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(54) Title: TRIAZOLONE COMPOUNDS AND USES THEREOF

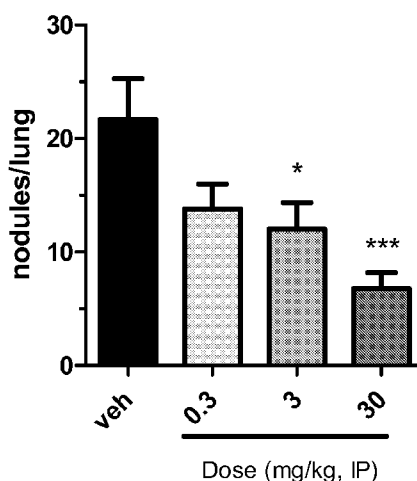


FIG. 1

(57) Abstract: The invention disclosed herein is directed to compounds of Formula (I) and pharmaceutically acceptable salts thereof, which are useful in the treatment of prostate, breast, colon, pancreatic, human chronic lymphocytic leukemia, melanoma and other cancers. The invention also comprises pharmaceutical compositions comprising a therapeutically effective amount of compound of Formula (I), or a pharmaceutically acceptable salt thereof. The invention disclosed herein is also directed to methods of treating prostate, breast, ovarian, liver, kidney, colon, pancreatic, human chronic lymphocytic leukemia, melanoma and other cancers. The invention disclosed herein is further directed to methods of treating prostate, breast, colon, pancreatic, chronic lymphocytic leukemia, melanoma and other cancers comprising administration of a of a therapeutically effective amount of a selective PPAR α antagonist. The compounds and pharmaceutical compositions of the invention are also useful in the treatment of viral infections, such as HCV infections and HIV infections. The invention disclosed herein is also directed to a methods of preventing the onset of and/or recurrence of acute and chronic myeloid leukemia, as well as other cancers, comprising administration of a of a therapeutically effective amount of a selective PPAR α antagonist.



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TRIAZOLONE COMPOUNDS AND USES THEREOF**RELATED APPLICATIONS**

[0001] This application claims the benefit of U.S. provisional patent application no. 61/608,961 entitled “TRIAZOLONES COMPOUNDS AND USES THEREOF” filed on March 9, 2012, which is incorporated by reference in its entirety.

FIELD OF THE INVENTION

[0002] This invention is directed to novel triazolones, or pharmaceutically acceptable salts thereof, useful in the treatment of prostate, breast, colon, pancreatic, human chronic lymphocytic leukemia, melanoma and other cancers. The invention disclosed herein is further directed to methods of treating prostate, breast, ovarian, liver, kidney, colon, pancreatic, human chronic lymphocytic leukemia, melanoma and other cancers comprising administration of selective PPAR α antagonists. The compounds and pharmaceutical compositions of the invention are also useful in the treatment of viral infections, such as HCV infections and HIV infections.

BACKGROUND OF THE INVENTION

[0003] While tremendous strides have been made in the treatment of various cancers, in many cases, cancer treatment continues to be a matter of administering one or more anti-cancer agents that are marginally less chemotoxic to healthy cells than they are to the cancer in question. In recognition of this problem, there has been substantial research effort aimed at identifying, understanding and taking advantage of phenotypical behavior peculiar to certain cancer cells. It has long been observed that most cancer cell types generate energy for cellular processes through aerobic glycolysis rather than through oxidative phosphorylation as found in the normal cell. This process, which became known as the “Warburg effect”, is highly energy inefficient and requires cancer cell mitochondria to resort to glucose fermentation to make up the energy deficit. Since perhaps the mid-1990’s researchers have sought to identify methods of treating cancer that take advantage of the “Warburg effect” and associated aspects of cancer cell mitochondrial metabolism. See, for example, Wang, *et. al.*, Small mitochondrial-targeting molecules as anti-cancer agents, *Mol. Aspects Med.* 2010 February; 31(1): 75-92.

[0004] Samudio, *et. al.*, *J. Clin. Invest.* 120: 142-156 (2010), disclosed that in certain leukemia cell lines “mitochondrial uncoupling – the continuing reduction of oxygen without ATP synthesis – has recently been shown in leukemic cells to circumvent the ability of oxygen to inhibit glycolysis, and may promote the metabolic preference for glycolysis by shifting from pyruvate oxidation to fatty acid oxidation (FAO).” Samudio, *et. al.*, also provided data indicating that inhibition of FAO could sensitize human leukemia cells to apoptosis, and further that inhibition of FAO may prove useful in the treatment of leukemia.

[0005] PPAR α is known to be an important regulator of fatty acid oxidation. See Pyper, *et. al.*, *Nucl. Recept. Signal.* 8:e002., e002 (2010). It has been reported that expression of the PPAR α gene can be higher

in human chronic lymphocytic leukemia (CLL) making this cancer type sensitive to therapies aimed at reducing FAO (Samudio *et al.*, J. Clin. Invest. 120:142–156 (2010)). This effect may generalize to several cancer types. For example, ovarian cancer and breast cancer (Linher-Melville *et al.*, 2011, BMC, 4;11:56), thrive in an adipose rich environment and as a result can be negatively impacted by targeted therapies that reduce fatty acid metabolism (Nieman *et al.*, 2011, Nat Med. 2011 Oct 30;17(11):1498-503). Still other cancers that rely on FAO include prostate cancer (Liu, Prostate Cancer Prostatic Dis., 2006; 9(3):230-4), colon cancer (Holla *et al.*, 2011, JCB 286(34):30003-30009), pancreatic cancer (Khasawneh *et al.*, 2009, PNAS, 106(9):3354-3359) and lung cancer (Zaugg *et al.*, 2011, Genes and Development, 25:1041-1051).

[0006] GW6471 (Xu, *et al.*, Nature 415, 813-817 (2002)) and MK-866 (Kehrer, *et al.*, Biochem. J. 356, 899-906 (2001)) have been identified as antagonists of PPAR α . Moreover, MK-866, whose primary activity is as an inhibitor of FLAP, has been disclosed to induce apoptosis in a human chronic lymphocytic leukemia cell line in a FLAP-independent manner; and has also been disclosed to induce apoptosis in prostate and glioblastoma cell lines.

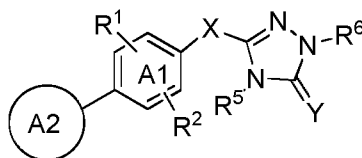
[0007] It is our belief that in cancers that rely heavily on FAO, antagonism of PPAR α by small molecules provides a panoply of anti-cancer treatment opportunities to: reduce or halt proliferation; decrease or reverse immunosuppression; enhance apoptosis; and increase susceptibility to other anti-cancer agents. These cancers include prostate, breast, colon and pancreatic cancer, among others.

[0008] Chronic myeloid leukemia (CML) is model of hematopoietic stem cell (HSC) disease. In 2008, Ito *et al.*, disclosed evidence linking the loss of promyelocytic leukemia (PML) gene expression with favorable outcomes in CML (Nature, 2008 June 19; 453 (7198) 1072-1078). More recently Ito *et al.*, disclosed that in the PML pathway, loss of PPAR δ and accompanying inhibition of mitochondrial FAO induced loss of hematopoietic stem cell (HSC) maintenance (Nature Medicine, doi:10.1038/nm.2882). Moreover, Carracedo *et al.*, disclosed that whereas PML expression allowed luminal filling in 3D basement membrane breast cancer, the effect was reversed by inhibition of FAO (J. Clin. Invest. 2012;122(9):3088-3100). This and other evidence support our view that inhibition of fatty acid oxidation, via antagonism of PPAR's (including PPAR α), will prove effective in inhibiting leukemia stem cell differential, and therefore, prove effective in preventing the onset of and/or recurrence of acute and chronic myeloid leukemia, as well as other cancers.

[0009] PPAR α antagonists have also been shown to inhibit HCV replication and thereby prove useful in the treatment of HCV infection (Rakic, B. *et al.*, Chem. & Biol. 13, 23-30 (January 2006)). In some embodiments, PPAR modulators have been shown to inhibit viral transcription and replication and thereby prove useful in the treatment of viral diseases (Capeau *et al.*, PPAR Research Volume 2009, Article ID 393408, 2 pages). In some embodiments, PPAR α antagonists are useful in the treatment of HIV infection. PPAR α antagonists have also been disclosed to be useful in the treatment of metabolic disorders (WO2012/027482A2). Metabolic disorders include, but are not limited to diabetes, obesity, metabolic syndrome, impaired glucose tolerance, syndrome X, and cardiovascular disease.

SUMMARY OF THE INVENTION

[0010] The invention disclosed herein is directed to compounds of Formula I



I

and pharmaceutically acceptable salts thereof, which are useful in the treatment of prostate, breast, colon, pancreatic, human chronic lymphocytic leukemia, melanoma and other cancers. The invention also comprises pharmaceutical compositions comprising a therapeutically effective amount of compound of Formula I, or a pharmaceutically acceptable salt thereof. The invention disclosed herein is also directed to methods of treating prostate, breast, ovarian, liver, kidney, colon, pancreatic, human chronic lymphocytic leukemia, melanoma and other cancers. The invention disclosed herein is further directed to methods of treating prostate, breast, ovarian, liver, kidney, colon, pancreatic, human chronic lymphocytic leukemia, melanoma and other cancers comprising administration of a therapeutically effective amount of a selective PPAR α antagonist. The compounds and pharmaceutical compositions of the invention are also useful in the treatment of viral infections, such as HCV infections and HIV infections.

BRIEF DESCRIPTION OF THE DRAWINGS

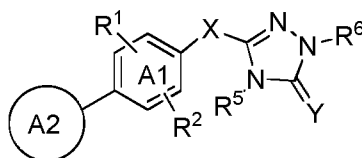
[0011] Figure 1 shows the ability of *N*-(6-(4-(3-(1-(4-(*tert*-butyl)benzyl)-4-ethyl-5-oxo-4,5-dihydro-1*H*-1,2,4-triazol-3-yl)propyl)phenyl)pyridin-3-yl)benzenesulfonamide (Example 10) to inhibit the metastasis of B16F10 melanoma cells to the lung.

INCORPORATION BY REFERENCE

[0012] All publications and patent applications mentioned in this specification are herein incorporated by reference to the same extent as if each individual publication or patent application was specifically and individually indicated to be incorporated by reference.

DETAILED DESCRIPTION OF THE INVENTION

[0013] In a first aspect the invention is directed to a compound of Formula I

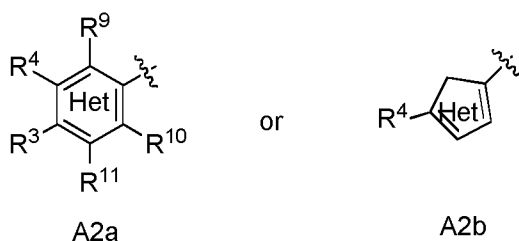


Formula I

or a pharmaceutical acceptable salt thereof wherein:

A1 is phenyl or a 6-membered heteroaromatic ring having 1, 2 or 3 N in the heteroaromatic ring;

A2 is selected from A2a or A2b



wherein A2a is phenyl or a 6-membered heteroaromatic ring having 1, 2 or 3 N in the heteroaromatic ring, and

A2b is a 5-membered heteroaromatic ring having 1, 2 or 3 heteroatoms independently selected from O, S and N;

X is selected from the group consisting of $-(CH_2)_m-$, $-(CH_2)_m-O-(CH_2)_n-$, $-(CH_2)_m-NH-(CH_2)_n-$, $-(CH_2)_m-S(=O)_o-(CH_2)_n-$, optionally mono- or di-substituted with halogen, wherein m and n are independently 0, 1, 2, 3 or 4, and each o is independently 0, 1 or 2;

Y is O or S;

R^1 and R^2 are each independently selected from the group consisting of:

- (a) hydrogen,
- (b) halogen,
- (c) CN,
- (d) $-CF_3$,
- (e) $-C_{1-6}$ alkyl,
- (f) $-C_{1-6}$ alkyl- $C(=O)OH$,
- (g) $-O-(R^7)$,
- (h) $-S(=O)_oR^7$,
- (i) $-N(R^7)(R^8)$,
- (j) $-N(R^7)-C(=O)-(R^8)$,
- (k) $-N(R^7)-C(=O)-O-(R^8)$,
- (l) $-N(R^7)S(=O)_2(R^8)$,
- (m) $-C_{3-6}$ cycloalkyl,
- (n) $-C(=O)(R^7)$,
- (o) aryl,
- (p) heteroaryl,
- (q) $-OC(=O)N(R^7)(R^8)$,
- (r) $-S(=O)_2N(R^7)(R^8)$,
- (s) $-C(=O)N(R^7)(R^8)$, and
- (t) $-C(R^7)(R^8)OH$,

wherein the alkyl portion of choices (e) and (f), and the cycloalkyl portion of choice (m) are optionally substituted with halogen, and

wherein the aryl of choice (o) and the heteroaryl of choice (p) are optionally mono- or di-substituted with substituents selected from the group consisting of halogen, nitro, C₁₋₆alkyl, C₁₋₆alkoxy, halo C₁₋₆alkyl, C₃₋₆cycloalkyl, C₃₋₆cycloalkoxy, -NH(C₁₋₆alkyl), -NH(C₃₋₆cycloalkyl), -N(C₁₋₆alkyl)₂, -N(C₃₋₆cycloalkyl)₂, -S(=O)_nC₁₋₆alkyl, -S(=O)_nC₃₋₆cycloalkyl, and CN;

R³ is selected from the group consisting of:

- (a) hydrogen,
- (b) halogen,
- (c) CN,
- (d) -CF₃,
- (e) -C₁₋₆alkyl,
- (f) -C₁₋₆alkyl-C(=O)OH,
- (g) -O-(R⁷),
- (h) -S(=O)_nR⁷,
- (i) -N(R⁷)(R⁸),
- (j) -N(R⁷)-C(=O)-(R⁸),
- (k) -N(R⁷)-C(=O)-O-(R⁸),
- (l) -N(R⁷)S(=O)₂(R⁸),
- (m) -C₃₋₆cycloalkyl,
- (n) -C(=O)(R⁷),
- (o) aryl,
- (p) heteroaryl,
- (q) -OC(=O)N(R⁷)(R⁸),
- (r) -S(=O)₂N(R⁷)(R⁸),
- (s) -C(=O)N(R⁷)(R⁸),
- (t) -C(R⁷)(R⁸)OH,
- (u) -C₁₋₆alkyl-S(=O)₂N(R⁷)(R⁸),
- (v) -C₃₋₆cycloalkyl-S(=O)₂N(R⁷)(R⁸),
- (w) -C₃₋₆cycloalkyl-C(=O)OH,
- (x) heterocycle,
- (y) -C₁₋₆alkyl-C(=O)-N(R⁷)(R⁸),
- (z) -C₃₋₆cycloalkyl-C(=O)-N(R⁷)(R⁸),
- (aa) -C(=O)OH,
- (bb) -C₁₋₆alkyl-(R⁷),
- (cc) -C₃₋₆cycloalkyl-(R⁷),
- (dd) -N(R⁷)-C(=O)-NH(R⁸), and
- (ee) -N(R⁷)-C(=O)N(R⁷)-S(=O)₂(R⁸),

wherein the alkyl portion of choices (e), (f), (u), (y) and (bb), and the cycloalkyl portion of choices (m), (v), (w), (z) and (cc) are optionally substituted with halogen, oxo or hydroxyl, and wherein the aryl of choice (o), heteroaryl of choice (p), and heterocycle of choice (x) are optionally mono- or di-substituted with substituents selected from the group consisting of halogen, nitro, C₁₋₆alkyl, C₁₋₆alkoxy, halo C₁₋₆alkyl, C₃₋₆cycloalkyl, C₃₋₆cycloalkoxy, -NH(C₁₋₆alkyl), -NH(C₃₋₆cycloalkyl), -N(C₁₋₆alkyl)₂, -N(C₃₋₆cycloalkyl)₂, -S(=O)_nC₁₋₆alkyl, -S(=O)_nC₃₋₆cycloalkyl, hydroxyl and CN;

R⁴ is selected from the group consisting of:

- (a) hydrogen,
- (b) -N(R⁷)(R⁸),
- (c) -N(R⁷)S(=O)₂R⁸,
- (d) -N(R⁷)-C(=O)R⁸,
- (e) -N(R⁷)C(=O)OR⁸,
- (f) -S(=O)_oR⁷,
- (g) -S(=O)₂N(R⁷)(R⁸),
- (h) -C(=O)R⁷,
- (i) -C(=O)N(R⁷)(R⁸),
- (j) -OC(=O)N(R⁷)(R⁸),
- (k) -O-R⁷,
- (l) -C(R⁷)(R⁸)OH,
- (m) -C₁₋₄alkyl-C(=O)NHS(=O)₂R⁷,
- (n) -C₁₋₄alkyl-S(=O)₂NHC(=O)R⁷,
- (o) -C₁₋₄alkyl-C(=O)-N(R⁷)(R⁸),
- (p) -C₁₋₄alkyl-N(R⁷)C(=O)(R⁸),
- (q) -C₁₋₄alkyl-N(R⁷)S(=O)₂(R⁸),
- (r) -C₁₋₄alkyl-S(=O)₂N(R⁷)(R⁸),
- (s) -C₁₋₄alkyl-N(R⁷)C(=O)O(R⁸),
- (t) -C₁₋₄alkyl-O-C(=O)N(R⁷)(R⁸),
- (u) -C₁₋₄alkyl-C(=O)(R⁷),
- (v) -C₁₋₄alkyl-C(R⁷)(R⁸)OH,
- (w) -C₁₋₄alkylO(R⁷),
- (x) -C₁₋₆alkyl-C(=O)OH,
- (y) -C₂₋₆alkenyl-C(=O)OH,
- (z) -C₃₋₆cycloalkyl-C(=O)OH,
- (aa) -C₃₋₆cycloalkyl-C(=O)NHS(=O)₂R⁷,
- (bb) -C₃₋₆cycloalkyl-S(=O)₂NHC(=O)R⁷,
- (cc) -C₃₋₆cycloalkyl-C(=O)-N(R⁷)(R⁸),
- (dd) -C₃₋₆cycloalkyl-N(R⁷)C(=O)(R⁸),

- (ee) $-C_{3-6}\text{cycloalkyl}-N(R^7)S(=O)_2(R^8)$,
- (ff) $-C_{3-6}\text{cycloalkyl}-S(=O)_2N(R^7)(R^8)$,
- (gg) $-C_{3-6}\text{cycloalkyl}-N(R^7)C(=O)O(R^8)$,
- (hh) $-C_{3-6}\text{cycloalkyl}-O-C(=O)N(R^7)(R^8)$,
- (ii) $-C_{3-6}\text{cycloalkyl}-C(=O)(R^7)$,
- (jj) $-C_{3-6}\text{cycloalkyl}-C(R^7)(R^8)OH$,
- (kk) $-C_{3-6}\text{cycloalkyl}O(R^7)$,
- (ll) $-C(=O)OH$,
- (mm) aryl,
- (nn) heteroaryl,
- (oo) $-C(=O)N(R^7)S(=O)_2(R^8)$,
- (pp) $-S(=O)_2N(R^7)C(=O)(R^8)$,
- (qq) $-C_{1-4}\text{alkyl}-R^7$,
- (rr) $-C_{3-6}\text{cycloalkyl}-R^7$
- (ss) $-N(R^7)S(=O)_2N(R^8)_2$,
- (tt) $-N(R^7)-C(=O)N(R^7)-S(=O)_2(R^8)$,
- (uu) $-N(R^7)C(=O)NH(R^8)$, and
- (vv) heterocycle,

wherein the alkyl portion of choices (m), (n), (o), (p), (q), (r), (s), (t), (u), (v), (w), (x), and (qq), the alkenyl portion of choice (y), and the cycloalkyl portion of choices (z), (aa), (bb), (cc), (dd), (ee), (ff), (gg), (hh), (ii), (jj), (kk), and (rr) are optionally mono or di-substituted with halogen, $-C_{1-6}\text{alkyl}$, $-C_{3-6}\text{cycloalkyl}$, $-C_{1-6}\text{alkoxy}$, $-C_{3-6}\text{cycloalkoxy}$, aryl, $-C_{1-6}\text{alkylaryl}$, hydroxyl or oxo, and

wherein the aryl of choice (mm), the heteroaryl of choice (nn) and the heterocycle of choice (vv) are optionally mono- or di-substituted with substituents selected from the group consisting of halogen, nitro, $C_{1-6}\text{alkyl}$, $C_{1-6}\text{alkoxy}$, halo $C_{1-6}\text{alkyl}$, $C_{3-6}\text{cycloalkyl}$, $C_{3-6}\text{cycloalkoxy}$, $-NH(C_{1-6}\text{alkyl})$, $-NH(C_{3-6}\text{cycloalkyl})$, $-N(C_{1-6}\text{alkyl})_2$, $-N(C_{3-6}\text{cycloalkyl})_2$, $-S(=O)_n C_{1-6}\text{alkyl}$, $S(=O)_n C_{3-6}\text{cycloalkyl}$, hydroxyl and CN, or

wherein R^3 and R^4 are joined together to form a 5- or 6-membered heterocyclic ring, said ring having one heteroatom selected from O and N, wherein said ring is optionally substituted with $-C(=O)OH$ or $-C_{1-6}\text{alkyl}-C(=O)OH$, with the proviso that at least one of R^3 and R^4 is other than hydrogen;

R^5 is selected from the group consisting of:

- (a) hydrogen,
- (b) $-C_{1-6}\text{alkyl}$,
- (c) $-C_{1-4}\text{alkyl}(R^7)$,
- (d) $-C_{1-4}\text{alkyl}CN$,
- (e) $-C_{1-4}\text{alkyl}O(R^7)$,
- (f) aryl,
- (g) heteroaryl,

- (h) -C₃₋₆cycloalkyl,
- (i) -C₃₋₆cycloalkylCN,
- (j) -C₃₋₆cycloalkyl(R⁷),
- (k) -C₃₋₆cycloalkylO(R⁷), and
- (l) C₂₋₆alkenyl,

wherein the alkyl portion of choices (b), (c), (d) and (e), the cycloalkyl portion of choices (h), (i), (j) and (k), and the alkenyl portion of choice (l), are optionally substituted with halogen or C₁₋₄alkyl, and

wherein the aryl of choice (f) and the heteroaryl of choice (g), are optionally mono- or di-substituted with substituents selected from the group consisting of halogen, nitro, C₁₋₆alkyl, CF₃, C₁₋₆alkoxy, halo C₁₋₆alkyl, aryl, heteroaryl, C₃₋₆cycloalkyl, C₃₋₆cycloalkoxy, and CN;

R⁶ is selected from the group consisting of:

- (a) hydrogen,
- (b) -C₁₋₆alkyl,
- (c) -C₁₋₆alkylaryl,
- (d) -C₁₋₆alkylheteroaryl,
- (e) -S(=O)₀C₁₋₆alkyl(R⁷),
- (f) -C(=O)C₁₋₆alkyl(R⁷),
- (g) -C₃₋₆cycloalkyl,
- (h) aryl,
- (i) heteroaryl,
- (j) -C(=O)C₃₋₆cycloalkyl(R⁷),
- (k) -S(=O)₀C₃₋₆cycloalkyl(R⁷), and
- (l) -C₁₋₆alkyl(R⁷),

wherein the alkyl portion of choices (b), (c), (d), (e), (f), and (l), and the cycloalkyl portion of choices (g), (j), and (k), are optionally substituted with halogen or -C₁₋₄alkyl, and

wherein the aryl of choices (c) and (h), and the heteroaryl of choices (d) and (i), are optionally mono- or di-substituted with substituents selected from the group consisting of halogen, nitro, CF₃, C₁₋₆alkyl, C₁₋₆alkoxy, halo C₁₋₆alkyl, C₃₋₆cycloalkyl, C₃₋₆cycloalkoxy, aryl, heteroaryl, -NH(C₁₋₆alkyl), -NH(C₃₋₆cycloalkyl), -N(C₁₋₆alkyl)₂, -N(C₃₋₆cycloalkyl)₂, -S(=O)₀C₁₋₆alkyl, -S(=O)₀C₃₋₆cycloalkyl, (heterocyclyl optionally substituted with hydroxyl or halogen), and CN;

R⁷ and R⁸ are each independently selected from the following:

- (a) hydrogen,
- (b) -C₁₋₆alkyl,
- (c) -C₃₋₆cycloalkyl,
- (d) aryl,
- (e) heteroaryl,
- (f) -C₁₋₆alkylaryl,

- (g) -C₁₋₆alkylheteroaryl,
- (h) cyano,
- (i) -aryl-aryl,
- (j) -aryl-heteroaryl,
- (k) -NH₂,
- (l) -NH(C₁₋₃alkyl), and
- (m) -N(C₁₋₃alkyl)₂,

wherein the alkyl of choices (b), (f), (g), (l) and (m), and the cycloalkyl portion of (c), are each optionally mono-, di- or tri-substituted with halogen, hydroxyl, C₁₋₆alkyl, C₁₋₆alkoxy, C₃₋₆cycloalkyl or C₃₋₆cycloalkoxy, and

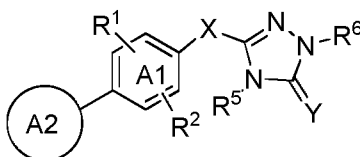
wherein the aryl portion of choices (d), (f), (i) and (j), and the heteroaryl portion of choices (e), (g) and (j), are each optionally mono- or di-substituted with substituents selected from the group consisting of halogen, nitro, C₁₋₆alkyl, C₁₋₆alkoxy, haloC₁₋₆alkyl, C₃₋₆cycloalkyl, C₃₋₆cycloalkoxy, -NH(C₁₋₃alkyl), -NH(C₃₋₆cycloalkyl), -N(C₁₋₃alkyl)₂, -N(C₃₋₆cycloalkyl)₂, -S(=O)₀C₁₋₄alkyl, -S(=O)₀C₃₋₆cycloalkyl, -C(=O)C₁₋₄alkyl, aryl, heteroaryl, -O-heteroaryl-CF₃, hydroxyl, -(C=O)OH, and CN;

R⁹, R¹⁰ and R¹¹ are each independently selected from the following:

- (a) hydrogen,
- (b) -C₁₋₆alkyl,
- (c) -C₃₋₆cycloalkyl,
- (d) halogen, and
- (e) -O-(R⁷),

wherein the alkyl of choice (b) and the cycloalkyl of choice (c) are each optionally mono-, di- or tri-substituted with halogen.

[0014] In a second aspect the invention is directed to a compound of Formula I

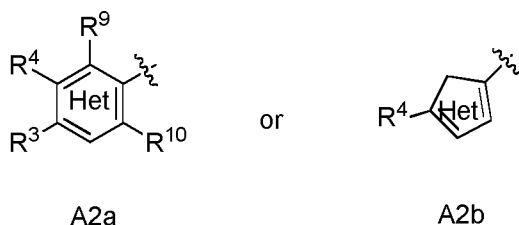


Formula I

or a pharmaceutical acceptable salt thereof wherein:

A1 is phenyl or a 6-membered heteroaromatic ring having 1, 2 or 3 N in the heteroaromatic ring;

A2 is selected from A2a or A2b



wherein A2a is phenyl or a 6-membered heteroaromatic ring having 1, 2 or 3 N in the heteroaromatic ring, and

A2b is a 5-membered heteroaromatic ring having 1, 2 or 3 heteroatoms independently selected from O, S and N;

X is selected from the group consisting of $-(CH_2)_m-$, $-(CH_2)_m-O-(CH_2)_n-$, $-(CH_2)_m-NH-(CH_2)_n-$, $-(CH_2)_m-S(=O)_o-(CH_2)_n-$ wherein m and n are independently 0, 1, 2, 3 or 4, and o is independently 0, 1 or 2;

Y is O or S;

R^1 and R^2 are each independently selected from the group consisting of:

- (a) hydrogen,
- (b) halogen,
- (c) CN,
- (d) $-CF_3$,
- (e) $-C_{1-6}alkyl$,
- (f) $-C_{1-6}alkyl-C(=O)OH$,
- (g) $-O-(R^7)$,
- (h) $-S(=O)_oR^7$,
- (i) $-N(R^7)(R^8)$,
- (j) $-N(R^7)-C(=O)-(R^8)$,
- (k) $-N(R^7)-C(=O)-O-(R^8)$,
- (l) $-N(R^7)S(=O)_2(R^8)$,
- (m) $-C_{3-6}cycloalkyl$,
- (n) $-C(=O)(R^7)$,
- (o) aryl,
- (p) heteroaryl,
- (r) $-OC(=O)N(R^7)(R^8)$,
- (q) $-S(=O)_2N(R^7)(R^8)$,
- (s) $-C(=O)N(R^7)(R^8)$, and
- (t) $-C(R^7)(R^8)OH$,

wherein the alkyl portion of choices (e) and (f), and the cycloalkyl portion of choice (m), are optionally substituted with halogen, and

wherein the aryl of choices (o) and heteroaryl of choice (p) are optionally mono- or di-substituted with substituents selected from the group consisting of halogen, nitro, $C_{1-6}alkyl$, $C_{1-6}alkoxy$, halo $C_{1-6}alkyl$, $C_{3-6}cycloalkyl$, $C_{3-6}cycloalkoxy$, $-NH(C_{1-6}alkyl)$, $-NH(C_{3-6}cycloalkyl)$, $-N(C_{1-6}alkyl)_2$, $-N(C_{3-6}cycloalkyl)_2$, $-S(=O)_nC_{1-6}alkyl$, $-S(=O)_nC_{3-6}cycloalkyl$ and CN;

R^3 is selected from the group consisting of:

- (a) hydrogen,
- (b) halogen,

- (c) CN,
- (d) -CF₃,
- (e) -C₁₋₆alkyl,
- (f) -C₁₋₆alkyl-C(=O)OH,
- (g) -O-(R⁷),
- (h) -S(=O)₆R⁷,
- (i) -N(R⁷)(R⁸),
- (j) -N(R⁷)-C(=O)-(R⁸),
- (k) -N(R⁷)-C(=O)-O-(R⁸),
- (l) -N(R⁷)S(=O)₂(R⁸),
- (m) -C₃₋₆cycloalkyl,
- (n) -C(=O)(R⁷),
- (o) aryl,
- (p) heteroaryl,
- (q) -OC(=O)N(R⁷)(R⁸),
- (r) -S(=O)₂N(R⁷)(R⁸),
- (s) -C(=O)N(R⁷)(R⁸), and
- (t) -C(R⁷)(R⁸)OH,

wherein the alkyl portion of choices (e) and (f), and the cycloalkyl portion of choice (m), are optionally substituted with halogen, and

wherein the aryl of choice (o) and heteroaryl of choice (p) are optionally mono- or di-substituted with substituents selected from the group consisting of halogen, nitro, C₁₋₆alkyl, C₁₋₆alkoxy, halo C₁₋₆alkyl, C₃₋₆cycloalkyl, C₃₋₆cycloalkoxy, -NH(C₁₋₆alkyl), -NH(C₃₋₆cycloalkyl), -N(C₁₋₆alkyl)₂, -N(C₃₋₆cycloalkyl)₂, -S(=O)_nC₁₋₆alkyl, -S(=O)_nC₃₋₆cycloalkyl and CN;

R⁴ is selected from the group consisting of:

- (a) hydrogen,
- (b) -N(R⁷)(R⁸),
- (c) -N(R⁷)S(=O)₂R⁸,
- (d) -N(R⁷)-C(=O)R⁸,
- (e) -N(R⁷)C(=O)OR⁸,
- (f) -S(=O)₆R⁷,
- (g) -S(=O)₂N(R⁷)(R⁸),
- (h) -C(=O)R⁷,
- (i) -C(=O)N(R⁷)(R⁸),
- (j) -OC(=O)N(R⁷)(R⁸),
- (k) -O-R⁷,
- (l) -C(R⁷)(R⁸)OH,

- (m) $-C_{1-4}\text{alkyl}-C(=O)NHS(=O)_2R^7$,
- (n) $-C_{1-4}\text{alkyl}-S(=O)_2NHC(=O)R^7$,
- (o) $-C_{1-4}\text{alkyl}-C(=O)-N(R^7)(R^8)$,
- (p) $-C_{1-4}\text{alkyl}-N(R^7)C(=O)(R^8)$,
- (q) $-C_{1-4}\text{alkyl}-N(R^7)S(=O)_2(R^8)$,
- (r) $-C_{1-4}\text{alkyl}-S(=O)_2N(R^7)(R^8)$,
- (s) $-C_{1-4}\text{alkyl}-N(R^7)C(=O)O(R^8)$,
- (t) $-C_{1-4}\text{alkyl}-O-C(=O)N(R^7)(R^8)$,
- (u) $-C_{1-4}\text{alkyl}-C(=O)(R^7)$,
- (v) $-C_{1-4}\text{alkyl}-C(R^7)(R^8)OH$,
- (w) $-C_{1-4}\text{alkyl}O(R^7)$,
- (x) $-C_{1-6}\text{alkyl}-C(=O)OH$,
- (y) $-C_{2-6}\text{alkenyl}-C(=O)OH$,
- (z) $-C_{3-6}\text{cycloalkyl}-C(=O)OH$,
- (aa) $-C_{3-6}\text{cycloalkyl}-C(=O)NHS(=O)_2R^7$,
- (bb) $-C_{3-6}\text{cycloalkyl}-S(=O)_2NHC(=O)R^7$,
- (cc) $-C_{3-6}\text{cycloalkyl}-C(=O)-N(R^7)(R^8)$,
- (dd) $-C_{3-6}\text{cycloalkyl}-N(R^7)C(=O)(R^8)$,
- (ee) $-C_{3-6}\text{cycloalkyl}-N(R^7)S(=O)_2(R^8)$,
- (ff) $-C_{3-6}\text{cycloalkyl}-S(=O)_2N(R^7)(R^8)$,
- (gg) $-C_{3-6}\text{cycloalkyl}-N(R^7)C(=O)O(R^8)$,
- (hh) $-C_{3-6}\text{cycloalkyl}-O-C(=O)N(R^7)(R^8)$,
- (ii) $-C_{3-6}\text{cycloalkyl}-C(=O)(R^7)$,
- (jj) $-C_{3-6}\text{cycloalkyl}-C(R^7)(R^8)OH$,
- (kk) $-C_{3-6}\text{cycloalkyl}O(R^7)$,
- (ll) $-C(=O)OH$,
- (mm) aryl,
- (nn) heteroaryl,
- (oo) $-C(=O)N(R^7)S(=O)_2(R^8)$, and
- (pp) $-S(=O)_2N(R^7)C(=O)(R^8)$,

wherein the alkyl portion of choices (m), (n), (o), (p), (q), (r), (s), (t), (u), (v), (w) and (x), the alkenyl portion of choice (y), and the cycloalkyl portion of choices (z), (aa), (bb), (cc), (dd), (ee), (ff), (gg), (hh), (ii), (jj) and (kk), are optionally mono- or di-substituted with halo, C_{1-6} alkyl, C_{3-6} cycloalkyl, C_{1-6} alkoxy, or C_{3-6} cycloalkoxy, and

wherein the aryl of choice (mm) and the heteroaryl of choice (nn) are optionally mono- or di-substituted with substituents selected from the group consisting of halogen, nitro, C_{1-6} alkyl, C_{1-6} alkoxy, halo C_{1-6} alkyl,

C₃₋₆cycloalkyl, C₃₋₆cycloalkoxy, -NH(C₁₋₆alkyl), -NH(C₃₋₆cycloalkyl), -N(C₁₋₆alkyl)₂, -N(C₃₋₆cycloalkyl)₂, -S(=O)_nC₁₋₆alkyl, -S(=O)_nC₃₋₆cycloalkyl and CN;

with the proviso that at least one of R³ and R⁴ is other than hydrogen;

R⁵ is selected from the group consisting of:

- (a) hydrogen,
- (b) -C₁₋₆alkyl,
- (c) -C₁₋₄alkyl(R⁷),
- (d) -C₁₋₄alkylCN,
- (e) -C₁₋₄alkylO(R⁷),
- (f) aryl,
- (g) heteroaryl,
- (h) -C₃₋₆cycloalkyl,
- (i) -C₃₋₆cycloalkylCN,
- (j) -C₃₋₆cycloalkyl(R⁷), and
- (k) -C₃₋₆cycloalkylO(R⁷),

wherein the alkyl portion of choices (b), (c), (d) and (e), and the cycloalkyl portion of choices (h), (i), (j) and (k), are optionally substituted with halogen or C₁₋₄alkyl, and

wherein the aryl of choice (f) and the heteroaryl of choice (g), are optionally mono- or di-substituted with substituents selected from the group consisting of halogen, nitro, C₁₋₆alkyl, CF₃, C₁₋₆alkoxy, halo C₁₋₆alkyl, aryl, heteroaryl, C₃₋₆cycloalkyl, C₃₋₆cycloalkoxy, and CN;

R⁶ is selected from the group consisting of:

- (a) hydrogen,
- (b) -C₁₋₆alkyl,
- (c) -C₁₋₆alkylaryl,
- (d) -C₁₋₆alkylheteroaryl,
- (e) -S(=O)₆C₁₋₆alkyl(R⁷),
- (f) -C(=O)C₁₋₆alkyl(R⁷),
- (g) -C₃₋₆cycloalkyl,
- (h) aryl,
- (i) heteroaryl,
- (j) -C(O)C₃₋₆cycloalkyl(R⁷),
- (k) -S(=O)₆C₃₋₆cycloalkyl(R⁷), and
- (l) -C₁₋₆alkyl(R⁷),

wherein the alkyl portion of choices (b), (c), (d), (e), (f), and (l), and the cycloalkyl portion of choices (g), (j), and (k), are optionally substituted with halogen or C₁₋₄alkyl, and

wherein the aryl of choices (c) and (h), and the heteroaryl of choices (d) and (i), are optionally mono- or di-substituted with substituents selected from the group consisting of halogen, nitro, CF₃, C₁₋₆alkyl, C₁₋₆alkoxy,

halo C₁₋₆alkyl, C₃₋₆cycloalkyl, C₃₋₆cycloalkoxy, aryl, heteroaryl, -NH(C₁₋₆alkyl), -NH(C₃₋₆cycloalkyl), -N(C₁₋₆alkyl)₂, -N(C₃₋₆cycloalkyl)₂, -S(=O)₀C₁₋₆alkyl, -S(=O)₀C₃₋₆cycloalkyl, and CN;

R⁷ and R⁸ are each independently selected from the following:

- (a) hydrogen,
- (b) -C₁₋₆alkyl,
- (c) -C₃₋₆cycloalkyl,
- (d) aryl,
- (e) heteroaryl,
- (f) -C₁₋₆alkylaryl, and
- (g) -C₁₋₆alkylheteroaryl,

wherein the alkyl of choices (b), (f) and (g), and the cycloalkyl portion of (c), are each optionally mono-, di- or tri-substituted with halogen, and

wherein the aryl portion of choices (d) and (f), and the heteroaryl portion of choices (e) and (g), are each optionally mono- or di-substituted with substituents selected from the group consisting of halogen, nitro, C₁₋₆alkyl, C₁₋₆alkoxy, haloC₁₋₆alkyl, C₃₋₆cycloalkyl, C₃₋₆cycloalkoxy, -NH(C₁₋₃alkyl), -NH(C₃₋₆cycloalkyl), -N(C₁₋₃alkyl)₂, -N(C₃₋₆cycloalkyl)₂, -S(=O)₀C₁₋₄alkyl, -S(=O)₀C₃₋₆cycloalkyl, aryl, heteroaryl, hydroxyl and CN;

R⁹ and R¹⁰ are each independently selected from the group consisting of:

- (a) hydrogen,
- (b) -C₁₋₆alkyl,
- (c) -C₃₋₆cycloalkyl, and
- (d) halogen,

wherein the alkyl of choice (b) and the cycloalkyl of choice (c), are each optionally mono-, di- or tri-substituted with halogen.

[0015] Within the first and second aspect there is a genus wherein X is selected from the group consisting of -(CH₂)_m-, and -(CH₂)_m-S(=O)_o-(CH₂)_n-, where m + n is 2, 3 or 4 and wherein o is 0, 1 or 2.

[0016] Within this genus there is a subgenus wherein X is -CH₂CH₂CH₂-.

[0017] Within first and second aspect there is a genus wherein A1 is a substituted phenyl or substituted pyridine.

[0018] Within the first and second aspect there is a genus wherein A2 is A2a.

[0019] Within this genus there is a subgenus wherein A2a is a substituted phenyl, or substituted pyridine.

[0020] Within the first and second aspect there is a genus wherein Y is O.

[0021] Within the first and second aspect there is a genus wherein

R¹ and R² are each independently selected from the group consisting of:

- (a) hydrogen,
- (b) halogen,
- (c) CN,

- (d) CF_3 ,
- (e) $\text{C}_{1-6}\text{alkyl}$,
- (g) $-\text{O}-(\text{R}^7)$, and
- (h) $-\text{N}(\text{R}^7)(\text{R}^8)$,

wherein the alkyl portion of choice (e), is optionally substituted with halogen.

[0022] Within this genus there is a subgenus wherein R^1 and R^2 are each hydrogen.

[0023] Within the first and second aspect there is a genus wherein R^3 is selected from the group consisting of:

- (a) $-\text{O}-(\text{R}^7)$,
- (b) $-\text{N}(\text{R}^7)-\text{C}(=\text{O})-\text{O}-(\text{R}^8)$,
- (c) $-\text{N}(\text{R}^7)\text{S}(=\text{O})_2(\text{R}^8)$,
- (d) $-\text{C}(=\text{O})(\text{R}^7)$,
- (e) aryl,
- (f) heteroaryl,
- (g) $-\text{OC}(=\text{O})\text{N}(\text{R}^7)(\text{R}^8)$,
- (h) $-\text{C}(\text{R}^7)(\text{R}^8)\text{OH}$, and
- (i) hydrogen

wherein the aryl of choice (e) and the heteroaryl of choice (f) are optionally mono- or di-substituted with substituents selected from the group consisting of halogen, nitro, $\text{C}_{1-6}\text{alkyl}$, $\text{C}_{1-6}\text{alkoxy}$, halo $\text{C}_{1-6}\text{alkyl}$, $\text{C}_{3-6}\text{cycloalkyl}$, $\text{C}_{3-6}\text{cycloalkoxy}$, $-\text{NH}(\text{C}_{1-6}\text{alkyl})$, $-\text{NH}(\text{C}_{3-6}\text{cycloalkyl})$, $-\text{N}(\text{C}_{1-6}\text{alkyl})_2$, $-\text{N}(\text{C}_{3-6}\text{cycloalkyl})_2$, $-\text{S}(=\text{O})_o\text{C}_{1-6}\text{alkyl}$, $-\text{S}(=\text{O})_o\text{C}_{3-6}\text{cycloalkyl}$, and CN.

[0024] Within this genus there is a subgenus wherein R^3 is selected from the group consisting of:

- (a) hydrogen
- (b) $-\text{O}-(\text{R}^7)$, and
- (c) $-\text{N}(\text{R}^7)\text{S}(=\text{O})_2(\text{R}^8)$.

[0025] Within the second aspect there is a genus wherein R^3 is selected from the group consisting of:

- (a) $-\text{O}-(\text{R}^7)$,
- (b) $-\text{N}(\text{R}^7)-\text{C}(=\text{O})-\text{O}-(\text{R}^8)$,
- (c) $-\text{N}(\text{R}^7)\text{S}(=\text{O})_2(\text{R}^8)$,
- (d) $-\text{C}(=\text{O})(\text{R}^7)$,
- (e) aryl,
- (f) heteroaryl,
- (g) $-\text{OC}(=\text{O})\text{N}(\text{R}^7)(\text{R}^8)$, and
- (h) $-\text{C}(\text{R}^7)(\text{R}^8)\text{OH}$,

wherein the aryl of choice (e) and the heteroaryl of choice (f) are optionally mono- or di-substituted with substituents selected from the group consisting of halogen, nitro, $\text{C}_{1-6}\text{alkyl}$, $\text{C}_{1-6}\text{alkoxy}$, halo $\text{C}_{1-6}\text{alkyl}$, $\text{C}_{3-6}\text{cycloalkyl}$, $\text{C}_{3-6}\text{cycloalkoxy}$, $-\text{NH}(\text{C}_{1-6}\text{alkyl})$, $-\text{NH}(\text{C}_{3-6}\text{cycloalkyl})$, $-\text{N}(\text{C}_{1-6}\text{alkyl})_2$, $-\text{N}(\text{C}_{3-6}\text{cycloalkyl})_2$, $-\text{S}(=\text{O})_o\text{C}_{1-6}\text{alkyl}$, $-\text{S}(=\text{O})_o\text{C}_{3-6}\text{cycloalkyl}$, and CN.

alkyl, C₃₋₆cycloalkyl, C₃₋₆cycloalkoxy, -NH(C₁₋₆alkyl), -NH(C₃₋₆cycloalkyl), -N(C₁₋₆alkyl)₂, -N(C₃₋₆cycloalkyl)₂, -S(=O)₂C₁₋₆alkyl, -S(=O)₂C₃₋₆cycloalkyl, and CN.

[0026] Within the first and second aspect there is a genus wherein R⁴ is selected from the group consisting of:

- (a) hydrogen,
- (b) -N(R⁷)(R⁸),
- (c) N(R⁷)S(=O)₂R⁸,
- (d) -S(=O)₂N(R⁷)(R⁸),
- (e) -C(=O)N(R⁷)(R⁸),
- (f) -C₁₋₄alkyl-C(=O)NHS(=O)₂R⁷,
- (g) -C₁₋₄alkyl-S(=O)₂NHC(=O)R⁷,
- (h) -C₁₋₄alkyl-C(=O)-N(R⁷)(R⁸),
- (i) -C₁₋₄alkyl-N(R⁷)S(=O)₂(R⁸),
- (j) -C₁₋₄alkyl-S(=O)₂N(R⁷)(R⁸),
- (k) -C₁₋₆alkyl-C(=O)OH,
- (l) -C₃₋₆cycloalkyl-C(=O)OH,
- (m) -C₃₋₆cycloalkyl-C(=O)NHS(=O)₂R⁷,
- (n) -C₃₋₆cycloalkyl-S(=O)₂NHC(=O)R⁷,
- (o) -C₃₋₆cycloalkyl-C(=O)-N(R⁷)(R⁸),
- (p) -C₃₋₆cycloalkyl-N(R⁷)C(=O)(R⁸),
- (q) -C₃₋₆cycloalkyl-N(R⁷)S(=O)₂(R⁸),
- (r) -C₃₋₆cycloalkyl-S(=O)₂N(R⁷)(R⁸),
- (s) -C(=O)OH,
- (t) -C(=O)NR⁷S(=O)₂(R⁸),
- (u) -C₁₋₄alkyl-N(R⁷)-C(=O)R⁸, and
- (v) -S(=O)₂N(R⁷)C(=O)R⁸,

wherein the alkyl portion of choices (f), (g), (h), (i), (j), (k) and (u), and the cycloalkyl portion of choices (l), (m), (n), (o), (p), (q) and (r), are optionally mono- or di-substituted with halogen, C₁₋₆alkyl, C₃₋₆cycloalkyl, C₁₋₆alkoxy, or C₃₋₆cycloalkoxy.

