1H), 3.43-3.38 (m, 1H), 3.16-3.10 (m, 2H), 2.73 (m, 1H), 2.49 (m, 1H), 2.10-1.82 (m, 8H), 1.65 (m, 1H), 1.30-1.16 (m, 4H), 0.88 (m, 1H); LC-MS $[M+H]^+$ 574.1
754		8-[(6-溴-1,3-苯并间二氧杂环戊烯-5-基)硫]-9-(2-{1-[(2*S*)-哌啶-2-基羰基]哌啶-4-基}乙基)-9*H*-嘌呤-6-胺。^{1}H NMR (CD_3OD) δ 8.31 (s, 1H), 7.29 (s, 1H), 7.21 (s, 1H), 6.10 (s, 2H), 4.48 (m, 1H), 4.38 (t, J = 7.2 Hz, 2H), 4.29 (m, 1H), 3.84 (brd, J = 13.6 Hz, 1H), 3.41-3.38 (m, 2H), 3.15-3.00 (m, 2H), 2.68 (m, 1H), 2.10 (m, 1H), 1.94-1.81 (m, 6H), 1.76-1.60 (m, 4H), 1.28-1.12 (m, 1H); LC-MS $[M+H]^+$ 588.1

755		9-(2-{(3*S*)-1-[(2*R*)-2-氨基丙酰基]哌啶-3-基}乙基)-8-[(6-溴-1,3-苯并间二氧杂环戊烯-5-基)硫]-9H-嘌呤-6-胺。^{1}H NMR (CD_3OD) δ 8.20 (s, 1H), 7.30 (s, 1H), 7.20 (s, 1H), 6.10 (s, 2H), 4.30-4.20 (m, 2H), 3.50-3.40 (m, 2H), 3.20-3.10 (m, 2H), 2.90-2.80 (m, 2H), 2.40-2.30 (m, 2H), 2.10-2.00 (m, 2H), 1.60-1.50 (m, 2H), 1.40 (s, 3H); LC-MS $[M+H]^+$ 548.2

实施例 756 和 757

(2*S*)-1-[4-(2-{6-氨基-8-[(6-溴-1,3-苯并间二氧杂环戊烯-5-基)硫]-3H-嘌呤-3-基}乙基)哌啶-1-基]-1-氧代丙-2-醇和 (2*S*)-1-[4-(2-{6-氨基-8-[(6-溴-1,3-苯并间二氧杂环戊烯-5-基)硫]-9H-嘌呤-9-基}乙基)哌啶-1-基]-1-氧代丙-2-醇



试剂：（a）Barton 碱，DMF，90-100 ℃；（b）$LiOH.H_2O$，MeOH-THF-H_2O (1:1:1)。

步骤 1：依照所述实施例 1 和 2 的步骤使用 8-(6-溴-苯并[1,3]间二氧杂环戊烯-5-基硫基)-9H-嘌呤-6-基胺（0.200g，0.54 mmol）和乙酸(*S*)-1-甲基-2-氧代-2-{4-[2-(甲苯-4-磺酰氧)-乙基]-哌啶-1-基}-乙酯（0.325 g，0.81 mmol）进行所述烷基化反应，得到 N-3 和 N-9 异构体的混合物。乙酸(1*S*)-2-[4-(2-{6-氨基-8-[(6-溴-1,3-苯并间二氧杂环戊烯-5-基)硫]-3*H*-嘌呤-3-基}乙基)哌啶-1-基]-1-甲基-2-氧代乙酯，LC-MS $[M+H]^+$ 591.1；以及乙酸(1*S*)-2-[4-(2-{6-

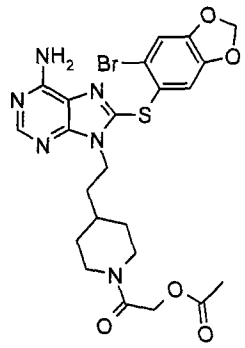
氨基-8-[(6-溴-1,3-苯并间二氧杂环戊烯-5-基)硫]-9*H*-嘌呤-9-基}乙基)哌啶-1-基]-1-甲基-2-氧代乙酯，LC-MS [M+H]$^+$ 591.1。所述粗混合物不经过进一步纯化而用于下一步水解反应。

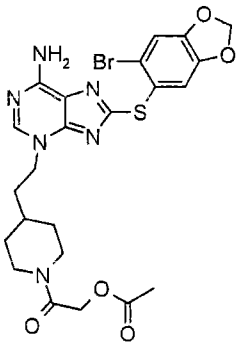
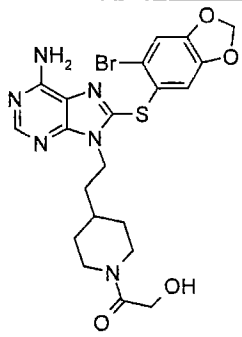
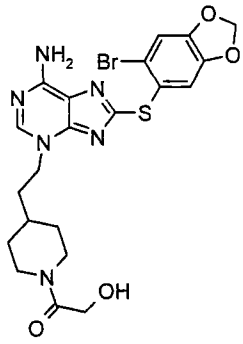
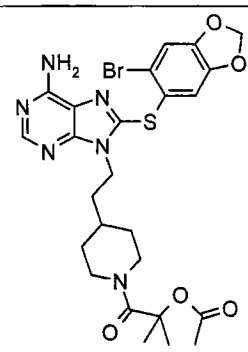
步骤 2: 向上述产物在 MeOH-THF-H_2O 混合物（1:1:1，10 mL）中的溶液中加入 LiOH.H_2O（0.1 g），并在室温下搅拌所形成的混合物过夜。在减压条件下浓缩反应混合物后，通过制备型 HPLC[X-Terra prep-RP18 10 um，19×250 mm（水），流动相：溶剂 A：含 0.01% TFA 的 HPLC 级水，和溶剂 B：含 0.01% TFA 的乙腈，一般洗脱梯度 – 在 15 至 25 分钟的实验时间内溶剂 B 从 15%至 80%]纯化所述剩余物。HPLC 馏分经冷冻干燥后分离出三氟乙酸盐形式的所述标题化合物。
(2*S*)-1-[4-(2-{6-氨基-8-[(6-溴-1,3-苯并间二氧杂环戊烯-5-基)硫]-3H-嘌呤-3-基}乙基)哌啶-1-基]-1-氧代丙-2-醇，TOF-MS [M+H]$^+$ 549.1；以及(2*S*)-1-[4-(2-{6-氨基-8-[(6-溴-1,3-苯并间二氧杂环戊烯-5-基)硫]-9H-嘌呤-9-基}乙基)哌啶-1-基]-1-氧代丙-2-醇，^{1}H NMR (CD_3OD) δ 8.31 (s, 1H), 7.28 (s, 1H), 7.20 (s, 1H), 6.09 (s, 2H), 4.60-4.45 (m, 2H), 4.37 (t, J = 7.8 Hz, 2H), 4.00 (d, J= 12.0 Hz, 1H), 3.10-2.98 (m, 1H), 2.70-2.56 (m, 1H), 1.96-1.79 (m, 4H), 1.70-1.55 (m, 1H), 1.30 (dd, J = 7.0, 10.1 Hz, 3H), 1.26-1.10 (m, 2H); LC-MS [M+H]$^+$ 549.1。

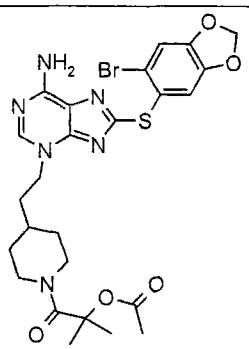
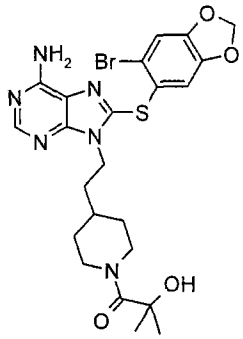
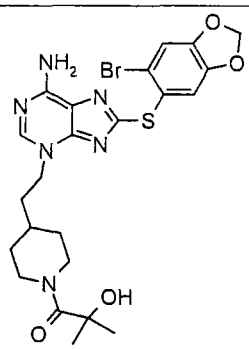
实施例 758-765

依照所述实施例 756 和 757 的步骤使用合适的原料制备实例 758-765。所有总结于表 17 中的化合物经过 HPLC 纯化后以三氟乙酸盐的形式分离出来。

表 17

实例	结构	名称和分析数据
758		乙酸 2-[4-(2-{6-氨基-8-[(6-溴-1,3-苯并间二氧杂环戊烯-5-基)硫]-9H-嘌呤-9-基}乙基)哌啶-1-基]-2-氧代乙酯。 LC-MS [M+H]$^+$ 577.1