[0027] Within this genus there is a subgenus wherein R⁴ is selected from the group consisting of:

- (a) hydrogen,
- (b) -N(R⁷)S(=O)₂R⁸,
- (c) -C₁₋₆alkyl-C(=O)OH,
- (d) -C₃₋₆cycloalkyl-C(=O)OH,
- (e) -C(=O)OH,
- (f) -C(=O)N(R⁷)S(=O)₂(R⁸), and
- (g) -S(=O)₂N(R⁷)C(=O)R⁸,

wherein the alkyl portion of choice (c) and the cycloalkyl portion of choice (d), are optionally mono- or di-substituted with halogen, C₁₋₆alkyl, C₃₋₆cycloalkyl, C₁₋₆alkoxy, or C₃₋₆cycloalkoxy.

[0028] Within the first and second aspect there is a genus wherein R⁵ is C₁₋₆alkyl, optionally substituted with halogen or C₁₋₄alkyl.

[0029] Within the first and second aspect there is a genus wherein R⁶ is selected from the group consisting of:

- (a) -C₁₋₆alkylaryl,
- (b) -C₁₋₆alkylheteroaryl, and
- (c) -C₃₋₆cycloalkyl,

wherein the alkyl portion of choices (a) and (b), and the cycloalkyl portion of choice (c), are optionally substituted with halogen or C₁₋₄alkyl, and the aryl portion of choice (a) and the heteroaryl portion of choice (b), are optionally mono- or di-substituted with substituents selected from the group consisting of halogen, nitro, CF₃, C₁₋₆alkyl, C₁₋₆alkoxy, halo C₁₋₆alkyl, C₃₋₆cycloalkyl, C₃₋₆cycloalkoxy, aryl, heteroaryl, -NH(C₁₋₆alkyl), -NH(C₃₋₆cycloalkyl), -N(C₁₋₆alkyl)₂, -N(C₃₋₆cycloalkyl)₂, -S(=O)_oC₁₋₆alkyl, -S(=O)_oC₃₋₆cycloalkyl and CN.

[0030] Within this genus there is a subgenus wherein R⁶ is selected from the group consisting of:

- (a) -C₁₋₆alkylaryl, and
- (b) -C₁₋₆alkylheteroaryl,

wherein the alkyl portion of choices (a) and (b), is optionally substituted with halogen or C₁₋₄alkyl, and the aryl portion of choice (a) and the heteroaryl portion of choice (b), are optionally mono- or di-substituted with substituents selected from the group consisting of halogen, nitro, CF₃, C₁₋₆alkyl, C₁₋₆alkoxy, halo C₁₋₆alkyl, C₃₋₆cycloalkyl, C₃₋₆cycloalkoxy, aryl, heteroaryl, -NH(C₁₋₆alkyl), -NH(C₃₋₆cycloalkyl), -N(C₁₋₆alkyl)₂, -N(C₃₋₆cycloalkyl)₂, -S(=O)_oC₁₋₆alkyl, -S(=O)_oC₃₋₆cycloalkyl and CN.

[0031] Within the first and second aspect there is a genus wherein R⁷ is selected from hydrogen and C₁₋₄alkyl optionally substituted with halogen; and R⁸ is selected from hydrogen, C₁₋₄alkyl optionally substituted with halogen, and aryl optionally mono- or di-substituted with substituents selected from the group consisting of halogen, nitro, C₁₋₆alkyl, C₁₋₆alkoxy, halo C₁₋₆alkyl, C₃₋₆cycloalkyl, C₃₋₆cycloalkoxy, -NH(C₁₋₃alkyl), -NH(C₃₋₆cycloalkyl), -N(C₁₋₃alkyl)₂, -N(C₃₋₆cycloalkyl)₂, -S(=O)_oC₁₋₄alkyl, -S(=O)_oC₃₋₆cycloalkyl, aryl, heteroaryl, hydroxyl and CN.

[0032] Within the first and second aspect there is a genus wherein R⁹ and R¹⁰ are each independently hydrogen or F.

[0033] Within this genus there is a subgenus wherein X is selected from the group consisting of -(CH₂)_m-, and -(CH₂)_m-S(=O)_o-(CH₂)_n-, where m + n is 2, 3 or 4 and wherein o is 0, 1 or 2;

Y is O or S; A1 is a substituted phenyl or substituted pyridine;

A2 is A2a;

R¹ and R² are each independently selected from the group consisting of:

- (a) hydrogen,

- (b) halogen,
- (c) CN,
- (d) CF₃,
- (e) C₁₋₆alkyl,
- (g) -O-(R⁷), and
- (h) -N(R⁷)(R⁸),

wherein the alkyl portion of choice (e) is optionally substituted with halogen;

R³ is selected from the group consisting of:

- (a) -O-(R⁷),
- (b) -N(R⁷)-C(=O)-O-(R⁸),
- (c) -N(R⁷)S(=O)₂(R⁸),
- (d) -C(=O)(R⁷),
- (e) aryl,
- (f) heteroaryl,
- (g) -OC(=O)N(R⁷)(R⁸),
- (h) -C(R⁷)(R⁸)OH, and
- (i) hydrogen

wherein aryl of choice (e) and heteroaryl of choice (f) are optionally mono- or di-substituted with substituents selected from the group consisting of halogen, nitro, C₁₋₆alkyl, C₁₋₆alkoxy, halo C₁₋₆alkyl, C₃₋₆cycloalkyl, C₃₋₆cycloalkoxy, -NH(C₁₋₆alkyl), -NH(C₃₋₆cycloalkyl), -N(C₁₋₆alkyl)₂, -N(C₃₋₆cycloalkyl)₂, -S(=O)₂C₁₋₆alkyl, -S(=O)₂C₃₋₆cycloalkyl and CN;

R⁴ is selected from the group consisting of:

- (a) hydrogen,
- (b) -N(R⁷)(R⁸),
- (c) -N(R⁷)S(=O)₂R⁸,
- (d) -S(=O)₂N(R⁷)(R⁸),
- (e) -C(=O)N(R⁷)(R⁸),
- (f) -C₁₋₄alkyl-C(=O)NHS(=O)₂R⁷,
- (g) -C₁₋₄alkyl-S(=O)₂NHC(=O)R⁷,
- (h) -C₁₋₄alkyl-C(=O)-N(R⁷)(R⁸),
- (i) -C₁₋₄alkyl-N(R⁷)S(=O)₂(R⁸),
- (j) -C₁₋₄alkyl-S(=O)₂N(R⁷)(R⁸),
- (k) -C₁₋₆alkyl-C(=O)OH,
- (l) -C₃₋₆cycloalkyl-C(=O)OH,
- (m) -C₃₋₆cycloalkyl-C(=O)NHS(=O)₂R⁷,
- (n) -C₃₋₆cycloalkyl-S(=O)₂NHC(=O)R⁷,
- (o) -C₃₋₆cycloalkyl-C(=O)-N(R⁷)(R⁸),

- (p) $-C_{3-6}\text{cycloalkyl}-N(R^7)C(=O)(R^8)$
- (q) $-C_{3-6}\text{cycloalkyl}-N(R^7)S(=O)_2(R^8)$,
- (r) $-C_{3-6}\text{cycloalkyl}-S(=O)_2N(R^7)(R^8)$,
- (s) $-C(=O)OH$,
- (t) $-C(=O)N(R^7)S(=O)_2(R^8)$,
- (u) $-C_{1-4}\text{alkyl}-N(R^7)-C(=O)R^8$, and
- (v) $-S(=O)_2N(R^7)C(=O)R^8$,

wherein the alkyl portion of choices (f), (g), (h), (i), (j), (k) and (u), and the cycloalkyl portion of choices (l), (m), (n), (o), (p), (q) and (r), are optionally mono- or di-substituted with halogen, $C_{1-6}\text{alkyl}$, $C_{3-6}\text{cycloalkyl}$, $C_{1-6}\text{alkoxy}$, or $C_{3-6}\text{cycloalkoxy}$;

R^5 is $C_{1-6}\text{alkyl}$, optionally substituted with halogen or $C_{1-4}\text{alkyl}$;

R^6 is selected from the group consisting of:

- (a) $-C_{1-6}\text{alkylaryl}$,
- (b) $-C_{1-6}\text{alkylheteroaryl}$, and
- (c) $-C_{3-6}\text{cycloalkyl}$,

wherein the alkyl portion of choices (a) and (b), and the cycloalkyl portion of choice (c), are optionally substituted with halogen or $C_{1-4}\text{alkyl}$, and the aryl portion of choice (a) and the heteroaryl portion of choice (b), is optionally mono- or di-substituted with substituents selected from the group consisting of halogen, nitro, CF_3 , $C_{1-6}\text{alkyl}$, $C_{1-6}\text{alkoxy}$, halo $C_{1-6}\text{alkyl}$, $C_{3-6}\text{cycloalkyl}$, $C_{3-6}\text{cycloalkoxy}$, aryl, heteroaryl, $-NH(C_{1-6}\text{alkyl})$, $-NH(C_{3-6}\text{cycloalkyl})$, $-N(C_{1-6}\text{alkyl})_2$, $-N(C_{3-6}\text{cycloalkyl})_2$, $-S(=O)_oC_{1-6}\text{alkyl}$, $S(=O)_oC_{3-6}\text{cycloalkyl}$ and CN;

R^7 is selected from hydrogen and $C_{1-4}\text{alkyl}$ optionally substituted with halogen;

R^8 is selected from hydrogen, $C_{1-4}\text{alkyl}$ optionally substituted with halogen, and aryl optionally mono- or di-substituted with substituents selected from the group consisting of halogen, nitro, $C_{1-6}\text{alkyl}$, $C_{1-6}\text{alkoxy}$, halo $C_{1-6}\text{alkyl}$, $C_{3-6}\text{cycloalkyl}$, $C_{3-6}\text{cycloalkoxy}$, $-NH(C_{1-3}\text{alkyl})$, $-NH(C_{3-6}\text{cycloalkyl})$, $-N(C_{1-3}\text{alkyl})_2$, $-N(C_{3-6}\text{cycloalkyl})_2$, $-S(=O)_oC_{1-4}\text{alkyl}$, $-S(=O)_oC_{3-6}\text{cycloalkyl}$, aryl, heteroaryl, hydroxyl and CN;

and

R^9 and R^{10} are each independently hydrogen or F.

[0034] Within this subgenus there is a class wherein

X is $-CH_2CH_2CH_2-$;

Y is O;

A1 is a substituted phenyl or substituted pyridine;

A2 is A2a, and A2a is a substituted phenyl, or substituted pyridine;

R^1 and R^2 are each hydrogen;

R^3 is selected from the group consisting of:

- (a) hydrogen,
- (b) $-O-(R^7)$, and

(c) $-N(R^7)S(=O)_2(R^8)$;

R^4 is selected from the group consisting of:

- (a) hydrogen,
- (b) $-N(R^7)S(=O)_2R^8$,
- (c) $-C_{1-6}alkyl-C(=O)OH$,
- (d) $-C_{3-6}cycloalkyl-C(=O)OH$,
- (e) $-C(=O)OH$,
- (f) $-C(=O)N(R^7)S(=O)_2(R^8)$, and
- (g) $-S(=O)_2N(R^7)C(=O)R^8$,

wherein the alkyl portion of choice (c) and the cycloalkyl portion of choice (d), are optionally mono- or di-substituted with halogen, $C_{1-6}alkyl$, $C_{3-6}cycloalkyl$, $C_{1-6}alkoxy$, or $C_{3-6}cycloalkoxy$;

R^5 is $C_{1-6}alkyl$, optionally substituted with halogen or $C_{1-4}alkyl$;

R^6 is selected from the group consisting of:

- (a) $-C_{1-6}alkylaryl$, and
- (b) $-C_{1-6}alkylheteroaryl$,

wherein the alkyl portion of choices (a) and (b) are optionally substituted with halogen or $C_{1-4}alkyl$, and the aryl portion of choice (a) and the heteroaryl portion of choice (b), are optionally mono- or di-substituted with substituents selected from the group consisting of halogen, nitro, CF_3 , $C_{1-6}alkyl$, $C_{1-6}alkoxy$, halo $C_{1-6}alkyl$, $C_{3-6}cycloalkyl$, $C_{3-6}cycloalkoxy$, aryl, heteroaryl, $-NH(C_{1-6}alkyl)$, $-NH(C_{3-6}cycloalkyl)$, $-N(C_{1-6}alkyl)_2$, $-N(C_{3-6}cycloalkyl)_2$, $-S(=O)_oC_{1-6}alkyl$, $S(=O)_oC_{3-6}cycloalkyl$ and CN;

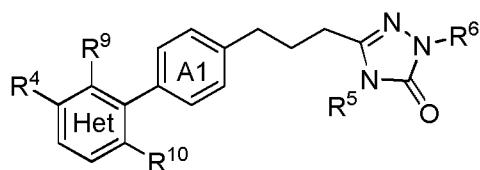
R^7 is selected from hydrogen and $C_{1-4}alkyl$ optionally substituted with halogen;

R^8 is selected from hydrogen, $C_{1-4}alkyl$ optionally substituted with halogen, and aryl optionally mono- or di-substituted with substituents selected from the group consisting of halogen, nitro, $C_{1-6}alkyl$, $C_{1-6}alkoxy$, halo $C_{1-6}alkyl$, $C_{3-6}cycloalkyl$, $C_{3-6}cycloalkoxy$, $-NH(C_{1-3}alkyl)$, $-NH(C_{3-6}cycloalkyl)$, $-N(C_{1-3}alkyl)_2$, $-N(C_{3-6}cycloalkyl)_2$, $-S(=O)_oC_{1-4}alkyl$, $-S(=O)_oC_{3-6}cycloalkyl$, aryl, heteroaryl, hydroxyl and CN;

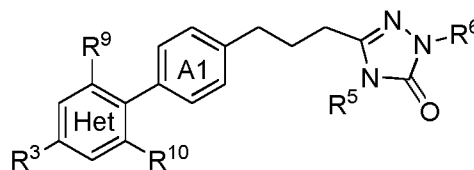
and

R^9 and R^{10} are each independently hydrogen or F.

[0035] Within the first and second aspect there is a genus of compounds of Formula 1a or 1b



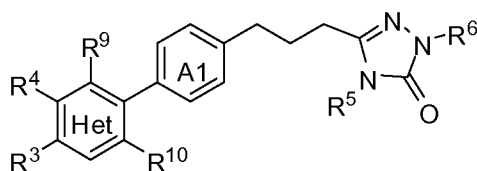
1a



1b

or a pharmaceutically acceptable salt thereof.

[0036] Within the first and second aspect there is a genus of compounds of Formula 1c



1c

or a pharmaceutically acceptable salt thereof.

[0037] Within this genus there is a first subgenus wherein A1 is a substituted phenyl or substituted pyridine; Het is A2a, where A2a is phenyl or substituted pyridine;

R³ is selected from the group consisting of:

- (a) -O-(R⁷),
- (b) -N(R⁷)-C(=O)-O-(R⁸),
- (c) -N(R⁷)S(=O)₂(R⁸),
- (d) -C(=O)(R⁷),
- (e) aryl,
- (f) heteroaryl,
- (g) -OC(=O)N(R⁷)(R⁸),
- (h) -C(R⁷)(R⁸)OH, and
- (i) hydrogen,

wherein aryl of choice (e) and heteroaryl of choice (f) are optionally mono- or di-substituted with substituents selected from the group consisting of halogen, nitro, C₁₋₆alkyl, C₁₋₆alkoxy, halo C₁₋₆alkyl, C₃₋₆cycloalkyl, C₃₋₆cycloalkoxy, -NH(C₁₋₆alkyl), -NH(C₃₋₆cycloalkyl), -N(C₁₋₆alkyl)₂, -N(C₃₋₆cycloalkyl)₂, -S(=O)₂C₁₋₆alkyl, -S(=O)₂C₃₋₆cycloalkyl wherein and CN;

R⁴ is selected from the group consisting of:

- (a) hydrogen,
- (b) -N(R⁷)(R⁸),
- (c) -N(R⁷)S(=O)₂R⁸,
- (d) -S(=O)₂N(R⁷)(R⁸),
- (e) -C(=O)N(R⁷)(R⁸),
- (f) -C₁₋₄alkyl-C(=O)NHS(=O)₂R⁷,
- (g) -C₁₋₄alkyl-S(=O)₂NHC(=O)R⁷,
- (h) -C₁₋₄alkyl-C(=O)-N(R⁷)(R⁸),
- (i) -C₁₋₄alkyl-N(R⁷)-C(=O)R⁸,
- (j) -C₁₋₄alkyl-N(R⁷)S(=O)₂(R⁸),
- (k) -C₁₋₄alkyl-S(=O)₂N(R⁷)(R⁸),
- (l) -C₁₋₆alkyl-C(=O)OH,
- (m) -C₃₋₆cycloalkyl-C(=O)OH,
- (n) -C₃₋₆cycloalkyl-C(=O)NHS(=O)₂R⁷,

- (o) $-C_{3-6}\text{cycloalkyl-S(=O)}_2\text{NHC(=O)R}^7$,
- (p) $-C_{3-6}\text{cycloalkyl-C(=O)-N(R}^7\text{)(R}^8\text{)}$,
- (q) $-C_{3-6}\text{cycloalkyl-N(R}^7\text{)C(=O)(R}^8\text{)}$,
- (r) $-C_{3-6}\text{cycloalkyl-N(R}^7\text{)S(=O)}_2\text{(R}^8\text{)}$,
- (s) $-C_{3-6}\text{cycloalkyl-S(=O)}_2\text{N(R}^7\text{)(R}^8\text{)}$,
- (t) $-C(=O)OH$,
- (u) $-C(=O)N(R^7)S(=O)_2(R^8)$, and
- (v) $-S(O)_2N(R^7)C(=O)R^8$,

wherein the alkyl portion of choices (f), (g), (h), (i), (j), (k) and (l), and the cycloalkyl portion of choices (m), (n), (o), (p), (q), (r) and (s), are optionally mono- or di-substituted with halogen, C_{1-6} alkyl, C_{3-6} cycloalkyl, C_{1-6} alkoxy, or C_{3-6} cycloalkoxy;

R^5 is C_{1-6} alkyl, optionally substituted with halogen or C_{1-4} alkyl;

R^6 is selected from the group consisting of:

- (a) $-C_{1-6}$ alkylaryl,
- (b) $-C_{1-6}$ alkylheteroaryl, and
- (c) $-C_{3-6}$ cycloalkyl,

wherein the alkyl portion of choices (a) and (b), and the cycloalkyl portion of choice (c), are optionally substituted with halogen or C_{1-4} alkyl, and the aryl portion of choice (a) and the heteroaryl of choice (b), are optionally mono- or di-substituted with substituents selected from the group consisting of halogen, nitro, CF_3 , C_{1-6} alkyl, C_{1-6} alkoxy, halo C_{1-6} alkyl, C_{3-6} cycloalkyl, C_{3-6} cycloalkoxy, aryl, heteroaryl, $-NH(C_{1-6}$ alkyl), $-NH(C_{3-6}$ cycloalkyl), $-N(C_{1-6}$ alkyl)₂, $-N(C_{3-6}$ cycloalkyl)₂, $-S(=O)_oC_{1-6}$ alkyl, $-S(=O)_oC_{3-6}$ cycloalkyl and CN;

R^7 is selected from hydrogen and C_{1-4} alkyl optionally substituted with halogen;

R^8 is selected from hydrogen, C_{1-4} alkyl optionally substituted with halogen, and aryl optionally mono- or di-substituted with substituents selected from the group consisting of halogen, nitro, C_{1-6} alkyl, C_{1-6} alkoxy, halo C_{1-6} alkyl, C_{3-6} cycloalkyl, C_{3-6} cycloalkoxy, $-NH(C_{1-3}$ alkyl), $-NH(C_{3-6}$ cycloalkyl), $-N(C_{1-3}$ alkyl)₂, $-N(C_{3-6}$ cycloalkyl)₂, $-S(=O)_oC_{1-4}$ alkyl, $-S(=O)_oC_{3-6}$ cycloalkyl, aryl, heteroaryl, hydroxyl and CN;

and

R^9 and R^{10} are each independently hydrogen or F.

[0038] Within this genus there is a second subgenus wherein A1 is a substituted phenyl or substituted pyridine;

Het is A2a, where A2a is phenyl or substituted pyridine;

R^3 is selected from the group consisting of:

- (a) $-O-(R^7)$,
- (b) $-N(R^7)-C(=O)-O-(R^8)$,
- (c) $-N(R^7)S(=O)_2(R^8)$,
- (d) $-C(=O)(R^7)$,
- (e) aryl,

- (f) heteroaryl,
- (g) $-\text{OC}(=\text{O})\text{N}(\text{R}^7)(\text{R}^8)$, and
- (h) $-\text{C}(\text{R}^7)(\text{R}^8)\text{OH}$,

wherein aryl of choice (e) and heteroaryl of choice (f) are optionally mono- or di-substituted with substituents selected from the group consisting of halogen, nitro, C_{1-6} alkyl, C_{1-6} alkoxy, halo C_{1-6} alkyl, C_{3-6} cycloalkyl, C_{3-6} cycloalkoxy, $-\text{NH}(\text{C}_{1-6}\text{alkyl})$, $-\text{NH}(\text{C}_{3-6}\text{cycloalkyl})$, $-\text{N}(\text{C}_{1-6}\text{alkyl})_2$, $-\text{N}(\text{C}_{3-6}\text{cycloalkyl})_2$, $-\text{S}(=\text{O})_o\text{C}_{1-6}\text{alkyl}$, $-\text{S}(=\text{O})_o\text{C}_{3-6}\text{cycloalkyl}$ wherein and CN;

R^4 is selected from the group consisting of:

- (a) hydrogen,
- (b) $-\text{N}(\text{R}^7)(\text{R}^8)$,
- (c) $-\text{N}(\text{R}^7)\text{S}(=\text{O})_2\text{R}^8$,
- (d) $-\text{S}(=\text{O})_2\text{N}(\text{R}^7)(\text{R}^8)$,
- (e) $-\text{C}(=\text{O})\text{N}(\text{R}^7)(\text{R}^8)$,
- (f) $-\text{C}_{1-4}\text{alkyl}-\text{C}(=\text{O})\text{NHS}(=\text{O})_2\text{R}^7$,
- (g) $-\text{C}_{1-4}\text{alkyl}-\text{S}(=\text{O})_2\text{NHC}(=\text{O})\text{R}^7$,
- (h) $-\text{C}_{1-4}\text{alkyl}-\text{C}(=\text{O})-\text{N}(\text{R}^7)(\text{R}^8)$,
- (i) $-\text{C}_{1-4}\text{alkyl}-\text{N}(\text{R}^7)-\text{C}(=\text{O})\text{R}^8$,
- (j) $-\text{C}_{1-4}\text{alkyl}-\text{N}(\text{R}^7)\text{S}(=\text{O})_2(\text{R}^8)$,
- (k) $-\text{C}_{1-4}\text{alkyl}-\text{S}(=\text{O})_2\text{N}(\text{R}^7)(\text{R}^8)$,
- (l) $-\text{C}_{1-6}\text{alkyl}-\text{C}(=\text{O})\text{OH}$,
- (m) $-\text{C}_{3-6}\text{cycloalkyl}-\text{C}(=\text{O})\text{OH}$,
- (n) $-\text{C}_{3-6}\text{cycloalkyl}-\text{C}(=\text{O})\text{NHS}(=\text{O})_2\text{R}^7$,
- (o) $-\text{C}_{3-6}\text{cycloalkyl}-\text{S}(=\text{O})_2\text{NHC}(=\text{O})\text{R}^7$,
- (p) $-\text{C}_{3-6}\text{cycloalkyl}-\text{C}(=\text{O})-\text{N}(\text{R}^7)(\text{R}^8)$,
- (q) $-\text{C}_{3-6}\text{cycloalkyl}-\text{N}(\text{R}^7)\text{C}(=\text{O})(\text{R}^8)$,
- (r) $-\text{C}_{3-6}\text{cycloalkyl}-\text{N}(\text{R}^7)\text{S}(=\text{O})_2(\text{R}^8)$,
- (s) $-\text{C}_{3-6}\text{cycloalkyl}-\text{S}(=\text{O})_2\text{N}(\text{R}^7)(\text{R}^8)$,
- (t) $-\text{C}(=\text{O})\text{OH}$,
- (u) $-\text{C}(=\text{O})\text{N}(\text{R}^7)\text{S}(=\text{O})_2(\text{R}^8)$, and
- (v) $-\text{S}(=\text{O})_2\text{N}(\text{R}^7)\text{C}(=\text{O})\text{R}^8$,

wherein the alkyl portion of choices (f), (g), (h), (i), (j), (k) and (l), and the cycloalkyl portion of choices (m), (n), (o), (p), (q), (r) and (s), are optionally mono- or di-substituted with halogen, C_{1-6} alkyl, C_{3-6} cycloalkyl, C_{1-6} alkoxy, or C_{3-6} cycloalkoxy;

R^5 is C_{1-6} alkyl, optionally substituted with halogen or C_{1-4} alkyl;

R^6 is selected from the group consisting of:

- (a) $-\text{C}_{1-6}\text{alkylaryl}$,
- (b) $-\text{C}_{1-6}\text{alkylheteroaryl}$, and

(c) -C₃₋₆cycloalkyl,

wherein the alkyl portion of choices (a) and (b), and the cycloalkyl portion of choice (c), are optionally substituted with halogen or C₁₋₄alkyl, and the aryl portion of choice (a) and the heteroaryl of choice (b), are optionally mono- or di-substituted with substituents selected from the group consisting of halogen, nitro, CF₃, C₁₋₆alkyl, C₁₋₆alkoxy, halo C₁₋₆alkyl, C₃₋₆cycloalkyl, C₃₋₆cycloalkoxy, aryl, heteroaryl, -NH(C₁₋₆alkyl), -NH(C₃₋₆cycloalkyl), -N(C₁₋₆alkyl)₂, -N(C₃₋₆cycloalkyl)₂, -S(=O)₂C₁₋₆alkyl, -S(=O)₂C₃₋₆cycloalkyl and CN;

R⁷ is selected from hydrogen and C₁₋₄alkyl optionally substituted with halogen;

R⁸ is selected from hydrogen, C₁₋₄alkyl optionally substituted with halogen, and aryl optionally mono- or di-substituted with substituents selected from the group consisting of halogen, nitro, C₁₋₆alkyl, C₁₋₆alkoxy, haloC₁₋₆alkyl, C₃₋₆cycloalkyl, C₃₋₆cycloalkoxy, -NH(C₁₋₃alkyl), -NH(C₃₋₆cycloalkyl), -N(C₁₋₃alkyl)₂, -N(C₃₋₆cycloalkyl)₂, -S(=O)₂C₁₋₄alkyl, -S(=O)₂C₃₋₆cycloalkyl, aryl, heteroaryl, hydroxyl and CN;

and

R⁹ and R¹⁰ are each independently hydrogen or F.

[0039] Within this first and second subgenus there is a class wherein

A1 is a substituted phenyl or substituted pyridine;

Het is A2a, and A2a is a substituted phenyl, or substituted pyridine.

R¹ and R² are each hydrogen;

R³ is selected from the group consisting of:

(a) hydrogen,

(b) -O-(R⁷), and

(c) -N(R⁷)S(=O)₂(R⁸);

R⁴ is selected from the group consisting of:

(a) hydrogen,

(b) -N(R⁷)S(=O)₂R⁸,

(c) -C₁₋₆alkyl-C(=O)OH,

(d) -C₃₋₆cycloalkyl-C(=O)OH,

(e) -C(=O)OH,

(f) -C(=O)N(R⁷)S(=O)₂(R⁸), and

(g) -S(=O)₂N(R⁷)C(=O)R⁸,

wherein the alkyl portion of choice (c) and the cycloalkyl portion of choice (d), are optionally mono- or di-substituted with halogen, C₁₋₆alkyl, C₃₋₆cycloalkyl, C₁₋₆alkoxy, or C₃₋₆cycloalkoxy;

R⁵ is C₁₋₆alkyl, optionally substituted with halogen or C₁₋₄alkyl;

R⁶ is selected from the group consisting of:

(a) -C₁₋₆alkylaryl, and

(b) -C₁₋₆alkylheteroaryl,

wherein the alkyl portion of choices (a) and (b) are optionally substituted with halogen or C₁₋₄alkyl, and the aryl portion of choice (a) and the heteroaryl portion of choice (b), are optionally mono- or di-substituted with

substituents selected from the group consisting of halogen, nitro, CF₃, C₁₋₆alkyl, C₁₋₆alkoxy, halo C₁₋₆alkyl, C₃₋₆cycloalkyl, C₃₋₆cycloalkoxy, aryl, heteroaryl, -NH(C₁₋₆alkyl), -NH(C₃₋₆cycloalkyl), -N(C₁₋₆alkyl)₂, -N(C₃₋₆cycloalkyl)₂, -S(=O)₂C₁₋₆alkyl, -S(=O)₂C₃₋₆cycloalkyl and CN;

R⁷ is selected from hydrogen and C₁₋₄alkyl optionally substituted with halogen;

R⁸ is selected from hydrogen, C₁₋₄alkyl optionally substituted with halogen, and aryl optionally mono- or di-substituted with substituents selected from the group consisting of halogen, nitro, C₁₋₆alkyl, C₁₋₆alkoxy, haloC₁₋₆alkyl, C₃₋₆cycloalkyl, C₃₋₆cycloalkoxy, -NH(C₁₋₃alkyl), -NH(C₃₋₆cycloalkyl), -N(C₁₋₃alkyl)₂, -N(C₃₋₆cycloalkyl)₂, -S(=O)₂C₁₋₄alkyl, -S(=O)₂C₃₋₆cycloalkyl, aryl, heteroaryl, hydroxyl and CN;

and

R⁹ and R¹⁰ are each independently hydrogen or F.

[0040] In some embodiments, R³ is not hydrogen. In some embodiments, R⁴ is not hydrogen. In some embodiments, R³ is not hydrogen; and R⁴ is not hydrogen.

[0041] In some embodiments, the compound of Formula I is a compound in the following table:

Example no.	Compound name
1	2-(4'-(3-(1-(4-(<i>tert</i> -Butyl)benzyl)-4-ethyl-5-oxo-4,5-dihydro-1 <i>H</i> -1,2,4-triazol-3-yl)propyl)-[1,1'-biphenyl]-3-yl)acetic acid
2	4'-(3-(1-(4-(<i>tert</i> -Butyl)benzyl)-4-ethyl-5-oxo-4,5-dihydro-1 <i>H</i> -1,2,4-triazol-3-yl)propyl)-[1,1'-biphenyl]-3-carboxylic acid
3	3-(3-(4-(6-Aminopyridin-2-yl)phenyl)propyl)-1-(4-(<i>tert</i> -butyl)benzyl)-4-ethyl-1 <i>H</i> -1,2,4-triazol-5(4 <i>H</i>)-one
4	<i>N</i> -(6-(4-(3-(1-(4-(<i>tert</i> -Butyl)benzyl)-4-ethyl-5-oxo-4,5-dihydro-1 <i>H</i> -1,2,4-triazol-3-yl)propyl)phenyl)pyridin-2-yl)benzenesulfonamide
5	3-(3-(4-(5-Aminopyridin-2-yl)phenyl)propyl)-1-(4-(<i>tert</i> -butyl)benzyl)-4-ethyl-1 <i>H</i> -1,2,4-triazol-5(4 <i>H</i>)-one
6	3-(3-(3'-Amino-[1,1'-biphenyl]-4-yl)propyl)-1-(4-(<i>tert</i> -butyl)benzyl)-4-ethyl-1 <i>H</i> -1,2,4-triazol-5(4 <i>H</i>)-one
7	<i>N</i> -(4'-(3-(1-(4-(<i>tert</i> -Butyl)benzyl)-4-ethyl-5-oxo-4,5-dihydro-1 <i>H</i> -1,2,4-triazol-3-yl)propyl)-[1,1'-biphenyl]-3-yl)-4-methylbenzenesulfonamide
8	2-(4'-(3-(1-(4-(<i>tert</i> -Butyl)benzyl)-4-ethyl-5-oxo-4,5-dihydro-1 <i>H</i> -1,2,4-triazol-3-yl)propyl)-[1,1'-biphenyl]-3-yl)- <i>N</i> -(phenylsulfonyl)acetamide
9	4'-(3-(1-(4-(<i>tert</i> -Butyl)benzyl)-4-ethyl-5-oxo-4,5-dihydro-1 <i>H</i> -1,2,4-triazol-3-yl)propyl)- <i>N</i> -(phenylsulfonyl)-[1,1'-biphenyl]-3-carboxamide
10	<i>N</i> -(6-(4-(3-(1-(4-(<i>tert</i> -Butyl)benzyl)-4-ethyl-5-oxo-4,5-dihydro-1 <i>H</i> -1,2,4-triazol-3-yl)propyl)phenyl)pyridin-3-yl)benzenesulfonamide
11	3-(3-(4-(4-Aminopyridin-2-yl)phenyl)propyl)-1-(4-(<i>tert</i> -butyl)benzyl)-4-ethyl-1 <i>H</i> -1,2,4-triazol-5(4 <i>H</i>)-one
12	<i>N</i> -(6-(4-(3-(1-(4-(<i>tert</i> -Butyl)benzyl)-4-ethyl-5-oxo-4,5-dihydro-1 <i>H</i> -1,2,4-triazol-3-yl)propyl)phenyl)pyridin-3-yl)methanesulfonamide
13	1-(4'-(3-(1-(4-(<i>tert</i> -Butyl)benzyl)-4-ethyl-5-oxo-4,5-dihydro-1 <i>H</i> -1,2,4-triazol-3-yl)propyl)-[1,1'-biphenyl]-3-yl)cyclopropanecarboxylic acid
14	1-(4'-(3-(1-(4-(<i>tert</i> -butyl)benzyl)-4-ethyl-5-oxo-4,5-dihydro-1 <i>H</i> -1,2,4-triazol-3-yl)propyl)-[1,1'-biphenyl]-3-yl)cyclopropanecarboxamide
15	2-(4'-(3-(1-(4-(<i>tert</i> -Butyl)benzyl)-4-ethyl-5-oxo-4,5-dihydro-1 <i>H</i> -1,2,4-triazol-3-yl)propyl)-[1,1'-biphenyl]-3-yl)-2-methylpropanamide
16	<i>N</i> -(2-(4-(3-(1-(4-(<i>tert</i> -Butyl)benzyl)-4-ethyl-5-oxo-4,5-dihydro-1 <i>H</i> -1,2,4-triazol-3-yl)propyl)phenyl)pyridin-4-yl)benzenesulfonamide
17	<i>N</i> -(6-(4-(3-(1-(4-(<i>tert</i> -Butyl)benzyl)-4-ethyl-5-oxo-4,5-dihydro-1 <i>H</i> -1,2,4-triazol-3-yl)propyl)phenyl)pyridin-4-yl)methanesulfonamide

Example no.	Compound name
18	2-(4'-(3-(1-(4-(<i>tert</i> -Butyl)benzyl)-4-ethyl-5-oxo-4,5-dihydro-1 <i>H</i> -1,2,4-triazol-3-yl)propyl)-2-fluoro-[1,1'-biphenyl]-3-yl)acetic acid
19	2-(4'-(3-(1-(4-(<i>tert</i> -Butyl)benzyl)-4-ethyl-5-oxo-4,5-dihydro-1 <i>H</i> -1,2,4-triazol-3-yl)propyl)-6-fluoro-[1,1'-biphenyl]-3-yl)acetic acid
20	2-(4'-(3-(1-(4-(<i>tert</i> -Butyl)benzyl)-4-ethyl-5-oxo-4,5-dihydro-1 <i>H</i> -1,2,4-triazol-3-yl)propyl)-6-methoxy-[1,1'-biphenyl]-3-yl)acetic acid
21	2-(4'-(3-(1-(4-(<i>tert</i> -Butyl)benzyl)-4-ethyl-5-oxo-4,5-dihydro-1 <i>H</i> -1,2,4-triazol-3-yl)propyl)-4-methoxy-[1,1'-biphenyl]-3-yl)acetic acid
22	2-(4'-(3-(1-(4-(Cyclopropylbenzyl)-4-ethyl-5-oxo-4,5-dihydro-1 <i>H</i> -1,2,4-triazol-3-yl)propyl)-[1,1'-biphenyl]-3-yl)acetic acid
23	2-(4'-(3-(1-Benzyl-4-ethyl-5-oxo-4,5-dihydro-1 <i>H</i> -1,2,4-triazol-3-yl)propyl)-[1,1'-biphenyl]-3-yl)acetic acid
24	2-(4'-(3-(4-Ethyl-5-oxo-1-(4-(trifluoromethyl)benzyl)-4,5-dihydro-1 <i>H</i> -1,2,4-triazol-3-yl)propyl)-[1,1'-biphenyl]-3-yl)acetic acid
25	<i>tert</i> -Butyl (2-(4-(3-(1-(4-(<i>tert</i> -butyl)benzyl)-4-ethyl-5-oxo-4,5-dihydro-1 <i>H</i> -1,2,4-triazol-3-yl)propyl)phenyl)oxazol-4-yl)carbamate
26	2-(4'-(3-(1-(4-Cyclohexylbenzyl)-4-ethyl-5-oxo-4,5-dihydro-1 <i>H</i> -1,2,4-triazol-3-yl)propyl)-[1,1'-biphenyl]-3-yl)acetic acid
27	2-(4'(((1-(4-(<i>tert</i> -Butyl)benzyl)-4-ethyl-5-oxo-4,5-dihydro-1 <i>H</i> -1,2,4-triazol-3-yl)methoxy)methyl)-[1,1'-biphenyl]-3-yl)acetic acid
28	2-(4'-(3-(1-(4-(<i>tert</i> -Butyl)benzyl)-4-ethyl-5-oxo-4,5-dihydro-1 <i>H</i> -1,2,4-triazol-3-yl)propyl)-[1,1'-biphenyl]-3-yl)-2,2-difluoroacetic acid
29	3-(3-(3'-(1 <i>H</i> -Tetrazol-5-yl)-[1,1'-biphenyl]-4-yl)propyl)-1-(4-(<i>tert</i> -butyl)benzyl)-4-ethyl-1 <i>H</i> -1,2,4-triazol-5(4 <i>H</i>)-one
30	2-(4'-(2-((1-(4-(<i>tert</i> -butyl)benzyl)-4-ethyl-5-oxo-4,5-dihydro-1 <i>H</i> -1,2,4-triazol-3-yl)methyl)cyclopropyl)-[1,1'-biphenyl]-3-yl)acetic acid
31	2-(4'-(3-(1-(4-(<i>tert</i> -Butyl)benzyl)-4-isopropyl-5-oxo-4,5-dihydro-1 <i>H</i> -1,2,4-triazol-3-yl)propyl)-[1,1'-biphenyl]-3-yl)acetic acid
32	2-(4'-(3-(1-(4-(<i>tert</i> -Butyl)benzyl)-5-oxo-4-phenyl-4,5-dihydro-1 <i>H</i> -1,2,4-triazol-3-yl)propyl)-[1,1'-biphenyl]-3-yl)acetic acid;
33	2-(4'-(3-(1-(4-(<i>tert</i> -Butyl)benzyl)-4-ethyl-5-oxo-4,5-dihydro-1 <i>H</i> -1,2,4-triazol-3-yl)propyl)-4-fluoro-[1,1'-biphenyl]-3-yl)acetic acid
34	3-(4'-(3-(1-(4-(<i>tert</i> -Butyl)benzyl)-4-ethyl-5-oxo-4,5-dihydro-1 <i>H</i> -1,2,4-triazol-3-yl)propyl)-[1,1'-biphenyl]-3-yl)acrylic acid
35	2-(4'-(3-(1-(4-(<i>tert</i> -Butyl)benzyl)-4-ethyl-5-oxo-4,5-dihydro-1 <i>H</i> -1,2,4-triazol-3-yl)propyl)-[1,1'-biphenyl]-3-yl)cyclopropanecarboxylic acid
36	3-(4'-(3-(1-(4-(<i>tert</i> -Butyl)benzyl)-4-ethyl-5-oxo-4,5-dihydro-1 <i>H</i> -1,2,4-triazol-3-yl)propyl)-[1,1'-biphenyl]-3-yl)propanoic acid
37	2-(4'-(3-(1-(4-Bromobenzyl)-4-ethyl-5-oxo-4,5-dihydro-1 <i>H</i> -1,2,4-triazol-3-yl)propyl)-[1,1'-biphenyl]-3-yl)acetic acid
38	2-(4'-(3-(1-(4-(<i>tert</i> -Butyl)benzyl)-4-ethyl-5-oxo-4,5-dihydro-1 <i>H</i> -1,2,4-triazol-3-yl)propyl)-4-ethoxy-[1,1'-biphenyl]-3-yl)acetic acid
39	2-(4-(4-(3-(1-(4-(<i>tert</i> -Butyl)benzyl)-4-ethyl-5-oxo-4,5-dihydro-1 <i>H</i> -1,2,4-triazol-3-yl)propyl)phenyl)thiophen-2-yl)acetic acid
40	1-{[4-(<i>tert</i> -Butyl)phenyl]methyl}-4-ethyl-3-[3-(4-{4-[(methylsulfonyl)amino](2-pyridyl)}phenyl)propyl]-1,2,4-triazolin-5-one
41	4'-(3-(1-(4-(<i>tert</i> -Butyl)benzyl)-4-ethyl-5-oxo-4,5-dihydro-1 <i>H</i> -1,2,4-triazol-3-yl)propyl)-5-(trifluoromethyl)-[1,1'-biphenyl]-3-carboxylic acid
42	1-{[4-(<i>tert</i> -Butyl)phenyl]methyl}-3-[3-(4-{6-[(cyclopropylsulfonyl)amino](2-pyridyl)}phenyl)propyl]-4-ethyl-1,2,4-triazolin-5-one
43	2-(5-{4-[3-(1-{[4-(<i>tert</i> -Butyl)phenyl]methyl}-4-ethyl-5-oxo-1,2,4-triazolin-3-yl)propyl]phenyl}-2-pyridyl)acetic acid
44	2-(3-{4-[3-(1-{[4-(<i>tert</i> -Butyl)phenyl]methyl}-4-ethyl-5-oxo-1,2,4-triazolin-3-

Example no.	Compound name
	yl)propyl]phenyl} phenyl)propanoic acid
45	2-(2-{4-[3-(1-{[4-(<i>tert</i> -Butyl)phenyl]methyl}-4-ethyl-5-oxo-1,2,4-triazolin-3-yl)propyl]phenyl}-4-pyridyl)acetic acid
46	2-(3-{4-[3-(1-{[4-(<i>tert</i> -Butyl)phenyl]methyl}-4-ethyl-5-oxo-1,2,4-triazolin-3-yl)propyl]phenyl} phenyl)butanoic acid
47	2-(3-{4-[3-(1-{[4-(<i>tert</i> -Butyl)phenyl]methyl}-4-ethyl-5-oxo(1,2,4-triazolin-3-yl))propyl]phenyl} phenyl)-3-phenylpropanoic acid
48	2-(6-{4-[3-(1-{[4-(<i>tert</i> -Butyl)phenyl]methyl}-4-ethyl-5-oxo(1,2,4-triazolin-3-yl))propyl]phenyl}-4-(trifluoromethyl)-2-pyridyl)acetic acid
49	2-(4'-(3-(1-(4-(<i>tert</i> -Butyl)benzyl)-4-ethyl-5-oxo-4,5-dihydro-1 <i>H</i> -1,2,4-triazol-3-yl)propyl)-4-(cyclopropylmethoxy)-[1,1'-biphenyl]-3-yl)acetic acid
50	2-(6-{4-[3-(1-{[4-(<i>tert</i> -Butyl)phenyl]methyl}-4-ethyl-5-oxo-1,2,4-triazolin-3-yl)propyl]phenyl}-2-pyridyl)acetic acid
51	2-(4'-(3-(1-(4-(<i>tert</i> -Butyl)benzyl)-4-ethyl-5-oxo-4,5-dihydro-1 <i>H</i> -1,2,4-triazol-3-yl)propyl)-[1,1'-biphenyl]-4-yl)- <i>N</i> -cyclopropyl-2-hydroxyacetamide
52	2-(4'-(3-(1-(4-(<i>tert</i> -Butyl)benzyl)-4-ethyl-5-oxo-4,5-dihydro-1 <i>H</i> -1,2,4-triazol-3-yl)propyl)-[1,1'-biphenyl]-4-yl)- <i>N</i> -cyclopropyl-2-oxoacetamide
53	2-(4'-(3-(1-(4-(<i>tert</i> -Butyl)benzyl)-4-(cyclopropylmethyl)-5-oxo-4,5-dihydro-1 <i>H</i> -1,2,4-triazol-3-yl)propyl)-[1,1'-biphenyl]-3-yl)acetic acid
54	2-(4'-(3-(1-((5-(<i>tert</i> -Butyl)thiophen-2-yl)methyl)-4-ethyl-5-oxo-4,5-dihydro-1 <i>H</i> -1,2,4-triazol-3-yl)propyl)-[1,1'-biphenyl]-3-yl)acetic acid
55	2-(4'-(3-(1-(4-(<i>tert</i> -Butyl)benzyl)-5-oxo-4-(2,2,2-trifluoroethyl)-4,5-dihydro-1 <i>H</i> -1,2,4-triazol-3-yl)propyl)-4-methoxy-[1,1'-biphenyl]-3-yl)acetic acid
56	2-(4'-(3-(1-(4-(<i>tert</i> -Butyl)benzyl)-4-ethyl-5-oxo-4,5-dihydro-1 <i>H</i> -1,2,4-triazol-3-yl)propyl)-[1,1'-biphenyl]-3-yl)- <i>N</i> -cyclopropyl-2-hydroxyacetamide
57	2-(4'-(3-(1-(4-(<i>tert</i> -Butyl)benzyl)-4-ethyl-5-oxo-4,5-dihydro-1 <i>H</i> -1,2,4-triazol-3-yl)propyl)-[1,1'-biphenyl]-3-yl)- <i>N</i> -cyclopropyl-2-oxoacetamide
58	3-{3-[4-(6-Amino-5-methoxy(2-pyridyl))phenyl]propyl}-1-{[4-(<i>tert</i> -butyl)phenyl]methyl}-4-ethyl-1,2,4-triazolin-5-one
59	1-{[4-(<i>tert</i> -Butyl)phenyl]methyl}-4-ethyl-3-[3-(4-{5-methoxy-6-[(phenylsulfonyl)amino](2-pyridyl)} phenyl)propyl]-1,2,4-triazolin-5-one
60	3-{3-[4-(6-Amino-5-ethoxy(2-pyridyl))phenyl]propyl}-1-{[4-(<i>tert</i> -butyl)phenyl]methyl}-4-ethyl-1,2,4-triazolin-5-one
61	2-(5-{4-[3-(1-{[4-(<i>tert</i> -Butyl)phenyl]methyl}-4-ethyl-5-oxo(1,2,4-triazolin-3-yl))propyl]phenyl}-2-ethylthiophenyl)acetic acid
62	1-{[4-(<i>tert</i> -Butyl)phenyl]methyl}-3-[3-(4-{5-ethoxy-6-[(phenylsulfonyl)amino](2-pyridyl)} phenyl)propyl]-4-ethyl-1,2,4-triazolin-5-one
63	2-(4'-(3-(4-Ethyl-1-(4-(3-fluorooxetan-3-yl)benzyl)-5-oxo-4,5-dihydro-1 <i>H</i> -1,2,4-triazol-3-yl)propyl)-[1,1'-biphenyl]-3-yl)acetic acid
64	2-(5-{4-[3-(1-{[4-(<i>tert</i> -Butyl)phenyl]methyl}-4-ethyl-5-oxo(1,2,4-triazolin-3-yl))propyl]phenyl}-2-methylthiophenyl)acetic acid
65	4'-(3-(1-(4-(<i>tert</i> -Butyl)benzyl)-4-ethyl-5-oxo-4,5-dihydro-1 <i>H</i> -1,2,4-triazol-3-yl)propyl)-4-methoxy-[1,1'-biphenyl]-3-carboxylic acid
66	4'-(3-(1-(4-(<i>tert</i> -Butyl)benzyl)-4-ethyl-5-oxo-4,5-dihydro-1 <i>H</i> -1,2,4-triazol-3-yl)propyl)-4-ethoxy-[1,1'-biphenyl]-3-carboxylic acid
67	2-(4'-(3-(1-(3-Bromo-4-(<i>tert</i> -butyl)benzyl)-4-ethyl-5-oxo-4,5-dihydro-1 <i>H</i> -1,2,4-triazol-3-yl)propyl)-[1,1'-biphenyl]-3-yl)acetic acid
68	2-(4'-(3-(1-(4-(<i>tert</i> -Butyl)benzyl)-5-oxo-4-propyl-4,5-dihydro-1 <i>H</i> -1,2,4-triazol-3-yl)propyl)-4-ethoxy-[1,1'-biphenyl]-3-yl)acetic acid
69	2-(4'-(3-(4-Butyl-1-(4-(<i>tert</i> -butyl)benzyl)-5-oxo-4,5-dihydro-1 <i>H</i> -1,2,4-triazol-3-yl)propyl)-4-ethoxy-[1,1'-biphenyl]-3-yl)acetic acid
70	5-(4-(3-(1-(4-(<i>tert</i> -Butyl)benzyl)-4-ethyl-5-oxo-4,5-dihydro-1 <i>H</i> -1,2,4-triazol-3-yl)propyl)phenyl)-1 <i>H</i> -indole-3-carboxylic acid

Example no.	Compound name
71	1- {[4-(<i>tert</i> -Butyl)phenyl]methyl}-4-ethyl-3- {3-[4-(5- {[4-(propylphenyl)sulfonyl]amino} (2-pyridyl))phenyl]propyl}-1,2,4-triazolin-5-one
72	1- {[4-(<i>tert</i> -Butyl)phenyl]methyl}-4-ethyl-3- {3-[4-(6- {[4-(propylphenyl)sulfonyl]amino} (2-pyridyl))phenyl]propyl}-1,2,4-triazolin-5-one
73	1- {[4-(<i>tert</i> -Butyl)phenyl]methyl}-4-ethyl-3-(3- {4-[6- ([4-(4-methylphenyl)phenyl]sulfonyl]amino)(2-pyridyl)]phenyl} propyl)-1,2,4-triazolin-5-one
74	1- {[4-(<i>tert</i> -Butyl)phenyl]methyl}-4-ethyl-3-(3- {4-[6- ([4-(4-methoxyphenyl)phenyl]sulfonyl]amino)(2-pyridyl)]phenyl} propyl)-1,2,4-triazolin-5-one
75	1-Acetyl-5- {[6- {4-[3-(1- {4-(<i>tert</i> -butyl)phenyl]methyl}-4-ethyl-5-oxo(1,2,4-triazolin-3-yl))propyl]phenyl} (3-pyridyl)amino]sulfonyl]indoline
76	2-(4'-(3-(4-Allyl-1-(4-(<i>tert</i> -butyl)benzyl)-5-oxo-4,5-dihydro-1 <i>H</i> -1,2,4-triazol-3-yl)propyl)-4-methoxy-[1,1'-biphenyl]-3-yl)acetic acid
77	1- {[4-(<i>tert</i> -Butyl)phenyl]methyl}-4-ethyl-3-[3-(4- {5- [(4-[5-(trifluoromethyl)(2-pyridyloxy)]phenyl]sulfonyl]amino)(2-pyridyl)]phenyl]propyl)-1,2,4-triazolin-5-one
78	1- {[4-(<i>tert</i> -Butyl)phenyl]methyl}-4-ethyl-3- {3-[4-(6- {[benzylsulfonyl]amino} (2-pyridyl))phenyl]propyl}-1,2,4-triazolin-5-one
79	1- {[4-(<i>tert</i> -Butyl)phenyl]methyl}-4-ethyl-3- {3-[4-(5- {[benzylsulfonyl]amino} (2-pyridyl))phenyl]propyl}-1,2,4-triazolin-5-one
80	2-(4'-(3-(1-(4-(<i>tert</i> -Butyl)benzyl)-5-oxo-4-propyl-4,5-dihydro-1 <i>H</i> -1,2,4-triazol-3-yl)propyl)-4-methoxy-[1,1'-biphenyl]-3-yl)acetic acid
81	<i>N</i> -(2-(4-(3-(1-(4-(<i>tert</i> -Butyl)benzyl)-4-ethyl-5-oxo-4,5-dihydro-1 <i>H</i> -1,2,4-triazol-3-yl)propyl)phenyl)pyrimidin-4-yl)benzenesulfonamide
82	1- {[4-(<i>tert</i> -Butyl)phenyl]methyl}-4-ethyl-3-(3- {4-[6- ([4-(trifluoromethyl)phenyl]sulfonyl]amino)(2-pyridyl)]phenyl} propyl)-1,2,4-triazolin-5-one
83	1- {[4-(<i>tert</i> -Butyl)phenyl]methyl}-3- {3-[4-(6- {[4-(chlorophenyl)sulfonyl]amino} (2-pyridyl))phenyl]propyl}-4-ethyl-1,2,4-triazolin-5-one
84	1- {[4-(<i>tert</i> -Butyl)phenyl]methyl}-4-ethyl-3- {3-[4-(6- ([4-(4-methoxyphenyl)sulfonyl]amino} (2-pyridyl))phenyl]propyl}-1,2,4-triazolin-5-one
85	2-(4'-(3-(1-(3-Cyclopropyl-4-(<i>tert</i> -butyl)benzyl)-4-ethyl-5-oxo-4,5-dihydro-1 <i>H</i> -1,2,4-triazol-3-yl)propyl)-[1,1'-biphenyl]-3-yl)acetic acid
86	1- {[4-(<i>tert</i> -Butyl)phenyl]methyl}-4-ethyl-3-(3- {4-[5- ([4-(trifluoromethyl)phenyl]sulfonyl]amino)(2-pyridyl)]phenyl} propyl)-1,2,4-triazolin-5-one
87	1- {[4-(<i>tert</i> -Butyl)phenyl]methyl}-4-ethyl-3- {3-[4-(5-methoxy-6- {[benzylsulfonyl]amino} (2-pyridyl))phenyl]propyl}-1,2,4-triazolin-5-one
88	1- {[4-(<i>tert</i> -Butyl)phenyl]methyl}-4-ethyl-3-(3- {4-[5-methoxy-6- ([4-(trifluoromethyl)phenyl]sulfonyl]amino)(2-pyridyl)]phenyl} propyl)-1,2,4-triazolin-5-one
89	5-(4-(3-(1-(4-(<i>tert</i> -Butyl)benzyl)-4-ethyl-5-oxo-4,5-dihydro-1 <i>H</i> -1,2,4-triazol-3-yl)propyl)phenyl)benzofuran-3-carboxylic acid
90	1- {[4-(<i>tert</i> -Butyl)phenyl]methyl}-3- {3-[4-(5- {[4-(chlorophenyl)sulfonyl]amino} (2-pyridyl))phenyl]propyl}-4-ethyl-1,2,4-triazolin-5-one
91	1- {[4-(<i>tert</i> -Butyl)phenyl]methyl}-4-ethyl-3- {3-[4-(5- {[4-(4-methoxyphenyl)sulfonyl]amino} (2-pyridyl))phenyl]propyl}-1,2,4-triazolin-5-one
92	1- {[4-(<i>tert</i> -Butyl)phenyl]methyl}-3- {3-[4-(6- {[4-(chlorophenyl)sulfonyl]amino}-5-methoxy(2-pyridyl))phenyl]propyl}-4-ethyl-1,2,4-triazolin-5-one
93	1- {[4-(<i>tert</i> -Butyl)phenyl]methyl}-4-ethyl-3- {3-[4-(5-methoxy-6- {[4-(4-methoxyphenyl)sulfonyl]amino} (2-pyridyl))phenyl]propyl}-1,2,4-triazolin-5-one
94	2-(4'-(3-(1-(4-(<i>tert</i> -Butyl)benzyl)-4-ethyl-5-oxo-4,5-dihydro-1 <i>H</i> -1,2,4-triazol-3-yl)propyl)-4-propoxy-[1,1'-biphenyl]-3-yl)acetic acid
95	2-(4'-(3-(1-(4-(<i>tert</i> -Butyl)benzyl)-4-methyl-5-oxo-4,5-dihydro-1 <i>H</i> -1,2,4-triazol-3-yl)propyl)-4-ethoxy-[1,1'-biphenyl]-3-yl)acetic acid
96	(<i>rac</i>)-5-(4-(3-(1-(4-(<i>tert</i> -Butyl)benzyl)-4-ethyl-5-oxo-4,5-dihydro-1 <i>H</i> -1,2,4-triazol-3-yl)propyl)phenyl)-2,3-dihydrobenzofuran-3-carboxylic acid
97	<i>N</i> -(6- {4-[3-(1- {4-(<i>tert</i> -Butyl)phenyl]methyl}-4-ethyl-5-oxo(1,2,4-triazolin-3-

Example no.	Compound name
	yl)propyl]phenyl}(2-pyridyl)benzamide
98	1-{[4-(<i>tert</i> -Butyl)phenyl]methyl}-4-ethyl-3-[3-(4-{6-methoxy-5-[(phenylsulfonyl)amino](2-pyridyl)}phenyl)propyl]-1,2,4-triazolin-5-one
99	<i>N</i> -benzyl-4'-(3-(1-(4-(<i>tert</i> -butyl)benzyl)-4-ethyl-5-oxo-4,5-dihydro-1 <i>H</i> -1,2,4-triazol-3-yl)propyl)-[1,1'-biphenyl]-4-sulfonamide
100	<i>N</i> -(6-{4-[3-(1-{[4-(<i>tert</i> -Butyl)phenyl]methyl}-4-ethyl-5-oxo-1,2,4-triazolin-3-yl)propyl]phenyl}-2-pyridyl)butanamide
101	<i>N</i> -(6-{4-[3-(1-{[4-(<i>tert</i> -Butyl)phenyl]methyl}-4-ethyl-5-oxo(1,2,4-triazolin-3-yl)propyl]phenyl}(2-pyridyl))-2-phenylacetamide
102	<i>N</i> -(6-{4-[3-(1-{[4-(<i>tert</i> -Butyl)phenyl]methyl}-4-ethyl-5-oxo(1,2,4-triazolin-3-yl)propyl]phenyl}(2-pyridyl))cyclopropylcarboxamide
103	<i>N</i> -((4'-(3-(1-(4-(<i>tert</i> -Butyl)benzyl)-4-ethyl-5-oxo-4,5-dihydro-1 <i>H</i> -1,2,4-triazol-3-yl)propyl)-[1,1'-biphenyl]-3-yl)sulfonyl)propionamide
104	<i>N</i> -Benzyl-1-(4'-(3-(1-(4-(<i>tert</i> -butyl)benzyl)-4-ethyl-5-oxo-4,5-dihydro-1 <i>H</i> -1,2,4-triazol-3-yl)propyl)-[1,1'-biphenyl]-4-yl)methanesulfonamide
105	<i>N</i> -Benzyl-1-(4'-(3-(1-(4-(<i>tert</i> -butyl)benzyl)-4-ethyl-5-oxo-4,5-dihydro-1 <i>H</i> -1,2,4-triazol-3-yl)propyl)-[1,1'-biphenyl]-3-yl)methanesulfonamide
106	2-(4'-(3-(1-(4-(<i>tert</i> -Butyl)benzyl)-4-methyl-5-oxo-4,5-dihydro-1 <i>H</i> -1,2,4-triazol-3-yl)propyl)-4-methoxy-[1,1'-biphenyl]-3-yl)acetic acid
107	3-{3-[4-(3-{[(Dimethylamino)sulfonyl]amino}phenyl)phenyl]propyl}-1-{[4-(<i>tert</i> -butyl)phenyl]methyl}-4-ethyl-1,2,4-triazolin-5-one
108	<i>N</i> -(2-(4-(3-(1-(4-(<i>tert</i> -Butyl)benzyl)-4-ethyl-5-oxo-4,5-dihydro-1 <i>H</i> -1,2,4-triazol-3-yl)propyl)phenyl)pyrimidin-5-yl)benzenesulfonamide
109	3-(3-(4-(5-Aminopyridin-3-yl)phenyl)propyl)-1-(4-(<i>tert</i> -butyl)benzyl)-4-ethyl-1 <i>H</i> -1,2,4-triazol-5(4 <i>H</i>)-one
110	1-{[4-(<i>tert</i> -Butyl)phenyl]methyl}-4-ethyl-3-[3-(4-{5-methoxy-6-[<i>N</i> -methyl(phenylsulfonyl)amino](2-pyridyl)}phenyl)propyl]-1,2,4-triazolin-5-one
111	3-{3-[4-(5-Amino-4-methoxy(2-pyridyl))phenyl]propyl}-1-{[4-(<i>tert</i> -butyl)phenyl]methyl}-4-ethyl-1,2,4-triazolin-5-one
112	1-{[4-(<i>tert</i> -Butyl)phenyl]methyl}-4-ethyl-3-[3-(4-{4-methoxy-5-[(phenylsulfonyl)amino](2-pyridyl)}phenyl)propyl]-1,2,4-triazolin-5-one
113	1-{[4-(<i>tert</i> -Butyl)phenyl]methyl}-3-{3-[4-(6-{[(6-chloro(3-pyridyl))sulfonyl]amino}-5-methoxy(2-pyridyl))phenyl]propyl}-4-ethyl-1,2,4-triazolin-5-one
114	1-{[4-(<i>tert</i> -Butyl)phenyl]methyl}-4-ethyl-3-{3-[4-(5-methoxy-6-{[(6-methoxy(3-pyridyl))sulfonyl]amino}(2-pyridyl))phenyl]propyl}-1,2,4-triazolin-5-one
115	2-(4'-(3-(1-(3-Methyl-4-(<i>tert</i> -butyl)benzyl)-4-ethyl-5-oxo-4,5-dihydro-1 <i>H</i> -1,2,4-triazol-3-yl)propyl)-[1,1'-biphenyl]-3-yl)acetic acid
116	<i>N</i> -(((4'-(3-(1-(4-(<i>tert</i> -Butyl)benzyl)-4-ethyl-5-oxo-4,5-dihydro-1 <i>H</i> -1,2,4-triazol-3-yl)propyl)-[1,1'-biphenyl]-3-yl)methyl)sulfonyl)propionamide
117	<i>N</i> -(5-(4-(3-(1-(4-(<i>tert</i> -Butyl)benzyl)-4-ethyl-5-oxo-4,5-dihydro-1 <i>H</i> -1,2,4-triazol-3-yl)propyl)phenyl)pyridin-3-yl)benzenesulfonamide
118	<i>N</i> -(5-(4-(3-(1-(4-(<i>tert</i> -Butyl)benzyl)-4-ethyl-5-oxo-4,5-dihydro-1 <i>H</i> -1,2,4-triazol-3-yl)propyl)phenyl)pyrazin-2-yl)benzenesulfonamide
119	<i>N</i> -(5-(4-(3-(1-(4-(<i>tert</i> -Butyl)benzyl)-4-ethyl-5-oxo-4,5-dihydro-1 <i>H</i> -1,2,4-triazol-3-yl)propyl)phenyl)pyrazin-2-yl)-1-phenylmethanesulfonamide
120	1-(4'-(3-(1-(4-(<i>tert</i> -Butyl)benzyl)-4-ethyl-5-oxo-4,5-dihydro-1 <i>H</i> -1,2,4-triazol-3-yl)propyl)-4-ethoxy-[1,1'-biphenyl]-3-yl)cyclopropanecarbonitrile
121	4'-(3-(1-(4-(<i>tert</i> -Butyl)benzyl)-4-ethyl-5-oxo-4,5-dihydro-1 <i>H</i> -1,2,4-triazol-3-yl)propyl)-4-(difluoromethoxy)-[1,1'-biphenyl]-3-carboxylic acid
122	1-(4'-(3-(1-(4-(<i>tert</i> -Butyl)benzyl)-4-ethyl-5-oxo-4,5-dihydro-1 <i>H</i> -1,2,4-triazol-3-yl)propyl)-4-ethoxy-[1,1'-biphenyl]-3-yl)cyclopropanecarboxylic acid
123	4'-(3-(1-(4-(<i>tert</i> -Butyl)benzyl)-4-ethyl-5-oxo-4,5-dihydro-1 <i>H</i> -1,2,4-triazol-3-yl)propyl)-4-methoxy- <i>N</i> -(pyridin-2-yl)-[1,1'-biphenyl]-3-sulfonamide

Example no.	Compound name
124	1-{[4-(<i>tert</i> -Butyl)phenyl]methyl}-4-ethyl-3-[3-(4-{6-methyl-5-[(phenylsulfonyl)amino](2-pyridyl)}phenyl)propyl]-1,2,4-triazolin-5-one
125	1-{[4-(<i>tert</i> -Butyl)phenyl]methyl}-4-ethyl-3-{3-[4-(6-methyl-5-{[benzylsulfonyl]amino}(2-pyridyl))phenyl]propyl}-1,2,4-triazolin-5-one
126	1-{[4-(<i>tert</i> -Butyl)phenyl]methyl}-4-ethyl-3-[3-(4-{4-methyl-5-[(phenylsulfonyl)amino](2-pyridyl)}phenyl)propyl]-1,2,4-triazolin-5-one
127	1-{[4-(<i>tert</i> -Butyl)phenyl]methyl}-4-ethyl-3-{3-[4-(4-methyl-5-{[benzylsulfonyl]amino}(2-pyridyl))phenyl]propyl}-1,2,4-triazolin-5-one
128	1-(4'-(3-(1-(4-(<i>tert</i> -Butyl)benzyl)-4-ethyl-5-oxo-4,5-dihydro-1 <i>H</i> -1,2,4-triazol-3-yl)propyl)-4-methoxy-[1,1'-biphenyl]-3-yl)cyclopropanecarboxylic acid
129	<i>N</i> -(6-(4-(3-(1-(4-(<i>tert</i> -Butyl)benzyl)-4-ethyl-5-oxo-4,5-dihydro-1 <i>H</i> -1,2,4-triazol-3-yl)propyl)phenyl)pyrazin-2-yl)benzenesulfonamide
130	2-(4'-(3-(1-(4-(<i>tert</i> -Butyl)benzyl)-4-ethyl-5-oxo-4,5-dihydro-1 <i>H</i> -1,2,4-triazol-3-yl)propyl)-4-(trifluoromethoxy)-[1,1'-biphenyl]-3-yl)acetic acid
131	4'-(3-(1-(4-(<i>tert</i> -Butyl)benzyl)-4-ethyl-5-oxo-4,5-dihydro-1 <i>H</i> -1,2,4-triazol-3-yl)propyl)-4-(trifluoromethoxy)-[1,1'-biphenyl]-3-carboxylic acid
132	4'-(3-(1-(4-(<i>tert</i> -Butyl)benzyl)-4-ethyl-5-oxo-4,5-dihydro-1 <i>H</i> -1,2,4-triazol-3-yl)propyl)-4-methyl-[1,1'-biphenyl]-3-carboxylic acid
133	1-(4'-(3-(1-(4-(<i>tert</i> -Butyl)benzyl)-4-ethyl-5-oxo-4,5-dihydro-1 <i>H</i> -1,2,4-triazol-3-yl)propyl)-4-methoxy-[1,1'-biphenyl]-3-yl)cyclobutanecarboxylic acid
134	4'-(3-(1-(4-(<i>tert</i> -Butyl)benzyl)-4-ethyl-5-oxo-4,5-dihydro-1 <i>H</i> -1,2,4-triazol-3-yl)propyl)-4-(trifluoromethyl)-[1,1'-biphenyl]-3-carboxylic acid
135	2-(4'-(3-(1-(4-(<i>tert</i> -Butyl)benzyl)-4-ethyl-5-oxo-4,5-dihydro-1 <i>H</i> -1,2,4-triazol-3-yl)propyl)-4-methoxy-[1,1'-biphenyl]-3-yl)- <i>N</i> -(methylsulfonyl)acetamide
136	2-(4'-(3-(1-(4-(<i>tert</i> -Butyl)benzyl)-4-ethyl-5-oxo-4,5-dihydro-1 <i>H</i> -1,2,4-triazol-3-yl)propyl)-4-methoxy-[1,1'-biphenyl]-3-yl)- <i>N</i> -(phenylsulfonyl)acetamide
137	1-(4'-(3-(1-(4-(<i>tert</i> -Butyl)benzyl)-4-ethyl-5-oxo-4,5-dihydro-1 <i>H</i> -1,2,4-triazol-3-yl)propyl)-[1,1'-biphenyl]-4-yl)cyclopropanecarboxylic acid
138	<i>N</i> -(4-(4-(3-(1-(4-(<i>tert</i> -Butyl)benzyl)-4-ethyl-5-oxo-4,5-dihydro-1 <i>H</i> -1,2,4-triazol-3-yl)propyl)phenyl)pyrimidin-2-yl)benzenesulfonamide
139	6-(4-(3-(1-(4-(<i>tert</i> -Butyl)benzyl)-4-ethyl-5-oxo-4,5-dihydro-1 <i>H</i> -1,2,4-triazol-3-yl)propyl)phenyl)-3-methoxypicolinic acid
140	2-(4-(3-(1-(4-(<i>tert</i> -Butyl)benzyl)-4-ethyl-5-oxo-4,5-dihydro-1 <i>H</i> -1,2,4-triazol-3-yl)propyl)phenyl)-5-methoxyisonicotinic acid
141	(<i>R</i>)-2-(4'-(3-(1-(4-(<i>tert</i> -Butyl)benzyl)-4-ethyl-5-oxo-4,5-dihydro-1 <i>H</i> -1,2,4-triazol-3-yl)propyl)-4-methoxy-[1,1'-biphenyl]-3-yl)propanoic acid
142	(<i>S</i>)-2-(4'-(3-(1-(4-(<i>tert</i> -Butyl)benzyl)-4-ethyl-5-oxo-4,5-dihydro-1 <i>H</i> -1,2,4-triazol-3-yl)propyl)-4-methoxy-[1,1'-biphenyl]-3-yl)propanoic acid
143	1-(4-(<i>tert</i> -Butyl)benzyl)-4-ethyl-3-(3-(4'-(3-fluorooxetan-3-yl)-[1,1'-biphenyl]-4-yl)propyl)-1 <i>H</i> -1,2,4-triazol-5(4 <i>H</i>)-one
144	2-(6-(4-(3-(1-(4-(<i>tert</i> -Butyl)benzyl)-4-ethyl-5-oxo-4,5-dihydro-1 <i>H</i> -1,2,4-triazol-3-yl)propyl)phenyl)-3-methoxypyridin-2-yl)acetic acid
145	2-(4'-(3-(1-(4-(<i>tert</i> -Butyl)benzyl)-4-ethyl-5-oxo-4,5-dihydro-1 <i>H</i> -1,2,4-triazol-3-yl)propyl)-2'-hydroxy-4-methoxy-[1,1'-biphenyl]-3-yl)acetic acid
146	2-(4'-(3-(1-(4-(<i>tert</i> -Butyl)benzyl)-4-ethyl-5-oxo-4,5-dihydro-1 <i>H</i> -1,2,4-triazol-3-yl)propyl)-3'-hydroxy-4-methoxy-[1,1'-biphenyl]-3-yl)acetic acid
147	3-(3-(3'-Amino-4'-methoxy-[1,1'-biphenyl]-4-yl)propyl)-1-(4-(<i>tert</i> -butyl)benzyl)-4-ethyl-1 <i>H</i> -1,2,4-triazol-5(4 <i>H</i>)-one
148	3-(3-(3'-Amino-4'-(trifluoromethyl)-[1,1'-biphenyl]-4-yl)propyl)-1-(4-(<i>tert</i> -butyl)benzyl)-4-ethyl-1 <i>H</i> -1,2,4-triazol-5(4 <i>H</i>)-one
149	3-(3-(3'-Amino-4'-methyl-[1,1'-biphenyl]-4-yl)propyl)-1-(4-(<i>tert</i> -butyl)benzyl)-4-ethyl-1 <i>H</i> -1,2,4-triazol-5(4 <i>H</i>)-one
150	2-(4'-(3-(1-(4-(<i>tert</i> -Butyl)benzyl)-4-ethyl-5-oxo-4,5-dihydro-1 <i>H</i> -1,2,4-triazol-3-yl)propyl)-

Example no.	Compound name
	4-methoxy-2'-(trifluoromethyl)-[1,1'-biphenyl]-3-yl)acetic acid
151	1-{[4-(<i>tert</i> -Butyl)phenyl]methyl}-4-ethyl-3-[3-(4-{4-methoxy-3-[(phenylsulfonyl)amino]phenyl}phenyl)propyl]-1,2,4-triazolin-5-one
152	1-{[4-(<i>tert</i> -Butyl)phenyl]methyl}-4-ethyl-3-[3-(4-{4-methyl-3-[(phenylsulfonyl)amino]phenyl}phenyl)propyl]-1,2,4-triazolin-5-one
153	1-(6-(4-(3-(1-(4-(<i>tert</i> -Butyl)benzyl)-4-ethyl-5-oxo-4,5-dihydro-1 <i>H</i> -1,2,4-triazol-3-yl)propyl)phenyl)pyridin-2-yl)-3-phenylurea
154	<i>N</i> -((6-(4-(3-(1-(4-(<i>tert</i> -Butyl)benzyl)-4-ethyl-5-oxo-4,5-dihydro-1 <i>H</i> -1,2,4-triazol-3-yl)propyl)phenyl)pyridin-2-yl)carbamoyl)benzenesulfonamide
155	1-Benzyl-3-(6-(4-(3-(1-(4-(<i>tert</i> -butyl)benzyl)-4-ethyl-5-oxo-4,5-dihydro-1 <i>H</i> -1,2,4-triazol-3-yl)propyl)phenyl)pyridin-2yl)urea
156	3-(3-{4-[5-Amino-3-(trifluoromethyl)(2-pyridyl)]phenyl}propyl)-1-{[4-(<i>tert</i> -butyl)phenyl]methyl}-4-ethyl-1,2,4-triazolin-5-one
157	2-(4'-(3-(1-(4-(<i>tert</i> -Butyl)benzyl)-4-ethyl-5-oxo-4,5-dihydro-1 <i>H</i> -1,2,4-triazol-3-yl)propyl)-4-methoxy-2'-methyl-[1,1'-biphenyl]-3-yl)acetic acid
158	2-(4'-(3-(1-(4-(<i>tert</i> -Butyl)benzyl)-4-ethyl-5-oxo-4,5-dihydro-1 <i>H</i> -1,2,4-triazol-3-yl)propyl)-3',4-dimethoxy-[1,1'-biphenyl]-3-yl)acetic acid
159	2-(4'-(3-(1-(4-(<i>tert</i> -Butyl)benzyl)-4-ethyl-5-oxo-4,5-dihydro-1 <i>H</i> -1,2,4-triazol-3-yl)propyl)-2',4-dimethoxy-[1,1'-biphenyl]-3-yl)acetic acid
160	<i>N</i> -((6-(4-(3-(1-(4-(<i>tert</i> -Butyl)benzyl)-4-ethyl-5-oxo-4,5-dihydro-1 <i>H</i> -1,2,4-triazol-3-yl)propyl)phenyl)pyridin-3-yl)carbamoyl)benzenesulfonamide
161	3-(3-{4-[6-Amino-5-(trifluoromethyl)(2-pyridyl)]phenyl}propyl)-1-{[4-(<i>tert</i> -butyl)phenyl]methyl}-4-ethyl-1,2,4-triazolin-5-one
162	6-(4-(3-(1-(4-(<i>tert</i> -Butyl)benzyl)-4-ethyl-5-oxo-4,5-dihydro-1 <i>H</i> -1,2,4-triazol-3-yl)propyl)phenyl)-3-methoxypyrazine-2-carboxylic acid
163	2-(4'-(3-(1-(4-(<i>tert</i> -Butyl)benzyl)-4-ethyl-5-oxo-4,5-dihydro-1 <i>H</i> -1,2,4-triazol-3-yl)-1,1-difluoropropyl)-4-methoxy-[1,1'-biphenyl]-3-yl)acetic acid
164	1-{[4-(<i>tert</i> -Butyl)phenyl]methyl}-4-ethyl-3-[3-(4-{6-[(phenylsulfonyl)amino]-5-(trifluoromethyl)(2-pyridyl)}phenyl)propyl]-1,2,4-triazolin-5-one
165	6-(4-(3-(1-(4-(<i>tert</i> -Butyl)benzyl)-4-ethyl-5-oxo-4,5-dihydro-1 <i>H</i> -1,2,4-triazol-3-yl)propyl)phenyl)-3-methylpicolinic acid
166	1-(4-(<i>tert</i> -Butyl)benzyl)-4-ethyl-3-(3-(4-(6-(3-fluorooxetan-3-yl)pyridine-3-yl)phenyl)propyl)-1 <i>H</i> -1,2,4-triazol-5(4 <i>H</i>)-one
167	1-(4-(<i>tert</i> -Butyl)benzyl)--3-(3-(4'-(3-hydroxyoxetan-3-yl)-[1,1'-biphenyl]-4-yl)propyl)-1 <i>H</i> -1,2,4-triazol-5(4 <i>H</i>)-one
168	4'-(3-(1-(4-(<i>tert</i> -Butyl)benzyl)-4-ethyl-5-oxo-4,5-dihydro-1 <i>H</i> -1,2,4-triazol-3-yl)propyl)-4-propoxy-[1,1'-biphenyl]-3-carboxylic acid
169	1-(6-(4-(3-(1-(4-(<i>tert</i> -Butyl)benzyl)-4-ethyl-5-oxo-4,5-dihydro-1 <i>H</i> -1,2,4-triazol-3-yl)propyl)phenyl)pyridin-3-yl)-3-ethylurea
170	1-(4-(<i>tert</i> -Butyl)benzyl)-4-ethyl-3-(3-(4-(2-(3-fluorooxetan-3-yl)pyrimidin-5-yl)phenyl)propyl)-1 <i>H</i> -1,2,4-triazol-5(4 <i>H</i>)-one
171	1-(6-(4-(3-(1-(4-(<i>tert</i> -Butyl)benzyl)-4-ethyl-5-oxo-4,5-dihydro-1 <i>H</i> -1,2,4-triazol-3-yl)propyl)phenyl)pyridin-2-yl)-3-ethylurea
172	3-(3-{4-[3-(Aminomethyl)phenyl]phenyl}propyl)-1-{[4-(<i>tert</i> -butyl)phenyl]methyl}-4-ethyl-1,2,4-triazolin-5-one
173	1-(4-(<i>tert</i> -Butyl)benzyl)-4-ethyl-3-(3-(4-(2-(3-hydroxyoxetan-3-yl)pyrimidin-5-yl)phenyl)propyl)-1 <i>H</i> -1,2,4-triazol-5(4 <i>H</i>)-one
174	1-(4-(<i>tert</i> -Butyl)benzyl)-4-ethyl-3-(3-(4'-(3-hydroxyoxetan-3-yl)-[1,1'-biphenyl]-4-yl)propyl)-1 <i>H</i> -1,2,4-triazol-5(4 <i>H</i>)-one
176	1-(4-(<i>tert</i> -Butyl)benzyl)-4-ethyl-3-(3-(4'-(1-hydroxycyclobutyl)-[1,1'-biphenyl]-4-yl)propyl)-1 <i>H</i> -1,2,4-triazol-5(4 <i>H</i>)-one
177	1-{[4-(<i>tert</i> -Butyl)phenyl]methyl}-4-ethyl-3-{3-[4-(3-{[(phenylsulfonyl)amino]methyl}phenyl)phenyl]propyl}-1,2,4-triazolin-5-one

Example no.	Compound name
178	1- {[4-(<i>tert</i> -Butyl)phenyl]methyl}-4-ethyl-3- {3-[4-(3- {[(methylsulfonyl)amino]methyl} phenyl)phenyl]propyl}-1,2,4-triazolin-5-one
179	3-(5- {4-[3-(1- {[4-(<i>tert</i> -Butyl)phenyl]methyl}-4-ethyl-5-oxo(1,2,4-triazolin-3-yl))propyl]phenyl}-2-methoxyphenyl)propanoic acid
180	1- {[4-(<i>tert</i> -Butyl)phenyl]methyl}-4-ethyl-3- [3-(4- {4-methoxy-3- [(methylamino)methyl]phenyl} phenyl)propyl]-1,2,4-triazolin-5-one
181	2-(4-(3-(1-(4-(<i>tert</i> -Butyl)benzyl)-4-ethyl-5-oxo-4,5-dihydro-1 <i>H</i> -1,2,4-triazol-3-yl)propyl)phenyl)-5-methoxypyrimidine-4-carboxylic acid
182	1- {[4-(<i>tert</i> -Butyl)phenyl]methyl}-4-ethyl-3- {3-[4-(4-methoxy-3- {2-[(phenylsulfonyl)amino] ethyl} phenyl)phenyl]propyl}-1,2,4-triazolin-5-one
183	1- {[4-(<i>tert</i> -Butyl)phenyl]methyl}-4-ethyl-3- {3-[4-(4-methoxy-3- {2-[(methylsulfonyl)amino] ethyl} phenyl)phenyl]propyl}-1,2,4-triazolin-5-one
184	3-(3- {4-[3-(Aminomethyl)-4-methoxyphenyl]phenyl} propyl)-1- {[4-(<i>tert</i> -butyl)phenyl]methyl}-4-ethyl-1,2,4-triazolin-5-one
185	1- {[4-(<i>tert</i> -Butyl)phenyl]methyl}-4-ethyl-3- {3-[4-(4-methoxy-3- {[(phenylsulfonyl)amino] methyl} phenyl)phenyl]propyl}-1,2,4-triazolin-5-one
186	1- {[4-(<i>tert</i> -Butyl)phenyl]methyl}-4-ethyl-3- {3-[4-(4-methoxy-3- {[(methylsulfonyl)amino] methyl} phenyl)phenyl]propyl}-1,2,4-triazolin-5-one
187	1-(4-(<i>tert</i> -Butyl)benzyl)-4-ethyl-3-(3-(4'- (4-hydroxytetrahydro-2 <i>H</i> -pyran-4-yl)-[1,1'-biphenyl]-4-yl)propyl)-1 <i>H</i> -1,2,4-triazol-5(4 <i>H</i>)-one
188	1- {[4-(<i>tert</i> -Butyl)phenyl]methyl}-4-ethyl-3-(3- {4-[4-methoxy-3- ({ [benzylsulfonyl]amino} methyl)phenyl]phenyl} propyl)-1,2,4-triazolin-5-one
189	1- {[4-(<i>tert</i> -Butyl)phenyl]methyl}-4-ethyl-3-[3-(4- {6-[(ethylsulfonyl)amino]-5-methoxy(2-pyridyl)} phenyl)propyl]-1,2,4-triazolin-5-one
190	1- {[4-(<i>tert</i> -Butyl)phenyl]methyl}-4-ethyl-3-[3-(4- {6-[(cyclopropylsulfonyl)amino]-5-methoxy(2-pyridyl)} phenyl)propyl]-1,2,4-triazolin-5-one
191	1-(4-(<i>tert</i> -Butyl)benzyl)-4-ethyl-3-(3-(4-(5-(3-fluorooxetan-3-yl)pyridine-2-yl)phenyl)propyl)-1 <i>H</i> -1,2,4-triazol-5(4 <i>H</i>)-one
192	1- {[4-(<i>tert</i> -Butyl)phenyl]methyl}-4-ethyl-3-[3-(4- {6-[(cyclohexylsulfonyl)amino]-5-methoxy(2-pyridyl)} phenyl)propyl]-1,2,4-triazolin-5-one
193	3- {4-[3-(1- {[4-(<i>tert</i> -Butyl)phenyl]methyl}-4-ethyl-5-oxo(1,2,4-triazolin-3-yl))propyl]phenyl}-5-methoxybenzoic acid
194	2-(3- {4-[3-(1- {[4-(<i>tert</i> -Butyl)phenyl]methyl}-4-ethyl-5-oxo(1,2,4-triazolin-3-yl))propyl]phenyl}-5-methoxyphenyl)acetic acid
195	1-(4-(<i>tert</i> -Butyl)benzyl)-3-(3,3-difluoro-3-(4-(5-(3-fluorooxetan-3-yl)pyridine-2-yl)phenyl)propyl)-4-ethyl-1 <i>H</i> -1,2,4-triazol-5(4 <i>H</i>)-one
196	1-(4-(<i>tert</i> -Butyl)benzyl)-3-(3,3-difluoro-3-(4'- (3-hydroxyoxetan-3-yl)-[1,1'-biphenyl]-4-yl)propyl)-4-ethyl-1 <i>H</i> -1,2,4-triazol-5(4 <i>H</i>)-one
197	1-(4-(<i>tert</i> -Butyl)benzyl)-4-ethyl-3-(3-(4-(5-(3-hydroxyoxetan-3-yl)pyridine-2-yl)phenyl)propyl)-1 <i>H</i> -1,2,4-triazol-5(4 <i>H</i>)-one
198	2-(5-(6-(3-(1-(4-(<i>tert</i> -Butyl)benzyl)-4-ethyl-5-oxo-4,5-dihydro-1 <i>H</i> -1,2,4-triazol-3-yl)propyl)pyridin-3-yl)-2-methoxyphenyl)acetic acid
199	2-(4'-(3-(1-(4-(<i>tert</i> -Butyl)benzyl)-4-ethyl-5-oxo-4,5-dihydro-1 <i>H</i> -1,2,4-triazol-3-yl)propyl)-3-methoxy-[1,1'-biphenyl]-4-yl)acetic acid
200	2-(4'-(3-(1-(4-(<i>tert</i> -Butyl)benzyl)-4-ethyl-5-oxo-4,5-dihydro-1 <i>H</i> -1,2,4-triazol-3-yl)propyl)-4-isopropoxy-[1,1'-biphenyl]-3-yl)acetic acid
201	1-(4-(<i>tert</i> -Butyl)benzyl)-4-ethyl-3-(3-(4-(2-(3-fluorooxetan-3-yl)thiazol-4-yl)phenyl)propyl)-1 <i>H</i> -1,2,4-triazol-5(4 <i>H</i>)-one
202	1-(4-(<i>tert</i> -Butyl)benzyl)-4-ethyl-3-(3-(4-(2-(3-fluorooxetan-3-yl)thiazol-5-yl)phenyl)propyl)-1 <i>H</i> -1,2,4-triazol-5(4 <i>H</i>)-one
203	1-(4-(<i>tert</i> -Butyl)benzyl)-4-ethyl-3-(3-(4-(2-(3-hydroxyoxetan-3-yl)thiazol-4-yl)phenyl)propyl)-1 <i>H</i> -1,2,4-triazol-5(4 <i>H</i>)-one
204	1-(4-(<i>tert</i> -Butyl)benzyl)-4-ethyl-3-(3-(4-(2-(3-hydroxyoxetan-3-yl)thiazol-5-

Example no.	Compound name
	yl)phenyl)propyl)-1 <i>H</i> -1,2,4-triazol-5(4 <i>H</i>)-one

or a pharmaceutically acceptable salt thereof.

[0042] In another aspect the invention is directed to a pharmaceutical composition comprising a compound of Formula I, or a pharmaceutically acceptable salt thereof, and a pharmaceutically acceptable carrier.

[0043] In another aspect the invention is directed to a method of treating a cancer which is negatively impacted by diminution in its metabolism of fatty acid oxidation via the administration of a therapeutically effective amount of a compound of Formula I, or a pharmaceutically acceptable salt thereof.

[0044] Within this aspect there is a genus wherein the cancer is selected from prostate, breast, ovarian, liver, kidney, colon, pancreatic, human chronic lymphocytic leukemia, and melanoma.

[0045] In another aspect the invention is directed to a method of treating cancer comprising the administration of a therapeutically effective amount of a compound of Formula I, or a pharmaceutically acceptable salt thereof.

[0046] In another aspect the invention is directed to a method of preventing the onset of and/or recurrence of acute and chronic myeloid leukemia, as well as other cancers, through the administration of a therapeutically effective amount of a compound of Formula I, or a pharmaceutically acceptable salt thereof.

DEFINITIONS

[0047] The term "patient" includes mammals such as mice, rats, cows, sheep, pigs, rabbits, goats, horses, monkeys, dogs, cats, and humans.

[0048] The term "halo" or "halogen" refers to any radical of fluorine, chlorine, bromine or iodine.

[0049] The term "alkyl" refers to a saturated hydrocarbon chain that may be a straight chain or branched chain, containing the indicated number of carbon atoms. For example, C₁₋₆alkyl indicates that the group may have from 1 to 6 (inclusive) carbon atoms in it. Any atom can be optionally substituted, e.g., by one or more substituents. Examples of alkyl groups include without limitation methyl, ethyl, *n*-propyl, isopropyl, *n*-butyl, *sec*-butyl and *tert*-butyl.

[0050] The term "haloalkyl" refers to an alkyl group, in which at least one hydrogen atom is replaced by halo. In some embodiments, more than one hydrogen atom (e.g., 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, or 14) are replaced by halo. In these embodiments, the hydrogen atoms can each be replaced by the same halogen (e.g., fluoro) or the hydrogen atoms can be replaced by a combination of different halogens (e.g., fluoro and chloro). "Haloalkyl" also includes alkyl moieties in which all hydrogens have been replaced by halo (sometimes referred to herein as perhaloalkyl, e.g., perfluoroalkyl, such as trifluoromethyl). Any atom can be optionally substituted, e.g., by one or more substituents.

[0051] As referred to herein, the term "alkoxy" refers to a group of formula -O-(alkyl). Alkoxy can be, for example, methoxy, ethoxy, propoxy, isopropoxy, butoxy, iso-butoxy, sec-butoxy, pentoxy, 2-pentoxy, 3-pentoxy, or hexyloxy. Likewise, the term "thioalkoxy" refers to a group of formula -S-(alkyl). The terms "haloalkoxy" and "thioalkoxy" refer to -O-(haloalkyl) and -S-(haloalkyl), respectively. The term "sulfhydryl" refers to -SH.

[0052] The term "aralkyl" refers to an alkyl moiety in which an alkyl hydrogen atom is replaced by an aryl group. One of the carbons of the alkyl moiety serves as the point of attachment of the aralkyl group to another moiety. Any ring or chain atom can be optionally substituted e.g., by one or more substituents. Non-limiting examples of "aralkyl" include benzyl, 2-phenylethyl, and 3-phenylpropyl groups.

[0053] The term "alkenyl" refers to a straight or branched hydrocarbon chain containing the indicated number of carbon atoms and having one or more carbon-carbon double bonds. Any atom can be optionally substituted, e.g., by one or more substituents. Alkenyl groups can include, e.g., vinyl, allyl, 1-butenyl, and 2-hexenyl.

[0054] The term "heterocycle" or "heterocyclic", as used herein except where noted, represents a stable 4-, 5-, 6- or 7-membered monocyclic- or stable 6-, 7-, 8-, 9-, 10-, 11-, or 12-membered fused bicyclic heterocyclic ring system which comprises at least one non-aromatic (i.e. saturated or partially unsaturated) ring which consists of carbon atoms and from one to four heteroatoms selected from the group consisting of N, O and S, wherein the nitrogen and sulfur heteroatoms may optionally be oxidized, and wherein the nitrogen heteroatom may optionally be quaternized. In the case of a "heterocycle" which is a bicyclic group, the second ring may also be a non-aromatic ring which consists of carbon atoms and from one to four heteroatoms selected from the group consisting of N, O and S, as defined above, or the second ring may be a benzene ring, or a "cycloalkyl", or a "cycloalkenyl", as defined immediately below. Examples of such heterocyclic groups include, but are not limited to, azetidine, chroman, dihydrofuran, dihydropyran, dioxane, dioxolane, hexahydroazepine, imidazolidine, imidazoline, indoline, isochroman, isoindoline, isothiazoline, isothiazolidine, isoxazoline, isoxazolidine, morpholine, oxazoline, oxazolidine, oxetane, piperazine, piperidine, pyran, pyrazolidine, pyrazoline, pyrrolidine, pyrroline, tetrahydrofuran, tetrahydropyran, thiamorpholine, thiazoline, thiazolidine, thiomorpholine, and N-oxides thereof.

[0055] The term "cycloalkyl" refers to a fully saturated monocyclic, bicyclic, tricyclic, or other polycyclic hydrocarbon groups. Any atom can be optionally substituted, e.g., by one or more substituents. A ring carbon serves as the point of attachment of a cycloalkyl group to another moiety. Cycloalkyl moieties can include, e.g., cyclopropyl, cyclobutyl, cyclopentyl, cyclohexyl, cycloheptyl, adamantyl, and norbornyl (bicycle[2.2.1]heptyl).