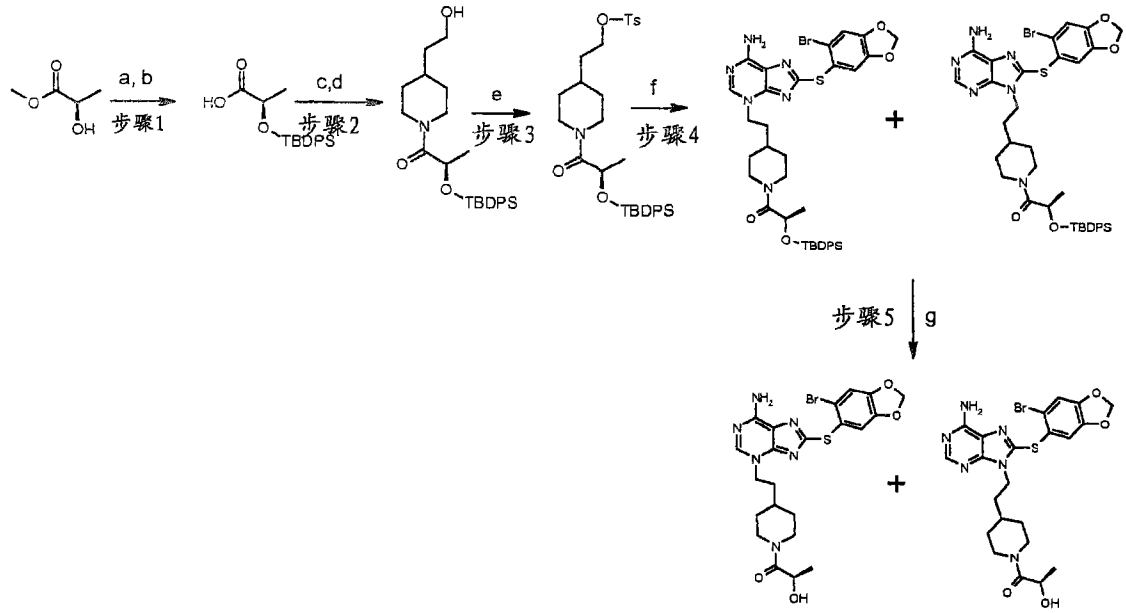
759		乙酸 2-[4-(2-{6-氨基-8-[(6-溴-1,3-苯并间二氧杂环戊烯-5-基)硫]-3H-嘌呤-3-基}乙基)哌啶-1-基]-2-氧代乙酯 LC-MS $[M+H]^+$ 577.1
760		2-[4-(2-{6-氨基-8-[(6-溴-1,3-苯并间二氧杂环戊烯-5-基)硫]-9H-嘌呤-9-基}乙基)哌啶-1-基]-2-氧代乙醇。^{1}H NMR (DMSO-D_6) δ 8.20 (s, 1H), 7.74-7.58 (宽峰的 s, 1H), 7.39 (s, 1H), 6.84 (s, 1H), 6.09 (s, 2H), 4.29 (d, J = 12.5 Hz, 1H), 4.19 (t, J = 7.4 Hz, 2H), 4.00 (d, J = 7.0 Hz, 2H), 3.60 (d, J = 13.6 Hz, 1H), 2.82 (t, J = 11.7 Hz, 1H), 2.56-2.44 (m, 与溶剂峰合并, 1H), 1.70 (d, J = 11.7 Hz, 2H), 1.61 (q, J = 7.0 Hz, 2H), 1.49-1.36 (m, 1H), 1.12-0.90 (m, 2H); TOF-MS $[M+H]^+$ 535.06
761		2-[4-(2-{6-氨基-8-[(6-溴-1,3-苯并间二氧杂环戊烯-5-基)硫]-3H-嘌呤-3-基}乙基)哌啶-1-基]-2-氧代乙醇。 LC-MS $[M+H]^+$ 535.1
762		乙酸 2-[4-(2-{6-氨基-8-[(6-溴-1,3-苯并间二氧杂环戊烯-5-基)硫]-9*H*-嘌呤-9-基}乙基)哌啶-1-基]-1,1-二甲基-2-氧代乙酯。LC-MS $[M+H]^+$ 605.1

763		乙酸 2-[4-(2-{6-氨基-8-[(6-溴-1,3-苯并间二氧杂环戊烯-5-基)硫]-3*H*-嘌呤-3-基}乙基)哌啶-1-基]-1,1-二甲基-2-氧代乙酯。LC-MS [M+H]$^+$ 605.1
764		1-[4-(2-{6-氨基-8-[(6-溴-1,3-苯并间二氧杂环戊烯-5-基)硫]-9H-嘌呤-9-基}乙基)哌啶-1-基]-2-甲基-1-氧代丙-2-醇。LC-MS [M+H]$^+$ 563.1
765		1-[4-(2-{6-氨基-8-[(6-溴-1,3-苯并间二氧杂环戊烯-5-基)硫]-3H-嘌呤-3-基}乙基)哌啶-1-基]-2-甲基-1-氧代丙-2-醇。LC-MS [M+H]$^+$ 563.1

实施例 766 和 767

(2*R*)-1-[4-(2-{6-氨基-8-[(6-溴-1,3-苯并间二氧杂环戊烯-5-基)硫]-3*H*-嘌呤-3-基}乙基)哌啶-1-基]-1-氧代丙-2-醇和

(2*R*)-1-[4-(2-{6-氨基-8-[(6-溴-1,3-苯并间二氧杂环戊烯-5-基)硫]-9*H*-嘌呤-9-基}乙基)哌啶-1-基]-1-氧代丙-2-醇



试剂：（a）TBDPS-Cl，Et_3N，THF，（b）LiOH.H_2O，MeOH，THF，H_2O，（c）$(COCl)_2$，DCM，催化剂 DMF，（d）4-哌啶乙醇，Et_3N，THF，（e）对甲苯磺酰氯，Et_3N，催化剂 DMAP，THF，（f）中间体 34，Barton 碱，DMF，90-100 ℃，（g）TBAF，THF。

步骤 1：(2*R*)-2-{[叔丁基(二苯基)甲硅烷基]氧基}丙酸

在室温下，向(*R*)-2-羟基-丙酸甲酯（1.0 g，9.6 mmol）和三乙胺（4.0 mL，28.81 mmol）在四氢呋喃（12 mL）中的混合物中加入叔丁基二苯基甲硅烷基氯（3.68 mL，14.4 mmol），并搅拌所述反应混合物 12 h。在所述反应完成后，所述反应混合物经 EtOAc（80 mL）稀释，并经水（70 mL）和盐水（70 mL）洗涤。EtOAc 层经 Na_2SO_4 干燥并在真空中蒸发溶剂以得到(2*R*)-2-{[叔丁基(二苯基)甲硅烷基]氧基}丙酸甲酯（3.28 g）。所述粗物质对下一步骤是足够纯的，不进行进一步纯化而使用。将所述粗物质用 THF-MeOH-H_2O（1:1:1，20 mL）稀释并加入 LiOH.H_2O（1.17 g，28.0 mmol）。在室温下搅拌所述反应混合物过夜。所述反应混合物经浓 HCl 中和并在真空中浓缩。剩余物用 75 mL 的水稀释并经 EtOAc（3 × 50 mL）萃取，合并的 EtOAc 层经 Na_2SO_4 干燥并在真空中蒸发。通过 Isco 硅胶闪式柱使用 EtOAc 纯化所述粗羧酸得到羧酸（0.6 g）。^1H NMR ($CDCl_3$) δ 7.70-7.60 (m, 4H), 7.50-7.38 (m, 6H), 4.32 (q, J = 6.6 Hz, 1H), 1.30 (d, J = 7.0 Hz, 9H); LC-MS $[M-H]^+$ 327.2。

步骤 2: 2-[1-((2*R*)-2-{[叔丁基-(二苯基)甲硅烷基]-氧基}丙酰基)-哌啶-4-基]-乙醇

在冰冷的温度下，向上述羧酸（0.6 g，1.82 mmol）在二氯甲烷（15 mL）的混合物中加入草酰氯（464 μL，3.65 mmol），然后加入两滴 N,N-二甲基甲酰胺。将所述反应混合物处于室温并搅拌 6 h。在该阶段末期在减压条件下将过量草酰氯蒸发，得到相应的酰基氯。将所述酰基氯用 2 mL 的 THF 稀释，并且在室温下加入 4-哌啶乙醇（0.235 g，1.8 mmol）和三乙胺（763 μL，5.48 mmol）在 THF（7 mL）中的混合物中。将所述反应混合物搅拌过夜，在反应完成后将所述反应混合物用 EtOAc（60 mL）稀释，并用饱和的 $NaHCO_3$ 水溶液（60 mL）和盐水（60 mL）洗涤。EtOAc 层经 Na_2SO_4 干燥、过滤并在减压条件下蒸发溶剂以得到粗产物。通过 Isco 硅胶闪式柱使用己烷-EtOAc（1:3）纯化所述粗产物，得到 0.748 g 的 2-[1-((2*R*)-2-{[叔丁基-(二苯基)甲硅烷基]-氧基}丙酰基)-哌啶-4-基]-乙醇。^1H NMR ($CDCl_3$) δ 7.70-7.60 (m, 4H), 7.46-7.33 (m, 6H), 4.55 (t, J = 5.4 Hz, 1H), 4.43 (d, J = 12.8 Hz, 1H), 4.26 and 4.06 (2 d, J = 12.5 Hz, 1H), 3.66 (q, J = 5.8 Hz, 2H), 2.86 和 2.69 (2 t, J = 12.8 Hz, 1H), 2.5-2.34 (m, 1H), 1.70-1.54 (m, 4H), 1.43 (q, J = 6.6 Hz, 2H), 1.34 (t, J = 7.0 Hz, 3H), 1.20-1.28 (m, 1H), 1.08 (s, 9H); LC-MS [M+H] 440.3。

步骤 3: 2-[1-((2*R*)-2-{[叔丁基-(二苯基)-甲硅烷基]-氧基}-丙酰基)-哌啶-4-基]-乙基 4-甲基苯磺酸酯

在室温下，向 2-[1-((2*R*)-2-{[叔丁基-(二苯基)甲硅烷基]-氧基}丙酰基)-哌啶-4-基]-乙醇（0.748 g，1.7 mmol）在四氢呋喃（10 mL）的溶液中加入三乙胺（711 μL，5.11 mmol）和 N,N-二甲基吡啶（10 mg），然后加入对甲苯磺酰氯（0.487 g，2.55 mmol），并搅拌所述反应混合物 12 h。将所述反应混合物在真空下浓缩并用 EtOAc（60 mL）稀释，用饱和的 $NaHCO_3$ 水溶液（50 mL）和盐水（50 mL）洗涤。EtOAc 层经 Na_2SO_4 干燥、过滤并在减压条件下蒸发溶剂以得到粗产物。通过 Isco 硅胶闪式柱使用己烷-EtOAc（1:3）纯化所述粗产物，得到 0.69 g 的 2-[1-((2*R*)-2-{[叔丁基-(二苯基)-甲硅烷

基]-氧基}-丙酰基)-哌啶-4-基]-乙基 4-甲基苯磺酸酯。^{1}H NMR ($CDCl_3$) δ 7.79 (d, J = 7.8 Hz, 2H), 7.68-7.58 (m, 4H), 7.40-7.32 (m, 8H), 4.60-4.50 (m,1H), 4.44-4.35 (m,1H), 4.30-3.96 (m, 4H), 2.85-2.58 (m, 1H), 2.45 (s, 3H), 2.40-2.25 (m, 1H), 1.58-1.42 (m, 5H), 1.40-1.30 (m, 5H), 1.07 (s, 9H), 1.00-0.80 (m, 1H); LC-MS $[M+23]^+$ 616.2。

步骤 4: 8-[(6-溴-1,3-苯并间二氧杂环戊烯-5-基)硫]-9-{2-[1-((2*R*)-2-{[叔丁基(二苯基)甲硅烷基]氧基}丙酰基)哌啶-4-基]乙基}-9*H*-嘌呤-6-胺和 8-[(6-溴-1,3-苯并间二氧杂环戊烯-5-基)硫]-3-{2-[1-((2*R*)-2-{[叔丁基(二苯基)甲硅烷基]氧基}丙酰基)哌啶-4-基]乙基}-3*H*-嘌呤-6-胺

依照所述实施例 1 和 2 的步骤使用 8-(6-溴-苯并[1,3]间二氧杂环戊烯-5-基硫基)-9H-嘌呤-6-基胺 (0.172 g, 0.47 mmol) 和从步骤 3 得到的 2-[1-((2*R*)-2-{[叔丁基-(二苯基)-甲硅烷基]-氧基}-丙酰基)-哌啶-4-基]-乙基 4-甲基苯磺酸酯 (0.280 g, 0.47 mmol) 进行所述烷基化反应，得到 8-[(6-溴-1,3-苯并间二氧杂环戊烯-5-基)硫]-9-{2-[1-((2*R*)-2-{[叔丁基(二苯基)甲硅烷基]氧基}丙酰基)哌啶-4-基]乙基}-9*H*-嘌呤-6-氨基，LC-MS $[M+1]^+$ 787.1; 以及 8-[(6-溴-1,3-苯并间二氧杂环戊烯-5-基)硫]-3-{2-[1-((2*R*)-2-{[叔丁基(二苯基)甲硅烷基]氧基}丙酰基)哌啶-4-基]乙基}-3*H*-嘌呤-6-氨基，LC-MS $[M+H]^+$ 787.1。

步骤 5: (2*R*)-1-[4-(2-{6-氨基-8-[(6-溴-1,3-苯并间二氧杂环戊烯-5-基)硫]-9*H*-嘌呤-9-基}乙基)哌啶-1-基]-1-氧代丙-2-醇和 (2*R*)-1-[4-(2-{6-氨基-8-[(6-溴-1,3-苯并间二氧杂环戊烯-5-基)硫]-3*H*-嘌呤-3-基}乙基)哌啶-1-基]-1-氧代丙-2-醇

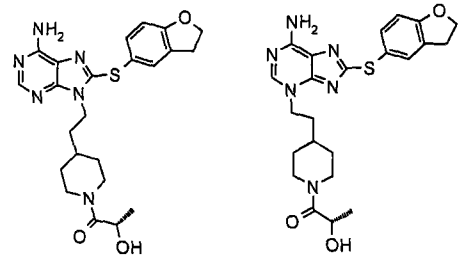
向 8-[(6-溴-1,3-苯并间二氧杂环戊烯-5-基)硫]-9-{2-[1-((2*R*)-2-{[叔丁基(二苯基)甲硅烷基]氧基}丙酰基)哌啶-4-基]乙基}-9*H*-嘌呤-6-胺和 8-[(6-溴-1,3-苯并间二氧杂环戊烯-5-基)硫]-3-{2-[1-((2*R*)-2-{[叔丁基(二苯基)甲硅烷基]氧基}丙酰基)哌啶-4-基]乙基}-3*H*-嘌呤-6-胺 (0.314 g, 0.398 mmol) 在 THF (5 mL) 中的混合物中，加入 1.0 M THF 中的四正丁基氟化铵溶

液（0.47 mL，0.47 mmol），并且在室温下搅拌所述反应混合物过夜。在反应完成后，所述反应混合物经浓缩并通过制备型 HPLC[X-Terra prep-RP18 10 um，19×250 mm（水），流动相：溶剂 A：含 0.01% TFA 的 HPLC 级水，和溶剂 B：含 0.01% TFA 的乙腈，一般洗脱梯度 – 在 15 至 25 分钟的实验时间内溶剂 B 从 15%至 80%]纯化。HPLC 馏分经冷冻干燥后以三氟乙酸盐的形式分离出 N-9 和 N-3 异构体。

(2*R*)-1-[4-(2-{6-氨基-8-[(6-溴-1,3-苯并间二氧杂环戊烯-5-基)硫]-3*H*-嘌呤-3-基}乙基)哌啶-1-基]-1-氧代丙-2-醇，LC-MS [M+H]$^+$ 549.1；以及(2*R*)-1-[4-(2-{6-氨基-8-[(6-溴-1,3-苯并间二氧杂环戊烯-5-基)硫]-9*H*-嘌呤-9-基}乙基)哌啶-1-基]-1-氧代丙-2-醇，LC-MS [M+H]$^+$ 549.1。

实施例 768 和 769

(2*S*)-1-(4-{2-[6-氨基-8-(2,3-二氢-1-苯并呋喃-5-基硫)-9H-嘌呤-9-基]乙基}哌啶-1-基)-1-氧代丙-2-醇和(2*S*)-1-(4-{2-[6-氨基-8-(2,3-二氢-1-苯并呋喃-5-基硫)-3H-嘌呤-3-基]乙基}哌啶-1-基)-1-氧代丙-2-醇