[0056] The term "cycloalkenyl" refers to partially unsaturated monocyclic, bicyclic, tricyclic, or other polycyclic hydrocarbon groups. A ring carbon (e.g., saturated or unsaturated) is the point of attachment of the cycloalkenyl substituent. Any atom can be optionally substituted e.g., by one or more substituents. Cycloalkenyl moieties can include, e.g., cyclopentenyl, cyclohexenyl, cyclohexadienyl, or norbornenyl.

[0057] The term "cycloalkylene", as used herein, refers to a divalent monocyclic cycloalkyl group having the indicated number of ring atoms.

[0058] The term "heterocycloalkylene", as used herein, refers to a divalent monocyclic heterocyclyl group having the indicated number of ring atoms.

[0059] The term "aryl" as used herein, is intended to mean any stable monocyclic or bicyclic carbon ring of up to 7 members in each ring, wherein at least one ring is aromatic. Examples of such aryl elements include phenyl, naphthyl, tetrahydronaphthyl, indanyl, or biphenyl.

[0060] The term "heteroaryl", as used herein except where noted, represents a stable 5-, 6- or 7-membered monocyclic- or stable 9 or 10-membered fused bicyclic ring system which comprises at least one aromatic ring, -which consists of carbon atoms and from one to three heteroatoms selected from the group consisting of N, O and S wherein the nitrogen and sulfur heteroatoms may optionally be oxidized, and the nitrogen heteroatom may optionally be quaternized. In the instance where nitrogen is the only heteroatom, there may be four nitrogens. In the case of a "heteroaryl" which is a bicyclic group, the second ring need not be aromatic and need not comprise a heteroatom. Accordingly, "heteroaryl" includes, for example, a stable 5-, 6- or 7-membered monocyclic aromatic ring consisting of carbon atoms and from one to four heteroatoms, as defined immediately above, fused to a benzene ring, or fused to a "heterocycle", a "cycloalkyl", or a "cycloalkenyl", as defined above. Examples of such heteroaryl groups include, but are not limited to, benzimidazole, benzisothiazole, benzisoxazole, benzofuran, isobenzofuran, benzothiazole, benzothiophene, benzotriazole, benzoxazole, carboline, cinnoline, furan, furazan, imidazole, indazole, indole, indolizine, isoquinoline, isothiazole, isoxazole, naphthyridine, oxadiazole, oxazole, phthalazine, pteridine, purine, pyrazine, pyrazole, pyridazine, pyridine, pyrimidine, pyrrole, quinazoline, quinoline, quinoxaline, tetrazole, thiadiazole, thiazole, thiophene, triazine, triazole, and N-oxides thereof.

[0061] The term "acyl", as used herein, refers to those groups derived from an organic acid by removal of the hydroxy portion of the acid. Accordingly, acyl is meant to include, for example, acetyl, propionyl, butyryl, decanoyl, pivaloyl, benzoyl and the like.

COMPOUND FORMS AND SALTS

[0062] The compounds of this invention may contain one or more asymmetric centers and thus occur as racemates and racemic mixtures, enantiomerically enriched mixtures, single enantiomers, individual diastereomers and diastereomeric mixtures. The compounds of this invention may also be represented in multiple tautomeric forms, in such instances, the invention expressly includes all tautomeric forms of the compounds described herein, even though only a single tautomeric form may be represented. All such isomeric forms of such compounds are expressly included in the present invention.

[0063] The compounds of this invention include the compounds themselves, as well as their salts and their prodrugs, if applicable. A salt, for example, can be formed between an anion and a positively charged substituent (e.g., amino) on a compound described herein. Suitable anions include chloride, bromide, iodide, sulfate, nitrate, phosphate, citrate, methanesulfonate, trifluoroacetate, and acetate. Likewise, a salt can also be formed between a cation and a negatively charged substituent (e.g., carboxylate) on a compound described herein. Suitable cations include sodium ion, potassium ion, magnesium ion, calcium ion, and an ammonium cation such as tetramethylammonium ion.

[0064] As used herein, "pharmaceutically acceptable salts" refer to derivatives wherein the parent compound is modified by making acid or base salts thereof. Examples of pharmaceutically acceptable salts include, but are not limited to, mineral or organic acid salts of basic residues such as amines; alkali or organic salts of acidic residues such as carboxylic acids; and the like. The pharmaceutically acceptable salts include the conventional non-toxic salts or the quaternary ammonium salts of the parent compound formed, for example, from non-toxic inorganic or organic acids. For example, such conventional non-toxic salts include those derived from inorganic acids such as hydrochloric, hydrobromic, sulfuric, sulfamic, phosphoric, nitric and the like; and the salts prepared from organic acids such as acetic, propionic, succinic, glycolic, stearic, lactic, malic, tartaric, citric, ascorbic, pantoic, maleic, hydroxymaleic, phenylacetic, glutamic, benzoic, salicylic, sulfanilic, 2-acetoxybenzoic, fumaric, toluenesulfonic, methanesulfonic, ethane disulfonic, oxalic, isethionic, and the like.

[0065] When the compound of the present invention is basic, salts may be prepared from pharmaceutically acceptable non-toxic acids, including inorganic and organic acids. Such acids include acetic, benzenesulfonic, benzoic, camphorsulfonic, citric, ethanesulfonic, fumaric, gluconic, glutamic, hydrobromic, hydrochloric, isethionic, lactic, maleic, malic, mandelic, methanesulfonic, mucic, nitric, pantoic, pantothenic, phosphoric, succinic, sulfuric, tartaric, p-toluenesulfonic acid, and the like. In one aspect of the invention the salts are citric, hydrobromic, hydrochloric, maleic, phosphoric, sulfuric, fumaric, and tartaric acids.

[0066] When the compound of the present invention is acidic, salts may be prepared from pharmaceutically acceptable non-toxic bases, including inorganic and organic acids. Such salts that may be prepared include lithium salt, sodium salt, potassium salt, magnesium salt, calcium salt, dicyclohexylamine salt, N-methyl-D-glucamine salt, tris(hydroxymethyl)methylamine salt, arginine salt, lysine salt, and the like.

[0067] Lists of suitable salts are found in Remington's Pharmaceutical Sciences, 17th ed., Mack Publishing Company, Easton, Pa., 1985, p. 1418; Journal of Pharmaceutical Science, 66, 2 (1977); and "Pharmaceutical Salts: Properties, Selection, and Use. A Handbook"; Wermuth, C. G. and Stahl, P. H. (eds.) Verlag Helvetica Chimica Acta, Zurich, 2002 [ISBN 3-906390-26-8] each of which is incorporated herein by reference in their entireties.

[0068] The compounds may be radiolabeled with radioactive isotopes, such as for example tritium, iodine-125 or carbon-14. All isotopic variations of the compounds of the invention, whether radioactive or not, are intended to be encompassed within the scope of the invention.

[0069] In some embodiments, hydrogen atoms of the compounds described herein may be replaced with deuterium atoms.

[0070] In some embodiments, compounds of Formula I are prepared as prodrugs. Prodrugs are generally drug precursors that, following administration to a subject and subsequent absorption, are converted to an active, or a more active species via some process, such as conversion by a metabolic pathway. Examples of prodrugs include C₁₋₆ alkyl esters of carboxylic acid groups, which, upon administration to a subject, are capable of providing active compounds.

PHARMACEUTICAL COMPOSITIONS

[0071] The term "pharmaceutically acceptable carrier" refers to a carrier or an adjuvant that may be administered to a patient, together with a compound of this invention, or a pharmaceutically acceptable salt thereof, and which does not destroy the pharmacological activity thereof and is nontoxic when administered in doses sufficient to deliver a therapeutic amount of the compound.

[0072] The term "composition" as used herein is intended to encompass a product comprising the specified ingredients in the specified amounts, as well as any product which results, directly or indirectly, from combination of the specified ingredients in the specified amounts. Such term in relation to pharmaceutical composition, is intended to encompass a product comprising the active ingredient(s), and the inert ingredient(s) that make up the carrier, as well as any product which results, directly or indirectly, from combination, complexation or aggregation of any two or more of the ingredients, or from dissociation of one or more of the ingredients, or from other types of reactions or interactions of one or more of the ingredients. Accordingly, the pharmaceutical compositions of the present invention encompass any composition made by admixing a compound of the present invention, or a pharmaceutically acceptable salt thereof, and a pharmaceutically acceptable carrier. By "pharmaceutically acceptable" it is meant the carrier, diluent or excipient must be compatible with the other ingredients of the formulation and not deleterious to the recipient thereof.

[0073] The present invention includes within its scope prodrugs of the compounds of this invention. In general, such prodrugs will be functional derivatives of the compounds of this invention which are readily convertible in vivo into the required compound. Thus, in the methods of treatment of the present invention, the terms "administration of" or "administering a" compound shall encompass the treatment of the various conditions described with the compound specifically disclosed or with a compound which may not be specifically disclosed, but which converts to the specified compound in vivo after administration to the patient. Conventional procedures for the selection and preparation of suitable prodrug derivatives are described, for example, in "Design of Prodrugs," ed. H. Bundgaard, Elsevier, 1985. Metabolites of these compounds include active species produced upon introduction of compounds of this invention into the biological milieu.

[0074] The amount administered depends on the compound formulation, route of administration, etc. and is generally empirically determined in routine trials, and variations will necessarily occur depending on the target, the host, and the route of administration, etc. Generally, the quantity of active compound in a unit dose of preparation may be varied or adjusted from about 1, 3, 10 or 30 to about 30, 100, 300 or 1000 mg, according to the particular application. For convenience, the total daily dosage may be divided and administered in portions during the day if desired.

USES

[0075] In one aspect the invention disclosed herein is directed to compounds of Formula I and pharmaceutically acceptable salts thereof, which are useful in the treatment of prostate, breast, ovarian, liver, kidney, colon, pancreatic, human chronic lymphocytic leukemia, melanoma and other cancers. In another aspect, the invention is directed to a method of preventing the onset of and/or recurrence of acute and chronic myeloid leukemia, as well as other cancers. The invention also includes pharmaceutical compositions comprising a therapeutically effective amount of compound of Formula I, or a pharmaceutically acceptable salt thereof. The invention disclosed herein is also directed to methods of treating prostate, breast, ovarian, liver, kidney, colon, pancreatic, human chronic lymphocytic leukemia, melanoma and other cancers. The invention disclosed herein is further directed to methods of treating prostate, breast, colon, pancreatic, human chronic lymphocytic leukemia, melanoma and other cancers comprising administration of a therapeutically effective amount of a selective PPAR α antagonist. The methods include administering to the subject an effective amount of a compound of Formula (I) (and/or a compound of any of the other formulae described herein) or a salt (e.g., a pharmaceutically acceptable salt) thereof as defined anywhere herein to the patient. In another aspect, the use of a compound of Formula (I) (and/or a compound of any of the other formulae described herein) or a salt (e.g., a pharmaceutically acceptable salt) thereof as defined anywhere herein in the preparation of, or for use as, a medicament for the treatment (e.g., controlling, alleviating, or slowing the progression of) or prevention (e.g., delaying the onset of or reducing the risk of developing) of one or more diseases, disorders, or conditions caused by, or associated with, prostate, breast, ovarian, liver, kidney, colon, pancreatic, human chronic lymphocytic leukemia, melanoma and other cancers.

[0076] In one aspect the invention is directed a method of treating a cancer which is negatively impacted by diminution in its metabolism via fatty acid oxidation, comprising administration of a therapeutically effective amount of a compound of Formula I (and/or a compound of any of the other formulae described herein) or a salt (e.g., a pharmaceutically acceptable salt) thereof. In another aspect, the invention is directed to a method of treating a cancer having a metabolism that is reliant on fatty acid oxidation, comprising administration of a therapeutically effective amount of a compound of Formula I (and/or a compound of any of the other formulae described herein), or a pharmaceutically acceptable salt thereof.

ADMINISTRATION

[0077] The compounds and compositions described herein can, for example, be administered orally, parenterally (e.g., subcutaneously, intracutaneously, intravenously, intramuscularly, intraarticularly, intraarterially, intrasynovially, intrasternally, intrathecally, intralesionally and by intracranial injection or infusion techniques), by inhalation spray, topically, rectally, nasally, buccally, vaginally, via an implanted reservoir, by injection, subdermally, intraperitoneally, transmucosally, or in an ophthalmic preparation, with a dosage ranging from about 0.01 mg/kg to about 1000 mg/kg, (e.g., from about 0.01 to about 100 mg/kg, from about 0.1 to about 100 mg/kg, from about 1 to about 100 mg/kg, from about 1 to about 10 mg/kg) every 4 to 120 hours, or according to the requirements of the particular drug. The interrelationship of

dosages for animals and humans (based on milligrams per meter squared of body surface) is described by Freireich et al., *Cancer Chemother. Rep.* 50, 219 (1966). Body surface area may be approximately determined from height and weight of the patient. See, e.g., *Scientific Tables*, Geigy Pharmaceuticals, Ardsley, N.Y., 537 (1970). In certain embodiments, the compositions are administered by oral administration or by injection. The methods herein contemplate administration of an effective amount of compound or compound composition to achieve the desired or stated effect. Typically, the pharmaceutical compositions of this invention will be administered from about 1 to about 6 times per day or alternatively, as a continuous infusion. Such administration can be used as a chronic or acute therapy.

[0078] Lower or higher doses than those recited above may be required. Specific dosage and treatment regimens for any particular patient will depend upon a variety of factors, including the activity of the specific compound employed, the age, body weight, general health status, sex, diet, time of administration, rate of excretion, drug combination, the severity and course of the disease, condition or symptoms, the patient's disposition to the disease, and the judgment of the treating physician.

[0079] Dosage forms include from about 0.05 milligrams to about 2,000 milligrams (e.g., from about 0.1 milligrams to about 1,000 milligrams, from about 0.1 milligrams to about 500 milligrams, from about 0.1 milligrams to about 250 milligrams, from about 0.1 milligrams to about 100 milligrams, from about 0.1 milligrams to about 50 milligrams, or from about 0.1 milligrams to about 25 milligrams) of a compound of Formula I (and/or a compound of any of the other formulae described herein) or a salt (e.g., a pharmaceutically acceptable salt) thereof as defined anywhere herein. The dosage forms can further include a pharmaceutically acceptable carrier and/or an additional therapeutic agent.

[0080] In one aspect the compounds of the invention may be co-administered with one or more additional anti-cancer agents. The additional anti-cancer agents include, but are not limited to alkylating agents such as cyclophosphamide, chlorambucil, meclorethamine, ifosfamide, or melphalan; antimetabolites such as methotrexate, cytarabine, fludarabine, 6-mercaptopurine, azathioprene, pyrimidines, or 5-fluorouracil; antimitotic agents such as vincristine, paclitaxel, vinorelbine or docetaxel; a topoisomerase inhibitors such as doxorubicin or irinotecan; platinum derivatives such as cisplatin, carboplatin or oxaliplatin; hormone therapeutics such as tamoxifen; aromatase inhibitors such as bicalutamide, anastrozole, exemestane or letrozole; signaling inhibitors such as imatinib, gefitinib or erlotinib; monoclonal antibodies such as rituximab, trastuzumab, gemtuzumab or ozogamicin; differentiating agents such as tretinoin or arsenic trioxide; antiangiogenic agents such as bevacizumab, sorafenib or sunitinib; biologic response modifiers such as interferon-alpha; topoisomerase inhibitors such as camptothecins (including irinotecan and topotecan), amsacrine, etoposide, etoposide phosphate, or teniposide; cytotoxic antibiotics such as actinomycin, anthracyclines including doxorubicin, daunorubicin, valrubicin, idarubicin, epirubicin, bleomycin, plicamycin or mitomycin; vinca alkaloids such as vincristine, vinblastine, viorelbine or vindesine; podophyllotoxins such as etoposide and teniposide; or mTOR inhibitors such as rapamycin, temsirolimus and everolimus.

[0081] Other anti-cancer agents for use in combination with the compounds include one or more of the following: abiraterone; adriamycin; acivicin; aclarubicin; acodazole hydrochloride; acronine; adozelesin; aldesleukin; altretamine; ambomycin; ametantrone acetate; aminoglutethimide; amsacrine; anastrozole; anthramycin; asparaginase; asperlin; azacitidine; azetepa; azotomycin; batimastat; benzodepa; bicalutamide; bisantrene hydrochloride; bisnafide dimesylate; bizelesin; bleomycin sulfate; brequinar sodium; bropirimine; busulfan; cactinomycin; calusterone; caracemide; carbetimer; carboplatin; carmustine; carubicin hydrochloride; carzelesin; cedefingol; chlorambucil; cirolemycin; cisplatin; cladribine; crisnatol mesylate; cyclophosphamide; cytarabine; dacarbazine; dactinomycin; daunorubicin hydrochloride; decitabine; dexormaplatin; dezaguanine; dezaguanine mesylate; diaziquone; doxorubicin; doxorubicin hydrochloride; droloxifene; droloxifene citrate; dromostanolone propionate; duazomycin; edatrexate; eflornithine hydrochloride; elsamitrucin; enloplatin; enpromate; epipropidine; epirubicin hydrochloride; erbulozole; esorubicin hydrochloride; estramustine; estramustine phosphate sodium; etanidazole; etoposide; etoposide phosphate; etoprine; everolimus; fadrozole hydrochloride; fazarabine; fenretinide; floxuridine; fludarabine phosphate; fluorouracil; flurocitabine; fosquidone; fostriecin sodium; gemcitabine; gemcitabine hydrochloride; hydroxyurea; idarubicin hydrochloride; ifosfamide; iimofosine; interleukin II (including recombinant interleukin II, or rIL2), interferon alfa-2a; interferon alfa-2b; interferon alfa-n1; interferon alfa-n3; interferon beta-1 a; interferon gamma-1 b; iproplatin; irinotecan hydrochloride; lanreotide acetate; letrozole; leuprolide acetate; liarozole hydrochloride; lometrexol sodium; lomustine; losoxantrone hydrochloride; masoprocil; maytansine; mechlorethamine hydrochloride; megestrol acetate; melengestrol acetate; melphalan; menogaril; mercaptopurine; methotrexate; methotrexate sodium; metoprine; meturedopa; mitindomide; mitocarcin; mitocromin; mitogillin; mitomalcin; mitomycin; mitosper; mitotane; mitoxantrone hydrochloride; mycophenolic acid; nocodazole; nogalamycin; ormaplatin; oxisuran; pegaspargase; peliomycin; pentamustine; peplomycin sulfate; perfosfamide; pipobroman; piposulfan; piroxantrone hydrochloride; plicamycin; plomestane; porfimer sodium; porfiromycin; prednimustine; procarbazine hydrochloride; puromycin; puromycin hydrochloride; pyrazofurin; rapamycin; riboprine; rogletimide; safingol; safingol hydrochloride; semustine; simtrazene; sparfosate sodium; sparsomycin; spirogermanium hydrochloride; spiromustine; spiroplatin; streptonigrin; streptozocin; sulofenur; talisomycin; tecogalan sodium; tegafur; teloxantrone hydrochloride; temoporfin; temsirolimus; teniposide; teroxirone; testolactone; thiamiprine; thioguanine; thiotepa; tiazofurin; tirapazamine; toremifene citrate; trestolone acetate; triciribine phosphate; trimetrexate; trimetrexate glucuronate; triptorelin; tubulozole hydrochloride; uracil mustard; uredepa; vapreotide; verteporfin; vinblastine sulfate; vincristine sulfate; vindesine; vindesine sulfate; vinepidine sulfate; vinglycinat sulfate; vinleurosine sulfate; vinorelbine tartrate; vinrosidine sulfate; vinzolidine sulfate; vorozole; zeniplatin; zinostatin; zorubicin hydrochloride.

[0082] In certain embodiments, the additional agents may be administered separately (e.g., sequentially; on different overlapping schedules), as part of a multiple dose regimen, from the compounds of this invention (e.g., one or more compounds of Formula (I) and/or a compound of any of the other formulae, including any subgenera or specific compounds thereof). In other embodiments, these agents may be part of a single

dosage form, mixed together with the compounds of this invention in a single composition. In still another embodiment, these agents can be given as a separate dose that is administered at about the same time as that of one or more compounds of Formula (I) (and/or a compound of any of the other formulae, including any subgenera or specific compounds thereof) are administered (e.g., simultaneously with the administration of one or more compounds of Formula (I) (and/or a compound of any of the other formulae, including any subgenera or specific compounds thereof)). When the compositions of this invention include a combination of a compound of the formulae described herein and one or more additional therapeutic or prophylactic agents, both the compound and the additional agent can be present at dosage levels of between about 1 to 100%, and more preferably between about 5 to 95% of the dosage normally administered in a monotherapy regimen.

[0083] The compositions of this invention may contain any conventional non-toxic pharmaceutically-acceptable carriers, adjuvants or vehicles. In some cases, the pH of the formulation may be adjusted with pharmaceutically acceptable acids, bases or buffers to enhance the stability of the formulated compound or its delivery form.

[0084] The compositions of this invention may be orally administered in any orally acceptable dosage form including, but not limited to, capsules, tablets, emulsions and aqueous suspensions, dispersions and solutions. In the case of tablets for oral use, carriers which are commonly used include lactose and corn starch. Lubricating agents, such as magnesium stearate, are also typically added. For oral administration in a capsule form, useful diluents include lactose and dried corn starch. When aqueous suspensions and/or emulsions are administered orally, the active ingredient may be suspended or dissolved in an oily phase and then combined with emulsifying and/or suspending agents. If desired, certain sweetening and/or flavoring and/or coloring agents may be added.

BIOLOGICAL FUNCTION

[0085] The utility of the invention can be demonstrated by one or more of the following methods or other methods known in the art:

Human PPAR α Reporter Assay

[0086] The screening of test compounds for agonist or antagonist activities against human PPAR α receptors was performed using a commercial kit, Human PPAR α Reporter Assay System (Indigo Biosciences, Cat. #IB00111).

This nuclear receptor assay system utilizes proprietary non-human mammalian cells engineered to provide constitutive, high-level expression of Human PPAR α . Because these cells incorporate a PPAR α -responsive luciferase reporter gene, quantifying expressed luciferase activity provides a sensitive surrogate measure of PPAR α activity in the treated cells. The primary application of this reporter assay system is in the screening of test samples to quantify any functional activity, either agonist or antagonist, that they may exert against human PPAR α .

[0087] While this assay may be used to measure agonism, each of the Examples, *vide infra*, exhibits antagonism rather than agonism. Briefly, reporter cells are dispensed into wells of the assay plate and then immediately dosed with test compounds. Following an overnight incubation, the treatment media is discarded and Luciferase Detection Reagent (LDR) is added. The intensity of light emission from the ensuing luciferase reaction provides a sensitive measure that is directly proportional to the relative level of PPAR α activation in the reporter cells.

Example	Luciferase IC ₅₀ (nM)	MS* (ESI)
1	95	512 (+H)
2	57	598 (+H)
3	271	470 (+H)
4	40	610 (+H)
5	43	470 (+H)
6	255	469 (+H)
7	471	623 (+H)
8	304	651 (+H)
9	363	637 (+H)
10	67	610 (+H)
11	157	470 (+H)
12	63	548 (+H)
13	268	538 (+H)
14	284	537 (+H)
15	519	539 (+H)
16	90	610 (+H)
17	407	548 (+H)
18	1420	530 (+H)
19	796	530 (+H)
20	1832	542 (+H)
21	25	542 (+H)
22	612	496 (+H)
23	7312	456 (+H)
24	579	524 (+H)
25	184	560 (+H)
26	4112	538 (+H)
27	2170	514 (+H)
28	1983	546 (-H)
29	1189	520 (-H)
30	1280	524 (+H)
31	1962	526 (+H)
32	2986	560 (+H)
33	427	530 (+H)
34	1451	522 (-H)
35	1117	536 (-H)
36	2759	526 (+H)
37	1958	535 (+H)
38	10	556 (+H)
39	707	518 (+H)
40	408	548 (+H)
41	510	566 (+H)

Example	Luciferase IC ₅₀ (nM)	MS* (ESI)
42	488	574 (+H)
43	898	513 (+H)
44	652	526 (+H)
45	306	513 (+H)
46	699	540 (+H)
47	685	602 (+H)
48	426	581 (+H)
49	69	582 (+H)
50	568	513 (+H)
51	292	567 (+H)
52	440	565 (+H)
53	363	538 (+H)
54	499	518 (+H)
55	250	596 (+H)
56	330	567 (+H)
57	175	565 (+H)
58	71	500 (+H)
59	3	640 (+H)
60	63	514 (+H)
61	20	572 (+H)
62	5	654 (+H)
63	562	560 (+H)
64	38	559 (+H)
65	6	528 (+H)
66	3	542 (+H)
67	88	591 (+H)
68	32	570 (+H)
69	24	584 (+H)
70	270	537 (+H)
71	865	652 (+H)
72	208	652 (+H)
73	62	700 (+H)
74	945	716 (+H)
75	207	693 (+H)
76	261	554 (+H)
77	703	771 (+H)
78	37	624 (+H)
79	263	624 (+H)
80	22	556 (+H)
81	127	611 (+H)
82	181	678 (+H)
83	60	645 (+H)
84	208	640 (+H)
85	662	552 (+H)
86	971	678 (+H)
87	10	654 (+H)
88	24	708 (+H)
89	251	538 (+H)
90	487	645 (+H)
91	136	640 (+H)
92	5	675 (+H)
93	3	670 (+H)

Example	Luciferase IC ₅₀ (nM)	MS* (ESI)
94	16	570 (+H)
95	15	542 (+H)
96	272	540 (+H)
97	745	574 (+H)
98	264	640 (+H)
99	524	623 (+H)
100	712	540 (+H)
101	402	588 (+H)
102	695	538 (+H)
103	436	589 (+H)
104	591	637 (+H)
105	985	637 (+H)
106	26	528 (+H)
107	683	576 (+H)
108	165	611 (+H)
109	590	470 (+H)
110	534	654 (+H)
111	641	500 (+H)
112	816	640 (+H)
113	8	676 (+H)
114	7	671 (+H)
115	116	526 (+H)
116	987	603 (+H)
117	799	610 (+H)
118	446	611 (+H)
119	941	625 (+H)
120	604	563 (+H)
121	39	564 (+H)
122	188	582 (+H)
123	186	640 (+H)
124	290	624 (+H)
125	356	638 (+H)
126	201	624 (+H)
127	445	638 (+H)
128	281	568 (+H)
129	36	611 (+H)
130	11	596 (+H)
131	15	582 (+H)
132	12	512 (+H)
133	597	582 (+H)
134	109	566 (+H)
135	192	619 (+H)
136	41	681 (+H)
137	676	538 (+H)
138	33	611 (+H)
139	89	529 (+H)
140	396	529 (+H)
141	29	556 (+H)
142	272	556 (+H)
143	101	528 (+H)
144	114	543 (+H)
145	692	558 (+H)

Example	Luciferase IC ₅₀ (nM)	MS* (ESI)
146	98	558 (+H)
147	85	499 (+H)
148	241	537 (+H)
149	161	483 (+H)
150	126	610 (+H)
151	61	639 (+H)
152	160	623 (+H)
153	947	589 (+H)
154	241	653 (+H)
155	362	603 (+H)
156	684	538 (+H)
157	94	556 (+H)
158	184	572 (+H)
159	410	572 (+H)
160	429	653 (+H)
161	638	538 (+H)
162	630	530 (+H)
163	15	578 (+H)
164	20	678 (+H)
165	202	513 (+H)
166	91	529 (+H)
167	454	498 (+H)
168	9	556 (+H)
169	535	541 (+H)
170	41	530 (+H)
171	816	541 (+H)
172	647	484 (+H)
173	126	528 (+H)
174	144	526 (+H)
176	78	524 (+H)
177	419	624 (+H)
178	417	562 (+H)
179	121	556 (+H)
180	640	527 (+H)
181	846	530 (+H)
182	414	667 (+H)
183	440	605 (+H)
184	534	513 (+H)
185	423	653 (+H)
186	587	591 (+H)
187	607	554 (+H)
188	430	667 (+H)
189	36	592 (+H)
190	12	604 (+H)
191	41	529 (+H)
192	12	646 (+H)
193	21	528 (+H)
194	83	542 (+H)
195	49	563 (+H)
196	110	562 (+H)
197	106	527 (+H)
198	623	543 (+H)

Example	Luciferase IC ₅₀ (nM)	MS* (ESI)
199	292	542 (+H)
200	13	570 (+H)
201	533	535 (+H)
202	51	535 (+H)
203	873	533 (+H)
204	50	533 (+H)

*mass spectroscopic data

Target Selectivity Assays

[0088] To determine species selectivity, a Mouse PPAR α Reporter Assay System was used (Indigo Biosciences, Cat. #M00111). Activity of test compounds to antagonize or agonize other isoforms of human PPAR, for example β/δ and γ , were assessed using the corresponding kits from Indigo Biosciences (Cat. #IB00121 and #IB00101, respectively). In addition to PPAR activity, compounds were also screened for activity against other nuclear hormone receptors including Estrogen Receptor β , Glucocorticoid Receptor and Thyroid Receptor β using commercially available kits (Indigo Biosciences, Cat. #IB00411, IB00201 and IB01101, respectively). Each assay system from Indigo Biosciences uses technology analogous to the human PPAR α kit, with the variance being that the cells used for each assay were engineered to over-express the receptor of interest. In addition, the appropriate receptor agonist (included with each kit) was used at $\sim$ EC₈₀ for assays in which antagonist potency was being assessed.

Target Selectivity – Counterscreen Assay Results

Example	PPAR alpha IC ₅₀ (nM)	PPAR beta/delta IC ₅₀ (nM)	PPAR gamma IC ₅₀ (nM)	Thyroid Receptor β IC ₅₀	Glucocorticoid Receptor IC ₅₀	Estrogen Receptor β IC ₅₀
10	67	2600	2900	>10 μ M	36.5 μ M	11.4 μ M
23	25	>50000	>50000	>10 μ M	>10 μ M	17.5 μ M

Measuring fatty acid oxidation using ³H palmitate

[0089] Fatty acid oxidation is measured using ³H palmitate metabolism into ³H₂O as described previously (Nieman et al., 2011). Briefly, cells (e.g. HepG2, PC3 and CLL) are plated in growth media and allowed to adhere overnight. Cells are then treated with compound or 40 μ M etomoxir (an inhibitor of fatty acid oxidation) as control. After treatment, cells are washed with DPBS followed by incubation in assay buffer (growth media, ³H palmitate and compound). After incubation, media is collected and proteins precipitated with 5% trichloroacetic acid. The precipitate is pelleted by centrifugation and the supernatant collected. Any remaining ³H palmitate in the supernatant is then removed by purification over a Dowex anion exchange column. ³H₂O is then measured by scintillation counting.

Measurement of cell viability

[0090] Purified CLL cells were cultured at 2 x 10⁵ cells/200 μ L of RPMI1640 supplemented with 10% FCS in 96-well plates under various treatment conditions. Determination of CLL cell viability was based on the analysis of mitochondrial transmembrane potential ($\Delta\Psi$ m) using 3,3'-dihexyloxacarbocyanine iodide (DiOC6) (Invitrogen) and cell membrane permeability to propidium iodide (PI) (Sigma). For viability assays, 100 μ L of the cell culture was collected at the indicated time points and transferred to polypropylene

tubes containing 100 μ L of 40 μ M DiOC6 and 10 μ g/mL PI in culture media. The cells were then incubated at 37 °C for 15 min and analyzed within 30 min by flow cytometry using an Accuri C6 flow cytometer. The percentage of viable cells was determined by gating on PI negative and DiOC6 bright cells.

In vivo PD model: PPAR alpha agonist-induced changes in liver gene expression

[0091] CD-1 mice were treated with test compound 1-2 hours prior to oral gavage with the PPAR alpha agonist WY14,643 (3 mg/kg). For the 1 day pharmacodynamic model, animals were euthanized 6 hours after agonist treatment. For the 3 day pharmacodynamic model, mice were dosed again with antagonist and WY14,643 on day 2 and day 3. In this case, mice were euthanized 6 hours following WY14,643 on day 3. Upon termination, blood was collected for DMPK analysis. Liver was collected, placed into Trizol and stored at -80 °C until processing. RNA was extracted from thawed and homogenized tissue using standard Trizol RNA isolation methods. RT-PCR was performed on the extracted RNA using primers specific for PPAR alpha regulated genes. Quantitative PCR was performed on the resulting cDNA and expression was normalized to β -actin.

In vivo cancer model: B16F10 model of pulmonary metastasis

[0092] B16F10 cells were cultured in standard growth media, harvested when approximately 50% confluent and injected into C57BL/6 mice via the tail vein (50,000 cells per mouse in 200 μ L). Mice were then treated daily with test compound. On day 21, mice were euthanized. Lungs were harvested and placed into Fekete's solution overnight to facilitate visualization of the tumors. Black nodules were enumerated.

[0093] Figure 1 shows inhibition of metastasis of B16F10 melanoma cells to the lung following intraperitoneal doses of *N*-(6-(4-(3-(1-(4-(*tert*-Butyl)benzyl)-4-ethyl-5-oxo-4,5-dihydro-1*H*-1,2,4-triazol-3-yl)propyl)phenyl)pyridin-3-yl)benzenesulfonamide (Example 10) at 0.3, 3 and 30 mg/kg. Statistics were performed by ANOVA with Dunnett's Multiple Comparison Test post-hoc to determine statistical differences from vehicle treatment group (* denotes $P < 0.05$ while *** denotes $P < 0.001$).

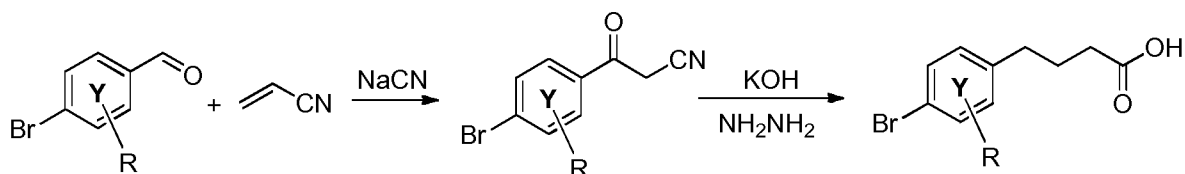
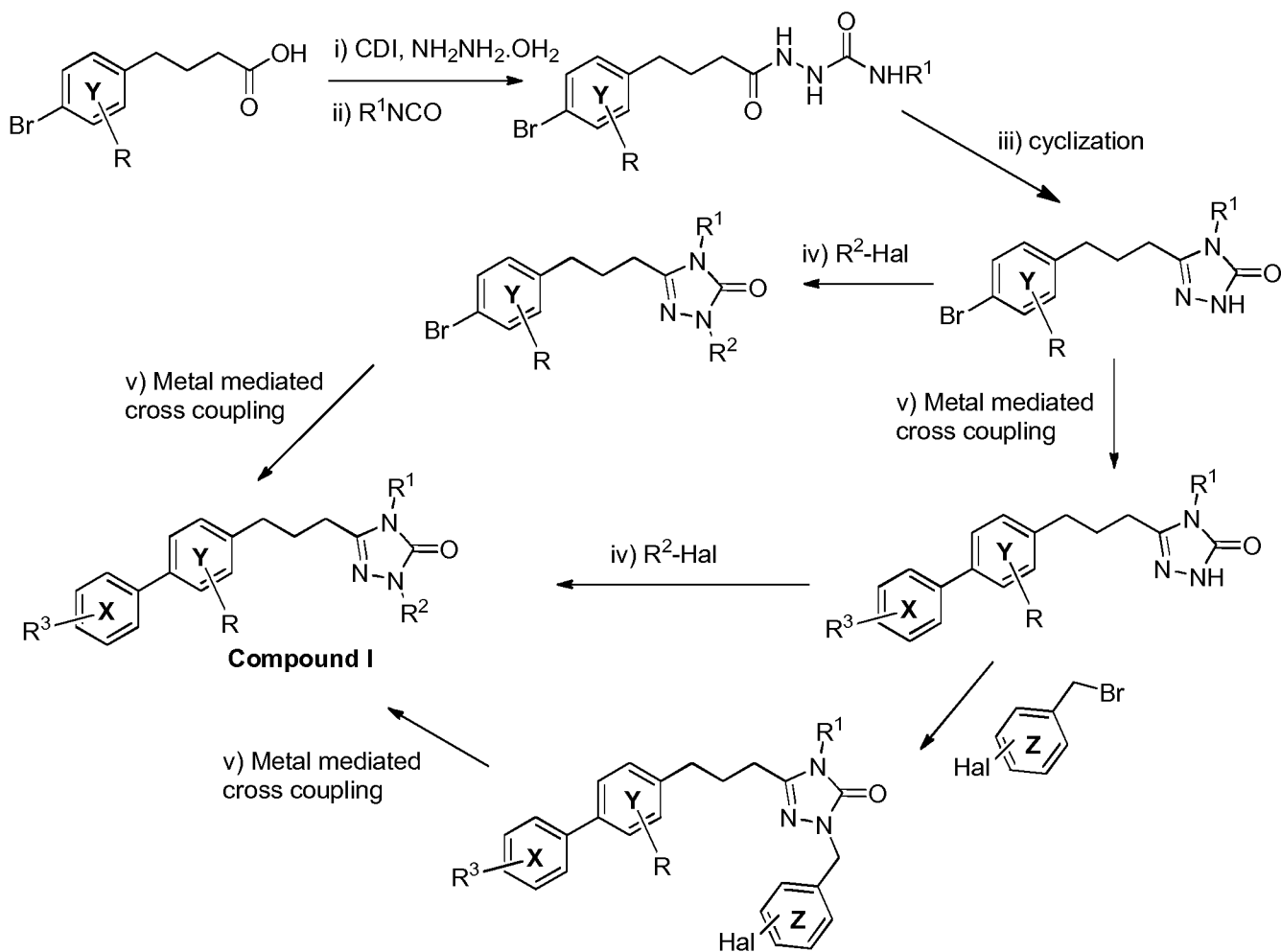
SYNTHESIS

[0094] The starting materials used for the synthesis are either synthesized or obtained from commercial sources, such as, but not limited to, Sigma-Aldrich, Fluka, Acros Organics, Alfa Aesar, VWR Scientific, and the like. General methods for the preparation of compounds can be modified by the use of appropriate reagents and conditions for the introduction of the various moieties found in the structures as provided herein.

[0095] In some embodiments, compounds described herein are prepared as outlined in the following general synthetic scheme. Generally, a commercially available carboxylic acid, such as 4-(4-bromophenyl)butanoic acid, is first converted into the corresponding hydrazide with hydrazine under typical coupling conditions (e.g. CDI, EDCI, HATU, etc.). The hydrazide thus obtained is then reacted with an alkyl isocyanate, which are commercially available or otherwise readily available. Subsequent cyclization of the resulting acyl hydrazine carboxamide is carried out in the presence of base (e.g. NaOH, KOH, etc.), acid (e.g. camphorsulfonic acid, methanesulfonic acid, etc.) or buffered lewis acid (e.g. TMSOTf with TEA,

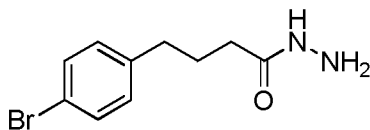
TMSOTf with Hunig's base, etc), to provide the requisite triazolone. At this junction, one could choose to functionalize first the NH of the triazolone using standard *N*-alkylation (e.g. Cs_2CO_3 with $\text{R}^2\text{-Hal}$, K_2CO_3 with $\text{R}^2\text{-Hal}$, etc.) or *N*-arylation (e.g. CuI , L-proline, K_2CO_3 , $\text{R}^2\text{-I}$; $\text{Cu}(\text{OAc})_2$, *trans*-diaminecyclohexane, K_2CO_3 , R^2I , etc.) conditions, before one elaborates the aryl bromide under standard metal-catalyzed conditions (e.g. Suzuki coupling with $\text{Pd}(\text{PPh}_3)_4$, aq. Na_2CO_3 , $\text{R}^3\text{-B}(\text{OH})_2$; Stille coupling with $\text{Pd}(\text{PPh}_3)_4$, KF , $\text{R}^3\text{-SnBu}_3$; Negishi coupling with $\text{Pd}(\text{PPh}_3)_4$, $\text{R}^3\text{-Zn-Br}$; etc.). Alternatively, one could instead choose to elaborate the aryl bromide under more specialized metal-catalyzed conditions (e.g. $\text{Pd}_2(\text{dba})_3$, S-Phos, aq. Na_2CO_3 , $\text{R}^4\text{-B}(\text{OH})_2$) before one functionalize the NH of the triazolone *via* standard *N*-alkylation or *N*-arylation conditions. The latter sequence would allow one to deploy metal-mediated cross-coupling conditions to further decorate the newly installed triazolone substituent without cross-reactivity issues. For examples where the starting carboxylic acid is not commercially available, one could instead synthesize these requisite acids using a two-step sequence where the commercially available aldehyde is allowed to react with acrylonitrile under standard Stetter conditions (e.g. KCN , NaCN , etc.), followed by deoxygenation-hydrolysis under standard Wolf-Kisner conditions (e.g. NH_2NH_2 , KOH). If appropriate, one could also deoxyfluorinate the intermediate ketone nitrile obtained from the Stetter condensation using commercially available reagents such as DAST or deoxyfluor before carrying out the nitrile hydrolysis. Regardless of the synthetic approach employed, Compound I thus accessed can optionally itself be further functionalized, depending on what other existing functionalities are present, using standard elaborative transformations known to those skilled in the art such as sulfonylation, amide coupling, hydrolysis, alkylation, oxidation, reduction, hydrogenation, de-alkylation, etc. or combinations thereof.

General Synthetic Scheme for Exemplary Compounds



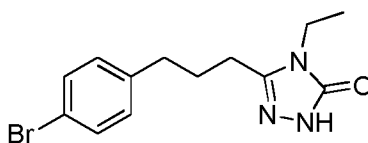
Preparation of Intermediates

4-(4-Bromophenyl)butanehydrazide:



[0096] To a solution of 4-(4-bromophenyl)butanoic acid (10.2 g, 41.9 mmol) in THF (175 mL) was added carbonyldiimidazole (7.47 g, 46.1 mmol) and stirred at room temperature for 2 hrs. Hydrazine hydrate (8.5 mL; ~ 4 eq) was added in one portion and stirring maintained for a period of 1 hr. The solvent was evaporated, the residue partitioned between EtOAc and water, extracted with EtOAc, dried (MgSO_4), filtered and evaporated to afford the title compound which is used without further purification.

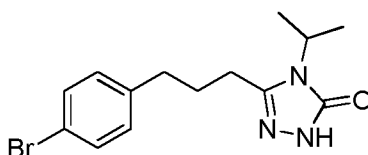
3-(3-(4-Bromophenyl)propyl)-4-ethyl-1H-1,2,4-triazol-5(4H)-one:



[0097] *Step 1:* To a solution of 4-(4-bromophenyl)butanhydrazide (5.3 g, 20.6 mmol) in THF (100 mL) was added ethyl isocyanate (2 mL, 24.7 mmol) dropwise. After stirring at room temperature for 2 hrs, a precipitate had formed. The solvent was then removed *in vacuo* and the product thus obtained was used in the next step without further purification.

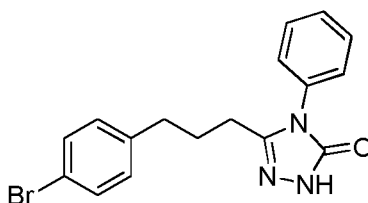
[0098] *Step 2:* The isolated material from the prior reaction was dissolved in MeOH (200 mL) and added potassium hydroxide (11 g). The resulting solution was heated to reflux for 12 hrs. The solvent was then removed *in vacuo* and the residue diluted with DCM (200 mL) and acidified with 1N HCl until an aqueous pH of ~ 2 was achieved. The organic layer was separated and the aqueous phase was extracted with DCM. The combined organic phases were then dried (MgSO₄), filtered and evaporated to dryness to afford the crude title compound as a colorless solid.

3-(3-(4-Bromophenyl)propyl)-4-isopropyl-1H-1,2,4-triazol-5(4H)-one:



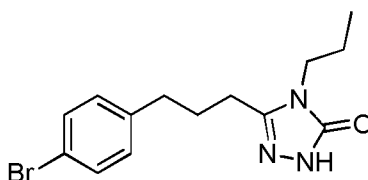
[0099] Prepared in an analogous fashion to the prior ethyl derivative but using isopropyl isocyanate instead.

3-(3-(4-Bromophenyl)propyl)-4-phenyl-1H-1,2,4-triazol-5(4H)-one:



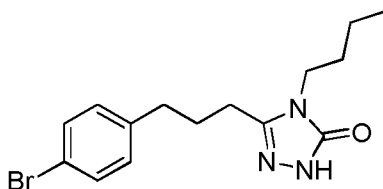
[00100] Prepared in an analogous fashion to the ethyl derivative but using phenyl isocyanate instead.

3-(3-(4-Bromophenyl)propyl)-4-propyl-1H-1,2,4-triazol-5(4H)-one:

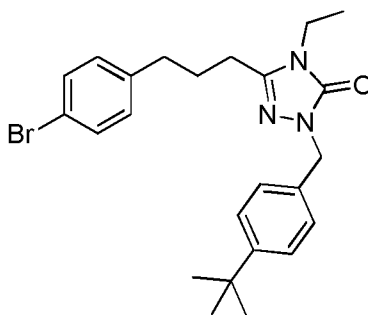


[00101] Prepared in an analogous fashion to the ethyl derivative but using *n*-propyl isocyanate instead.

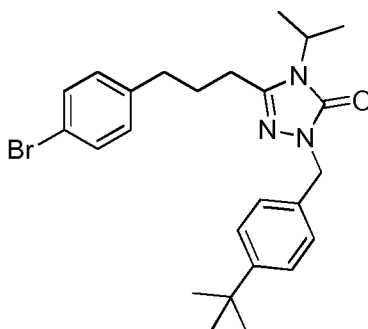
3-(3-(4-Bromophenyl)propyl)-4-butyl-1H-1,2,4-triazol-5(4H)-one:



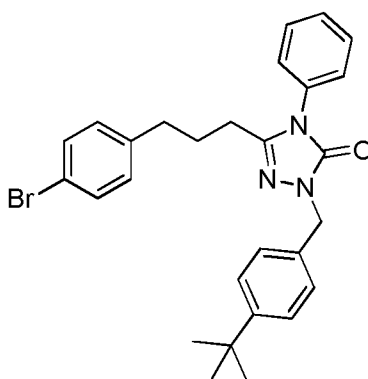
[00102] Prepared in an analogous fashion to the ethyl derivative but using *n*-butyl isocyanate instead.