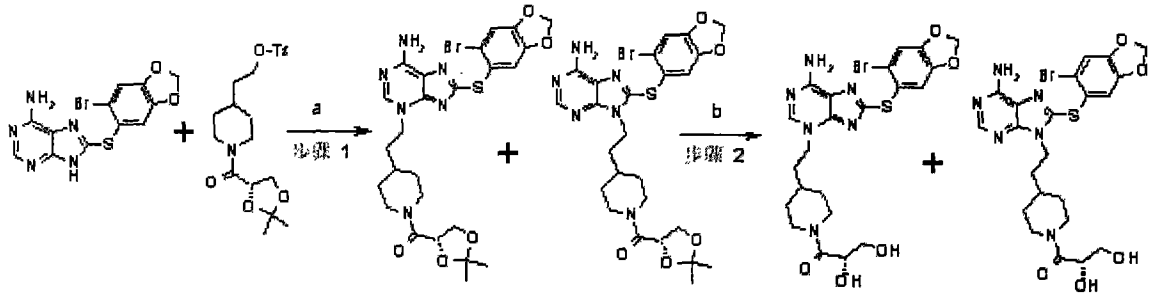
标题化合物以类似于实施例 756 和 757 的步骤使用 8-(2,3-二氢-苯并呋喃-5-基硫基)-9H-嘌呤-6-基胺（0.100 g，0.350 mmol）和乙酸(*S*)-1-甲基-2-氧代-2-{4-[2-(甲苯-4-磺酰氧)-乙基]-哌啶-1-基}-乙酯（0.278 g，0.700 mmol）制备，得到乙酸(1*S*)-2-(4-{2-[6-氨基-8-(2,3-二氢-1-苯并呋喃-5-基硫)-9*H*-嘌呤-9-基]乙基}哌啶-1-基)-1-甲基-2-氧代乙酯，LC-MS [M+H]$^+$ 511.2 和乙酸(1*S*)-2-(4-{2-[6-氨基-8-(2,3-二氢-1-苯并呋喃-5-基硫)-3*H*-嘌呤-3-基]乙基}哌啶-1-基)-1-甲基-2-氧代乙酯，LC-MS [M+H]$^+$ 511.2 的混合物。

上述混合物如实施例 62 和 63 中所述用 $LiOH.H_2O$ 处理，通过制

备型 HPLC 分离所述异构体。(2*S*)-1-(4-{2-[6-氨基-8-(2,3-二氢-1-苯并呋喃-5-基硫)-9H-嘌呤-9-基]乙基}哌啶-1-基)-1-氧代丙-2-醇。^{1}H NMR (CD_3OD) δ 8.28 (s, 1H), 7.49 (s, 1H), 7.40 (dd, J = 1.9, 8.2 Hz, 1H), 6.84 (d, J = 8.2 Hz, 1H), 4.62 (t, J = 8.5 Hz, , 2H), 4.59-4.42 (m, 2H), 4.34 (t, J = 7.4 Hz, , 2H), 4.06-3.97 (m, 1H), 3.25 (t, J = 8.5 Hz, , 2H), 3.10-2.98 (m, 1H), 2.70-2.39 (m, 1H), 1.96-1.74 (m, 4H), 1.70-1.55 (m, 1H), 1.35-1.10 (m, 5H); TOF-MS $[M+H]^+$ 469.2。(2*S*)-1-(4-{2-[6-氨基-8-(2,3-二氢-1-苯并呋喃-5-基硫)-3H-嘌呤-3-基]乙基}哌啶-1-基)-1-氧代丙-2-醇。TOF-MS $[M+H]^+$ 469.2。

实施例 770 和 771

(2*S*)-3-[4-(2-{6-氨基-8-[(6-溴-1,3-苯并间二氧杂环戊烯-5-基)硫]-3H-嘌呤-3-基}乙基)哌啶-1-基]-3-氧代丙-1,2-二醇和 (2*S*)-3-[4-(2-{6-氨基-8-[(6-溴-1,3-苯并间二氧杂环戊烯-5-基)硫]-9H-嘌呤-9-基}乙基)哌啶-1-基]-3-氧代丙-1,2-二醇



试剂：Barton 碱，DMF，90 -100 ℃，16 h；b）AcOH 水溶液，rt，12 h

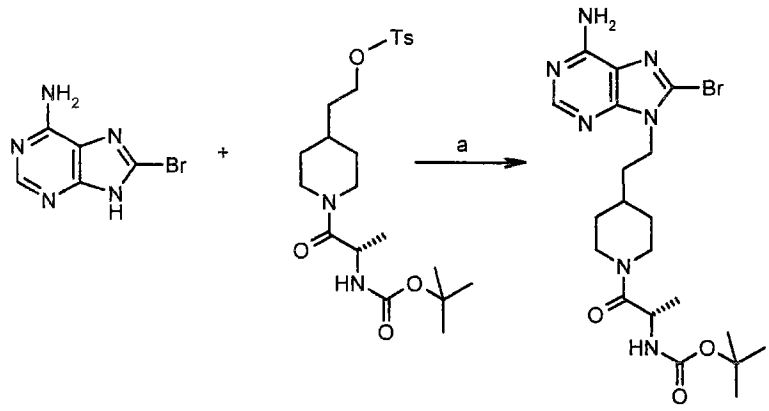
步骤 1：依照所述实施例 1 和 2 的步骤使用 8-(6-溴-苯并[1,3]间二氧杂环戊烯-5-基硫基)-9H-嘌呤-6-基胺（0.100g，0.27 mmol）和甲苯-4-磺酸 2-[1-((*S*)-2,2-二甲基-[1,3]二氧杂环戊二烯酮-4-羰基)-哌啶-4-基]-乙酯（0.224 g，0.54 mmol）进行所述烷基化反应，得到 8-[(6-溴-1,3-苯并间二氧杂环戊烯-5-基)硫]-3-[2-(1-{[(4*S*)-2,2-二甲基-1,3-二氧戊环-4-基]羰基}哌啶-4-基)乙基]-3*H*-嘌呤-6-胺，LC-MS $[M+H]^+$ 605.2 和 8-[(6-溴-1,3-苯并间二氧杂环戊烯-5-基)硫]-9-[2-(1-{[(4*S*)-2,2-二甲基-1,3-二氧戊环-4-基]羰基}哌啶-4-基)乙基]-9*H*-嘌呤-6-胺，LC-MS $[M+H]^+$

605.2的混合物。所述粗混合物不经过进一步纯化而用于下一反应中。

步骤2: 将来自步骤1的8-[(6-溴-1,3-苯并间二氧杂环戊烯-5-基)硫]-3-[2-(1-{[(4*S*)-2,2-二甲基-1,3-二氧戊环-4-基]羰基}哌啶-4-基)乙基]-3*H*-嘌呤-6-胺和8-[(6-溴-1,3-苯并间二氧杂环戊烯-5-基)硫]-9-[2-(1-{[(4*S*)-2,2-二甲基-1,3-二氧戊环-4-基]羰基}哌啶-4-基)乙基]-9*H*-嘌呤-6-胺的粗混合物(0.31 g, 0.51 mmol)溶解于60%的AcOH水溶液(5 mL)中，并且将所述反应混合物搅拌12 h。用K_2CO_3中和所述反应混合物并蒸发内含物。剩余物用MeOH-DCM(1:2)(10 mL)稀释并过滤。在减压条件下蒸发所述滤液。通过制备型HPLC[X-Terra prep-RP18 10 um, 19×250 mm(水)，流动相: 溶剂A: 含0.01% TFA的HPLC级水，和溶剂B: 含0.01% TFA的乙腈，一般洗脱梯度 – 在15至25分钟的实验时间内溶剂B从15%至80%]纯化所述混合物。HPLC馏分经冷冻干燥后以三氟乙酸盐的形式分离出N-9异构体和N-3异构体。(2S)-3-[4-(2-{6-氨基-8-[(6-溴-1,3-苯并间二氧杂环戊烯-5-基)硫]-3H-嘌呤-3-基}乙基)哌啶-1-基]-3-氧代丙-1,2-二醇。TOF-MS $[M+H]^+$ 565.09和(2S)-3-[4-(2-{6-氨基-8-[(6-溴-1,3-苯并间二氧杂环戊烯-5-基)硫]-9H-嘌呤-9-基}乙基)哌啶-1-基]-3-氧代丙-1,2-二醇。^1H NMR (CD_3OD) δ 8.34 (s, 1H), 7.28 (s, 1H), 7.22 (s, 1H), 6.09 (s, 2H), 4.55-4.45 (m, 2H), 4.38 (t, J = 7.0 Hz, 2H), 4.12-4.02 (m, 1H), 3.73-3.58 (m, 2H), 3.12-3.00 (m, 1H), 2.70-2.60 (m, 1H), 1.95-1.55 (m, 5H), 1.30-1.10 (m, 2H); TOF-MS $[M+H]^+$ 565.09。

实施例772

((1*S*)-2-{4-[2-(6-氨基-8-溴-9*H*-嘌呤-9-基)乙基]哌啶-1-基}-1-甲基-2-氧代乙基)氨基甲酸叔丁酯

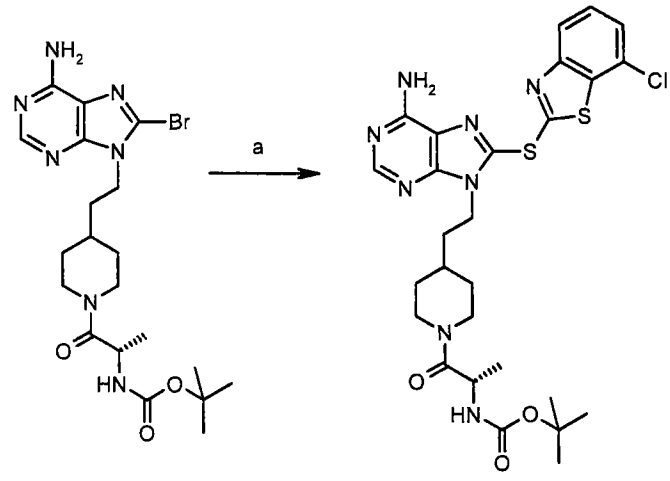


试剂：a）Barton碱，THF，100 ℃，MW，15 min；

在室温下，向8-溴代腺嘌呤（0.08 g，0.367 mmol）和甲苯-4-磺酸 2-[1-((*S*)-2-叔丁氧羰基氨基-丙酰基)-哌啶-4-基]-乙酯（0.200 g，0.440 mmol）在THF中的悬浮液中加入Barton碱（91 μl，0.40 mmol）。将所述反应混合物在微波反应器中100 ℃加热15 min，在该阶段末期将反应物冷却至室温并通过Isco硅胶闪式柱使用0-30%梯度的EtOAc-己烷纯化所述粗产物，得到{(1*S*)-2-[4-(2-{6-氨基-8-[(7-氯-1,3-苯并噻唑-2-基)硫]-3*H*-嘌呤-3-基}乙基)哌啶-1-基]-1-甲基-2-氧代乙基}氨基甲酸叔丁酯和{(1*S*)-2-[4-(2-{6-氨基-8-[(7-氯-1,3-苯并噻唑-2-基)硫]-9*H*-嘌呤-9-基}乙基)哌啶-1-基]-1-甲基-2-氧代乙基}氨基甲酸叔丁酯（0.090 g，49%）。

实施例773

{(1*S*)-2-[4-(2-{6-氨基-8-[(7-氯-1,3-苯并噻唑-2-基)硫]-9*H*-嘌呤-9-基}乙基)哌啶-1-基]-1-甲基-2-氧代乙基}氨基甲酸叔丁酯

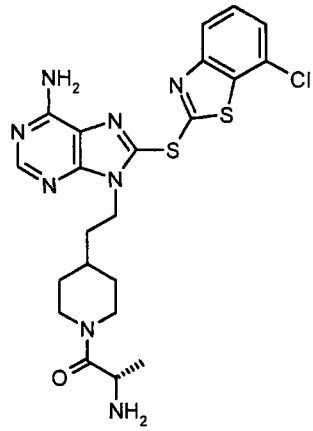


试剂：a）7-氯-2-巯基苯并噻唑，$(CH_3)_3COK$，DMF，130 ℃，6 h；

在室温下，向 7-氯-2-巯基苯并噻唑（0.020 g，0.097 mmol）的 DMF（2.0 mL）悬浮液中加入$(CH_3)_3COK$（0.011 g，0.97 mmol）并继续搅拌 30 min。在室温下，向上述反应混合物中加入((1*S*)-2-{4-[2-(6-氨基-8-溴-9*H*-嘌呤-9-基)乙基]哌啶-1-基}-1-甲基-2-氧代乙基)氨基甲酸叔丁酯（0.040 g，0.081 mmol）在 DMF（1 mL）中的混合物。将所述反应混合物在 130℃加热 6h，在该阶段末期蒸发溶剂并通过制备型 HPLC[X-Terra prep-RP18 10 um，19×250 mm（水），流动相：溶剂 A：含 0.01% TFA 的 HPLC 级水，和溶剂 B：含 0.01% TFA 的乙腈，一般洗脱梯度 – 在 15 至 25 分钟的实验时间内溶剂 B 从 15%至 80%]纯化所述粗产物。HPLC 馏分经冷冻干燥后得到标题产物。^{1}H NMR δ (CD_3OD)，8.35 (s, 1H)，7.85-7.82 (m, 1H)，7.50-7.40 (m, 2H)， 4.40 (t, J=7.2 Hz, 2H)，4.00-3.90 (m, 2H)，1.80-1.70 (m, 4H)，1.21-1.15 (m, 6H)，1.15 (s, 9H)，1.10 (s, 3H)；LC-MS $[M+H]^+$ 617.1。

实施例 774

9-(2-{1-[(2*S*)-2-氨基丙酰基]哌啶-4-基}乙基)-8-[(7-氯-1,3-苯并噻唑-2-基)硫]-9*H*-嘌呤-6-胺

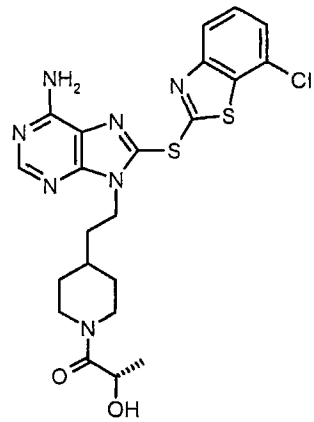


向 Boc 保护的实施例 773 的产物的 DCM 溶液中加入 TFA 并在室温搅拌 3h。在减压条件下将溶剂和过量 TFA 蒸发并通过与甲苯共蒸发除去剩余 TFA，得到三氟乙酸盐形式的标题产物。^{1}H NMR δ (CD_3OD)，8.35 (s, 1H)，7.84-7.82 (m, 1H)，7.50-7.40 (m, 2H)， 4.40 (t, J=7.2 Hz, 2H)，4.00-3.90 (m, 1H)，1.80-1.70 (m, 4H)，

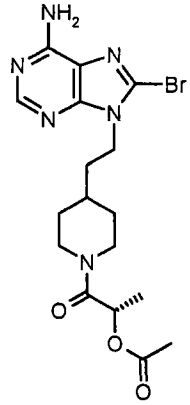
1.41-1.37 (m, 4H), 1.32-1.30 (m, 3H), 1.20 (s, 3H); LC-MS $[M+H]^+$ 517.1。

实施例 775

(2*S*)-1-[4-(2-{6-氨基-8-[(7-氯-1,3-苯并噻唑-2-基)硫]-9*H*-嘌呤-9-基}乙基)哌啶-1-基]-1-氧代丙-2-醇

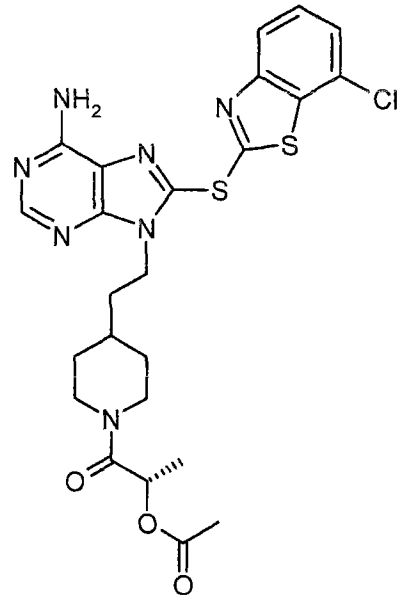


步骤 1: 乙酸(1*S*)-2-{4-[2-(6-氨基-8-溴-9*H*-嘌呤-9-基)乙基]哌啶-1-基}-1-甲基-2-氧代乙酯



标题化合物依照所述实施例 756 和 757 (步骤 1) 的步骤使用乙酸(*S*)-1-甲基-2-氧代-2-{4-[2-(甲苯-4-磺酰氧)-乙基]-哌啶-1-基}-乙酯和 8-溴代腺嘌呤制备，得到乙酸(1*S*)-2-{4-[2-(6-氨基-8-溴-9*H*-嘌呤-9-基)乙基]哌啶-1-基}-1-甲基-2-氧代乙酯和乙酸(1*S*)-2-{4-[2-(6-氨基-8-溴-3*H*-嘌呤-3-基)乙基]哌啶-1-基}-1-甲基-2-氧代乙酯的混合物。通过 Isco 硅胶闪式柱使用 EtOAc 纯化该混合物，得到乙酸(1*S*)-2-{4-[2-(6-氨基-8-溴-9*H*-嘌呤-9-基)乙基]哌啶-1-基}-1-甲基-2-氧代乙酯。LC-MS $[M+H]^+$ 439.1。

步骤 2: 乙酸(1*S*)-2-[4-(2-{6-氨基-8-[(7-氯-1,3-苯并噻唑-2-基)硫]-9*H*-嘌呤-9-基}乙基)哌啶-1-基]-1-甲基-2-氧代乙酯