3-(3-(4-Bromophenyl)propyl)-1-(4-(tert-butyl)benzyl)-4-ethyl-1H-1,2,4-triazol-5(4H)-one:

[00103] To a solution of 3-(3-(4-bromophenyl)propyl)-4-ethyl-1H-1,2,4-triazol-5(4H)-one (6.05 g, 19.6 mmol) in DMF (40 mL) was added potassium carbonate (10.8 g, 80 mmol) and 4-(tert-butyl)benzyl bromide (4.3 mL, 21.6 mmol). The resulting suspension was then heated at 45 °C until complete reaction as judged by LCMS analysis (~ 2 hrs). The reaction was allowed to cool to room temperature and partitioned between EtOAc and water. The organic phase was separated, the aqueous phase was back extracted with EtOAc. The combined organic phases was washed with water (x2), dried (MgSO₄), filtered and the filtrate concentrated *in vacuo*. The residue thus obtained was purified on silica gel eluting with a solvent gradient of 0 to 50% EtOAc in hexanes to afford the title compound as a colorless oil.

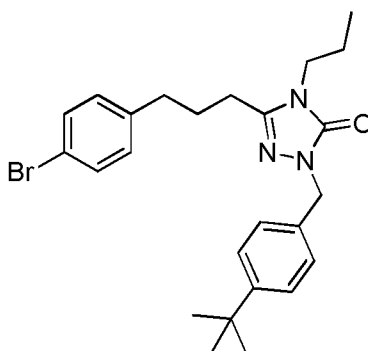
3-(3-(4-Bromophenyl)propyl)-1-(4-(tert-butyl)benzyl)-4-isopropyl-1H-1,2,4-triazol-5(4H)-one:

[00104] Prepared in an analogous fashion to the prior ethyl derivative.

3-(3-(4-Bromophenyl)propyl)-1-(4-(tert-butyl)benzyl)-4-phenyl-1H-1,2,4-triazol-5(4H)-one:

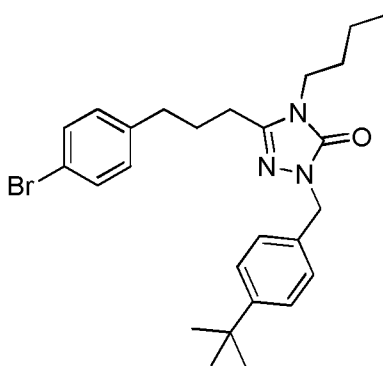
[00105] Prepared in an analogous manner to the prior ethyl derivative.

3-(3-(4-Bromophenyl)propyl)-1-(4-(tert-butyl)benzyl)-4-propyl-1H-1,2,4-triazol-5(4H)-one



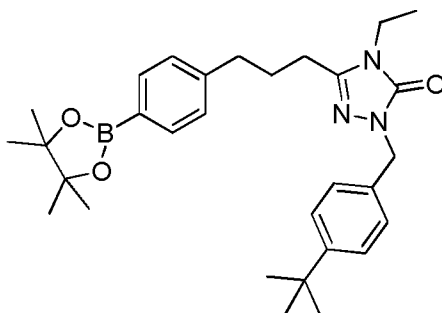
[00106] Prepared in analogous fashion to the prior ethyl derivative.

3-(3-(4-Bromophenyl)propyl)-4-butyl-1-(4-(tert-butyl)benzyl)-1H-1,2,4-triazol-5(4H)-one



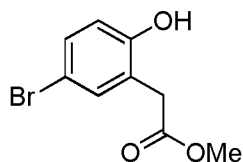
[00107] Prepared in analogous fashion to the prior ethyl derivative.

1-(4-(tert-Butyl)benzyl)-4-ethyl-3-(3-(4-(4,4,5,5-tetramethyl-1,3,2-dioxaborolan-2-yl)phenyl)propyl)-1H-1,2,4-triazol-5(4H)-one:



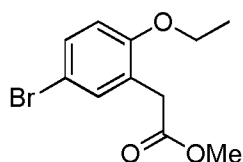
[00108] To a solution of 3-(3-(4-bromophenyl)propyl)-1-(4-(tert-butyl)benzyl)-4-ethyl-1H-1,2,4-triazol-5(4H)-one (10.0 g, 21.9 mmol) in *p*-dioxane (150 mL) was added potassium acetate (6.5 g, 66.2 mmol), bis(pinacolato)diboron (7.2 g, 28.4 mmol) and [1,1'-bis(diphenylphosphino)ferrocene]dichloropalladium(II) (750 mg). The solution was degassed by sparging with nitrogen gas for 10 minutes and then heated at 85 °C under a nitrogen atmosphere for 12 hrs. The solvent was evaporated *in vacuo* and the residue thus obtained was partitioned between EtOAc and water. The organic phase was then separated, washed with water, dried (MgSO₄), filtered and the filtrate concentrated *in vacuo*. The resulting residue was purified using silica gel chromatography eluting with a gradient of 0 to 60% EtOAc in hexanes to afford the title compound as an oily solid.

Methyl 2-(5-bromo-2-hydroxyphenyl)acetate:



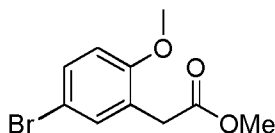
[00109] To a solution of 2-(2-hydroxyphenyl)acetic acid (15.6 g, 103 mmol) in MeOH (350 mL) was added tetrabutylammonium tribromide (50 g, 103 mmol) in small portions over a 10 minute period. After stirring at ambient temperature for 24 hrs, the solvent was evaporated and the residue taken up in EtOAc and 1N aq. HCl. The aqueous wash was separated and back-extracted with EtOAc. The combined organic phases were then dried (MgSO₄), filtered and the filtrate concentrated *in vacuo*. The resulting residue was purified on silica gel eluting with a gradient of 30% EtOAc in hexanes to afford the title compound as a colorless solid.

Methyl 2-(5-bromo-2-ethoxyphenyl)acetate:



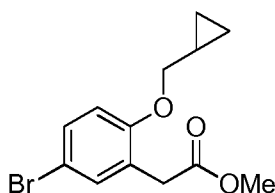
[00110] To a solution of methyl 2-(5-bromo-2-hydroxyphenyl)acetate (1.0 g, 4.1 mmol) in DMF (8 mL) was added cesium carbonate (2.66 g, 8.2 mmol) and iodoethane (392 μ L, 4.9 mmol). After 2 hrs of stirring at rt, the reaction mixture was partitioned between EtOAc and water. The organic phase was then separated, washed with water, dried (MgSO₄), filtered and the filtrate concentrated *in vacuo*. The resulting residue was purified on silica gel eluting with a gradient of 0 to 10% EtOAc in hexanes to afford the title compound as a colorless oil.

Methyl 2-(5-bromo-2-methoxyphenyl)acetate



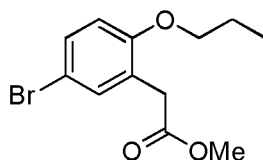
[00111] Prepared in an analogous fashion to the aforementioned ethyl derivative using instead methyl iodide as the electrophile.

Methyl 2-(5-bromo-2-(cyclopropylmethoxy)phenyl)acetate



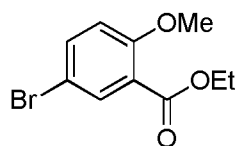
[00112] Prepared in analogous fashion to the aforementioned ethyl derivative using (bromomethyl)cyclopropane as the electrophile.

Methyl 2-(5-bromo-2-propoxyphenyl)acetate



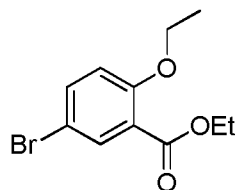
[00113] Prepared in analogous fashion to the aforementioned ethyl derivative using 1-bromopropane as the electrophile.

Ethyl 5-bromo-2-methoxybenzoate



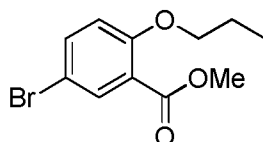
[00114] To a solution of ethyl 5-bromo-2-hydroxybenzoate (2.0 g, 8.66 mmol) in DMF (15 mL) was added cesium carbonate (5.64 g, 17.3 mmol) and iodomethane (600 μ L, 9.63 mmol). After 2 hrs of stirring at rt, the reaction mixture was partitioned between EtOAc and water. The organic phase was then separated, washed with water, dried (MgSO_4), filtered and the filtrate concentrated *in vacuo*. The resulting residue was purified on silica gel eluting with a gradient of 0 to 20% EtOAc in hexanes to afford the title compound as a colorless oil.

Ethyl 5-bromo-2-ethoxybenzoate



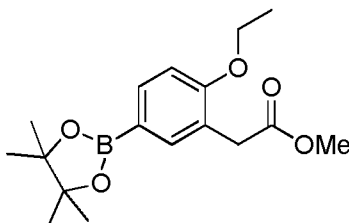
[00115] Prepared in an analogous fashion to the aforementioned methyl derivative with iodoethane as the electrophile.

Methyl 5-bromo-2-propoxybenzoate



[00116] Prepared in an analogous fashion to the aforementioned methyl derivative with 1-bromopropane as the electrophile and methyl 5-bromo-2-hydroxybenzoate as the nucleophile.

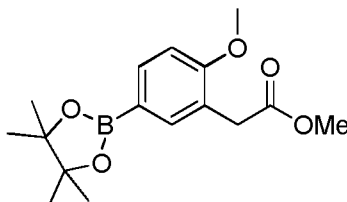
Methyl 2-(2-ethoxy-5-(4,4,5,5-tetramethyl-1,3,2-dioxaborolan-2-yl)phenyl)acetate



[00117] To a solution of methyl 2-(5-bromo-2-ethoxyphenyl)acetate (1.42 g, 5.2 mmol) in *p*-dioxane (35 mL) was added potassium acetate (1.53 g, 15.6 mmol), bis(pinacolato)diboron (1.6 g, 6.3 mmol) and

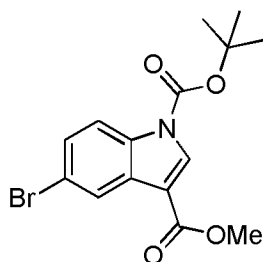
Pd(dppf)Cl₂ (100 mg). The solution as degassed *via* sub-surface purging with dry nitrogen gas for 10 minutes, then heated at 85 °C under a nitrogen atmosphere for 12 hrs. After complete reaction, the suspension was allowed to cool, evaporated, the residue partitioned between EtOAc and water and the organic phase separated, dried (MgSO₄), filtered and evaporated *in vacuo*. The residue was purified on silica gel eluting with a gradient of 0 to 20% EtOAc in hexanes to afford the title compound as a colorless oil which solidified upon standing.

Methyl 2-(2-methoxy-5-(4,4,5,5-tetramethyl-1,3,2-dioxaborolan-2-yl)phenyl)acetate



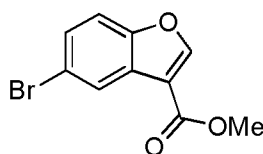
[00118] Prepared in an analogous fashion to the aforementioned ethyl derivative with methyl 2-(5-bromo-2-methoxyphenyl)acetate as the aryl bromide.

Methyl 5-bromo-1H-indole-3-carboxylate



[00119] To a solution of methyl 1H-indole-3-carboxylate (1.0 g, 3.94 mmol) in MeCN (20 mL) was added di-*tert*-butyldicarbonate (1.0 g, 4.58 mmol) and DMAP (cat.) and the solution allowed to stir for 16 hrs. The solvent was evaporated to dryness and the residue partitioned between EtOAc and water. The organic phase was separated, dried (MgSO₄), filtered and evaporated to afford the title compound. This was used without further purification.

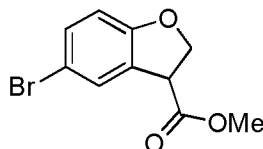
Methyl 5-bromobenzofuran-3-carboxylate



[00120] To a solution of 5-bromobenzofuran-3(2H)-one (1.0 g, 4.7 mmol) in CH₂Cl₂ (20 mL) cooled to 0 °C was added diisopropylethylamine (1.64 mL, 9.4 mmol) and dropwise addition of trifluoromethanesulfonic anhydride (909 µL, 5.4 mmol). After 10 minutes, the reaction mixture was diluted with CH₂Cl₂, washed with water, the organic phase separated, dried (MgSO₄), filtered and evaporated. The residue was filtered through a plug of silica eluting with EtOAc/hexanes (1:1) to afford the intermediate triflate used without further analysis. The triflate was dissolved in MeOH (15 mL) and triethylamine (5 mL) to which was added Pd(OAc)₂ (105 mg, 0.47 mmol) and 1,3-bis(diphenylphosphino)propane (194 mg, 0.47 mmol) and the

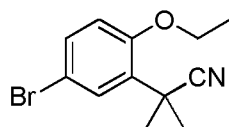
solution sparged with CO gas via sub-surface purge. The resulting solution was heated to 80 °C under an atmosphere of CO for 16 hrs after which the solution was evaporated, the residue partitioned between EtOAc and water, the organic phase separated, dried (MgSO₄), filtered and evaporated *in vacuo*. Purification of the residue on silica gel eluting with a gradient of EtOAc in hexanes (0 to 15%) afforded the title compound.

(rac)-Methyl 5-bromo-2,3-dihydrobenzofuran-3-carboxylate



[00121] To a solution of the previously synthesized methyl 5-bromobenzofuran-3-carboxylate (120 mg, 0.47 mmol) in MeOH (5 mL) was added magnesium turnings (~ 100 mg) and the solution stirred vigorously for 6 hrs after which TLC analysis indicated complete reduction. 1N aq. HCl was carefully added to the solution and after complete dissolution of the magnesium metal the resulting mixture was partitioned between EtOAc and water. The organic phase was separated, dried (MgSO₄), filtered and evaporated to give the title compound in quantitative yield.

1-(5-Bromo-2-ethoxyphenyl)cyclopropanecarbonitrile



[00122] *Step 1:* To a solution of 4-bromo-2-methylphenol (5.0 g, 26.7 mmol) in DMF (20 mL) was added cesium carbonate (13.0 g, 39.9 mmol) and iodoethane (2.6 mL, 32.5 mmol) and the suspension stirred vigorously for 12 hrs. The resulting mixture was partitioned between EtOAc and water. The organic phase was then separated, washed further with water, dried (MgSO₄), and filtered. Evaporation of the filtrate *in vacuo* afforded 4-bromo-1-ethoxy-2-methylbenzene which could be used without further purification.

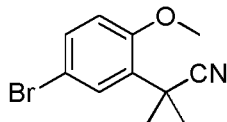
[00123] *Step 2:* To the previously synthesized ether (4.97 g, 23.1 mmol) in carbon tetrachloride (80 mL) was added *N*-bromosuccinimide (4.93 g, 27.6 mmol) and benzoyl peroxide (100 mg). The resulting solution was heated to reflux for 3 hrs, allowed to cool, partially evaporated and then filtered. The filtrate was evaporated *in vacuo* to afford 4-bromo-2-(bromomethyl)-1-ethoxybenzene which could be used without further purification.

[00124] *Step 3:* To a solution of the aforementioned bromide (6.8 g, 23.1 mmol) in DMF (20 mL) was added potassium cyanide (2.26 g, 34.7 mmol) and the resulting suspension stirred for 48 hrs. The reaction mixture was diluted with EtOAc. The organic layer was separated, washed further with water, dried (MgSO₄), filtered and the filtrate concentrated *in vacuo*. The crude residue thus obtained was purified on silica gel eluting with a gradient of EtOAc in hexanes (0 to 10%) to afford 2-(5-bromo-2-ethoxyphenyl)acetonitrile (2.5 g, 45%) over 3 steps.

[00125] *Step 4:* In a sealable vial was placed 2-(5-bromo-2-ethoxyphenyl)acetonitrile (1.0 g, 4.16 mmol), potassium hydroxide (50% aq. soln; 2 mL), 1,2-dibromoethane (541 µL, 6.25 mmol) and

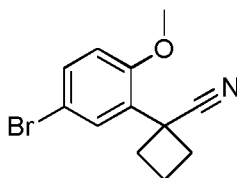
tetrabutylammonium bromide (200 mg). The mixture was heated at 50 °C with vigorous stirring for 4 hrs after which the solution was diluted in EtOAc and then acidified with 1N aq. HCl. The organic phase was separated, dried (MgSO₄), filtered and evaporated to afford the title compound.

1-(5-Bromo-2-methoxyphenyl)cyclopropanecarbonitrile



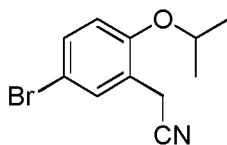
[00126] Prepared in an analogous fashion to the aforementioned ethyl derivative with iodomethane as the electrophile in step 1.

1-(5-Bromo-2-methoxyphenyl)cyclobutanecarbonitrile



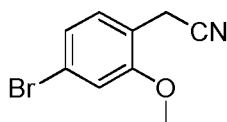
[00127] Prepared in an analogous fashion to the aforementioned ethyl derivative with iodomethane as the electrophile in step 1 and 1,3-dibromopropane as the electrophile in step 4.

2-(5-Bromo-2-isopropoxyphenyl)acetonitrile



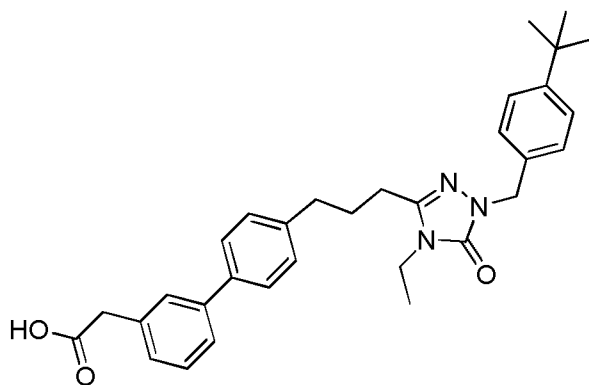
[00128] Prepared in an analogous fashion to the aforementioned ethyl derivative with 2-iodopropane as the electrophile in step 1 and omitting the cyclopropanation step (i.e. step 4).

2-(4-Bromo-2-methoxyphenyl)acetonitrile



[00129] Prepared in an analogous fashion to 2-(5-bromo-2-isopropoxyphenyl)acetonitrile, but with iodomoethane as the electrophile and 5-bromo-2-methylphenol as the nucleophile in step 1.

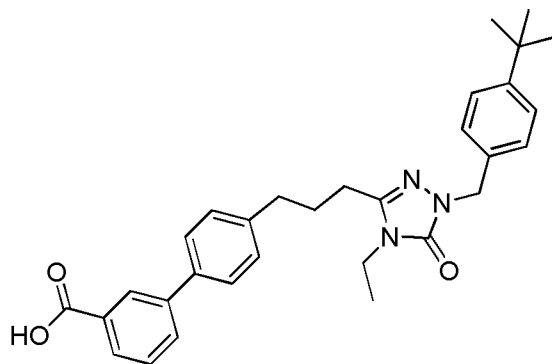
Example 1: 2-(4'-(3-(1-(4-(*tert*-Butyl)benzyl)-4-ethyl-5-oxo-4,5-dihydro-1*H*-1,2,4-triazol-3-yl)propyl)-[1,1'-biphenyl]-3-yl)acetic acid:



[00130] *Step 1:* To a solution of 3-(3-(4-bromophenyl)propyl)-1-(4-(*tert*-butyl)benzyl)-4-ethyl-1*H*-1,2,4-triazol-5(4*H*)-one (275 mg, 0.6 mmol) in DME (4 mL) and water (1.5 mL) was added potassium carbonate (208 mg, 1.5 mmol) and ethyl 2-(3-(4,4,5,5-tetramethyl-1,3,2-dioxaborolan-2-yl)phenyl)acetate (210 mg, 0.72 mmol). The resulting suspension was sparged with nitrogen for 10 minutes before tetrakis(triphenylphosphine)palladium (0) (30 mg) was added. The reaction vessel was then sealed and heated at 80 °C for 3 hrs. After cooling, the solution was partitioned between EtOAc and water. The organic phase was separated, dried (MgSO₄), filtered and the filtrate concentrated *in vacuo*. The resulting residue was purified using silica gel chromatography (0 to 50% EtOAc in hexanes) to afford ethyl 2-(4'-(3-(1-(4-(*tert*-butyl)benzyl)-4-ethyl-5-oxo-4,5-dihydro-1*H*-1,2,4-triazol-3-yl)propyl)-[1,1'-biphenyl]-3-yl)acetate.

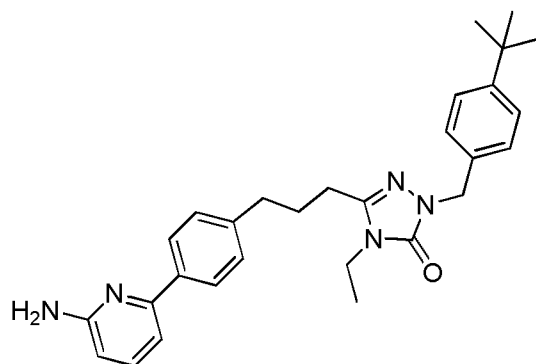
[00131] *Step 2:* To the isolated ester (270 mg, 5 mmol) in a mixture of THF:MeOH:H₂O (6:1.5:1.5 mL) was added lithium hydroxide monohydrate (60 mg). The resulting mixture was then stirred at room temperature until reaction completion as judged by LCMS analysis. At this time, the reaction mixture was diluted with EtOAc and water, and then added solid citric acid added to an aqueous pH of ~ 4. The organic phase was separated, washed further with H₂O, dried (MgSO₄), and filtered. Concentration of the resulting filtrate *in vacuo* afforded the title compound as a colorless foam. LC-MS 512 (M+H)⁺.

Example 2: 4'-(3-(1-(4-(*tert*-Butyl)benzyl)-4-ethyl-5-oxo-4,5-dihydro-1*H*-1,2,4-triazol-3-yl)propyl)-[1,1'-biphenyl]-3-carboxylic acid:



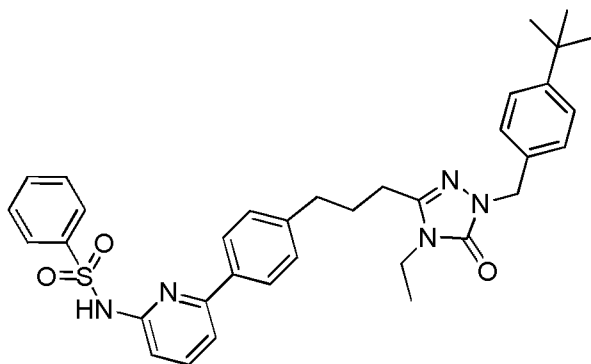
[00132] Prepared in an analogous manner to example 1 using ethyl 3-(4,4,5,5-tetramethyl-1,3,2-dioxaborolan-2-yl)benzoate as the coupling partner in step 1. LC-MS 498 (M+H)⁺.

Example 3: 3-(3-(4-(6-Aminopyridin-2-yl)phenyl)propyl)-1-(4-(*tert*-butyl)benzyl)-4-ethyl-1*H*-1,2,4-triazol-5(4*H*)-one:



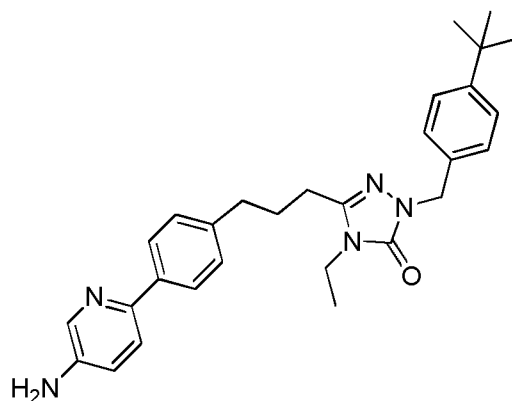
[00133] A mixture of 1-(4-(*tert*-butyl)benzyl)-4-ethyl-3-(3-(4-(4,4,5,5-tetramethyl-1,3,2-dioxaborolan-2-yl)phenyl)propyl)-1*H*-1,2,4-triazol-5(4*H*)-one (98 mg, 0.194 mmol), 2-amino-6-bromopyridine (40 mg, 0.233 mmol, 1.2 eq) and potassium carbonate (80 mg, 0.582 mmol, 3eq) were taken up in DME (2 mL) and water (1 mL). To this was added tetrakis(triphenylphosphine)palladium(0) (22 mg, 0.0194 mmol, 0.1 eq) and the resulting mixture was stirred at 85 °C under an atmosphere of N₂ for 24 hrs. The reaction mixture was then cooled to room temperature and the solvent was removed *in vacuo*. The crude material thus obtained was partitioned between water and EtOAc. The aqueous layer was back-extracted with EtOAc (3 x 20 mL) and the combined organic extracts were dried over anhydrous Na₂SO₄ and filtered. The filtrate thus obtained was then evaporated *in vacuo* to afford the crude product that could be purified further by flash column chromatography (silica gel, 0-10% MeOH/DCM) to afford the title compound as a white foam (75.5 mg, 83 %). LC-MS: 470 (M+H)⁺.

Example 4: *N*-(6-(4-(3-(1-(4-(*tert*-Butyl)benzyl)-4-ethyl-5-oxo-4,5-dihydro-1*H*-1,2,4-triazol-3-yl)propyl)phenyl)pyridin-2-yl)benzenesulfonamide:



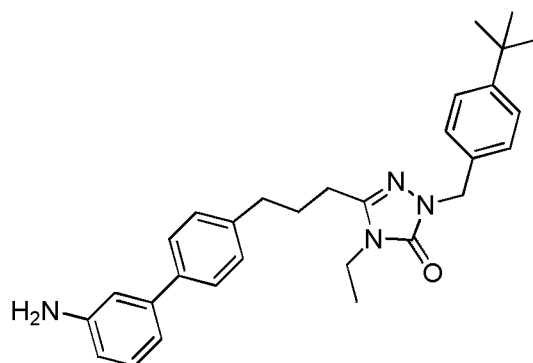
[00134] A mixture of 3-(3-(4-(6-aminopyridin-2-yl)phenyl)propyl)-1-(4-(*tert*-butyl)benzyl)-4-ethyl-1*H*-1,2,4-triazol-5(4*H*)-one (126 mg, 0.268 mmol) and benzene sulfonylchloride (38 μ L, 0.295 mmol, 1.1 eq) was stirred in pyridine (1.5 mL) at room temperature for 24 hrs. The mixture thus obtained was poured onto dichloromethane (40 mL) and washed with saturated CuSO₄, water, and brine. The organic extract was then dried over anhydrous Na₂SO₄, filtered and the filtrate concentrated *in vacuo*. The crude product thus obtained was then purified by flash column chromatography (silica gel, 0-90% EtOAc/Hexanes) to afford the title compound as a white solid (115.6 mg, 71 %). LC-MS: 610 (M+H)⁺.

Example 5: 3-(3-(4-(5-Aminopyridin-2-yl)phenyl)propyl)-1-(4-(*tert*-butyl)benzyl)-4-ethyl-1*H*-1,2,4-triazol-5(4*H*)-one:



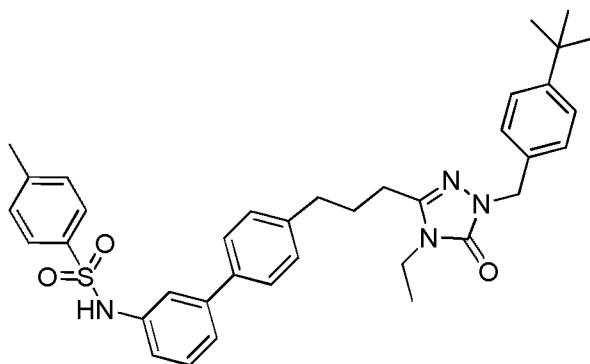
[00135] Prepared in an analogous manner to example 3 using 5-amino-2-bromopyridine as the coupling partner. LC-MS: 470 (M+H)⁺.

Example 6: 3-(3-(3'-Amino-[1,1'-biphenyl]-4-yl)propyl)-1-(4-(tert-butyl)benzyl)-4-ethyl-1H-1,2,4-triazol-5(4H)-one:



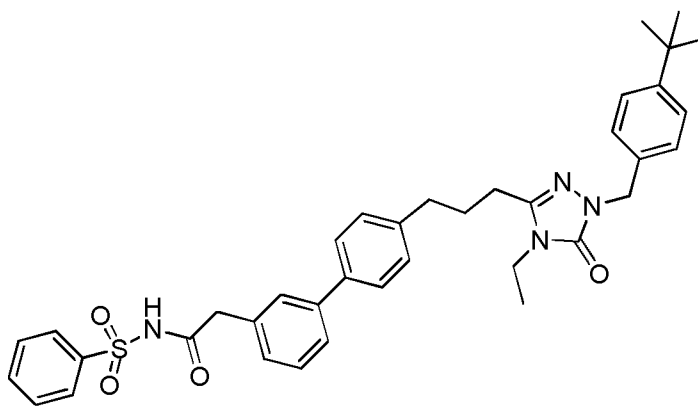
[00136] Prepared in an analogous manner to example 1 using 3-(4,4,5,5-tetramethyl-1,3,2-dioxaborolan-2-yl)aniline as the coupling partner in step 1. LC-MS: 469 (M+H)⁺.

Example 7: N-(4'-(3-(1-(4-(tert-Butyl)benzyl)-4-ethyl-5-oxo-4,5-dihydro-1H-1,2,4-triazol-3-yl)propyl)-[1,1'-biphenyl]-3-yl)-4-methylbenzenesulfonamide:



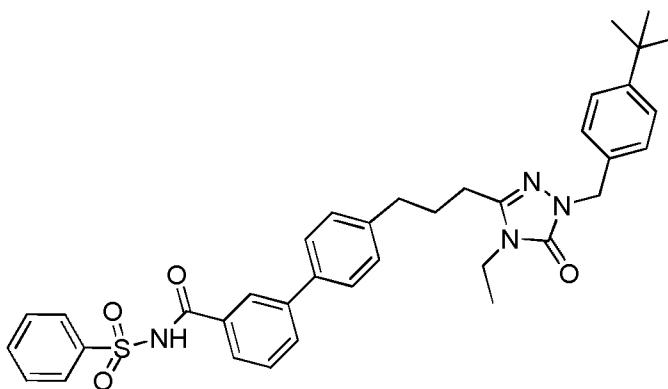
[00137] Prepared in an analogous manner to example 1 using (3-(4-methylphenylsulfonamido)phenyl)boronic acid as the coupling partner in step 1. LC-MS: 623 (M+H)⁺.

Example 8: 2-(4'-(3-(1-(4-(tert-Butyl)benzyl)-4-ethyl-5-oxo-4,5-dihydro-1H-1,2,4-triazol-3-yl)propyl)-[1,1'-biphenyl]-3-yl)-N-(phenylsulfonyl)acetamide:



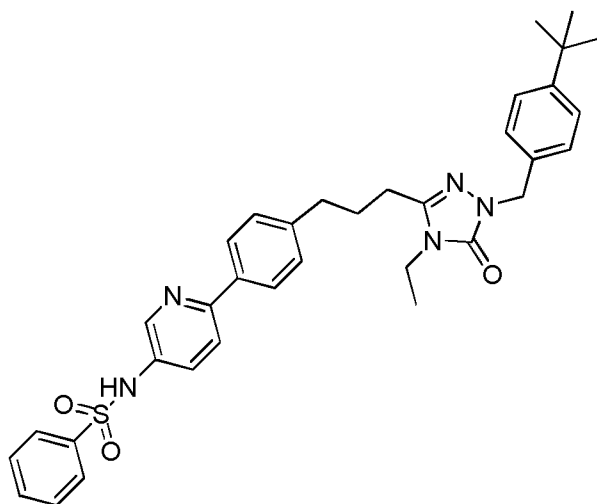
[00138] To a solution of 2-(4'-(3-(1-(4-(*tert*-butyl)benzyl)-4-ethyl-5-oxo-4,5-dihydro-1*H*-1,2,4-triazol-3-yl)propyl)-[1,1'-biphenyl]-3-yl)acetic acid (100 mg, 0.195 mmol) in THF (1.5 mL) was added carbonyldiimidazole (41 mg, 0.253 mmol) and catalytic amount of DMAP. The resulting solution was stirred at ambient temperature for 3 hrs after which benzenesulfonamide (46 mg, 0.3 mmol) was added and the reaction heated at 50 °C for 16 hrs. The reaction was allowed to cool to RT, diluted with EtOAc and washed with 1N HCl. The organic phase was separated, dried (MgSO₄), filtered and the filtrate evaporated *in vacuo*. The residue thus obtained was purified using silica gel chromatography (0 to 5% MeOH in DCM) to afford the title compound. LC-MS: 651 (M+H)⁺.

Example 9: 4'-(3-(1-(4-(*tert*-Butyl)benzyl)-4-ethyl-5-oxo-4,5-dihydro-1*H*-1,2,4-triazol-3-yl)propyl)-*N*-(phenylsulfonyl)-[1,1'-biphenyl]-3-carboxamide:



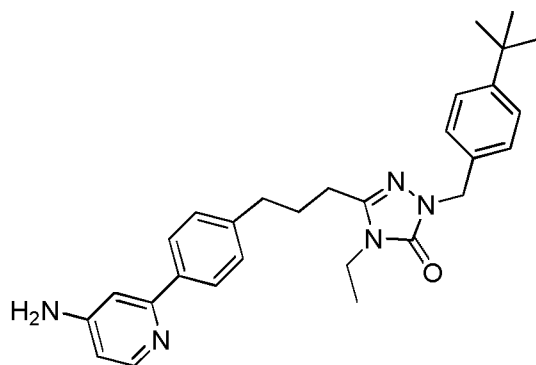
[00139] Prepared in an analogous manner to example 8 using 4'-(3-(1-(4-(*tert*-butyl)benzyl)-4-ethyl-5-oxo-4,5-dihydro-1*H*-1,2,4-triazol-3-yl)propyl)-[1,1'-biphenyl]-3-carboxylic acid as the starting material. LC-MS 637 (M+H)⁺.

Example 10: *N*-(6-(4-(3-(1-(4-(*tert*-Butyl)benzyl)-4-ethyl-5-oxo-4,5-dihydro-1*H*-1,2,4-triazol-3-yl)propyl)phenyl)pyridin-3-yl)benzenesulfonamide:



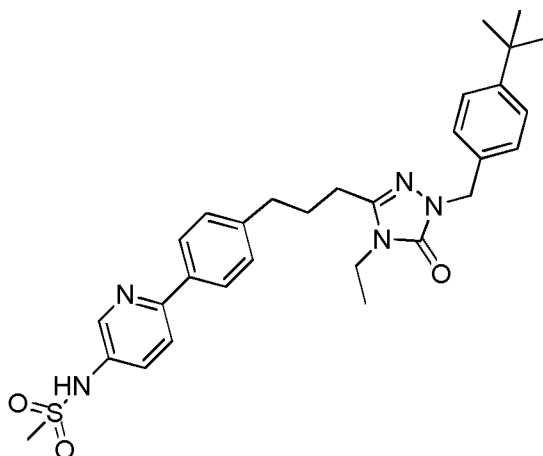
[00140] Prepared in an analogous manner to example 4 using 3-(3-(4-(5-aminopyridin-2-yl)phenyl)propyl)-1-(4-(*tert*-butyl)benzyl)-4-ethyl-1*H*-1,2,4-triazol-5(4*H*)-one as the starting material. LC-MS: 610 (M+H)⁺.

Example 11: 3-(3-(4-(4-Aminopyridin-2-yl)phenyl)propyl)-1-(4-(*tert*-butyl)benzyl)-4-ethyl-1*H*-1,2,4-triazol-5(4*H*)-one:



[00141] Prepared in an analogous manner to example 3 using 4-amino-2-chloropyridine as the coupling partner. LC-MS: 470 (M+H)⁺.

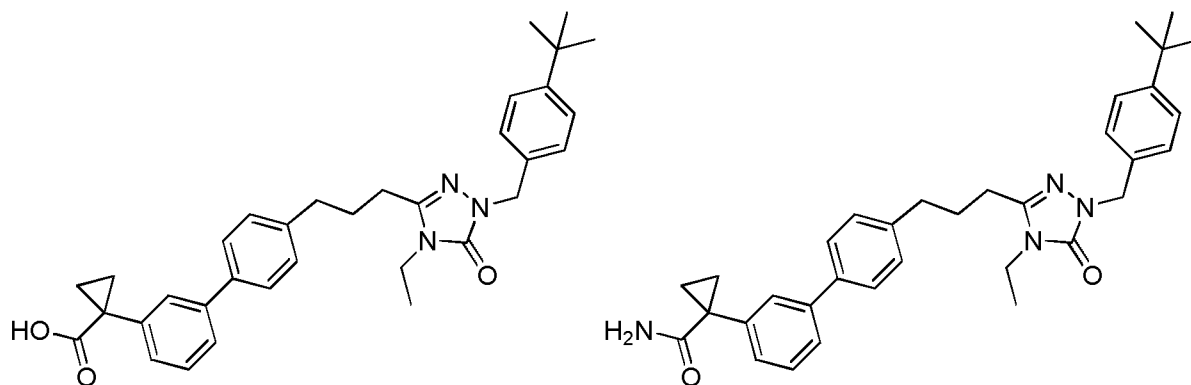
Example 12: *N*-(6-(4-(3-(1-(4-(*tert*-Butyl)benzyl)-4-ethyl-5-oxo-4,5-dihydro-1*H*-1,2,4-triazol-3-yl)propyl)phenyl)pyridin-3-yl)methanesulfonamide:



[00142] A mixture of 3-(3-(4-(5-aminopyridin-2-yl)phenyl)propyl)-1-(4-(*tert*-butyl)benzyl)-4-ethyl-1*H*-1,2,4-triazol-5(4*H*)-one (44 mg, 0.094 mmol, methane sulfonylchloride (8 μ L, 0.094 mmol, 1 eq), 4-

dimethylaminopyridine (12 mg, 94 μ mol, 1 eq), and 1,8-diazabicycloundec-7-ene (28 μ L, 187 μ mol, 2 eq.) was stirred in 1,2-dichloroethane (2 mL) at 50 °C for 18 hrs. The reaction mixture was cooled to room temperature and the solvent was then removed *in vacuo*. The crude material thus obtained was partitioned between water and ethyl acetate. The aqueous layer was extracted with ethyl acetate (2 x 20 mL) and the combined organic extracts were dried over anhydrous Na₂SO₄, filtered and the filtrate concentrated *in vacuo*. The crude product thus obtained was then purified on reverse phase HPLC to afford the title compound as a white solid (20.2 mg, 40 %). LC-MS: 548 (M+H)⁺.

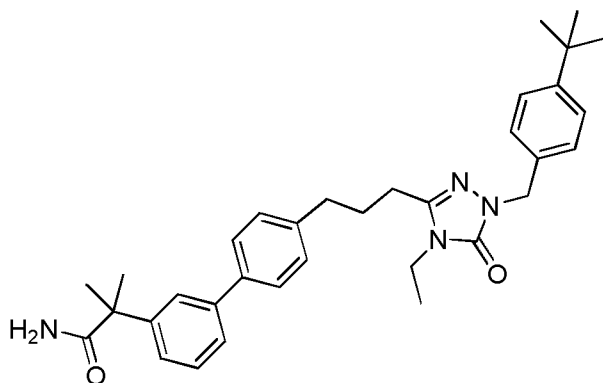
Examples 13: 1-(4'-(3-(1-(4-(*tert*-Butyl)benzyl)-4-ethyl-5-oxo-4,5-dihydro-1*H*-1,2,4-triazol-3-yl)propyl)-[1,1'-biphenyl]-3-yl)cyclopropanecarboxylic acid and 14: 1-(4'-(3-(1-(4-(*tert*-butyl)benzyl)-4-ethyl-5-oxo-4,5-dihydro-1*H*-1,2,4-triazol-3-yl)propyl)-[1,1'-biphenyl]-3-yl)cyclopropanecarboxamide:



[00143] Step 1; To a solution of 1-(4-(*tert*-butyl)benzyl)-4-ethyl-3-(3-(4-(4,4,5,5-tetramethyl-1,3,2-dioxaborolan-2-yl)phenyl)propyl)-1*H*-1,2,4-triazol-5(4*H*)-one (270 mg, 0.54 mmol) in DME (5 mL) and H₂O (1.5 mL) was added 1-(3-bromophenyl)cyclopropanecarbonitrile (143 mg, 0.64 mmol) and potassium carbonate (186 mg, 1.34 mmol). The resulting mixture was sparged with nitrogen gas for 10 minutes before tetrakis(triphenylphosphine)palladium (0) (20 mg) was added. The reaction vessel was then sealed and heated at 85 °C for 10 hrs. The reaction mixture was allowed to cool to RT and partitioned between EtOAc and water. The organic phase was separated, dried (MgSO₄), filtered and the filtrate concentrated *in vacuo*. The residue thus obtained was purified using silica gel chromatography (0 to 70% EtOAc in hexanes) to afford 1-(4'-(3-(1-(4-(*tert*-butyl)benzyl)-4-ethyl-5-oxo-4,5-dihydro-1*H*-1,2,4-triazol-3-yl)propyl)-[1,1'-biphenyl]-3-yl)cyclopropanecarbonitrile.

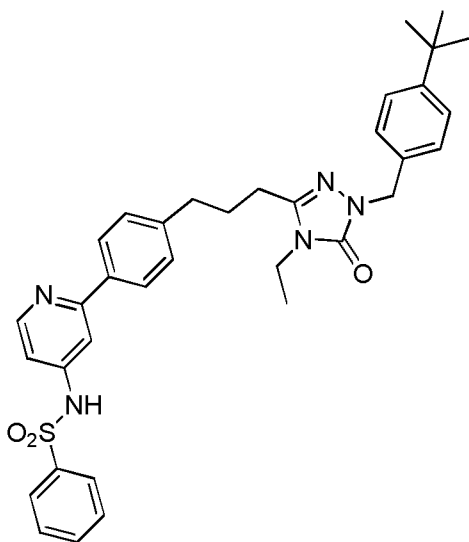
[00144] Step 2; To the isolated nitrile (200 mg, 0.39 mmol) in *p*-dioxane (4 mL) and water (4 mL) was added potassium hydroxide (750 mg). The reaction vessel was then sealed and heated at 120 °C for 24 hrs. After cooling to RT, the mixture was partitioned between EtOAc and 1N HCl (to pH ~ 2). The organic phase was separated, dried (MgSO₄), filtered and the filtrate concentrated *in vacuo*. The residue thus obtained was purified on reverse phase HPLC to afford the two title compounds. Example 13: LC-MS: 538 (M+H)⁺, example 14: LC-MS: 537 (M+H)⁺.

Example 15: 2-(4'-(3-(1-(4-(*tert*-Butyl)benzyl)-4-ethyl-5-oxo-4,5-dihydro-1*H*-1,2,4-triazol-3-yl)propyl)-[1,1'-biphenyl]-3-yl)-2-methylpropanamide:



[00145] Prepared in an analogous manner to example 14 using 2-(3-bromophenyl)-2-methylpropanenitrile as the coupling partner. LC-MS: 539 (M+H)⁺.

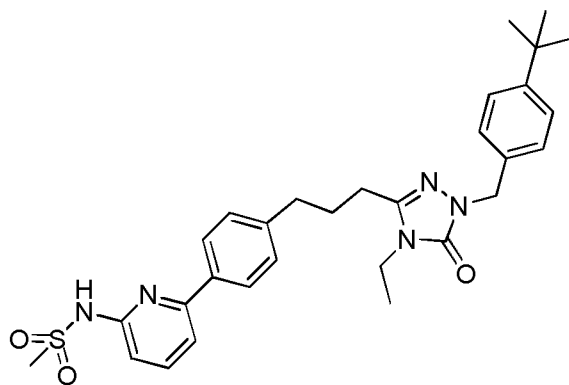
Example 16: *N*-(2-(4-(3-(1-(4-(*tert*-Butyl)benzyl)-4-ethyl-5-oxo-4,5-dihydro-1*H*-1,2,4-triazol-3-yl)propyl)phenyl)pyridin-4-yl)benzenesulfonamide:



[00146] Prepared in an analogous manner to example 4 using 3-(3-(4-(4-aminopyridin-2-yl)phenyl)propyl)-1-(4-(*tert*-butyl)benzyl)-4-ethyl-1*H*-1,2,4-triazol-5(4*H*)-one as the starting material. LC-MS: 610 (M+H)⁺.

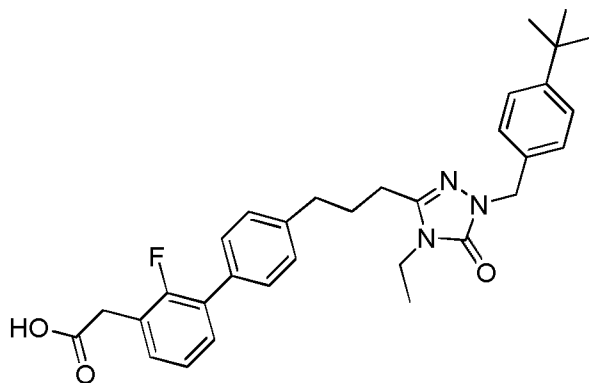
[00147]

Example 17: *N*-(6-(4-(3-(1-(4-(*tert*-Butyl)benzyl)-4-ethyl-5-oxo-4,5-dihydro-1*H*-1,2,4-triazol-3-yl)propyl)phenyl)pyridin-4-yl)methanesulfonamide:



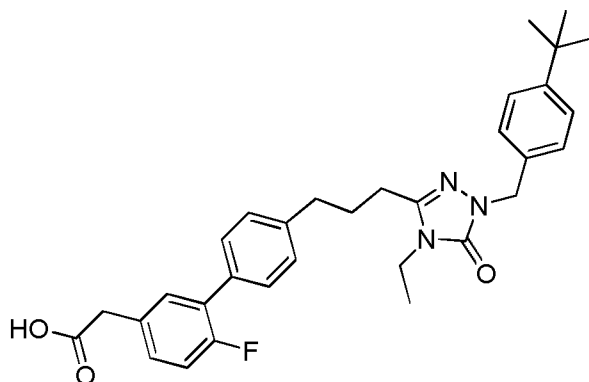
[00148] Prepared in an analogous manner to example 12 using 3-(3-(4-(4-aminopyridin-2-yl)phenyl)propyl)-1-(4-(*tert*-butyl)benzyl)-4-ethyl-1H-1,2,4-triazol-5(4H)-one as the starting material. LC-MS: 548 (M+H)⁺.