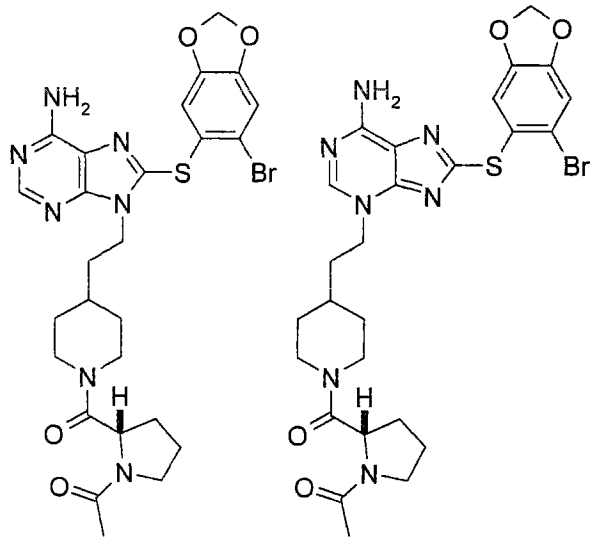
依照所述实施例 81 的步骤使用乙酸(1*S*)-2-{4-[2-(6-氨基-8-溴-9*H*-嘌呤-9-基)乙基]哌啶-1-基}-1-甲基-2-氧代乙酯和 7-氯-2-巯基苯并噻唑制备所述标题化合物，LC-MS $[M+H]^+$ 562.1，连同水解产物，所述混合物不经过任何进一步纯化而用于下一步中。

步骤 3: (2*S*)-1-[4-(2-{6-氨基-8-[(7-氯-1,3-苯并噻唑-2-基)硫]-9*H*-嘌呤-9-基}乙基)哌啶-1-基]-1-氧代丙-2-醇

将步骤 2 的粗产物悬浮于甲醇中，加入 K_2CO_3 并继续搅拌 2 h。所述标题产物经制备型 HPLC 纯化后以三氟乙酸盐的形式分离出来。LC-MS $[M+H]^+$ 518.1。

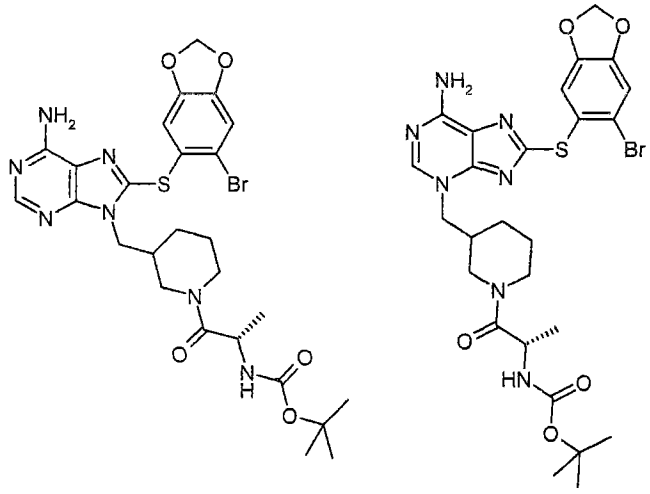
实施例 776 和 777

9-{2-[1-(1-乙酰基-L-脯氨酰基)哌啶-4-基]乙基}-8-[(6-溴-1,3-苯并间二氧杂环戊烯-5-基)硫]-9H-嘌呤-6-胺和 3-{2-[1-(1-乙酰基-L-脯氨酰基)哌啶-4-基]乙基}-8-[(6-溴-1,3-苯并间二氧杂环戊烯-5-基)硫]-3H-嘌呤-6-胺



依照所述实施例 1 和 2 的步骤使用 8-(6-溴-苯并[1,3]间二氧杂环戊烯-5-基硫基)-9H-嘌呤-6-基胺和甲苯-4-磺酸 2-[1-[(*S*)-1-乙酰基-吡咯烷-2-羰基)-哌啶-4-基]-乙酯制备所述标题化合物。所述产物经过制备型 HPLC 纯化以及冷冻干燥 HPLC 馏分后以三氟乙酸盐的形式分离出来。9-{2-[1-(1-乙酰基-L-脯氨酰基)哌啶-4-基]乙基}-8-[(6-溴-1,3-苯并间二氧杂环戊烯-5-基)硫]-9H-嘌呤-6-胺 ^{1}H NMR (CD_3OD) δ 8.28 (s, 1H), 7.28 (s, 1H), 7.19 and 7.17 (s, 1H), 6.09 (s, 2H), 4.47 (m, 1H), 4.37 (t, J = 7.2 Hz, 2H), 4.04 (m 1H), 3.67-3.56 (m, 2H), 3.15 (m, 1H), 2.64 (m, 1H), 2.23 (m, 1H), 2.08 and 2.076 (s, 3H), 2.06-1.96 (m, 2H), 1.91-1.78 (m, 6H), 1.62 (m, 1H), 1.23 (m, 1H), 1.11 (m, 1H); LC-MS $[M+H]^+$ 616.1。3-{2-[1-(1-乙酰基-L-脯氨酰基)哌啶-4-基]乙基}-8-[(6-溴-1,3-苯并间二氧杂环戊烯-5-基)硫]-3H-嘌呤-6-胺。LC-MS $[M+H]^+$ 616.1。

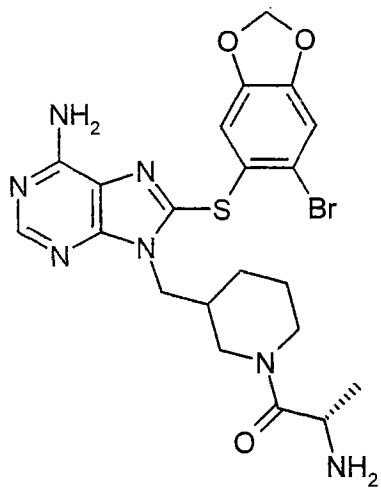
实施例 778 和 779



{(1*S*)-2-[3-({6-氨基-8-[(6-溴-1,3-苯并间二氧杂环戊烯-5-基)硫]-9*H*-嘌呤-9-基}甲基)哌啶-1-基]-1-甲基-2-氧代乙基}氨基甲酸叔丁酯和{(1*S*)-2-[3-({6-氨基-8-[(6-溴-1,3-苯并间二氧杂环戊烯-5-基)硫]-3*H*-嘌呤-3-基}甲基)哌啶-1-基]-1-甲基-2-氧代乙基}氨基甲酸叔丁酯

依照所述实施例 1 和 2 的步骤使用 8-(6-溴-苯并[1,3]间二氧杂环戊烯-5-基硫基)-9H-嘌呤-6-基胺和甲苯-4-磺酸 1-((*S*)-2-叔丁氧羰基氨基-丙酰基)-哌啶-3-基甲酯制备所述标题化合物。所述产物以三氟乙酸盐的形式分离出来。{(1*S*)-2-[3-({6-氨基-8-[(6-溴-1,3-苯并间二氧杂环戊烯-5-基)硫]-9*H*-嘌呤-9-基}甲基)哌啶-1-基]-1-甲基-2-氧代乙基}氨基甲酸叔丁酯，LC-MS $[M+H]^+$ 634.5；以及{(1*S*)-2-[3-({6-氨基-8-[(6-溴-1,3-苯并间二氧杂环戊烯-5-基)硫]-3*H*-嘌呤-3-基}甲基)哌啶-1-基]-1-甲基-2-氧代乙基}氨基甲酸叔丁酯，LC-MS $[M+H]^+$ 634.5。

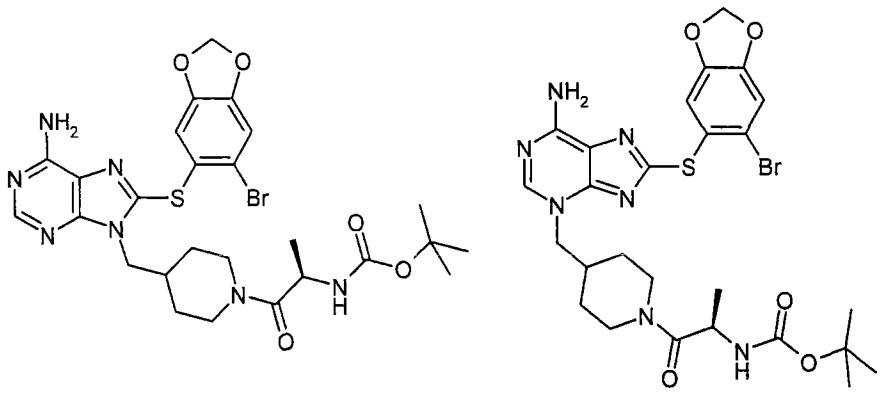
实施例 780



9-({1-[(2*S*)-2-氨基丙酰基]哌啶-3-基}甲基)-8-[(6-溴-1,3-苯并间二氧杂环戊烯-5-基)硫]-9*H*-嘌呤-6-胺

标题化合物依照所述实施例 50 的步骤使用{(1*S*)-2-[3-({6-氨基-8-[(6-溴-1,3-苯并间二氧杂环戊烯-5-基)硫]-9*H*-嘌呤-9-基}甲基)哌啶-1-基]-1-甲基-2-氧代乙基}氨基甲叔丁酸酯制备，并以三氟乙酸盐的形式分离出来。LC-MS $[M+H]^+$ 534.4。