Example 18: 2-(4'-(3-(1-(4-(*tert*-Butyl)benzyl)-4-ethyl-5-oxo-4,5-dihydro-1H-1,2,4-triazol-3-yl)propyl)-2-fluoro-[1,1'-biphenyl]-3-yl)acetic acid:



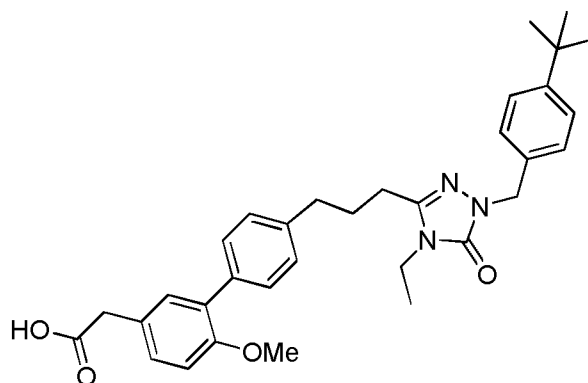
[00149] Prepared in an analogous manner to example 13 using 2-(3-bromo-2-fluorophenyl)acetonitrile as the coupling partner in step 1. Hydrolysis of the intermediate nitrile was carried out at 85 °C under similar conditions to step 2. LC-MS: 530 (M+H)⁺.

Example 19: 2-(4'-(3-(1-(4-(*tert*-Butyl)benzyl)-4-ethyl-5-oxo-4,5-dihydro-1H-1,2,4-triazol-3-yl)propyl)-6-fluoro-[1,1'-biphenyl]-3-yl)acetic acid :



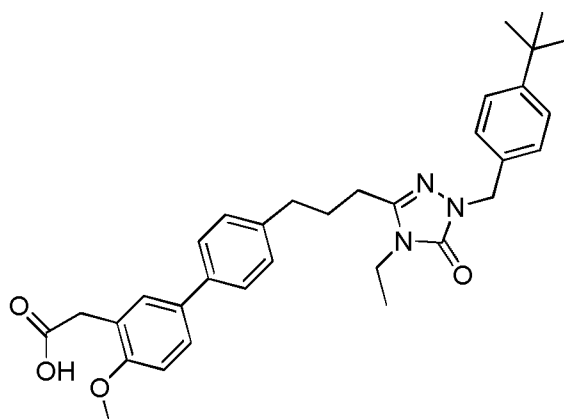
[00150] Prepared in an analogous manner to example 13 using ethyl 2-(3-bromo-4-fluorophenyl)acetate as the coupling partner in step 1. Hydrolysis of the intermediate ester was carried out as in example 1, step 2. LC-MS: 530 (M+H)⁺.

Example 20: 2-(4'-(3-(1-(4-(*tert*-Butyl)benzyl)-4-ethyl-5-oxo-4,5-dihydro-1*H*-1,2,4-triazol-3-yl)propyl)-6-methoxy-[1,1'-biphenyl]-3-yl)acetic acid:



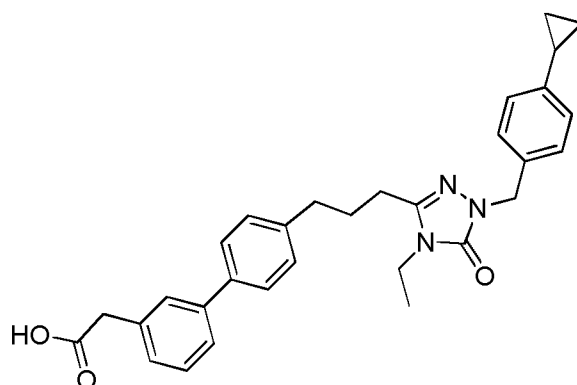
[00151] Prepared in an analogous manner to example 13 using ethyl 2-(3-bromo-4-methoxyphenyl)acetate as the coupling partner in step 1. Hydrolysis of the intermediate ester was carried out as in example 1, step 2. LC-MS: 542 (M+H)⁺.

Example 21: 2-(4'-(3-(1-(4-(*tert*-Butyl)benzyl)-4-ethyl-5-oxo-4,5-dihydro-1*H*-1,2,4-triazol-3-yl)propyl)-4-methoxy-[1,1'-biphenyl]-3-yl)acetic acid:



[00152] Prepared in an analogous manner to example 13 using ethyl 2-(5-bromo-2-methoxyphenyl)acetate as coupling partner in step 1. Hydrolysis of the intermediate ester was carried out as in example 1, step 2. LC-MS: 542 (M+H)⁺.

Example 22: 2-(4'-(3-(1-(4-Cyclopropylbenzyl)-4-ethyl-5-oxo-4,5-dihydro-1*H*-1,2,4-triazol-3-yl)propyl)-[1,1'-biphenyl]-3-yl)acetic acid:



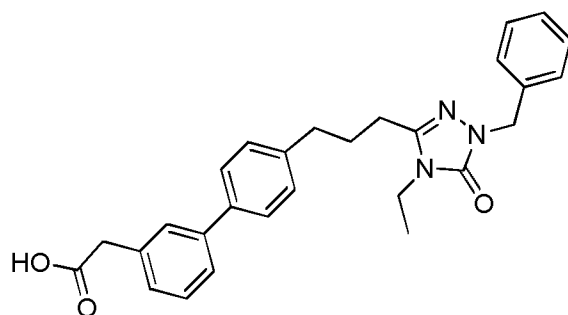
[00153] *Step 1*; Under a nitrogen atmosphere, 3-(3-(4-bromophenyl)propyl)-4-ethyl-1*H*-1,2,4-triazol-5(4*H*)-one (0.20 g, 0.65 mmol), Pd(PPh)₄ (0.056 g, 0.065 mmol), KF (0.17 g, 2.84 mmol), (3-(2-ethoxy-2-oxoethyl)phenyl)boronic acid (0.296 g, 1.42 mmol), toluene (4 mL) and water (4 mL) were combined and the resulting mixture was stirred under nitrogen at 100 °C for 16 hrs. The reaction mixture was then cooled to rt, diluted with EtOAc and washed with a 50% brine/50% water solution. The organic phase was separated, washed once more with brine, filtered through a Na₂SO₄/paper plug, and the filtrate concentrated *in vacuo*. The residue was thus obtained was purified by column chromatography using a 1%-9% gradient MeOH/DCM as eluent to afford 0.190 g of ethyl 2-(4'-(3-(4-ethyl-5-oxo-4,5-dihydro-1*H*-1,2,4-triazol-3-yl)propyl)-[1,1'-biphenyl]-3-yl)acetate (contaminated with unreacted starting material which coeluted). This was used as is in the next step.

[00154] *Step 2*; To a solution of ethyl 2-(4'-(3-(4-ethyl-5-oxo-4,5-dihydro-1*H*-1,2,4-triazol-3-yl)propyl)-[1,1'-biphenyl]-3-yl)acetate (0.10 g, 0.25 mmol) in anhydrous CH₃CN (4 mL) and Cs₂CO₃ (0.25 g, 0.72 mmol) at rt was added 4-bromobenzyl bromide (0.076 g, 0.31 mmol). The resulting mixture was stirred at 65 °C for 16 hrs. The mixture was diluted with EtOAc and a 50% brine/50% water solution. The organic extract was separated, washed once more with brine, filtered through a Na₂SO₄/paper plug, and the filtrate concentrated *in vacuo*. The crude product thus obtained was used as is in the next step.

[00155] *Step 3*; Under a nitrogen atmosphere, ethyl 2-(4'-(3-(1-(4-bromobenzyl)-4-ethyl-5-oxo-4,5-dihydro-1*H*-1,2,4-triazol-3-yl)propyl)-[1,1'-biphenyl]-3-yl)acetate (0.07 g, 0.12 mmol), P(Cy)₃ (0.007 g, 0.025 mmol), cyclopropylboronic acid (0.054 g, 0.62 mmol), K₃PO₄·xH₂O, toluene (4 mL) and water (0.4 mL) were combined. The suspension thus obtained was purged with nitrogen for 5 min after which Pd(OAc)₂ (0.003 g, 0.012 mmol) was added and the resulting mixture was stirred at 100 °C for 48 hrs. The reaction was cooled to rt and diluted with EtOAc and brine. The brine layer was separated and back-extracted with DCM. The combined organic extracts were concentrated *in vacuo* and the residue thus obtained was then purified by preparatory TLC using 5% MeOH/DCM as eluent to afford 0.050 g (76% yield) of ethyl 2-(4'-(3-(1-(4-cyclopropylbenzyl)-4-ethyl-5-oxo-4,5-dihydro-1*H*-1,2,4-triazol-3-yl)propyl)-[1,1'-biphenyl]-3-yl)acetate as an oil.

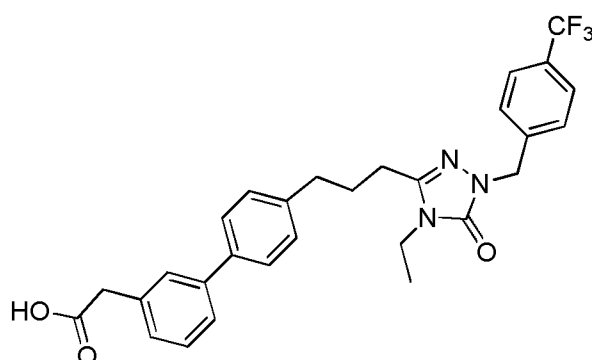
[00156] *Step 4*; To a solution of ethyl 2-(4'-(3-(1-(4-cyclopropylbenzyl)-4-ethyl-5-oxo-4,5-dihydro-1*H*-1,2,4-triazol-3-yl)propyl)-[1,1'-biphenyl]-3-yl)acetate (0.050 g, 0.10 mmol) in THF (1 mL) and MeOH (1 mL) was added water (1 mL) and LiOH (0.023 g, 0.96 mmol). The resulting mixture was stirred at 60 °C for 16 hrs. The solvents were evaporated and the resulting residue was taken up in DCM and 0.5 M aq. HCl. The aqueous layer was separated and extracted once more with DCM. The combined organics were then concentrated *in vacuo* and the residue thus obtained was purified by preparatory TLC using 10% MeOH/DCM as eluent to afford 0.010 g (16% yield, two steps) of the title compound as a yellow foam. LC-MS: 496 (M+H)⁺.

Example 23: 2-(4'-(3-(1-Benzyl-4-ethyl-5-oxo-4,5-dihydro-1*H*-1,2,4-triazol-3-yl)propyl)-[1,1'-biphenyl]-3-yl)acetic acid:



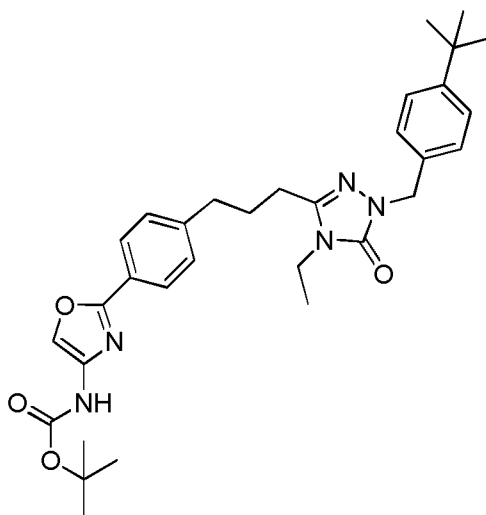
[00157] Prepared in an analogous manner to example 22 using benzyl bromide as the electrophile in step 2. LC-MS: 456 (M+H)⁺.

Example 24: 2-(4'-(3-(4-Ethyl-5-oxo-1-(4-(trifluoromethyl)benzyl)-4,5-dihydro-1H-1,2,4-triazol-3-yl)propyl)-[1,1'-biphenyl]-3-yl)acetic acid:



[00158] Prepared in an analogous manner to example 22 using 4-trifluorobenzyl bromide as the electrophile in step 2. LC-MS: 524 (M+H)⁺.

Example 25: *tert*-Butyl (2-(4-(3-(1-(4-(*tert*-butyl)benzyl)-4-ethyl-5-oxo-4,5-dihydro-1H-1,2,4-triazol-3-yl)propyl)phenyl)oxazol-4-yl)carbamate:



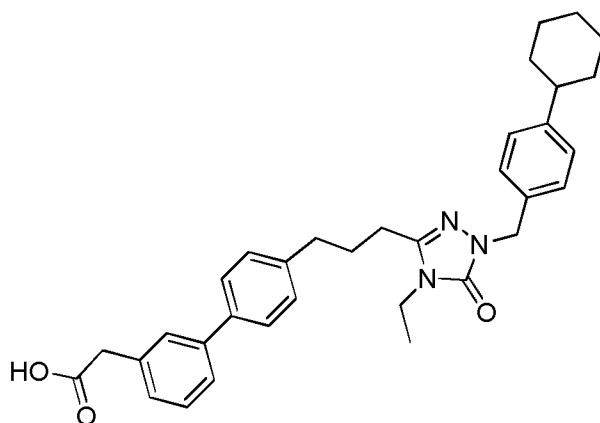
[00159] *Step 1*; A mixture of 3-(3-(4-bromophenyl)propyl)-1-(4-(*tert*-butyl)benzyl)-4-ethyl-1H-1,2,4-triazol-5(4H)-one (2.2 g, 4.37 mmol), ethyl-2-bromooxazole-4-carboxylate (1.15 g, 5.24 mmol, 1.2 eq) and potassium carbonate (1.81 g, 13.11 mmol, 3eqv) were dissolved in DME (12 mL) and H₂O (6 mL). To this was then added tetrakis(triphenylphosphine)palladium(0) (505 mg, 0.437 mmol, 0.1 eq) and the resulting mixture was stirred at 85 °C under an atmosphere of N₂ for 24 hrs. The reaction mixture was cooled to room

temperature and the solvent was removed *in vacuo*. The crude material thus obtained was then partitioned between water and ethyl acetate. The aqueous layer was separated and back-extracted with ethyl acetate (3 x 20 mL). The combined organic extracts were then dried over anhydrous Na₂SO₄, filtered and the filtrate concentrated *in vacuo*. The crude product thus obtained was purified on flash column chromatography (silica gel, 0-70% EtOAc/Hexanes) to afford ethyl 2-(4-(3-(1-(4-(*tert*-butyl)benzyl)-4-ethyl-5-oxo-4,5-dihydro-1*H*-1,2,4-triazol-3-yl)propyl)phenyl)oxazole-4-carboxylate (1.82 g, 82 %) as a white foam.

[00160] *Step 2*; To a stirred solution of ethyl 2-(4-(3-(1-(4-(*tert*-butyl)benzyl)-4-ethyl-5-oxo-4,5-dihydro-1*H*-1,2,4-triazol-3-yl)propyl)phenyl)oxazole-4-carboxylate (1.82 g, 3.48 mmol) in THF (4 mL), water (4 mL) and methanol (4 mL) was added lithium hydroxide (56 mg, 13.92 mmol, 4eq). The resulting mixture was stirred at 60 °C for 13hrs. After cooling to room temperature, the mixture was diluted with saturated ammonium chloride and ethyl acetate. The aqueous layer was separated and back-extracted with ethyl acetate (2 x 20mL). The combined organic extracts were dried over anhydrous Na₂SO₄, filtered and the filtrate concentrated *in vacuo*. The crude product thus obtained was used directly in the next step without further purification.

[00161] *Step 3*; A mixture of 2-(4-(3-(1-(4-(*tert*-butyl)benzyl)-4-ethyl-5-oxo-4,5-dihydro-1*H*-1,2,4-triazol-3-yl)propyl)phenyl)oxazole-4-carboxylic acid (1.6 g, 3.28 mmol), triethylamine (550 µL, 3.94 mmol, 1.2 eq) and diphenylphosphoryl azide (830 µL, 3.61 mmol, 1.1eq) were dissolved in *t*-butanol (11 mL). The resulting mixture was stirred at reflux under an atmosphere of N₂ for 18 hrs. The reaction mixture was then cooled to room temperature and diluted with water and ethyl acetate. The aqueous layer was separated and back-extracted with ethyl acetate (2 x 30 mL). The combined organic extracts were dried over anhydrous Na₂SO₄, filtered and the filtrate concentrated *in vacuo*. The crude product thus obtained was purified further by way of flash column chromatography (silica gel, 0-80% EtOAc/Hexanes) to afford the title compound as a white solid (403 mg, 22 %). LC-MS: 560 (M+H)⁺.

Example 26: 2-(4'-(3-(1-(4-Cyclohexylbenzyl)-4-ethyl-5-oxo-4,5-dihydro-1*H*-1,2,4-triazol-3-yl)propyl)-[1,1'-biphenyl]-3-yl)acetic acid:

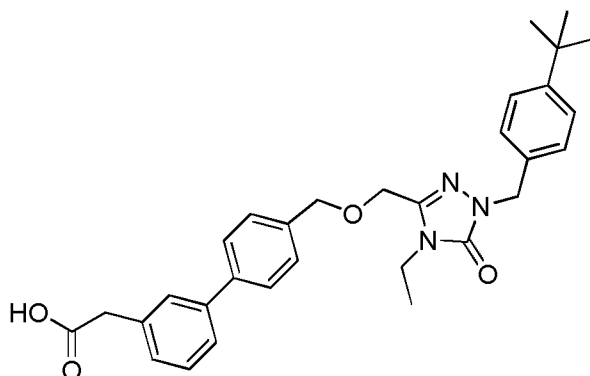


[00162] *Step 1*; Under a nitrogen atmosphere, K₂CO₃ (0.056 g, 0.41 mmol), 2-(cyclohex-1-en-1-yl)-4,4,5,5-tetramethyl-1,3,2-dioxaborolane (0.039 g, 0.19 mmol), ethyl 2-(4'-(3-(1-(4-bromobenzyl)-4-ethyl-5-oxo-4,5-dihydro-1*H*-1,2,4-triazol-3-yl)propyl)-[1,1'-biphenyl]-3-yl)acetate (0.076 g, 0.14 mmol), DME (4 mL) and water (2 mL) were combined. The reaction mixture was purged with nitrogen for several minutes before

Pd(PPh)_4 (0.016 g, 0.014 mmol) was added. The resulting mixture was stirred under nitrogen at 85 °C for 16 hrs. The solution was then cooled to rt and diluted with EtOAc and a 10% brine/90% water solution. The organic layer was separated, washed once more with water, and concentrated *in vacuo*. The crude ethyl 2-(4'-(3-(1-(4-(cyclohex-1-en-1-yl)benzyl))-4-ethyl-5-oxo-4,5-dihydro-1*H*-1,2,4-triazol-3-yl)propyl)-[1,1'-biphenyl]-3-yl)acetate (0.10 g) thus obtained was immediately taken on to the next step.

[00163] Step 2: A solution of ethyl 2-(4'-(3-(1-(4-(cyclohex-1-en-1-yl)benzyl))-4-ethyl-5-oxo-4,5-dihydro-1*H*-1,2,4-triazol-3-yl)propyl)-[1,1'-biphenyl]-3-yl)acetate (0.10 g, 0.10 mmol) in EtOAc (3 mL) and MeOH (3 mL) was purged with nitrogen and then added 10% Pd/C (dry) (0.10 g, 100% wt/wt) in one rapid portion. Thereafter, the reaction vessel was purged with hydrogen gas and stirred under an atmosphere of hydrogen for 16 hrs. The reaction was quenched with DCM, filtered through a celite plug and the filtrate thus obtained was concentrated *in vacuo*. The residue thus obtained was dissolved in THF (2 mL) and MeOH (2 mL), to which was then added water (1 mL) and LiOH (0.043 g, 1.77 mmol). The resulting mixture was stirred at 60 °C for 16 hrs. The solvents were evaporated and the residue partitioned between DCM and 0.5 M aq. HCl. The organic phase was separated, concentrated *in vacuo* and the resulting residue was purified by preparatory TLC using 10% MeOH/DCM as eluent to afford 0.028 g of the title compound (39% yield) as a white foam. LC-MS: 538 (M+H)⁺.

Example 27: 2-(4'(((1-(4-(*tert*-Butyl)benzyl)-4-ethyl-5-oxo-4,5-dihydro-1*H*-1,2,4-triazol-3-yl)methoxy)methyl)-[1,1'-biphenyl]-3-yl)acetic acid:



[00164] Step 1: To an anhydrous DMF solution (0.67 M) of (4-bromophenyl)methanol (1 eq.) was added sequentially cesium carbonate (1.1 eq.) and *tert*-butyl 2-bromoacetate (1 eq.). The resulting suspension was allowed to stir at RT for 16 hrs. The reaction was then diluted with ether and carefully quenched with 1 N aq. HCl. The organic layer was separated and washed further with water and brine. The organic extract was then dried over sodium sulfate and filtered. Concentration of the filtrate *in vacuo* afforded the crude reaction product as a viscous oil. Further purification by way of column chromatography (SiO₂, gradient elution, Hex to 3:7 (v/v) Hex: EtOAc) afforded *tert*-butyl 2-((4-bromobenzyl)oxy)acetate as a colorless oil (44% yield). LC-MS: 301, 303 (M+H)⁺.

[00165] Step 2: To a dichloromethane solution (0.13 M) of *tert*-butyl 2-((4-bromobenzyl)oxy)acetate (1 eq) was added dropwise at RT trifluoroacetic acid (10 eq.). The resulting solution was stirred at RT for 18 hrs.

The volatiles were then removed *in vacuo* and the resulting residue was triturated in 1:1 (v/v) ether: hexanes to furnish 2-((4-bromobenzyl)oxy)acetic acid as a white solid (75% yield). LC-MS: 243, 245 (M-H)⁻.

[00166] Step 3; 2-((4-Bromobenzyl)oxy)acetic acid (1 eq), 1-(4-(*tert*-butyl)benzyl)-*N*-ethylhydrazinecarboxamide monomethanesulfonate (1.2 eq., prepared according to published procedure found in Braden, T. M. *et al.*, *Org. Process Res. Dev.* **2007**, *11*, p. 431-440) and 2-(7-aza-1*H*-benzotriazole-1-yl)-1,1,3,3- tetramethyluronium hexafluorophosphate (1.3 eq.) were combined in anhydrous DMF (0.073 M). To the reaction solution was then added Hunig's base (2.6 eq.) and the resulting yellow solution was allowed to stir at RT for 14 hrs. The reaction mixture was then quenched with ether and 1 N aq. HCl. The organic extract was separated and washed further with 1 N aq. NaOH, water and brine. The organic extract was then dried over sodium sulfate and filtered. Concentration of the filtrate *in vacuo* afforded the crude reaction product as a white semi-solid. Further purification by way of column chromatography (SiO₂, gradient elution, 4:1 (v/v) Hex: EtOAc to EtOAc) afforded 2-(2-((4-bromobenzyl)oxy)acetyl)-1-(4-(*tert*-butyl)benzyl)-*N*-ethylhydrazinecarboxamide as a white solid (41% yield). LC-MS: 476, 478 (M+H)⁺.

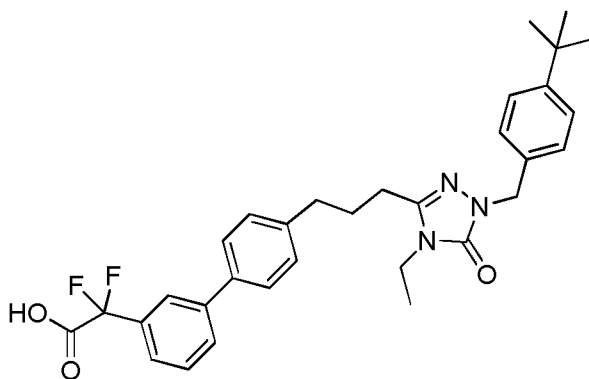
[00167] Step 4; To an EtOAc solution (0.075 M) of 2-(2-((4-bromobenzyl)oxy)acetyl)-1-(4-(*tert*-butyl)benzyl)-*N*-ethylhydrazinecarboxamide (1 eq.) was added camphorsulfonic acid (1 eq.) and the resulting solution was heated at 80 °C for 16 hrs. The volatiles were then removed *in vacuo* and the crude product thus obtained was subjected to purification by way of column chromatography (SiO₂, gradient elution, 4:1 (v/v) Hex: EtOAc to EtOAc). 3-(((4-Bromobenzyl)oxy)methyl)-1-(4-(*tert*-butyl)benzyl)-4-ethyl-1*H*-1,2,4-triazol-5(4*H*)-one was isolated as a colorless, viscous oil (85% yield). LC-MS: 458, 460 (M+H)⁺.

[00168] Step 5; To a DME solution (0.1 M) of 3-(((4-bromobenzyl)oxy)methyl)-1-(4-(*tert*-butyl)benzyl)-4-ethyl-1*H*-1,2,4-triazol-5(4*H*)-one (1 eq.) was added Pd₂dba₃ (0.025 eq.), dicyclohexyl(2',6'-dimethoxybiphenyl-2-yl)phosphine (0.2 eq.), and ethyl 2-(3-(4,4,5,5-tetramethyl-1,3,2-dioxaborolan-2-yl)phenyl)acetate (1 eq.). The resulting solution was sub-surface purged with nitrogen gas for 15 min before 0.3 M aq. potassium phosphate (4 eq.) was added. The reaction vessel was sealed and heated at 110 °C for 16 hrs. The reaction mixture was then cooled to RT, diluted with EtOAc and washed sequentially with 1 N aq. HCl, water and finally brine. The organic extract was then dried over sodium sulfate and filtered. Concentration of the filtrate *in vacuo* afforded a yellow oil. This was then taken up in anhydrous ethanol (0.05 M) and added concentrated sulfuric acid (0.5 eq.). The resulting solution was stirred at RT for 4 hrs. The volatiles were then removed *in vacuo* and the resulting residue was partitioned between ether and water. The organic extract was separated and washed sequentially with sat. aq. NaHCO₃, water and brine. The organic extract was then dried over sodium sulfate and filtered. Concentration of the filtrate *in vacuo* afforded a yellow oil. Further purification by way of column chromatography (SiO₂, gradient elution, 9:1 (v/v) Hex: EtOAc to EtOAc) afforded ethyl 2-(4'-(((1-(4-(*tert*-butyl)benzyl)-4-ethyl-5-oxo-4,5-dihydro-1*H*-1,2,4-triazol-3-yl)methoxy)methyl)-[1,1'-biphenyl]-3-yl)acetate as a pale yellow oil (71% yield). LC-MS 542: (M+H)⁺.

[00169] Step 6; To a 2:1 (v/v) solution of THF and methanol (0.07 M) of ethyl 2-(4'-(((1-(4-(*tert*-butyl)benzyl)-4-ethyl-5-oxo-4,5-dihydro-1*H*-1,2,4-triazol-3-yl)methoxy)methyl)-[1,1'-biphenyl]-3-

yl)acetate (1 eq.) was added 2 N aq. lithium hydroxide (3 eq.). The resulting solution was stirred at RT for 14 hrs. The volatiles were then removed *in vacuo* and the resulting residue was partitioned between EtOAc and 1 N aq. HCl. The organic extract was separated and then washed sequentially with water and brine. The organic extract was then dried over sodium sulfate and filtered. Concentration of the filtrate *in vacuo* afforded the title compound as a white solid (71% yield). LC-MS: 514 (M+H)⁺.

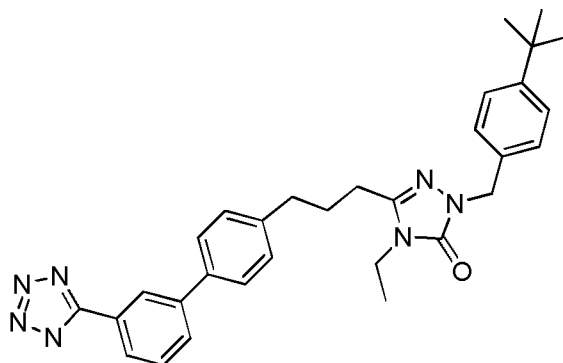
Example 28: 2-(4'-(3-(1-(4-(*tert*-Butyl)benzyl)-4-ethyl-5-oxo-4,5-dihydro-1*H*-1,2,4-triazol-3-yl)propyl)-[1,1'-biphenyl]-3-yl)-2,2-difluoroacetic acid:



[00170] *Step 1:* To an anhydrous THF solution (0.5 M) of methyl 2-(3-bromophenyl)acetate (1 eq.) was added, at -78 °C, sodium hexamethyldisilazide (2.2 eq., 1 M THF solution) dropwise over a period of 5 min. The resulting pale yellow solution was stirred at -78 °C for 20 min before *N*-fluoro-*N*-(phenylsulfonyl)-benzenesulfonamide (2.2 eq., 0.5 M THF solution) was added dropwise over a period of 10 min. After 3.5 hrs, the reaction mixture was quenched carefully with the dropwise addition of 1 N aq. HCl. The aqueous layer was separated and back-extracted with ether. The combined organic extracts were then washed sequentially with 10% aq. NaHCO₃, water and brine. The organic extract was dried over sodium sulfate and filtered. Concentration of the filtrate *in vacuo* afforded a pale yellow semi-solid. This was then briefly sonicated in 1:1 (v/v) hexanes and ether. The resulting suspension was then filtered through a bed of celite and the filtrate was concentrated *in vacuo* to afford methyl 2-(3-bromophenyl)-2,2-difluoroacetate as a yellow oil (98% yield).

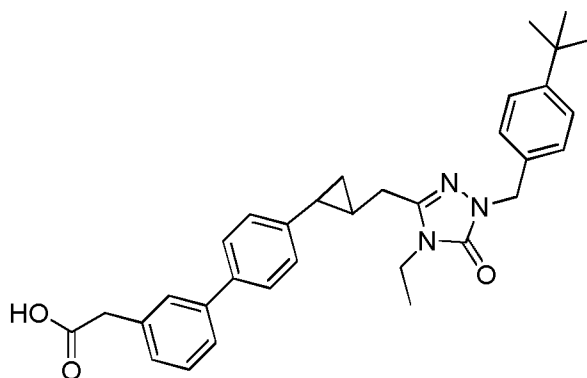
[00171] *Step 2:* To a DME solution (0.2 M) of 1-(4-(*tert*-butyl)benzyl)-4-ethyl-3-(3-(4-(4,4,5,5-tetramethyl-1,3,2-dioxaborolan-2-yl)phenyl)propyl)-1*H*-1,2,4-triazol-5(4*H*)-one (1 eq.) was added Pd₂dba₃ (0.025 eq.), dicyclohexyl(2',6'-dimethoxybiphenyl-2-yl)phosphine (0.2 eq.), and methyl 2-(3-bromophenyl)-2,2-difluoroacetate (1 eq.). The resulting solution was sub-surface purged with nitrogen gas for 15 min before 0.3 M aq. potassium phosphate (4 eq.) was added. The reaction vessel was sealed and heated at 110 °C for 16 hrs. The reaction mixture was then cooled to RT, diluted with ether and washed sequentially with 1 N aq. HCl, water and finally brine. The organic extract was then dried over sodium sulfate and filtered. Concentration of the filtrate *in vacuo* afforded a yellow oil. Further purification by way of column chromatography (SiO₂, gradient elution, 4:1 (v/v) Hex: EtOAc to EtOAc) afforded the title compound as a pale yellow foam (18% yield). LC-MS: 546 (M-H)⁻.

Example 29: 3-(3-(3'-(1*H*-Tetrazol-5-yl)-[1,1'-biphenyl]-4-yl)propyl)-1-(4-(*tert*-butyl)benzyl)-4-ethyl-1*H*-1,2,4-triazol-5(4*H*)-one:



[00172] To a DME solution (0.1 M) of 3-(3-(4-bromophenyl)propyl)-1-(4-*tert*-butyl)benzyl)-4-ethyl-1*H*-1,2,4-triazol-5(4*H*)-one (1 eq.) was added Pd₂dba₃ (0.025 eq.), dicyclohexyl(2',6'-dimethoxybiphenyl-2-yl)phosphine (0.2 eq.), and (3-(1*H*-tetrazol-5-yl)phenyl)boronic acid (1 eq.). The resulting solution was sub-surface purged with nitrogen gas for 15 min before 0.3 M aq. potassium phosphate (4 eq.) was added. The reaction vessel was sealed and heated at 110 °C for 16 h. The reaction mixture was then cooled to RT, diluted with EtOAc and washed sequentially with 1 N aq. HCl, water and finally brine. The organic extract was then dried over sodium sulfate and filtered. Concentration of the filtrate *in vacuo* afforded an orange solid. Further purification by way of column chromatography (C₁₈-reverse phase, gradient elution, 9:1 (v/v) H₂O: MeCN+0.1% TFA to MeCN+0.1% TFA) afforded the title compound as a white solid (11% yield). LC-MS: 520 (M-H)⁺.

Example 30: 2-(4'-(2-((1-(4-(*tert*-butyl)benzyl)-4-ethyl-5-oxo-4,5-dihydro-1*H*-1,2,4-triazol-3-yl)methyl)cyclopropyl)-[1,1'-biphenyl]-3-yl)acetic acid:



[00173] *Step 1*; To a solution of (*E*)-ethyl 3-(4-bromophenyl)acrylate (10.0 g, 39.2 mmol) in THF (150 mL) was slowly added at -78 °C a solution of DIBAL-H (86 mL of 1M solution in hexanes, 86.0 mmol). The resulting solution was then allowed to slowly warm to 0 °C, after which a further 10 mL of DIBAL-H solution was added. TLC analysis indicated complete reaction and the mixture was re-cooled to -78 °C. MeOH was then slowly added to quench the remaining reducing agent and the mixture allowed to warm back to rt over 30 minutes. The resulting mixture was poured into a saturated aqueous solution of Rochelle's salt and then extracted with EtOAc. The organic phase was separated, dried (MgSO₄), filtered and the filtrate

concentrated *in vacuo*. The crude product thus obtained was purified on silica eluting with a gradient of 0 to 35% EtOAc in hexanes to afford 6.0 g (71%) of (E)-3-(4-bromophenyl)prop-2-en-1-ol.

[00174] *Step 2*; To a solution of diethylzinc (1.0M; 9.4 mL, 9.4 mmol) in anhydrous DCE (30 mL) at -23 °C was added iodochloromethane (1.37 mL, 18.7 mmol) and the resulting mixture was maintained at -23 °C for 20 minutes. (E)-3-(4-Bromophenyl)prop-2-en-1-ol (1.0 g, 4.7 mmol) was then added as a solution in DCE (20 mL) dropwise after which the reaction was allowed to stir at -23 °C for another hr. The mixture was carefully quenched with saturated ammonium chloride solution and extracted with DCM. The combined organic extracts were dried (MgSO₄), filtered and the filtrate concentrated *in vacuo*. The residue thus obtained was purified on silica gel eluting with a gradient of 0 to 30% EtOAc in hexanes to afford the (2-(4-bromophenyl)cyclopropyl)methanol (862 mg, 81%).

[00175] *Step 3*; To an ice-cooled solution of (2-(4-bromophenyl)cyclopropyl)methanol (850 mg, 3.74 mmol) in DCM (15 mL) was added methanesulfonyl chloride (330 µL; 4.3 mmol) and Et₃N (1 mL, 7.2 mmol). After stirring at room temperature for 1 hr, the reaction mixture was diluted with DCM and washed with saturated aqueous sodium bicarbonate solution. The organic phase was separated, dried (MgSO₄), filtered and the filtrate was partially concentrated *in vacuo* until about 5 mL of solvent remained. To this mixture was added 7 mL of DMF before the remaining DCM was evaporated *in vacuo*. Finally, potassium cyanide (487 mg, 7.4 mmol) was added and the reaction solution was stirred for 12 hrs at 60 °C. The mixture was diluted with EtOAc and washed with water. The organic extract was then separated, dried (MgSO₄), filtered and the filtrate concentrated *in vacuo*. The residue thus obtained was purified on silica gel eluting with a gradient of 0 to 20% EtOAc in hexanes to afford 2-(2-(4-bromophenyl)cyclopropyl)acetonitrile contaminated with approx 10% of the ring opened nitrile.

[00176] *Step 4*; To a solution of 2-(2-(4-bromophenyl)cyclopropyl)acetonitrile (800 mg, 3.39 mmol) in EtOH (6 mL) and water (1 mL) was added potassium hydroxide (400 mg, 7.1 mmol). The reaction vessel was then sealed and heated to 85 °C until complete conversion to the acid as judged by LC-MS analysis (~24 hrs). The reaction mixture was diluted with EtOAc and acidified with 1N HCl until an aqueous pH of ~2 was attained. The organic phase was then separated, washed further with water, dried (MgSO₄), and filtered. Concentration of the filtrate *in vacuo* afforded 2-(2-(4-bromophenyl)cyclopropyl)acetic acid as a viscous oil.

[00177] *Step 5*; To a solution of 2-(2-(4-bromophenyl)cyclopropyl)acetic acid (623 mg, 2.44 mmol) in THF (10 mL) was first added carbonyldiimidazole (475 mg, 2.93 mmol) and then, after stirring for 2 hrs, hydrazine monohydrate (500 µL, ~4 eq.). After another 1 hr of stirring at RT, the solvent was removed *in vacuo*. The residue was taken up in EtOAc, washed with water, dried (MgSO₄), and filtered. Concentration of the filtrate *in vacuo* afforded 2-(2-(4-bromophenyl)cyclopropyl)acetohydrazide as a viscous oil.

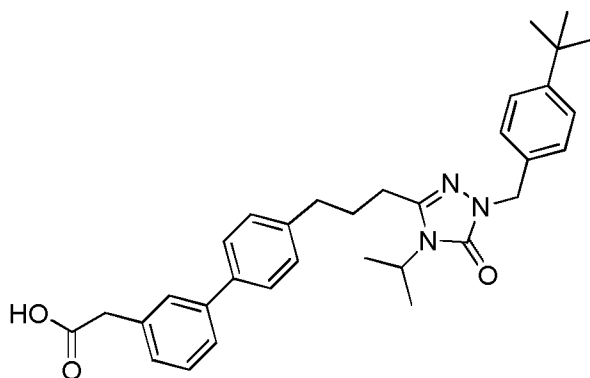
[00178] *Step 6*; To a solution of 2-(2-(4-bromophenyl)cyclopropyl)acetohydrazide (2.44 mmol) in THF (10 mL) was added ethyl isocyanate (230 µL, 2.90 mmol). After 1 hr at RT, the solvent was evaporated *in vacuo* to afford 2-(2-(2-(4-bromophenyl)cyclopropyl)acetyl)-N-ethylhydrazinecarboxamide as a pink solid.

[00179] *Step 7*: The hydrazine carboxamide from step 6 (2.44 mmol) was dissolved in MeOH (10 mL) and added potassium hydroxide (500 mg). The resulting mixture was heated at reflux for 12 hrs. After

completion of reaction, the solvent was removed *in vacuo* and the residue thus obtained was partitioned between DCM and 1N HCl. The organic extract was then separated, dried (MgSO₄), filtered and filtrate concentrated *in vacuo*. The residue was purified on silica gel eluting with 100% EtOAc to afford 3-((2-(4-bromophenyl)cyclopropyl)methyl)-4-ethyl-1*H*-1,2,4-triazol-5(4*H*)-one as a colorless solid.

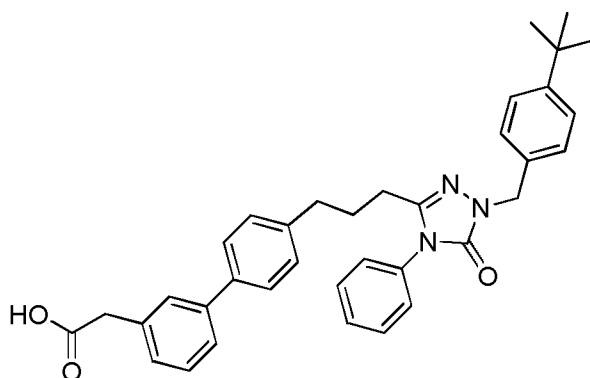
[00180] *Step 8*: To a solution of 3-((2-(4-bromophenyl)cyclopropyl)methyl)-4-ethyl-1*H*-1,2,4-triazol-5(4*H*)-one (444 mg, 1.35 mmol) in DMF (3 mL) was added potassium carbonate (764 mg, 5.5 mmol) and 4-(*tert*-butyl)benzylbromide (280 μ L, 1.52 mmol). The mixture was heated at 45 °C until the reaction was judged to be complete by LC-MS analysis (~ 3 hrs). The mixture was partitioned between EtOAc and water. The organic phase was separated, washed further with water, dried (MgSO₄), filtered and the filtrate concentrated *in vacuo*. The residue was purified on silica gel eluting with a gradient of 0 to 60% EtOAc in hexanes to afford 3-((2-(4-bromophenyl)cyclopropyl)methyl)-1-(4-(*tert*-butyl)benzyl)-4-ethyl-1*H*-1,2,4-triazol-5(4*H*)-one. This could then be coupled in an analogous fashion as example 1 to afford the title compound as a white solid. LC-MS: 524 (M+H)⁺.

Example 31: 2-(4'-(3-(1-(4-(*tert*-Butyl)benzyl)-4-isopropyl-5-oxo-4,5-dihydro-1*H*-1,2,4-triazol-3-yl)propyl)-[1,1'-biphenyl]-3-yl)acetic acid:



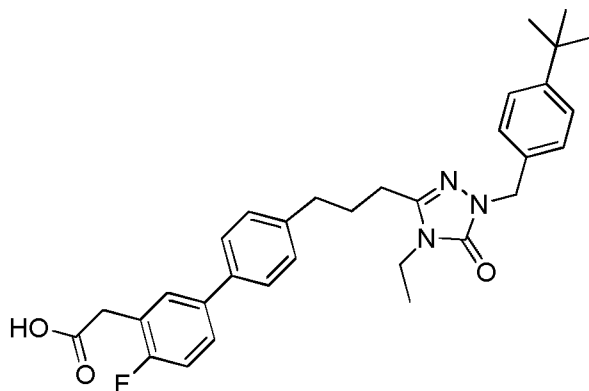
[00181] Prepared in an analogous fashion to example 1, but employing 3-(3-(4-bromophenyl)propyl)-1-(4-(*tert*-butyl)benzyl)-4-isopropyl-1*H*-1,2,4-triazol-5(4*H*)-one as the coupling partner in step 1. LC-MS: 526 (M+H)⁺.

Example 32: 2-(4'-(3-(1-(4-(*tert*-Butyl)benzyl)-5-oxo-4-phenyl-4,5-dihydro-1*H*-1,2,4-triazol-3-yl)propyl)-[1,1'-biphenyl]-3-yl)acetic acid:



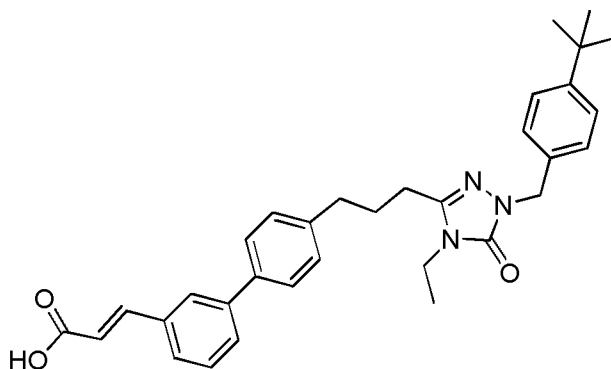
[00182] Prepared in an analogous fashion to example 1, but employing 3-(3-(4-bromophenyl)propyl)-1-(4-(*tert*-butyl)benzyl)-4-phenyl-1*H*-1,2,4-triazol-5(4*H*)-one as the coupling partner in step 1. LC-MS: 560 (M+H)⁺.

Example 33: 2-(4'-(3-(1-(4-(*tert*-Butyl)benzyl)-4-ethyl-5-oxo-4,5-dihydro-1*H*-1,2,4-triazol-3-yl)propyl)-4-fluoro-[1,1'-biphenyl]-3-yl)acetic acid:



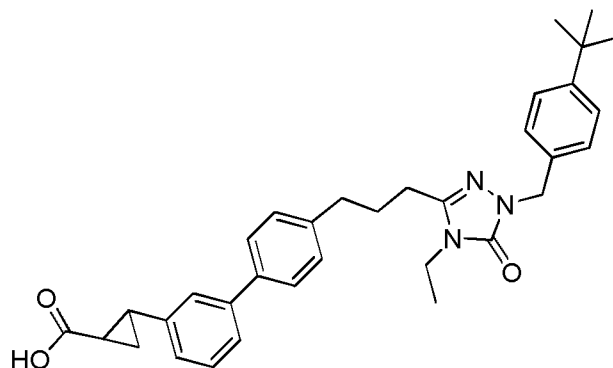
[00183] Prepared in an analogous manner to example 13, step 1 using ethyl 2-(5-bromo-2-fluorophenyl)acetate as coupling partner. Hydrolysis of the intermediate ester was carried out as in example 1, step 2. LC-MS: 530 (M+H)⁺.

Example 34: 3-(4'-(3-(1-(4-(*tert*-Butyl)benzyl)-4-ethyl-5-oxo-4,5-dihydro-1*H*-1,2,4-triazol-3-yl)propyl)-[1,1'-biphenyl]-3-yl)acrylic acid:



[00184] To a DME solution (0.07 M) of 1-(4-(*tert*-butyl)benzyl)-4-ethyl-3-(3-(4-(4,4,5,5-tetramethyl-1,3,2-dioxaborolan-2-yl)phenyl)propyl)-1*H*-1,2,4-triazol-5(4*H*)-one (1 eq.) was added Pd₂dba₃ (0.025 eq.), dicyclohexyl(2',6'-dimethoxybiphenyl-2-yl)phosphine (0.2 eq.), and (*E*)-3-(3-bromophenyl)acrylic acid (1 eq.). The resulting solution was sub-surface purged with nitrogen gas for 10 min before 0.3 M aq. potassium phosphate (4 eq.) was added. The reaction vessel was sealed and heated at 110 °C for 16 h. The reaction mixture was then cooled to RT, diluted with EtOAc and washed sequentially with 1 N aq. HCl, water and finally brine. The organic extract was then dried over sodium sulfate and filtered. Concentration of the filtrate *in vacuo* afforded a viscous, orange oil. Further purification by way of column chromatography (C₁₈-reverse phase, gradient elution, 9:1 (v/v) H₂O: MeCN+0.1% TFA to MeCN+0.1% TFA) afforded the title compound as a pale yellow foam (73% yield). LC-MS: 522 (M-H)⁻.