实施例 781 和 782



{(1*R*)-2-[4-({6-氨基-8-[(6-溴-1,3-苯并间二氧杂环戊烯-5-基)硫]-9*H*-嘌呤-9-基}甲基)哌啶-1-基]-1-甲基-2-氧代乙基}氨基甲酸叔丁酯和{(1*R*)-2-[4-({6-氨基-8-[(6-溴-1,3-苯并间二氧杂环戊烯-5-基)硫]-3*H*-嘌呤-3-基}甲基)哌啶-1-基]-1-甲基-2-氧代乙基}氨基甲酸叔丁酯

依照所述实施例 1 和 2 的步骤使用 8-(6-溴-苯并[1,3]间二氧杂环戊烯-5-基硫基)-9H-嘌呤-6-基胺和甲苯-4-磺酸 1-((*R*)-2-叔丁氧羰基氨基-丙酰基)-哌啶-4-基甲酯制备所述标题化合物。所述标题

化合物经过制备型 HPLC 纯化后以三氟乙酸盐的形式分离出来。{(1*R*)-2-[4-({6-氨基-8-[(6-溴-1,3-苯并间二氧杂环戊烯-5-基)硫]-9*H*-嘌呤-9-基}甲基)哌啶-1-基]-1-甲基-2-氧代乙基}氨基甲酸叔丁酯，LC-MS [M+H]$^+$ 634.5；以及{(1*R*)-2-[4-({6-氨基-8-[(6-溴-1,3-苯并间二氧杂环戊烯-5-基)硫]-3*H*-嘌呤-3-基}甲基)哌啶-1-基]-1-甲基-2-氧代乙基}氨基甲酸叔丁酯，LC-MS [M+H]$^+$ 634.5。

活性实施例

结合测定

通过由 Kim 等人改良的荧光偏振测定法(*Journal of Biomolecular Screening* 2004, 9(5):375-381)使用 BODIPY-标记的格尔德霉素（BODIPY-GM）监测化合物与纯化的 Hsp90 的结合。将化合物稀释物（在 100% DMSO 中）加至黑底 96-孔板（Greiner；终浓度 2%的 DMSO），并依次加入等体积的处于测定缓冲液（20 mM HEPES-KOH pH 7.3，50 mM KCl，5 mM $MgCl_2$，20 mM Na_2MoO_4，0.01% NP-40，0.1 mg/mL 牛血清丙种球蛋白[Invitrogen, P2045]，2 mM DTT）中的 BODIPY-GM（终浓度 10 nM）和纯化的人 Hsp90（Stressgen, SPP-770；终浓度 30 nM），得到 50 微升的终体积。在室温下将所述板培养过夜。用 485/530 nm 的激发/发射波长读取平行和垂直荧光测量值（LJL BioSystems Analyst AD 板读数仪）。减去背景荧光（仅缓冲液），并按照如下方法由平行和垂直荧光读数计算以 mP 单位表示的荧光偏振（FP）值：

FP = (平行 - 垂直)/(平行 + 垂直)*1000

通过以下方式计算抑制百分率：将所述 FP 值归一化至从含 DMSO 的平行反应中得到的值，并从 100%中减去这些归一化的值。独立地监测内在化合物的荧光，并将混有化合物荧光的 FP 数据点从分析中去除。

Her2-萤光素酶测定

将 Her2（激酶域）-萤光素酶融合物稳定转染的 HCT116 细胞以每孔 100 微升（添加 10%血清的 DMEM）中 10,000 细胞接种于黑 96-

孔板中，并培养过夜。将化合物稀释物（在 100% DMSO 中）加至各个孔中（终浓度 0.4%的 DMSO），并将板培养 4 小时。将板平衡至室温（5 min），每孔加入 100 微升 Steady-Glo 剂（Promega #E2520），将板在室温培养 5 分钟。然后测定发光（TopCount，Perkin-Elmer）。

细胞毒性测定

将 HCT116 细胞以每孔 100 微升（添加 10%血清的 DMEM）中 5,000 细胞接种于黑 96-孔板中，并培养过夜。将化合物稀释物（在 100% DMSO 中）加至各个孔中（终浓度 0.4%的 DMSO），并将板培养 72 小时。将板平衡至室温（5 分钟）。每孔加入 50 微升裂解缓冲液，然后加入 50 微升基质溶液（ATPLite [2 step]，Perkin-Elmer，#601941），并将板在室温培养 5 分钟。然后测定发光（TopCount，Perkin-Elmer）。

表 18

实例	5 μM 浓度化合物的抑制百分数	IC50 (μ M)
1		0.34
2		3.47
3	36	
4	75	0.65
5	8	
6	66	1.06
7	22	
8		18.0
9		1.0
10		>50
11		0.6
12		>10
13		0.045
14		5.0
15		6.5
16	6	
17		>10
18	0	

19		>10
20	0	>10
21		>10
22		>10
23		>10
24		>10
25		0.041
26		>10
27		>10
28	0	
29		0.15
30	16	>10
31		>10
32		>10
33		0.017
34		>10
35		0.80
36		>5
37		0.8
38		>10
39		0.23
40		>10
41		0.50
42		>5
43		0.70
44		27
45		8.1
46		>10
47		>10
48		>10
49	55	1.2
50	3	
51	52	1.5
52	0	
53		0.045
46		>10

47		>10
48		>10
49	55	1.2
50	3	
51	52	1.5
52	0	
53		0.045
46		>10
47		>10
48		>10
49	55	1.2
50	3	
51	52	1.5
52	0	
53		0.045
46		>10
47		>10
48		>10
49	55	1.2
50	3	
51	52	1.5
52	0	
53		0.045
54	13	
55		1.7
56	3	
57		0.4
58	8	
59		>25
60	30	
61		>10
62		>10
63		>5
64		>5
65	61	0.50
66	5	

67	56	1.5
68	0	
69	69	0.25
70	7	
71	41	>25
72	0	
73	2	>3
74	0	
75		2.9
76	6	
77		1.9
78	17	
79		0.30
80	10	
81	23	
82	5	
83	0	
84	0	>5
85		0.36
86		>5
87	12	
88		1.3
89		>10
90	6	
91		0.2
92	0	
93		0.19
94	0	
95		>3
96	2	
97		0.45
98	0	
99		0.3
100	39	
101		>3
102	39	

103		>1
104	38	
105		>1
106	41	
107	0	
108	30	
109		0.3
110	16	
111		10.00
112	0	
113		0.55
114	14	
115		0.110
116	0	
117	54	0.30
118	0	
119	15	
120	0	
121	54	0.52
122		0.085
123	0	
124		0.22
125	12	
126		0.30
127	51	
128		0.066
129	54	
130		0.04
131	18	
132	54	0.50
133	0	
134		>3
135		1.3
136	16	
137		0.210
138	0	

139		0.09
140	0	
141		0.04
142	0	
143		>3
144	0	
145		>3
146	0	
147		0.044
148	35	
149		0.07
150	0	
151		0.05
152	20	
153		0.60
154	>10	
155		0.095
156	16	
157	58	0.50
158	0	
159	63	0.80
160	0	
161	17	0.32
162	0	
163	>10	
164	0	
165	60	0.30
166	0	
167	44	>25
168	0	
169	37	0.470
170	3	
171		>25
172	>10	
173	44	>25
174	37	>25

175	46	14.00
135		1.3
136	16	
137		0.210
138	0	
139		0.09
140	0	
141		0.04
142	0	
143		>3
144	0	
145		>3
146	0	
147		0.044
148	35	
149		0.07
150	0	
151		0.05
152	20	
153		0.60
154	>10	
155		0.095
156	16	
157	58	0.50
158	0	
159	63	0.80
160	0	
161	17	0.32
162	0	
163	>10	
164	0	
165	60	0.30
166	0	
167	44	>25
168	0	
169	37	0.470