Example 35: 2-(4'-(3-(1-(4-(*tert*-Butyl)benzyl)-4-ethyl-5-oxo-4,5-dihydro-1*H*-1,2,4-triazol-3-yl)propyl)-[1,1'-biphenyl]-3-yl)cyclopropanecarboxylic acid:



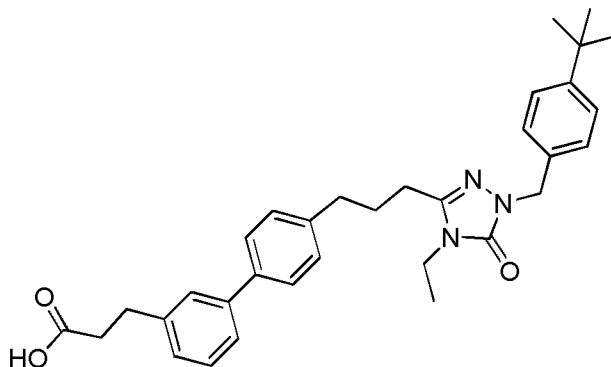
[00185] *Step 1*; To an ethanol solution (0.8 M) of (*E*)-3-(3-bromophenyl)acrylic acid (1 eq.) was added concentrated sulfuric acid (4.7 eq.). The resulting solution was allowed to stir at RT for 6 hrs. The volatiles were then removed *in vacuo* and the resulting residue was partitioned between ether and 1N aq. NaOH. The organic layer was separated, washed further with water then brine, and dried over sodium sulfate. Filtration and concentration of the filtrate *in vacuo* furnished (*E*)-ethyl 3-(3-bromophenyl)acrylate as a colorless oil (53% yield).

[00186] *Step 2*; To an anhydrous DMSO solution (0.3 M) of trimethylsulfoxonium iodide (1.8 eq.) was added at RT sodium hydride (1.7 eq., 60% dispersion in paraffin oil) in one rapid portion. The resulting suspension was allowed to stir at RT for 1.5 hrs during which time the reaction mixture became yellow in color. Then, (*E*)-ethyl 3-(3-bromophenyl)acrylate (1 eq.) was added and the resulting mixture was heated at 60 °C for 14 hrs. The now orange solution was cooled to RT and diluted with ether. This was then washed sequentially with 1 N aq. HCl, 1 N aq. NaOH, water and brine. The organic layer was dried over sodium sulfate and filtered. Concentration of the filtrate *in vacuo* furnished a viscous, red oil that was then subjected to purification by way of column chromatography (SiO₂, gradient elution, Hex to 3:7 (v/v) Hex: EtOAc). Ethyl 2-(3-bromophenyl)cyclopropanecarboxylate was isolated as a colorless oil (20% yield). LC-MS: 269, 271 (M+H)⁺.

[00187] *Step 3*; To a DME solution (0.045 M) of 1-(4-(*tert*-butyl)benzyl)-4-ethyl-3-(3-(4-(4,4,5,5-tetramethyl-1,3,2-dioxaborolan-2-yl)phenyl)propyl)-1*H*-1,2,4-triazol-5(4*H*)-one (1 eq.) was added Pd₂dba₃ (0.025 eq.), dicyclohexyl(2',6'-dimethoxybiphenyl-2-yl)phosphine (0.2 eq.), and ethyl 2-(3-bromophenyl)cyclopropanecarboxylate (1 eq.). The resulting solution was sub-surface purged with nitrogen gas for 10 min before 0.3 M aq. potassium phosphate (4 eq.) was added. The reaction vessel was sealed and heated at 110 °C for 16 hrs. The reaction mixture was then cooled to RT, diluted with EtOAc and washed sequentially with 1N aq. HCl, water and finally brine. The organic extract was then dried over sodium sulfate and filtered. Concentration of the filtrate *in vacuo* afforded a golden, yellow oil. This was then taken in a 2:1 (v/v) THF and methanol solution (0.1 M) and added 2 N aq. lithium hydroxide (3 eq.). The resulting solution was stirred at RT for 4 h. The volatiles were then removed *in vacuo* and the resulting residue was partitioned between EtOAc and 1 N aq. HCl. The organic extract was separated and then washed sequentially with water and brine. The organic extract was then dried over sodium sulfate and filtered.

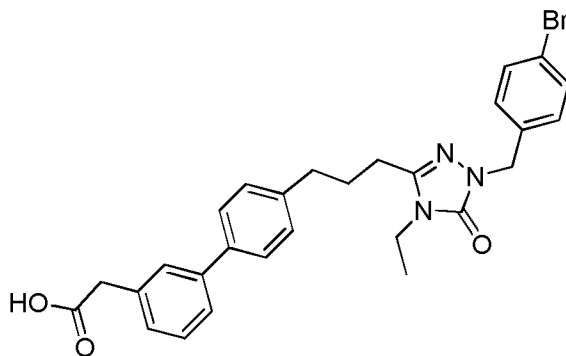
Concentration of the filtrate *in vacuo* afforded a viscous yellow oil. Further purification by way of column chromatography (SiO₂, gradient elution, 9:1 (v/v) Hex: EtOAc to EtOAc) afforded the title compound as a white foam (62% yield). LC-MS: 536 (M-H)⁻.

Example 36: 3-(4'-(3-(1-(4-(*tert*-Butyl)benzyl)-4-ethyl-5-oxo-4,5-dihydro-1*H*-1,2,4-triazol-3-yl)propyl)-[1,1'-biphenyl]-3-yl)propanoic acid:



[00188] To an EtOAc solution (0.04 M) of 3-(4'-(3-(1-(4-(*tert*-butyl)benzyl)-4-ethyl-5-oxo-4,5-dihydro-1*H*-1,2,4-triazol-3-yl)propyl)-[1,1'-biphenyl]-3-yl)acrylic acid (1 eq., example 36) was added palladium over carbon (0.25 eq., 10% w/w). The reaction suspension was thrice evacuated and back-filled with nitrogen. To thus obtained deoxygenated suspension was then gently sub-surface bubbled hydrogen gas for 1.5 h. The reaction was finally quenched with the addition of dichloromethane. The suspension was then carefully filtered through a pad of dichloromethane-wetted celite and the insolubles were rinsed further with methanol, EtOAc and finally dichloromethane. Concentration of the filtrate thus obtained *in vacuo* afforded the title compound as a white foam (73% yield). LC-MS: 526 (M+H)⁺.

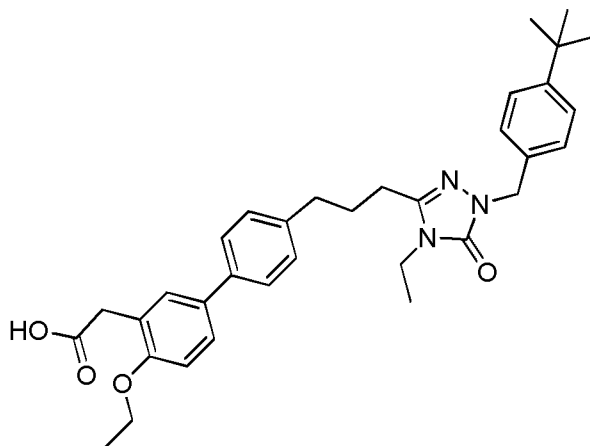
Example 37: 2-(4'-(3-(1-(4-Bromobenzyl)-4-ethyl-5-oxo-4,5-dihydro-1*H*-1,2,4-triazol-3-yl)propyl)-[1,1'-biphenyl]-3-yl)acetic acid:



[00189] To a solution of ethyl 2-(4'-(3-(1-(4-bromobenzyl)-4-ethyl-5-oxo-4,5-dihydro-1*H*-1,2,4-triazol-3-yl)propyl)-[1,1'-biphenyl]-3-yl)acetate (0.143 g, 0.25 mmol, intermediate from example 24, step 2) in THF (2 mL) and MeOH (2 mL) was added water (2 mL) and LiOH (0.061 g, 2.56 mmol). The resulting mixture was stirred at 60 °C for 16 hrs. The solvents were evaporated and the residue treated with DCM and 0.25 M HCl solution. The aqueous layer was separated and back-extracted with DCM. The combined organic extracts were concentrated *in vacuo* and the crude material thus obtained was purified by preparatory TLC

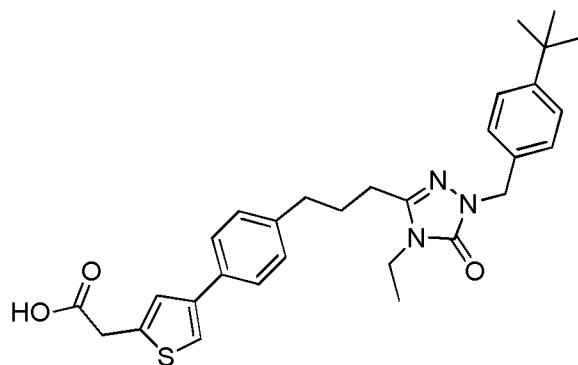
using 10% MeOH/DCM as eluent to afford 0.021 g of the title compound (15% yield) as a white foam. LC-MS: 535 (M+H)⁺.

Example 38: 2-(4'-(3-(1-(4-(*tert*-Butyl)benzyl)-4-ethyl-5-oxo-4,5-dihydro-1*H*-1,2,4-triazol-3-yl)propyl)-4-ethoxy-[1,1'-biphenyl]-3-yl)acetic acid:



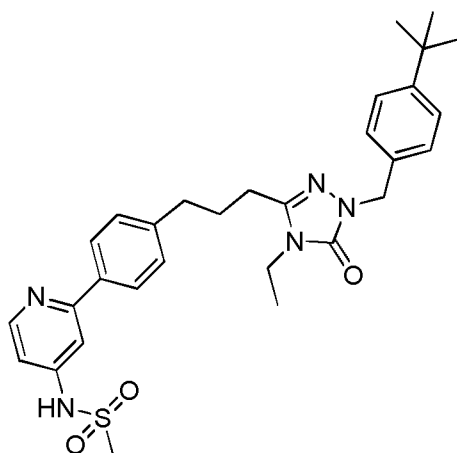
[00190] Prepared in an analogous manner to example 13, step 1 using methyl 2-(5-bromo-2-ethoxyphenyl)acetate as the coupling partner in step 1. Hydrolysis of the intermediate ester was carried out as in example 1, step 2. LC-MS: 556 (M+H)⁺.

Example 39: 2-(4-(4-(3-(1-(4-(*tert*-Butyl)benzyl)-4-ethyl-5-oxo-4,5-dihydro-1*H*-1,2,4-triazol-3-yl)propyl)phenyl)thiophen-2-yl)acetic acid:



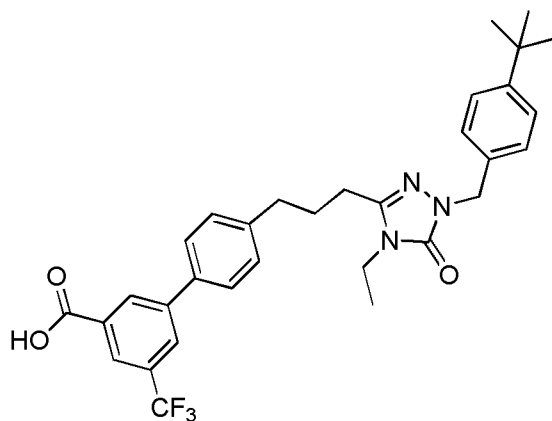
[00191] Prepared in an analogous manner to example 13, step 1 using ethyl 2-(4-bromothiophen-2-yl)acetate as the coupling partner in step 1. Hydrolysis of the intermediate ester was carried out as in example 1, step 2. LC-MS: 518 (M+H)⁺.

Example 40: 1-{[4-(*tert*-Butyl)phenyl]methyl}-4-ethyl-3-[3-(4-{4-[(methylsulfonyl)amino](2-pyridyl)}phenyl)propyl]-1,2,4-triazolin-5-one:



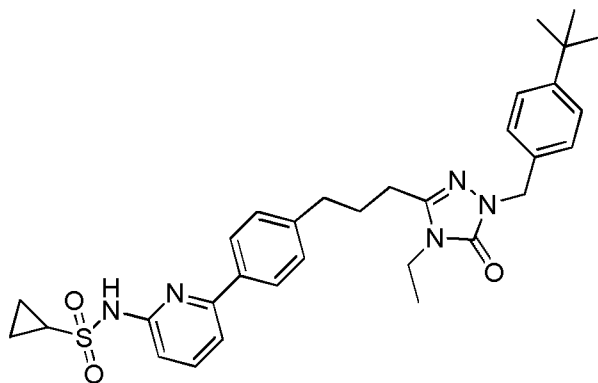
[00192] Prepared in an analogous manner to example 12, but using instead 3-(3-(4-(4-aminopyridin-2-yl)phenyl)propyl)-1-(4-(*tert*-butyl)benzyl)-4-ethyl-1*H*-1,2,4-triazol-5(4*H*)-one (example 11) as the starting material. LC-MS: 548 (M+H)⁺

Example 41: 4'-(3-(1-(4-(*tert*-Butyl)benzyl)-4-ethyl-5-oxo-4,5-dihydro-1*H*-1,2,4-triazol-3-yl)propyl)-5-(trifluoromethyl)-[1,1'-biphenyl]-3-carboxylic acid:



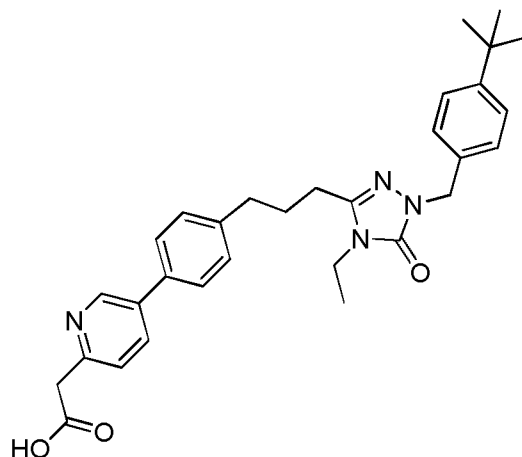
[00193] Prepared in an analogous manner to example 13 using instead ethyl 3-bromo-5-(trifluoromethyl)benzoate as the coupling partner in step 1. Hydrolysis of the intermediate ester was carried out as in example 1, step 2. LC-MS: 566 (M+H)⁺.

Example 42: 1-([4-(*tert*-Butyl)phenyl]methyl)-3-[3-(4-{6-[(cyclopropylsulfonyl)amino](2-pyridyl)}phenyl)propyl]-4-ethyl-1,2,4-triazolin-5-one:



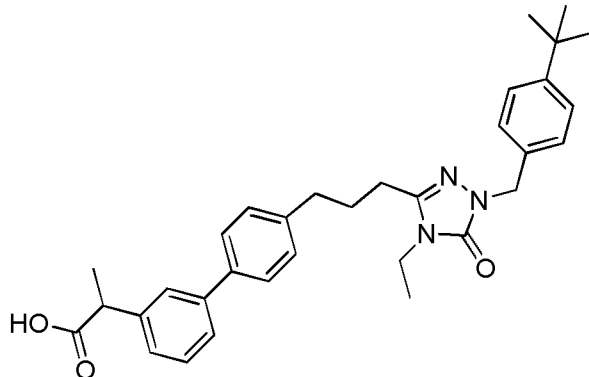
[00194] Prepared in an analogous manner to example 4 using instead cyclopropane sulfonyl chloride as the electrophile. LC-MS: 574 (M+H)⁺.

Example 43: 2-(5-{4-[3-(1-{[4-(*tert*-Butyl)phenyl]methyl}-4-ethyl-5-oxo-1,2,4-triazolin-3-yl)propyl]phenyl}-2-pyridyl)acetic acid:



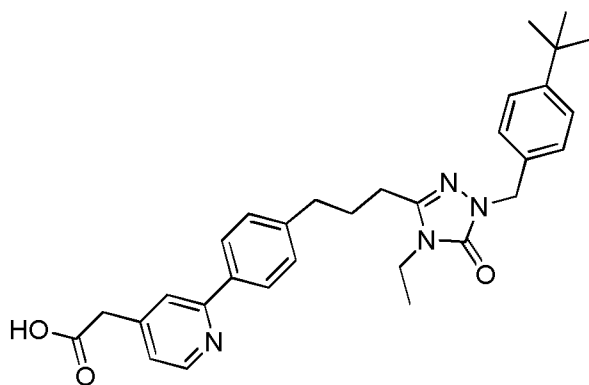
[00195] Prepared in an analogous manner to example 13 using instead ethyl 2-(5-bromopyridin-2-yl)acetate as the coupling partner in step 1. Hydrolysis of the intermediate ester was carried out as in example 1, step 2. LC-MS: 513 (M+H)⁺.

Example 44: 2-(3-{4-[3-(1-{[4-(*tert*-Butyl)phenyl]methyl}-4-ethyl-5-oxo-1,2,4-triazolin-3-yl)propyl]phenyl} phenyl)propanoic acid:



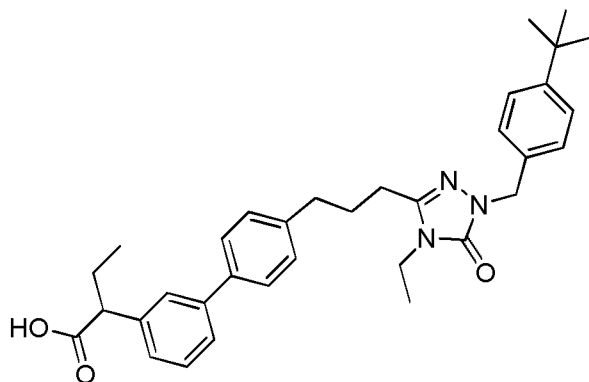
[00196] Prepared in an analogous manner to example 13 using instead ethyl 2-(3-bromophenyl)propanoate (prepared according to the procedure described in *Bioorg. Med. Chem.* 2011, 19(11), p3299-3311) as the coupling partner in step 1. Hydrolysis of the intermediate ester was carried out as in example 1, step 2. LC-MS: 526 (M+H)⁺.

Example 45: 2-(2-{4-[3-(1-{[4-(*tert*-Butyl)phenyl]methyl}-4-ethyl-5-oxo-1,2,4-triazolin-3-yl)propyl]phenyl}-4-pyridyl)acetic acid:



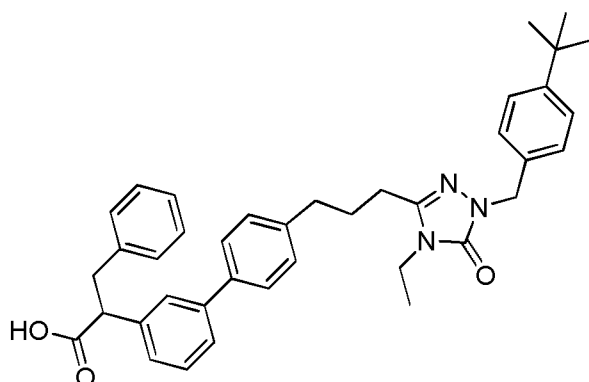
[00197] Prepared in an analogous manner to example 13 using instead ethyl 2-(2-chloropyridin-4-yl)acetate as the coupling partner in step 1. Hydrolysis of the intermediate ester was carried out as in example 1, step 2. LC-MS: 513 (M+H)⁺.

Example 46: 2-(3-{4-[3-(1-{[4-(tert-Butyl)phenyl]methyl}-4-ethyl-5-oxo-1,2,4-triazolin-3-yl)propyl]phenyl} phenyl)butanoic acid:



[00198] Prepared in an analogous manner to example 13 using instead ethyl 2-(3-bromophenyl)butanoate (prepared according to the procedure described in *Bioorg. Med. Chem.* 2011, 19(11), p3299-3311) as the coupling partner in step 1. Hydrolysis of the intermediate ester was carried out as in example 1, step 2. LC-MS: 540 (M+H)⁺.

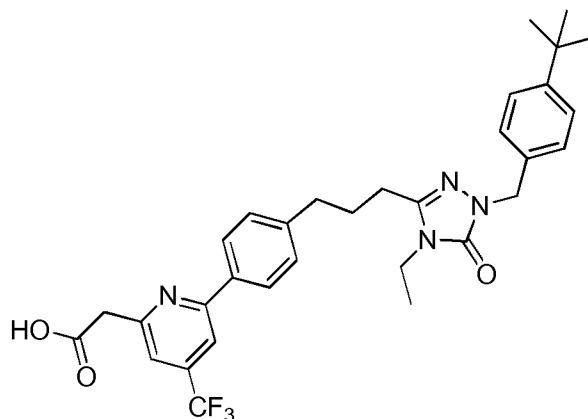
Example 47: 2-(3-{4-[3-(1-{[4-(tert-Butyl)phenyl]methyl}-4-ethyl-5-oxo(1,2,4-triazolin-3-yl)propyl]phenyl} phenyl)-3-phenylpropanoic acid:



[00199] Prepared in an analogous manner to example 13 using instead ethyl 2-(3-bromophenyl)-3-phenylpropanoate (prepared according to the procedure described in *Bioorg. Med. Chem.* 2011, 19(11),

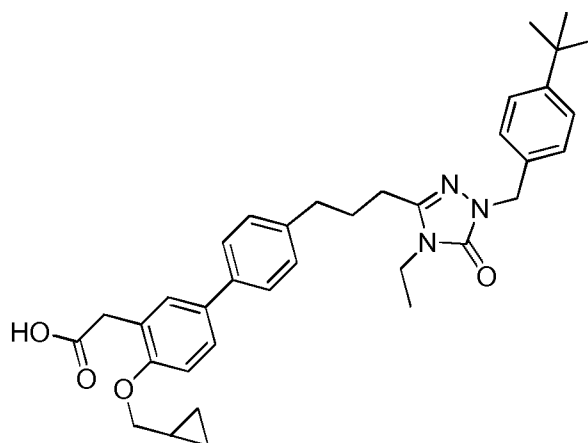
p3299-3311) as the coupling partner in step 1. Hydrolysis of the intermediate ester was carried out as in example 1, step 2. LC-MS: 602 (M+H)⁺.

Example 48: 2-(6-{4-[3-(1-{[4-(tert-Butyl)phenyl]methyl}-4-ethyl-5-oxo(1,2,4-triazolin-3-yl))propyl]phenyl}-4-(trifluoromethyl)-2-pyridyl)acetic acid:



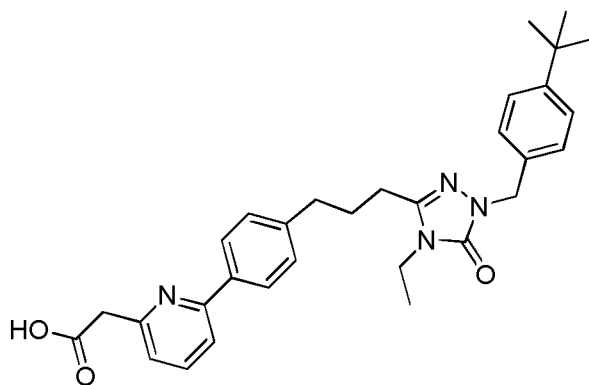
[00200] Prepared in an analogous manner to example 13 using instead ethyl 2-(6-chloro-4-(trifluoromethyl)pyridin-2-yl)acetate as the coupling partner in step 1. Hydrolysis of the intermediate ester was carried out as in example 1, step 2. LC-MS: 581 (M+H)⁺.

Example 49: 2-(4'-(3-(1-(4-(tert-Butyl)benzyl)-4-ethyl-5-oxo-4,5-dihydro-1H-1,2,4-triazol-3-yl)propyl)-4-(cyclopropylmethoxy)-[1,1'-biphenyl]-3-yl)acetic acid:



[00201] Prepared in an analogous manner to example 13 using instead methyl 2-(5-bromo-2-(cyclopropylmethoxy)phenyl)acetate as coupling partner in step 1. Hydrolysis of the intermediate ester was carried out as in example 1, step 2. LC-MS: 582 (M+H)⁺.

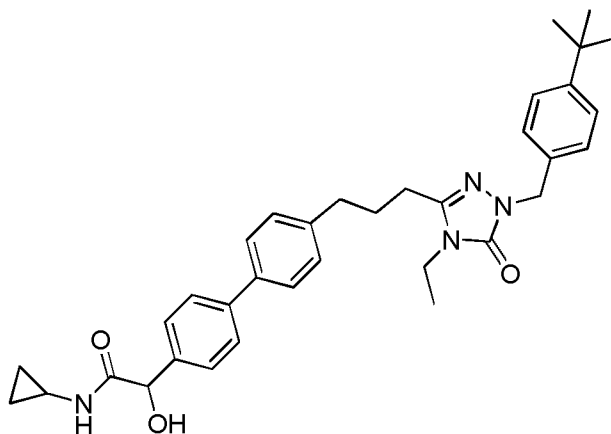
Example 50: 2-(6-{4-[3-(1-{[4-(tert-Butyl)phenyl]methyl}-4-ethyl-5-oxo-1,2,4-triazolin-3-yl))propyl]phenyl}-2-pyridyl)acetic acid:



[00202] *Step 1*; To a stirred a solution of diisopropylamine (5.3 mL, 37.6 mmol) in anhydrous THF (100 mL) mixture was added at -78 °C *n*-butyllithium (13.8 mL, 34.4 mmol, 2.5 M solution in hexanes) dropwise. The resulting mixture was stirred for 1 hr at -78 °C before 2-chloro-6-methylpyridine (3.4 mL, 31.3 mmol) and tetramethylethylenediamine (4.7 mL, 31.3 mmol) were added. The reaction mixture was then allowed to warm to 0 °C over 2 hrs. The reaction mixture was re-cooled to -78 °C before dimethyl carbonate (7.9 mL, 93.9 mmol) was added and the resulting solution was allowed to warm slowly to room temperature overnight. Reaction was quenched with the addition of saturated aq. ammonium chloride and extracted with EtOAc. The combined organic extracts were washed further with water and brine, dried (Na₂SO₄), filtered and and the filtrate concentrated *in vacuo*. The residue thus obtained was purified on silica gel eluting with a solvent gradient of 0 to 50% EtOAc in hexanes to afford methyl 2-(6-chloropyridin-2-yl)acetate.

[00203] *Step2*: Prepared in an analogous manner to example 1 using methyl 2-(6-chloropyridin-2-yl)acetate from the previous step as the coupling partner in step 1. Hydrolysis of the intermediate ester was then carried out as in example 1, step 2. LC-MS: 513 (M+H)⁺.

Example 51: 2-(4'-(3-(1-(4-(*tert*-Butyl)benzyl)-4-ethyl-5-oxo-4,5-dihydro-1H-1,2,4-triazol-3-yl)propyl)-[1,1'-biphenyl]-4-yl)-N-cyclopropyl-2-hydroxyacetamide:

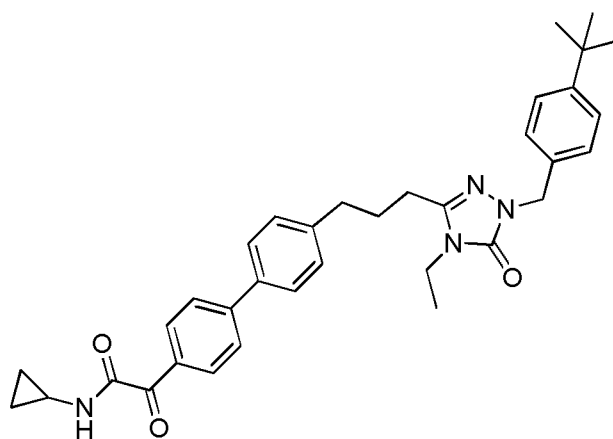


[00204] *Step 1*; To a solution of ethyl 2-bromo-(4-bromophenyl)acetate (1 mL, 5.1 mmol) in DMF (10 mL) was added potassium acetate (750 mg, 7.6 mmol) and the resulting reaction solution was heated at 70 °C for 16 hrs. The reaction was then quenched with 10% aq. HCl and extracted with ether. The combined organic extracts were then washed further with water and brine, dried over Na₂SO₄, and filtered. Concentration of the filtrate *in vacuo* afforded the crude ethyl 2-acetoxy-2-(4-bromophenyl)acetate as a viscous oil.

[00205] *Step 2:* To a solution of 1-(4-(*tert*-butyl)benzyl)-4-ethyl-3-(3-(4-(4,4,5,5-tetramethyl-1,3,2-dioxaborolan-2-yl)phenyl)propyl)-1*H*-1,2,4-triazol-5(4*H*)-one (492 mg, 0.98 mmol) in DME (12 mL) was added Pd₂dba₃ (22 mg, 0.024 mmol), dicyclohexyl(2',6'-dimethoxybiphenyl-2-yl)phosphine (80 mg, 0.196 mmol), and ethyl 2-acetoxy-2-(4-bromophenyl)acetate (441 mg, 1.47 mmol) from the previous step. The resulting solution was sub-surface purged with nitrogen gas for 10 min before 0.4 M aq. potassium phosphate (10 mL) was added. The reaction vessel was sealed and heated at 80 °C for 16 hrs. The reaction mixture was then cooled to RT, quenched with 1N aq. HCl and extracted with EtOAc. The combined organic extracts were washed further with 1N aq. HCl, water and finally brine. The organic extract was then dried over sodium sulfate, filtered and concentrated *in vacuo*. Purification by way of reverse-phase column chromatography (C₁₈, gradient elution, 9:1 (v/v) H₂O: MeCN + 0.1% TFA to MeCN + 0.1% TFA) afforded 2-(4'-(3-(1-(4-(*tert*-butyl)benzyl)-4-ethyl-5-oxo-4,5-dihydro-1*H*-1,2,4-triazol-3-yl)propyl)-[1,1'-biphenyl]-4-yl)-2-hydroxyacetic acid the title compound as a white foam.

[00206] *Step 3:* To a solution of 2-(4'-(3-(1-(4-(*tert*-butyl)benzyl)-4-ethyl-5-oxo-4,5-dihydro-1*H*-1,2,4-triazol-3-yl)propyl)-[1,1'-biphenyl]-4-yl)-2-hydroxyacetic acid (82 mg, 0.16 mmol) in DMF (2 mL) was added cyclopropylamine (21 µL, 0.3 mmol) and HATU (75 mg, 0.2 mmol). Finally, diisopropylethylamine (52 µL, 0.3 mmol) was added and the resulting yellow solution was allowed to stir at RT for 16 hrs. The crude reaction mixture was then diluted with ether and washed sequentially with 10% aq. HCl, 1 N aq. NaOH, water and brine. The organic extract was then dried over Na₂SO₄, filtered and the filtrate concentrated *in vacuo* to afford the crude product as a pale yellow oil. Further purification by way of column chromatography (SiO₂, gradient elution, 9:1 (v/v) Hex: EtOAc to EtOAc) afforded the title compound as a white foam (73% yield). LC-MS: 567 (M+H)⁺.

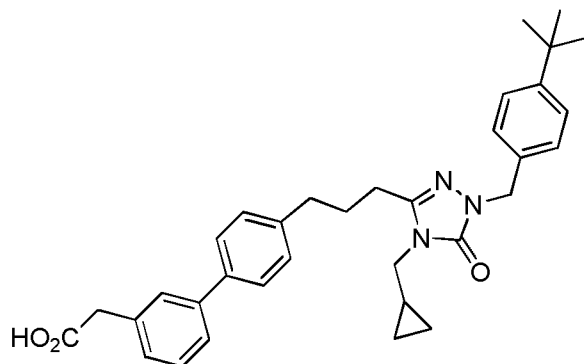
Example 52: 2-(4'-(3-(1-(4-(*tert*-Butyl)benzyl)-4-ethyl-5-oxo-4,5-dihydro-1*H*-1,2,4-triazol-3-yl)propyl)-[1,1'-biphenyl]-4-yl)-*N*-cyclopropyl-2-oxoacetamide:



[00207] To a solution of 2-(4'-(3-(1-(4-(*tert*-butyl)benzyl)-4-ethyl-5-oxo-4,5-dihydro-1*H*-1,2,4-triazol-3-yl)propyl)-[1,1'-biphenyl]-4-yl)-*N*-cyclopropyl-2-hydroxyacetamide (65 mg, 0.11 mmol, example 51) was added Dess-Martin periodinane (73 mg, 0.15 mmol) in one rapid portion at 0 °C. The resulting solution was first stirred at 0 °C for 30 min and then at RT for 4 h. The reaction mixture was then diluted with ether and washed sequentially with 10% aq. Na₂S₂O₃, sat. aq. NaHCO₃, water and brine. The organic extract was then

dried over Na_2SO_4 , filtered and the filtrate concentrated *in vacuo* to afford the crude product as a viscous oil. Further purification by way of column chromatography (SiO_2 , gradient elution, 9:1 (v/v) Hex: EtOAc to EtOAc) afforded the title compound as a white foam (93% yield). LC-MS: 565 ($\text{M}+\text{H}$)⁺.

Example 53: 2-(4'-(3-(1-(4-(*tert*-Butyl)benzyl)-4-(cyclopropylmethyl)-5-oxo-4,5-dihydro-1*H*-1,2,4-triazol-3-yl)propyl)-[1,1'-biphenyl]-3-yl)acetic acid:



[00208] Step 1: 2-((4-Bromobenzyl)oxy)acetic acid (590 mg, 2.4 mmol), 1-(4-(*tert*-butyl)benzyl)hydrazinecarboxamide monomethanesulfonate (774 mg, 2.5 mmol, prepared according to published procedure found in Braden, T. M. *et al.*, *Org. Process Res. Dev.* **2007**, *11*, p. 431-440) and 2-(7-aza-1*H*-benzotriazole-1-yl)-1,1,3,3-tetramethyluronium hexafluorophosphate (1.2 g, 3.15 mmol) were combined in anhydrous DMF (30 mL). To the reaction solution was then added Hunig's base (1.1 mL, 6.3 mmol) and the resulting yellow solution was allowed to stir at RT for 16 hrs. The reaction mixture was then quenched with EtOAc and 1 N aq. HCl. The organic extract was separated and washed further with water and brine. The organic extract was then dried over sodium sulfate and filtered. Concentration of the filtrate *in vacuo* afforded the crude reaction product as a white semi-solid. Further purification by way of column chromatography (SiO_2 , gradient elution, 4:1 (v/v) Hex: EtOAc to EtOAc) afforded 2-(4-(4-bromophenyl)butanoyl)-1-(4-(*tert*-butyl)benzyl)hydrazinecarboxamide as a white solid (778 mg, 72% yield).

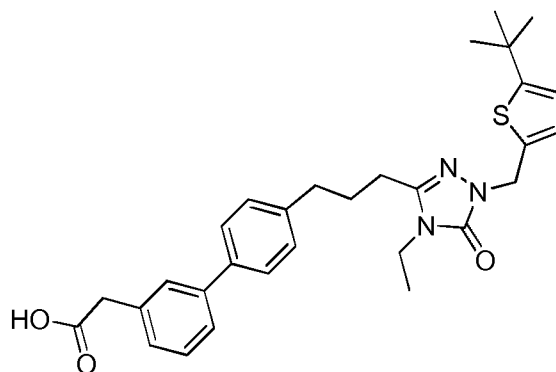
[00209] Step 2: To a solution of 2-(4-(4-bromophenyl)butanoyl)-1-(4-(*tert*-butyl)benzyl)hydrazinecarboxamide (778 mg, 1.74 mmol) in EtOAc (15 mL) was added camphorsulfonic acid (405 mg, 1.74 mmol) and the resulting solution was heated at 80 °C for 16 hrs. The volatiles were then removed *in vacuo* and the crude product thus obtained was recrystallized from ether and hexanes. 3-(3-(4-Bromophenyl)propyl)-1-(4-(*tert*-butyl)benzyl)-1*H*-1,2,4-triazol-5(4*H*)-one was isolated as a white solid (428 mg, 57% yield).

[00210] Step 3: To a solution of 3-(3-(4-bromophenyl)propyl)-1-(4-(*tert*-butyl)benzyl)-1*H*-1,2,4-triazol-5(4*H*)-one (80 mg, 0.19 mmol) in DMF (2 mL) was added sodium hydride (60% w/w dispersion in oil, 14 mg, 0.35 mmol). The resulting suspension was allowed to stir at RT for 3 hrs before cyclopropylmethyl bromide (40 μL , 0.35 mmol) was added. After another 8 hrs of stirring at RT, the crude reaction mixture was diluted with ether and washed sequentially with 10% aq. HCl, 1 N aq. NaOH, water and brine. The organic extract was then dried over Na_2SO_4 , filtered and the filtrate concentrated *in vacuo*. Purification by way of column chromatography (SiO_2 , gradient elution, 8:1 (v/v) Hex: EtOAc to EtOAc) afforded 3-(3-(4-

bromophenyl)propyl)-1-(4-(*tert*-butyl)benzyl)-4-(cyclopropylmethyl)-1*H*-1,2,4-triazol-5(4*H*)-one as a colorless oil (77 mg, 78% yield).

[00211] *Step 4*; Carried out in an analogous manner to example 1, using instead 3-(3-(4-bromophenyl)propyl)-1-(4-(*tert*-butyl)benzyl)-4-(cyclopropylmethyl)-1*H*-1,2,4-triazol-5(4*H*)-one prepared in the previous step as the coupling partner. LC-MS: 538 (M+H)⁺.

Example 54: 2-(4'-(3-(1-((5-(*tert*-Butyl)thiophen-2-yl)methyl)-4-ethyl-5-oxo-4,5-dihydro-1*H*-1,2,4-triazol-3-yl)propyl)-[1,1'-biphenyl]-3-yl)acetic acid:

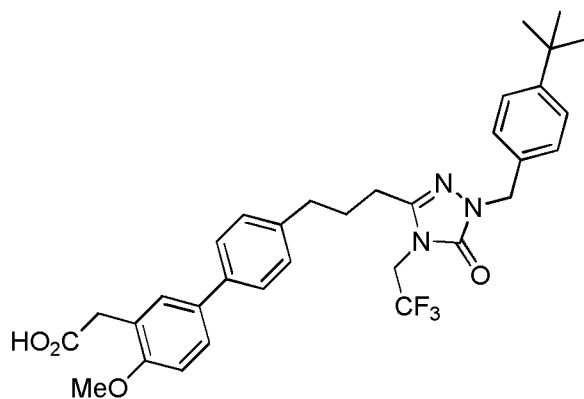


[00212] *Step 1*; To a solution of 5-(*tert*-butyl)thiophene-2-carboxylic acid (0.20 g, 1.09 mmol) and TEA (0.33 mL, 2.39 mmol) in anhydrous THF (20 mL) at 0 °C was added ethyl chloroformate (0.12 mL, 1.19 mmol). The resulting mixture was stirred at RT for 2 hrs, the solids were filtered off, and to the filtrate was added LiBH₄ (5.40 mL, 10.85 mmol, 2.0 M in THF). The resulting mixture was stirred for 16 hrs at 55 °C. The volatiles were then evaporated and the residue was diluted with DCM and 1:1 brine/water. The organic extract was separated, filtered through a Na₂SO₄/paper plug, and the filtrate concentrated *in vacuo*. Crude 1-(5-(*tert*-butyl)thiophen-2-yl)methanol thus obtained was used directly in the next step.

[00213] *Step 2;* To a solution of 1-(5-(*tert*-butyl)thiophen-2-yl)methanol (0.15 g, 0.88 mmol) in DCM (20 mL) at -78 °C was added TEA (0.37 mL, 2.6 mmol), followed by methanesulfonyl chloride (0.10 mL, 1.3 mmol). The resulting mixture was stirred at RT for 1.5 hrs and the volatiles were then evaporated. The resulting residue was quenched with 20% citric acid solution (aq.) and extracted with ether. The combined organic extracts were washed further with brine, filtered through a Na₂SO₄/paper plug and concentrated *in vacuo*. Crude (5-(*tert*-butyl)thiophen-2-yl)methyl methanesulfonate thus obtained was used directly in the next step.

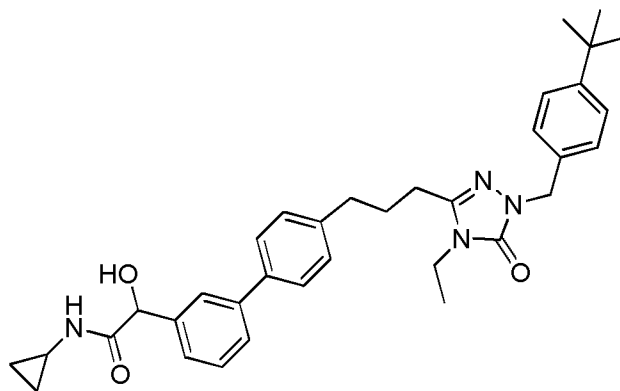
[00214] *Step 3*: Carried out in an analogous manner to example 22, using instead (5-(*tert*-butyl)thiophen-2-yl)methyl methanesulfonate prepared in the electrophile in step 2. Hydrolysis of the intermediate ester was then carried out as in example 1, step 2. LC-MS: 518 (M+H)⁺.

Example 55: 2-(4'-(3-(1-(4-(*tert*-Butyl)benzyl)-5-oxo-4-(2,2,2-trifluoroethyl)-4,5-dihydro-1*H*-1,2,4-triazol-3-yl)propyl)-4-methoxy-[1,1'-biphenyl]-3-yl)acetic acid:



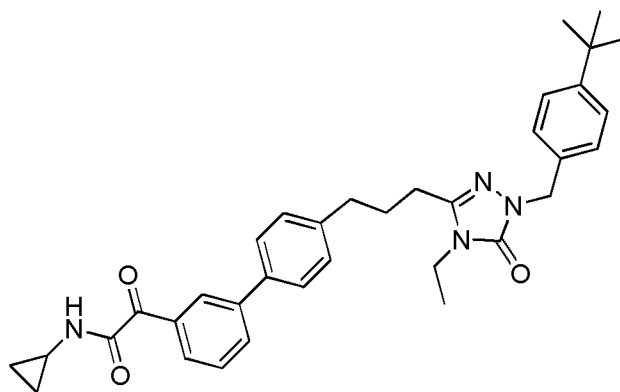
[00215] Prepared in an analogous manner to example 53, using instead 2,2,2-trifluoroethyl triflate as the electrophile in step 3 and methyl 2-(2-methoxy-5-(4,4,5,5-tetramethyl-1,3,2-dioxaborolan-2-yl)phenyl)acetate as the boronate coupling partner in step 4. LC-MS: 596 (M+H)⁺.

Example 56: 2-(4'-(3-(1-(4-(*tert*-Butyl)benzyl)-4-ethyl-5-oxo-4,5-dihydro-1*H*-1,2,4-triazol-3-yl)propyl)-[1,1'-biphenyl]-3-yl)-*N*-cyclopropyl-2-hydroxyacetamide:



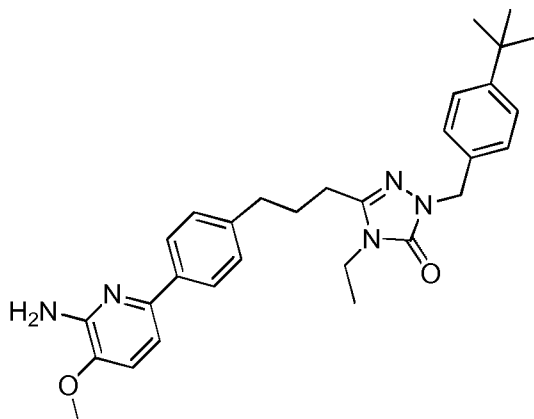
[00216] Prepared in an analogous manner to example 51, using instead ethyl 2-bromo-(3-bromophenyl)acetate as the substrate in step 1. LC-MS: 567 (M+H)⁺.

Example 57: 2-(4'-(3-(1-(4-(*tert*-Butyl)benzyl)-4-ethyl-5-oxo-4,5-dihydro-1*H*-1,2,4-triazol-3-yl)propyl)-[1,1'-biphenyl]-3-yl)-*N*-cyclopropyl-2-oxoacetamide:



[00217] Prepared in an analogous manner to example 52, using instead 2-(4'-(3-(1-(4-(*tert*-butyl)benzyl)-4-ethyl-5-oxo-4,5-dihydro-1*H*-1,2,4-triazol-3-yl)propyl)-[1,1'-biphenyl]-3-yl)-*N*-cyclopropyl-2-hydroxyacetamide as the substrate in step 1. LC-MS: 565 (M+H)⁺.

Example 58: 3-{3-[4-(6-Amino-5-methoxy(2-pyridyl))phenyl]propyl}-1-{[4-(*tert*-butyl)phenyl]methyl}-4-ethyl-1,2,4-triazolin-5-one:



[00218] *Step 1*; To a stirred solution of 3-hydroxy-2-nitropyridine (10g, 71.4 mmol) in MeOH (200 mL) was added sodium methoxide (19.8 mL, 71.4 mmol, 3.6 M solution in MeOH) and the resulting mixture was allowed to stir at room temperature for 30 min. The reaction mixture was then cooled to 0 °C and bromine (3.7 mL, 71.4 mmol) was added slowly over a period of 30 min. After the reaction was deemed to be complete by LC-MS, the mixture was quenched with glacial acetic acid (1.3 mL) and the volatiles were removed *in vacuo*. The crude residue thus obtained was azeotroped with heptane to afford 6-bromo-2-nitropyridin-3-ol as a brown solid.

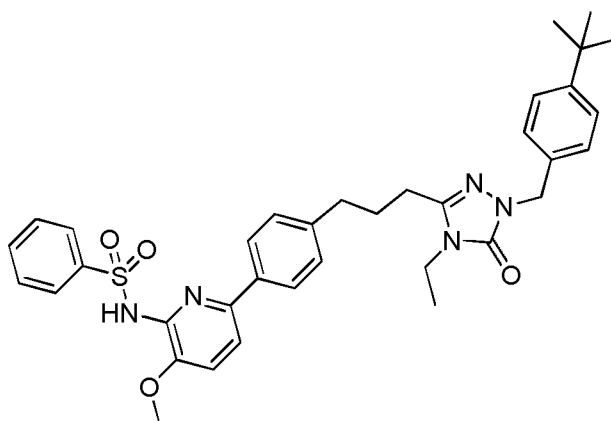
[00219] *Step 2*; To a solution of the aforementioned nitropyridine (4 g, 18.4 mmol) in acetone (50 mL) was added potassium carbonate (3 g, 22.1 mmol) and iodomethane (1.4 mL, 22.1 mmol). The resulting suspension was heated at 40°C until the reaction was deemed to be complete by TLC. The volatiles were removed *in vacuo* and the resulting residue was partitioned between water and EtOAc. The aqueous layer was separated and back-extracted with EtOAc. The combined organic extracts were dried over anhydrous Na₂SO₄, filtered and the filtrate concentrated *in vacuo*. Further purification by way of column chromatography (SiO₂, gradient elution, 9:1 (v/v) Hex: EtOAc to EtOAc).