170	3	
171		>25
172	>10	
173	44	>25
174	37	>25
175	46	14.00
176	6	
177	0	
178	9	
179	8	
180	>10	
181		>25
182	>10	
183	100	1.100
184	0	
185		>2.5
186	0	
187		>2.5
188	21	
189		>8
190	8	
191		>8
192	0	
193	39	0.31
194	0	
195	80	0.079
196	10	
197		0.170
198	18	
199		0.110
200	18	
201		0.072
202	9	
203		0.09
204	11	
205	80	0.240

206	0	
207		0.038
208	46	>25
209		0.45
210	8	
211		>25
212	4	
213	52	0.310
214		0.950
215	0	
216	78	>8
217		>10
218		>3
219		>8
220		2
221		>9
222	71	0.062
223		0.50
224		>5
225		>25
226		>25
227	0	
228		>8
229	24	
230		0.210
231		>25
232		>25
233		0.500
234	0	
235		>8
236	0	
237		>25
238		>25
239		>25
240		>8
241	0	

242		ND
243		>1
244		ND
245	1	
246		ND
247		3.0
248		>5
249		0.100
250		0.900
251		0.075
252		>25
253		>8
254		>8
255		0.250
256		0.470
257		>25
258		>25
259		12.0
260		1.50
261		>25
262		>25
263		>25
264		ND
265	20	
266		12.0
267		>25
268	7.0	
269		5.50
270	7.0	
271		>25
272	16	
273		1.30
274	0.0	
275		>3.0
276	0.0	
277		>8.0

278	1.0	
279		>25.0
280	0.0	
281		0.120
282		0.055
283		12.0
284	3.0	
285		1.30
286		3.0
287		0.06
288		4.00
289		1.60
290		0.07
291	0.0	
292		>25.0
293	0.0	
294		>25.0
295	0.0	
296		0.350
297	8.0	
298		>25.0
299	0.0	
300		0.400
301	5.0	
302		>25.0
303	21.0	
304		>25.0
305	29.0	
306		>25.0
307	40.0	
308		0.180
309	25.0	
310		>25.0
311	0.0	
312		>25
313	3.0	

314		6.80
315	21.0	
316		18.0
317	0.0	
318		7.0
319	27.0	
320		0.240
321	49.0	
322		0.100
323	0.0	
324		2.80
325	0.0	
326		0.035
327	33.0	
328		>8.0
329	25.0	
330		0.070
331	25.0	
332		1.00
333	43.0	
334		2.30
335		3.00
336	13.0	
337		>8
338	0	
339		0.115
340	23	
341		0.200
342		19
343	0	
344	22	
345	3	
346		0.325
347		2.5
348		0.800
349	12	

350	25	
351	8	
352	35	
353		0.057
354		0.250
355		>25
356		>25
357	0	
358		0.450
359	3	
360	5	
361		2.90
362		>25
363		0.300
364		0.102
365	31	
366	20	
367		>25
368	*有荧光	
369		0.035
370		0.600
371		0.700
372		0.100
373	15	
374		>25
375		>1
376	0	
377	*有荧光	
378		0.240
379		9.80
380	4	
381		0.390
382		0.140
383		21
384		>1
385	ND	ND

386		0.110
387		>8
388	13	
389	38	
390		0.310
391		1.2
392		2.9
393	0	
394		0.700
395	0	
396		0.810
397	1	
398		0.140
399		0.950
400		6.0
401	2	
402		0.590
403	14	
404	ND	ND
405		>8
406		>25
407		>25
408	ND	ND
409		0.130
410	11	
411		0.200
412	0	
413	28	
414		0.54
415		0.46
416		0.200
417	0	
418		0.300
419		2.90
420	7	
421	28	

422		>3
423	0	
424		0.152
425	6	
426		0.150
427	32	
428		>8
429		3.8
430	15	
431		0.130
432		0.065
433		0.125
434		0.037
435		0.195
436		0.390
437		0.390
438	ND	ND
439	24	
440	60	
441	45	
442	4	
443	36	
444		1.10
445		0.305
446	4	
447		0.210
448	45	
449		0.200
450	57	
451		0.195
452	21	
453		0.700
454		0.305
455		0.060
456		ND
457		>2.00

458		0.380
459	18	
460		2.80
461	15	
462		7.90
463	14%	
464		0.40
465		0.470
466		0.060
467	0	
468	9	
469		8.8
470		0.280
471		0.600
472		0.070
473		0.035
474		0.140
475		0.172
476		0.090
477		0.467
478		0.140
479		0.199
480		0.160
481		0.050
482	0.0	
483		0.184
484		0.600
485		1
486		7
487		0.900
488	29	
489		1.40
490		25
491		0.039
492		0.900
493		8.9

494		5.5
495	6	
496		0.081
497		25
498		0.525
499	21	
500		0.060
501		ND
502		0.140
503		0.190
504		ND
505		0.085
506		ND
507		0.405
508		ND
509		ND
510		0.250
511		ND
512		0.110
513		ND
514		0.110
515		ND
516		0.600
517		ND
518		0.140
519		ND
520		>2.00
521		ND
522		0.053
523		ND
524		0.100
525	13.00	
526		0.300
527	19.00	
528		>5.00
529		ND

530		2.50
531		ND
532		5.00
533	0.00	
534		5.00
535	1.00	
536		>5.00
537		>5.00
538		1.60
539		>5.00
540		>5.00
541	4.00	
542		>5.00
543	0.00	
544		1.40
545		0.050
546		>5.00
547	12.00	
548		>5.00
549	11.00	
550		>5.00
551	0.00	
552		ND
553		>5.00
554	0.00	
555		0.700
556		2.00
557		1.50
558		>5.00
559		>5.00
560		>5.00
561		>5.00
562		ND
563		>5.00
564		>2.00
565		>5.00

566	1.00	
567		>5.00
568	0.00	
569		>5.00
570	0.00	
571		>5.00
572	0.00	
573		1.40
574		1.80
575		0.80
576	31	
577		0.140
578		0.550
579		0.310
580		0.400
581		0.240
582		0.900
583	55.00	
584		1.40
585		0.600
586		0.450
587		ND
588		>2.00
589		ND
590		0.500
591		ND
592		>5.00
593		ND
594		0.270
595	43.00	
596		ND
597		0.310
598		ND
599		0.260
600		ND
601		>8.00

602	31.00	
603	4.00	
604		0.190
605		0.056
606	49.00	
607		0.062
608	5.00	
609		0.045
610		0.088
611	22.00	
612		0.230
613	15.00	
614		1.80
615	13.00	
616		0.090
617	83.00	
618		0.041
619	76.00	
620		0.170
621		>5.00
622		>5.00
623		>4.00
624		0.580
625		0.110
626		ND
627		>8.00
628	23.00	
629		> 25.00
630		9.00
631		2.00
632		>3.00
633		1.50
634		8.10
635		2.10
636	25.00	
637		> 25.00

638		> 25.00
639		0.900
640	19.00	
641		1.10
642	15.00	
643		5.00
644		0.200
645		0.450
646		0.060
647		ND
648		0.684
649		ND
650		>2.00
651		>5.00
652	0.00	
653		>2.00
654		2.00
655		>5.00
656		>5.00
657		0.190
658		>5.00
659		4.00
660		>5.00
661		0.060
649		ND
650		>2.00
651		>5.00
652	0.00	
653		>2.00
654		2.00
655		>5.00
656		>5.00
657		0.190
658		>5.00
659		4.00
660		>5.00

661		0.060
662		0.300
663	15	
664	*有荧光	
665	0	
666		0.800
667	0	
668		4.8
669	10	
670		1.6
671		1.0
672		0.9
673	0	
674		0.08
675	49	
676		0.95
677	ND	
678	*有荧光	
679	ND	
680	14	
681		1.0
682		0.19
683	5	
684		
685		
686		ND
687		0.080
688	30	
689		0.120
690		0.29
691		0.125
692		2.00
693		0.059
695		0.410
697		0.600

698	55	
699		0.600
701		0.200
703		0.190
705		0.080
707		0.070
709		0.230
711		0.600
713		0.495
715		>2
717		0.200
719		0.800
720	ND	
722		0.130
723	ND	
724		0.105
725		0.100
726	26	
727		32
728		0.200
730		>5
731	1.0	
732		>5
734		>2
736	ND	
738	ND	
740		>5
741	ND	ND
742		0.140
743		0.040
744		0.068
745		0.123
746		0.240
747		0.110
748		0.210
749		0.330

750		0.180
751		0.195
752		0.130
753		0.059
754		0.050
755		0.140
756	ND	
757		0.205
760		0.325
761	ND	ND
764	ND	
765	ND	
766	ND	
767	ND	
768		>5
769	ND	
771		0.120
772		>5
773		0.390
774		0.200
775		1.80
776		0.310
778		2.00
779	43.00	
780		ND
781		ND
782		ND

*化合物在萤光素酶重折叠测定中有活性

ND-未确定