[00220] *Step 3*; A mixture of 1-(4-(*tert*-butyl)benzyl)-4-ethyl-3-(3-(4-(4,4,5,5-tetramethyl-1,3,2-dioxaborolan-2-yl)phenyl)propyl)-1*H*-1,2,4-triazol-5(4*H*)-one (470 mg, 0.934 mmol), 6-bromo-3-methoxy-2-nitropyridine (266 mg, 1.12 mmol) and potassium carbonate (386 mg, 2.80 mmol) were taken up in DME (4 mL) and water (2 mL). To this was then added tetrakis(triphenylphosphine)palladium(0) (108 mg, 0.0935 mmol) and the resulting biphasic suspension was heated at 85 °C under an atmosphere of N₂ for 24 hrs. The reaction mixture was then cooled to room temperature and the volatiles were removed *in vacuo*. The crude material thus obtained was partitioned between water and EtOAc. The aqueous layer was separated and back-extracted with EtOAc. The combined organic extracts were then dried over anhydrous Na₂SO₄, filtered, and the filtrate concentrated *in vacuo*. Further purification by way of column chromatography (SiO₂, gradient elution, 9:1 (v/v) Hex: EtOAc to EtOAc) afforded 1-(4-(*tert*-butyl)benzyl)-4-ethyl-3-(3-(4-(5-methoxy-6-nitropyridin-2-yl)phenyl)propyl)-1*H*-1,2,4-triazol-5(4*H*)-one (356 mg, 74 % yield).

[00221] *Step 4*; To a solution of the aforementioned nitropyridine (356 mg, 0.673 mmol) in MeOH/EtOAc (1:1, 10 mL) was added Pd/C (10% w/w, dry, 200 mg). The suspension thus obtained was then stirred at

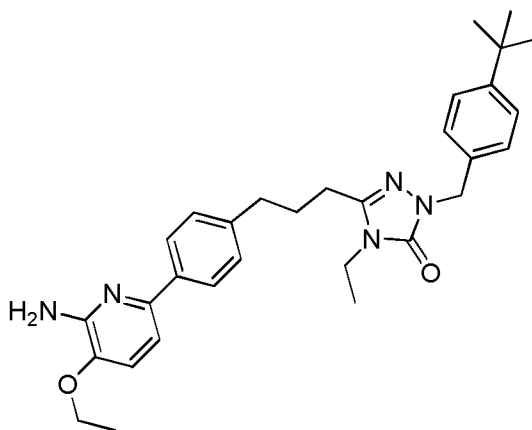
room temperature under a balloon-maintained hydrogen atmosphere for 16 hrs. The reaction was quenched with the addition of DCM and then filtered through a pad of DCM-wetted celite celite, The insolubles were washed further with DCM and the filtrate thus obtained was concentrated *in vacuo*. Further purification by way of column chromatography (SiO₂, gradient elution, DCM to 95:5 (v/v) DCM: MeOH) afforded the title compound as a colorless foam. LC-MS: 500 (M+H)⁺.

Example 59: 1-{[4-(*tert*-Butyl)phenyl]methyl}-4-ethyl-3-[3-(4-{5-methoxy-6-[(phenylsulfonyl)amino](2-pyridyl)}phenyl)propyl]-1,2,4-triazolin-5-one:



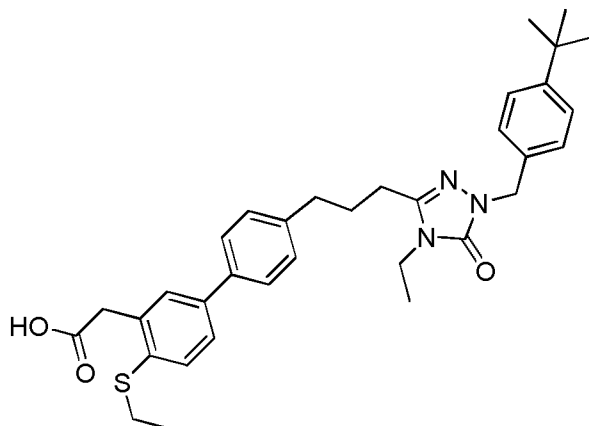
[00222] To a solution of 3-{3-[4-(6-amino-5-methoxy(2-pyridyl))phenyl]propyl}-1-{[4-(*tert*-butyl)phenyl]methyl}-4-ethyl-1,2,4-triazolin-5-one (247 mg, 0.494 mmol) in pyridine (1.5 mL) was added benzene sulfonylchloride (70 μ L, 0.544 mmol, 1.1 eq). After 24 hrs of stirring at RT, the reaction mixture was then poured onto dichloromethane (40 mL) and washed sequentially with saturated aq. CuSO₄, water, and brine. The organic extract was dried over anhydrous Na₂SO₄, filtered and the filtrate concentrated *in vacuo*. The crude product thus obtained was then purified by flash column chromatography (SiO₂, gradient elution, 9:1 (v/v) Hex: EtOAc to EtOAc) to afford the title compound as a white solid (115.6 mg, 78 %). LC-MS: 640 (M+H)⁺.

Example 60: 3-{3-[4-(6-Amino-5-ethoxy(2-pyridyl))phenyl]propyl}-1-{[4-(*tert*-butyl)phenyl]methyl}-4-ethyl-1,2,4-triazolin-5-one:



[00223] Prepared in an analogous manner to example 58 but using instead ethyl iodide as the electrophile in step 2. LC-MS: 514 (M+H)⁺.

Example 61: 2-(5-{4-[3-(1-{4-(*tert*-Butyl)phenyl}methyl}-4-ethyl-5-oxo(1,2,4-triazolin-3-yl))propyl]phenyl}-2-ethylthiophenyl)acetic acid:



[00224] *Step 1*; To a stirred solution of 1-bromo-2-(bromomethyl)-4-iodobenzene (5g, 13.3 mmol) in DMF (44 mL) was added potassium cyanide (1.7g, 26.6 mmol) and the resulting mixture was stirred at room temperature for 16 hrs. This was then diluted with water and extracted with diethyl ether. The combined organic extracts were dried over anhydrous Na₂SO₄, filtered and the filtrate concentrated *in vacuo*. Further purification by way of column chromatography (SiO₂, gradient elution, 9:1 (v/v) Hex: EtOAc to EtOAc) afforded 2-(2-bromo-5-iodophenyl)acetonitrile as a pale yellow oil.

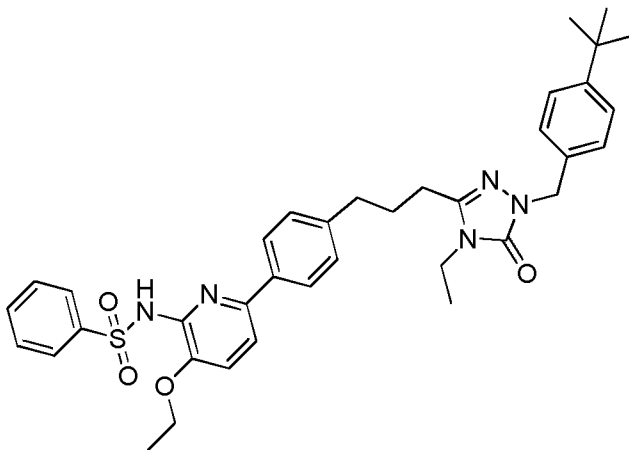
[00225] *Step 2*; A mixture of 1-(4-(*tert*-butyl)benzyl)-4-ethyl-3-(3-(4-(4,4,5,5-tetramethyl-1,3,2-dioxaborolan-2-yl)phenyl)propyl)-1*H*-1,2,4-triazol-5(4*H*)-one (538 mg, 1.07 mmol), 2-(2-bromo-5-iodophenyl)acetonitrile (413 mg, 1.3 mmol) and potassium carbonate (443 mg, 3.2 mmol) were taken up in DME (4 mL) and water (2 mL). To this was then added tetrakis(triphenylphosphine)palladium(0) (124 mg, 0.107 mmol) and the resulting mixture was stirred at 85 °C under an atmosphere of N₂ for 24 hrs. The reaction mixture was then cooled to room temperature and the volatiles were removed *in vacuo*. The crude material thus obtained was then partitioned between water and EtOAc. The aqueous layer was separated and back-extracted with EtOAc. The combined organic extracts were dried over anhydrous Na₂SO₄, filtered and the filtrate concentrated *in vacuo*. Further purification by way of column chromatography (SiO₂, gradient elution, 9:1 (v/v) Hex: EtOAc to EtOAc) afforded 2-(4-bromo-4'-(3-(1-(4-(*tert*-butyl)benzyl)-4-ethyl-5-oxo-4,5-dihydro-1*H*-1,2,4-triazol-3-yl)propyl)-[1,1'-biphenyl]-3-yl)acetonitrile.

[00226] *Step 3*: To a stirred suspension of potassium carbonate (38 mg, 0.27 mmol) in xylene (5 mL) was added at 0 °C ethanethiol (0.040 mL, 0.54 mmol). The reaction mixture was allowed to warm slowly to room temperature over 1 hr. In a separate round bottom flask, the isolated nitrile from the previous step (246 mg, 0.431 mmol), Pd₂(dba)₃ (40 mg, 0.043 mmol) and Xantphos (28 mg, 0.047 mmol) were combined in deoxygenated xylenes (10 mL) and this was then added to the above thiol mixture. The reaction mixture thus obtained was then heated at reflux over night under a nitrogen atmosphere. After cooling to room temperature, the reaction mixture was diluted with EtOAc and washed with water. The organic phase was separated, dried (MgSO₄), filtered and the filtrate concentrated *in vacuo*. The crude product thus obtained was purified by way of column chromatography (SiO₂, gradient elution, 9:1 (v/v) Hex: EtOAc to EtOAc) to

afford 2-(4'-(3-(1-(4-(*tert*-butyl)benzyl)-4-ethyl-5-oxo-4,5-dihydro-1*H*-1,2,4-triazol-3-yl)propyl)-4-(ethylthio)-[1,1'-biphenyl]-3-yl)acetonitrile.

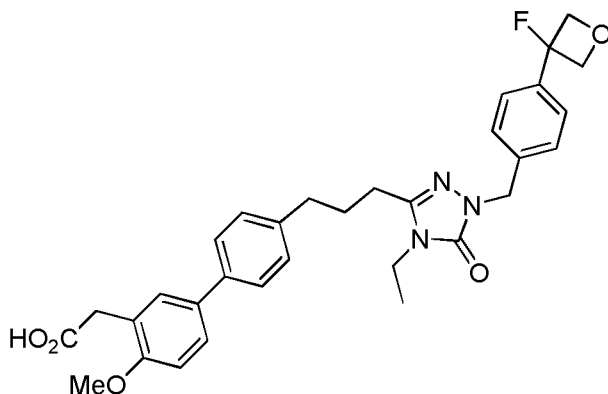
[00227] *Step 4*: To a solution of the isolated nitrile from the previous step (250 mg, 0.45 mmol) in EtOH: H₂O (1:1 v/v, 4 mL) was added potassium hydroxide (300 mg, 4.5 mmol). The resulting mixture was then heated at reflux for 16 hrs. The volatiles were then removed *in vacuo* and the resulting residue was taken up in 1 N aq. HCl and EtOAc. The organic extract was separated, washed further with water and brine, dried (MgSO₄), and filtered. Concentration of the filtrate *in vacuo* afforded the crude product that was purified further by reverse phase HPLC. The titled compound was isolated as a white solid. LC-MS: 572 (M+H)⁺.

Example 62: 1-{[4-(*tert*-Butyl)phenyl]methyl}-3-[3-(4-{5-ethoxy-6-[(phenylsulfonyl)amino](2-pyridyl)}phenyl)propyl]-4-ethyl-1,2,4-triazolin-5-one:



[00228] Prepared in an analogous manner to example 4 but using instead 3-{3-[4-(6-amino-5-ethoxy(2-pyridyl))phenyl]propyl}-1-{[4-(*tert*-butyl)phenyl]methyl}-4-ethyl-1,2,4-triazolin-5-one (example 60) as the starting material. LC-MS: 654 (M+H)⁺.

Example 63: 2-(4'-(3-(4-Ethyl-1-(4-(3-fluorooxetan-3-yl)benzyl)-5-oxo-4,5-dihydro-1*H*-1,2,4-triazol-3-yl)propyl)-[1,1'-biphenyl]-3-yl)acetic acid:



[00229] *Step 1*: To a solution of 4-bromobenzyl alcohol (1.0 g, 5.3 mmol) in THF (50 mL) was added sodium hydride (0.32 g, 8 mmol, 60% w/w dispersion in oil) in one rapid portion. After 1 hr of stirring at RT, the reaction suspension was cooled to -78 °C before *n*-BuLi (2.1 mL, 5.3 mmol, 2.5 M solution in hexanes) was added dropwise over 12 min. The resulting yellow suspension was stirred at -78 °C for another 45 min before 3-oxetanone (310 μL, 5.3 mmol) was added neat, dropwise over a period of 10 min. The

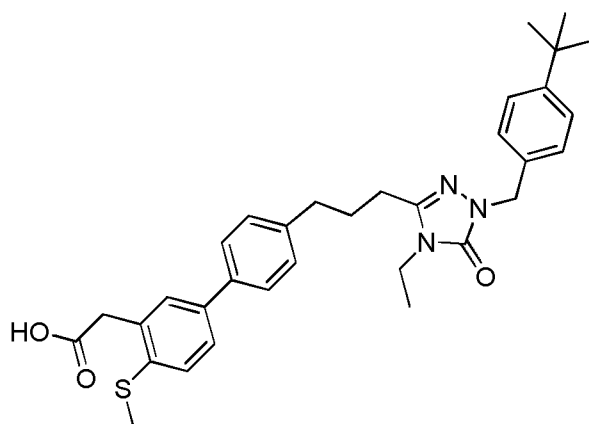
reaction mixture was then allowed to warm slowly to RT over 1 hr and stirred at RT for another 2 hrs. The reaction was quenched with the addition of saturated aq. NH_4Cl and then extracted with ether. The combined organic extracts were washed further with water and brine, dried over Na_2SO_4 , filtered and the filtrate concentrated *in vacuo*. Further purification by way of column chromatography (SiO_2 , gradient elution, 4:1 (v/v) Hex: EtOAc to EtOAc) afforded 3-(4-(hydroxymethyl)phenyl)oxetan-3-ol as a white solid (112 mg, 12% yield).

[00230] *Step 2*; To a solution of 3-(4-(hydroxymethyl)phenyl)oxetan-3-ol (112 mg, 0.63 mmol) in DCM (5 mL) was added sequentially at 0 °C triethylamine (220 μL , 1.6 mmol) and methanesulfonyl chloride (62 μL , 0.8 mmol). The resulting solution was allowed to warm slowly to RT over 3 hrs before the reaction was quenched with the addition of ether and water. The organic layer was separated, washed sequentially with 10% aq. HCl, water and brine, dried over Na_2SO_4 , and filtered. Concentration of the filtrate *in vacuo* afforded the crude 4-(3-hydroxyoxetan-3-yl)benzyl methanesulfonate as a golden, yellow oil.

[00231] *Step 3*; To a solution of 4-(3-hydroxyoxetan-3-yl)benzyl methanesulfonate (163 mg, 0.63 mmol) in DCM (2 mL) was added dropwise at -78 °C neat diethylaminosulfur trifluoride (165 μL , 1.26 mmol). The resulting mixture was allowed to stir at -78 °C for 8 hrs before it was carefully quenched with sat. aq. NaHCO_3 . The organic layer was separated, dried over Na_2SO_4 , filtered and the filtrate concentrated *in vacuo*. Purification by way of column chromatography (SiO_2 , gradient elution, 9:1 (v/v) Hex: EtOAc to EtOAc) afforded 4-(3-fluorooxetan-3-yl)benzyl methanesulfonate as a pale yellow oil that solidified upon standing (34 mg, 20% yield over two steps).

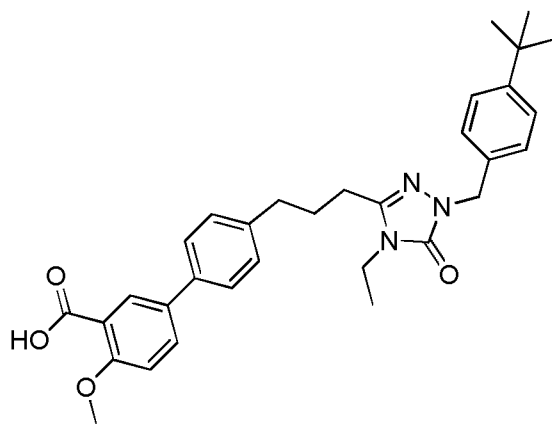
[00232] *Step 4*; Carried out in an analogous manner to example 22 using instead 4-(3-fluorooxetan-3-yl)benzyl methanesulfonate prepared in the previous step as the electrophile. LC-MS: 560 ($\text{M}+\text{H}$)⁺.

Example 64: 2-(5-{4-[3-(1-{4-(*tert*-Butyl)phenyl}methyl}-4-ethyl-5-oxo(1,2,4-triazolin-3-yl)propyl}phenyl)-2-methylthiophenyl)acetic acid:



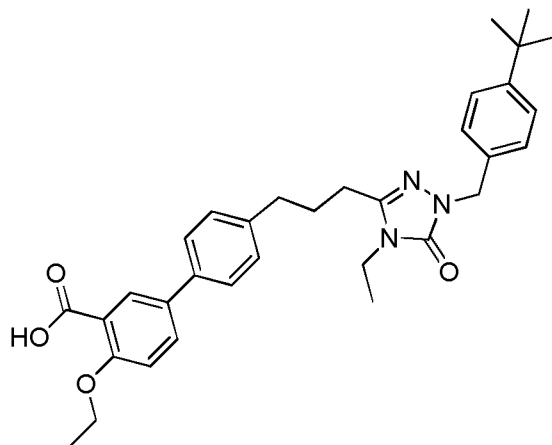
[00233] Prepared in an analogous manner to example 61 but using instead sodium thiomethoxide as the nucleophile in step 3. LC-MS: 559 ($\text{M}+\text{H}$)⁺.

Example 65: 4'-(3-(1-(4-(*tert*-Butyl)benzyl)-4-ethyl-5-oxo-4,5-dihydro-1*H*-1,2,4-triazol-3-yl)propyl)-4-methoxy-[1,1'-biphenyl]-3-carboxylic acid:



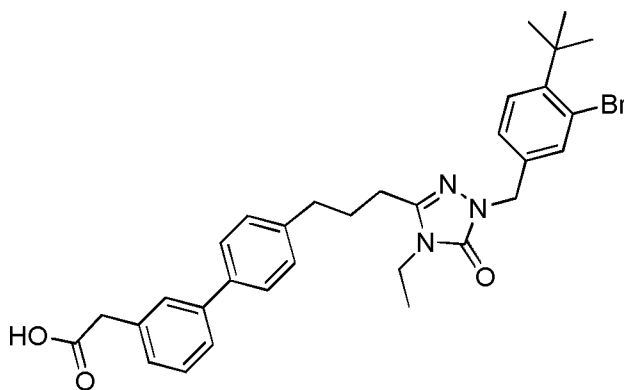
[00234] Prepared in an analogous manner to example 13 but using instead 5-bromo-2-methoxybenzoate as the coupling partner in step 1. Hydrolysis of the intermediate ester was carried out as in example 1, step 2. LC-MS: 528 (M+H)⁺.

Example 66: 4'-((3-(1-(4-(*tert*-Butyl)benzyl)-4-ethyl-5-oxo-4,5-dihydro-1H-1,2,4-triazol-3-yl)propyl)-4-ethoxy-[1,1'-biphenyl]-3-carboxylic acid:



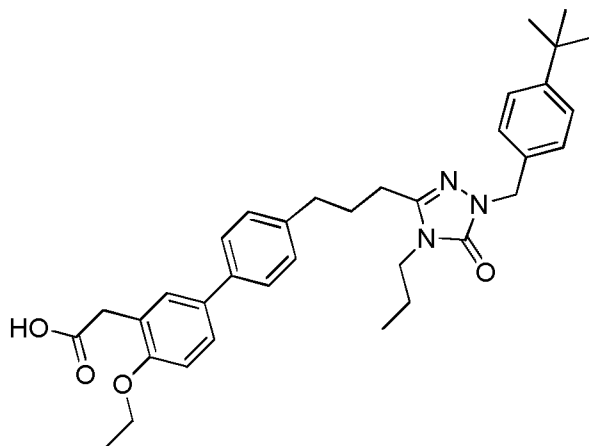
[00235] Prepared in an analogous manner to example 13 but using instead 5-bromo-2-ethoxybenzoate as the coupling partner in step 1. Hydrolysis of the intermediate ester was carried out as in example 1, step 2. LC-MS: 542 (M+H)⁺.

Example 67: 2-(4'-((3-(1-(3-Bromo-4-(*tert*-butyl)benzyl)-4-ethyl-5-oxo-4,5-dihydro-1H-1,2,4-triazol-3-yl)propyl)-[1,1'-biphenyl]-3-yl)acetic acid:



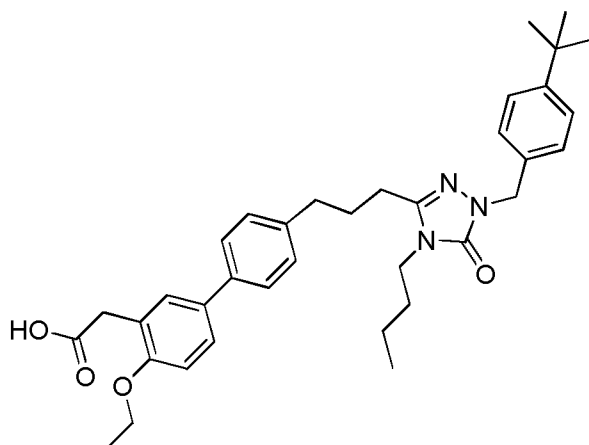
[00236] Prepared in an analogous manner to example 54 but using instead 3-bromo-4-(*tert*-butyl)benzoic acid as the acid substrate in step 1. LC-MS: 591 (M+H)⁺.

Example 68: 2-(4'-(3-(1-(4-(*tert*-Butyl)benzyl)-5-oxo-4-propyl-4,5-dihydro-1*H*-1,2,4-triazol-3-yl)propyl)-4-ethoxy-[1,1'-biphenyl]-3-yl)acetic acid:



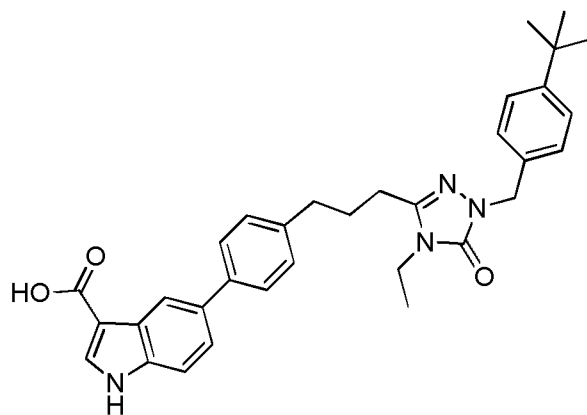
[00237] Prepared in an analogous manner to example 1 but using instead 3-(3-(4-bromophenyl)propyl)-1-(4-(*tert*-butyl)benzyl)-4-isopropyl-1*H*-1,2,4-triazol-5(4*H*)-one and methyl 2-(2-ethoxy-5-(4,4,5,5-tetramethyl-1,3,2-dioxaborolan-2-yl)phenyl)acetate as coupling partners in step 1. LC-MS: 570 (M+H)⁺.

Example 69: 2-(4'-(3-(4-Butyl-1-(4-(*tert*-butyl)benzyl)-5-oxo-4,5-dihydro-1*H*-1,2,4-triazol-3-yl)propyl)-4-ethoxy-[1,1'-biphenyl]-3-yl)acetic acid:



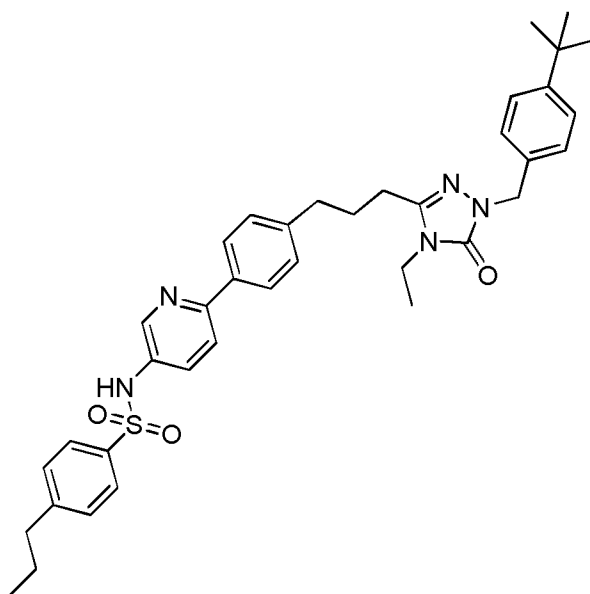
[00238] Prepared in an analogous manner to example 1 but using instead 3-(3-(4-bromophenyl)propyl)-4-butyl-1-(4-(*tert*-butyl)benzyl)-1*H*-1,2,4-triazol-5(4*H*)-one and methyl 2-(2-ethoxy-5-(4,4,5,5-tetramethyl-1,3,2-dioxaborolan-2-yl)phenyl)acetate as coupling partners in step 1. LC-MS: 584 (M+H)⁺.

Example 70: 5-(4-(3-(1-(4-(*tert*-Butyl)benzyl)-4-ethyl-5-oxo-4,5-dihydro-1*H*-1,2,4-triazol-3-yl)propyl)phenyl)-1*H*-indole-3-carboxylic acid:



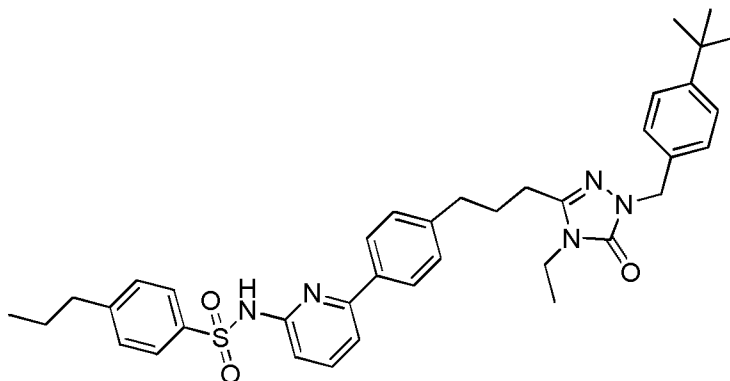
[00239] Prepared in an analogous manner to example 13 but using instead 5-bromo-1*H*-indole-3-carboxylate as the coupling partner in step 1. Hydrolysis of the intermediate ester was carried out as in example 1, step 2. LC-MS: 537 (M+H)⁺.

Example 71: 1-{[4-(*tert*-Butyl)phenyl]methyl}-4-ethyl-3-{3-[4-(5-{[(4-propylphenyl)sulfonyl]amino}(2-pyridyl))phenyl]propyl}-1,2,4-triazolin-5-one:



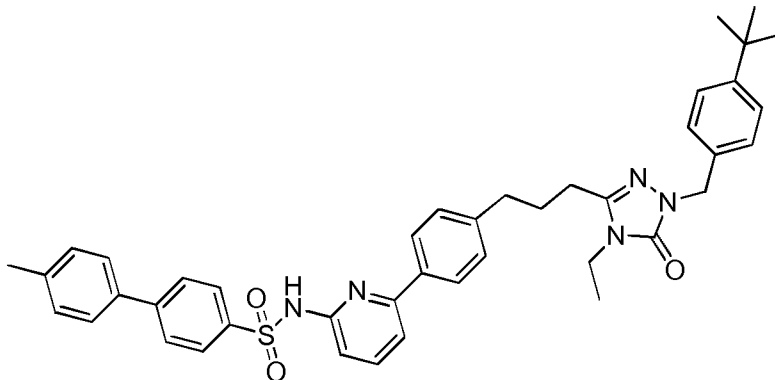
[00240] Prepared in an analogous manner to example 12 using instead 4-*n*-propylbenzenesulfonyl chloride as the electrophile. LC-MS: 652 (M+H)⁺.

Example 72: 1-{[4-(*tert*-Butyl)phenyl]methyl}-4-ethyl-3-{3-[4-(6-{[(4-propylphenyl)sulfonyl]amino}(2-pyridyl))phenyl]propyl}-1,2,4-triazolin-5-one:



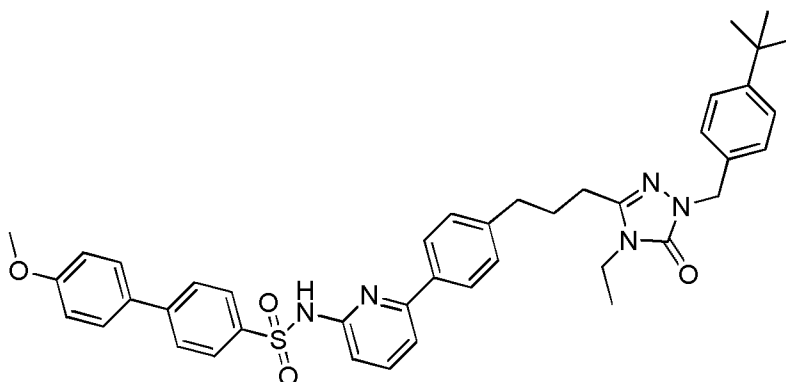
[00241] Prepared in an analogous manner to example 4 using instead 4-*n*-propylbenzenesulfonyl chloride as the electrophile. LC-MS: 652 (M+H)⁺.

Example 73: 1-{[4-(*tert*-Butyl)phenyl]methyl}-4-ethyl-3-(3-{4-[6-{[4-(4-methylphenyl)phenyl]sulfonyl}amino)(2-pyridyl)]phenyl}propyl)-1,2,4-triazolin-5-one:



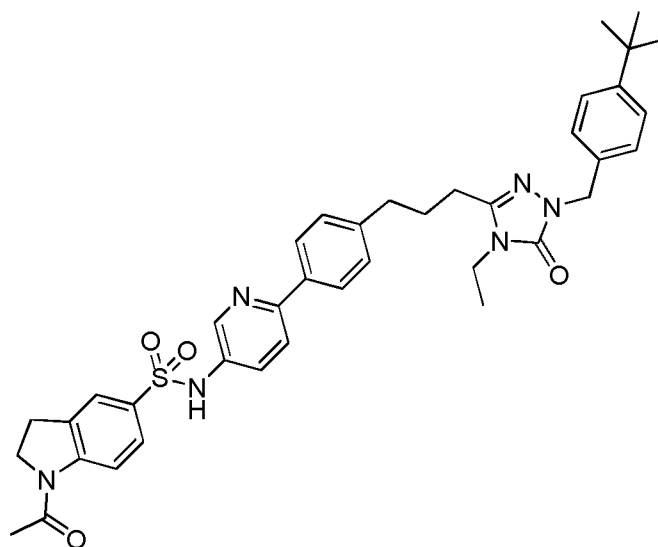
[00242] Prepared in an analogous manner to example 4 using instead 4-methylbiphenyl-4-sulfonyl chloride as the electrophile. LC-MS: 700 (M+H)⁺.

Example 74: 1-{[4-(*tert*-Butyl)phenyl]methyl}-4-ethyl-3-(3-{4-[6-{[4-(4-methoxyphenyl)phenyl]sulfonyl}amino)(2-pyridyl)]phenyl}propyl)-1,2,4-triazolin-5-one:



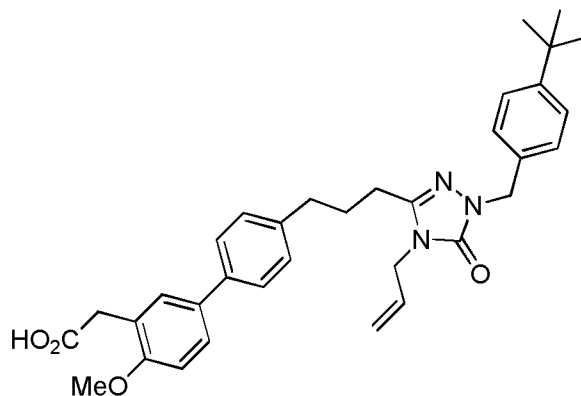
[00243] Prepared in an analogous manner to example 4 using instead 4-methoxybiphenyl-4-sulfonyl chloride as the electrophile. LC-MS: 716 (M+H)⁺.

Example 75: 1-Acetyl-5-{[(6-{4-[3-(1-{[4-(*tert*-butyl)phenyl]methyl}-4-ethyl-5-oxo(1,2,4-triazolin-3-yl))propyl]phenyl}(3-pyridyl))amino]sulfonyl}indoline:



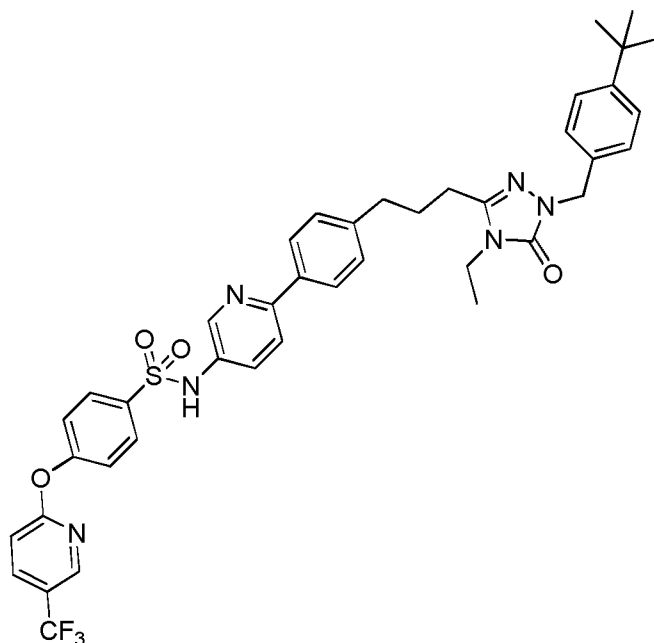
[00244] Prepared in an analogous manner to example 12 using instead 1-acetyl-5-indolinesulfonyl chloride as the electrophile. LC-MS: 693 (M+H)⁺.

Example 76: 2-(4'-(3-(4-Allyl-1-(4-(*tert*-butyl)benzyl)-5-oxo-4,5-dihydro-1*H*-1,2,4-triazol-3-yl)propyl)-4-methoxy-[1,1'-biphenyl]-3-yl)acetic acid:



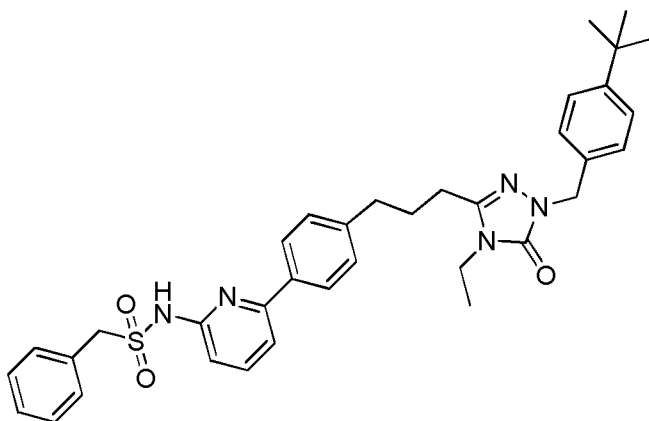
[00245] Prepared in an analogous manner to example 53, using instead allyl bromide as the electrophile in step 3 and methyl 2-(2-methoxy-5-(4,4,5,5-tetramethyl-1,3,2-dioxaborolan-2-yl)phenyl)acetate as the boronate coupling partner in step 4. LC-MS: 554 (M+H)⁺.

Example 77: 1-([4-(*tert*-Butyl)phenyl]methyl)-4-ethyl-3-[3-(4-{5-[(4-[5-(trifluoromethyl)(2-pyridyloxy)]phenyl]sulfonyl)amino(2-pyridyl)}phenyl)propyl]-1,2,4-triazolin-5-one:



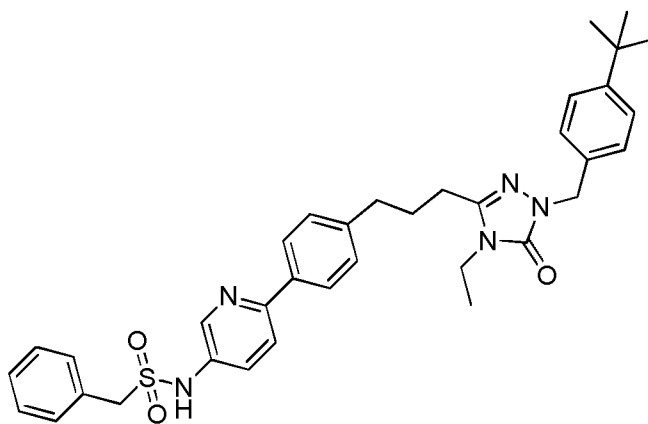
[00246] Prepared in an analogous manner to example 12 using instead 4-([5-(trifluoromethyl)pyridine-2-yl]oxy)benzenesulfonyl chloride as the electrophile. LC-MS: 771 (M+H)⁺.

Example 78: 1-([4-(*tert*-Butyl)phenyl]methyl)-4-ethyl-3-{3-[4-(6-{[benzylsulfonyl]amino}(2-pyridyl))phenyl]propyl}-1,2,4-triazolin-5-one:



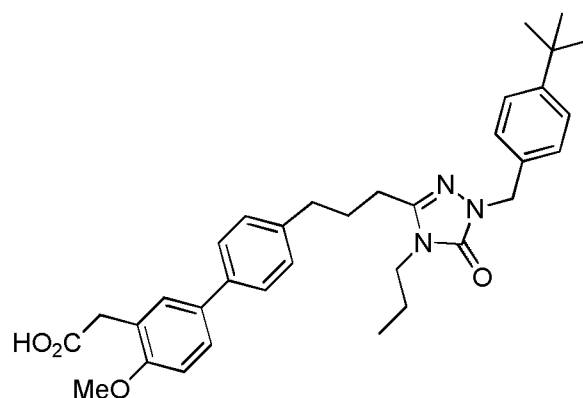
[00247] Prepared in an analogous manner to example 4 using instead benzylsulfonyl chloride as the electrophile. LC-MS: 624 (M+H)⁺.

Example 79: 1-([4-(*tert*-Butyl)phenyl]methyl)-4-ethyl-3-{3-[4-(5-{[benzylsulfonyl]amino}(2-pyridyl))phenyl]propyl}-1,2,4-triazolin-5-one:



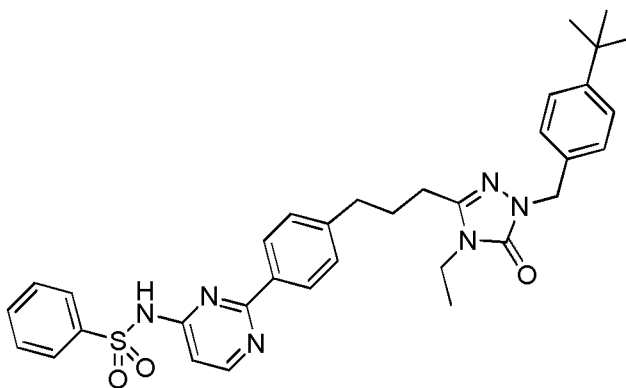
[00248] Prepared in an analogous manner to example 12 using instead benzylsulfonyl chloride as the electrophile. LC-MS: 624 (M+H)⁺.

Example 80: 2-(4'-(3-(1-(4-(*tert*-Butyl)benzyl)-5-oxo-4-propyl-4,5-dihydro-1*H*-1,2,4-triazol-3-yl)propyl)-4-methoxy-[1,1'-biphenyl]-3-yl)acetic acid:



[00249] Prepared in an analogous manner to example 36, using instead 2-(4'-(3-(4-allyl-1-(4-(*tert*-butyl)benzyl)-5-oxo-4,5-dihydro-1*H*-1,2,4-triazol-3-yl)propyl)-4-methoxy-[1,1'-biphenyl]-3-yl)acetic acid (example 76) as the substrate. LC-MS: 556 (M+H)⁺.

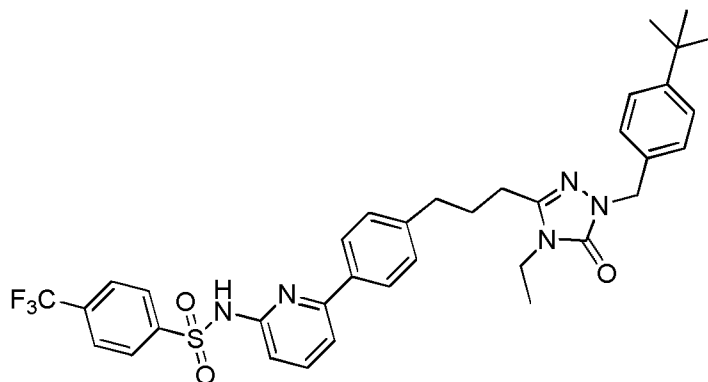
Example 81: *N*-(2-(4-(3-(1-(4-(*tert*-Butyl)benzyl)-4-ethyl-5-oxo-4,5-dihydro-1*H*-1,2,4-triazol-3-yl)propyl)phenyl)pyrimidin-4-yl)benzenesulfonamide:



[00250] *Step 1*; Carried out in an analogous manner to example 3 using instead 2-chloropyrimidin-4-amine as the coupling partner and dioxane as the reaction solvent.

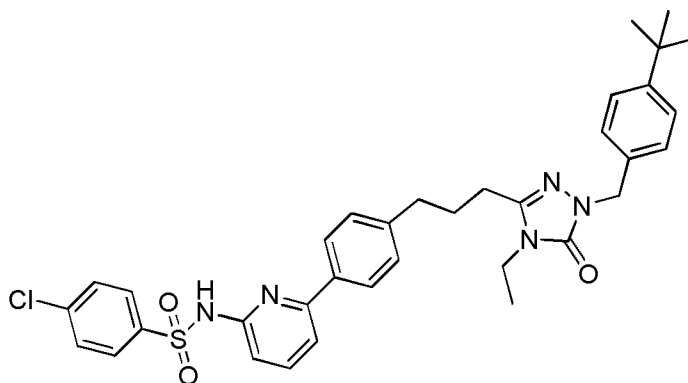
[00251] *Step 2*; Carried out in an analogous manner to example 4 using instead 3-(3-(4-(4-aminopyrimidin-2-yl)phenyl)propyl)-1-(4-(*tert*-butyl)benzyl)-4-ethyl-1H-1,2,4-triazol-5(4*H*)-one from the previous step as the substrate. LC-MS: 611 (M+H)⁺.

Example 82: 1-{[4-(*tert*-Butyl)phenyl]methyl}-4-ethyl-3-(3-[4-[6-([4-(trifluoromethyl)phenyl]sulfonyl)amino](2-pyridyl)]phenyl]propyl)-1,2,4-triazolin-5-one:



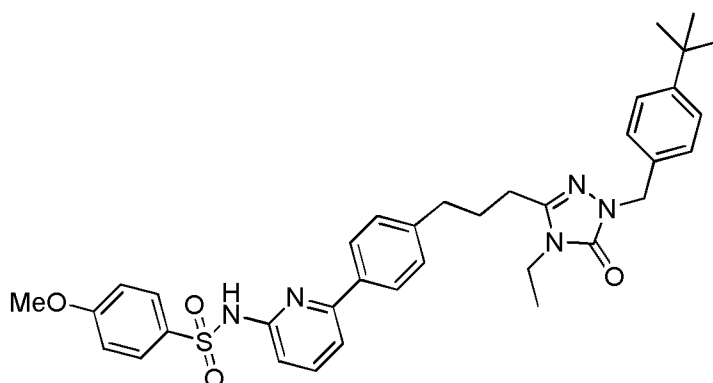
[00252] Prepared in an analogous manner to example 4 using instead 4-(trifluoromethyl)benzenesulfonyl chloride as the electrophile. LC-MS: 678 (M+H)⁺.

Example 83: 1-{[4-(*tert*-Butyl)phenyl]methyl}-3-[3-[4-(6-([4-(chlorophenyl)sulfonyl)amino](2-pyridyl))phenyl]propyl]-4-ethyl-1,2,4-triazolin-5-one:



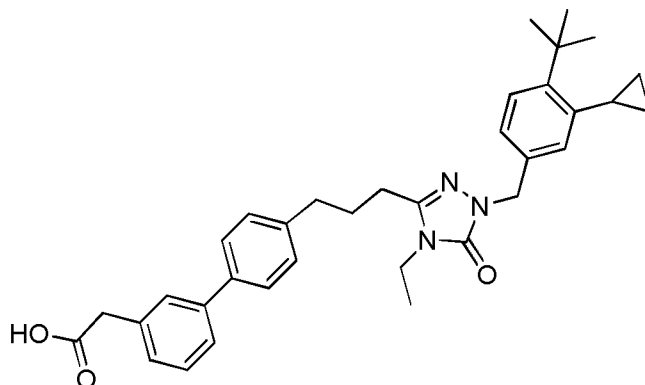
[00253] Prepared in an analogous manner to example 4 using instead 4-chlorobenzenesulfonyl chloride as the electrophile. LC-MS: 645 (M+H)⁺.

Example 84: 1-{[4-(*tert*-Butyl)phenyl]methyl}-4-ethyl-3-[3-[4-(6-([4-(methoxyphenyl)sulfonyl)amino](2-pyridyl))phenyl]propyl]-1,2,4-triazolin-5-one:



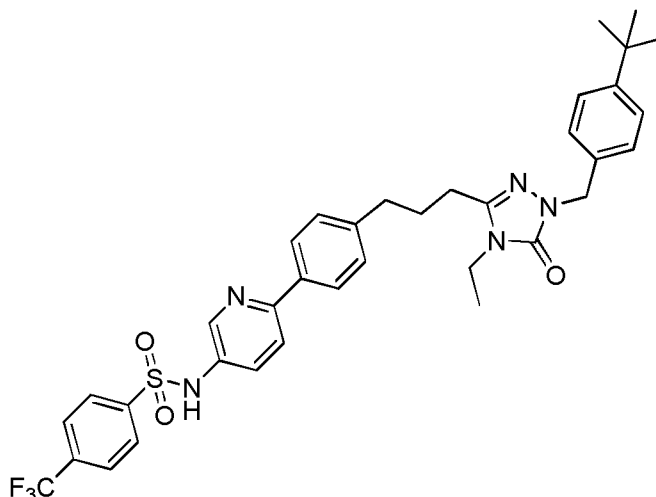
[00254] Prepared in an analogous manner to example 4 using instead 4-methoxybenzenesulfonyl chloride as the electrophile. LC-MS: 640 (M+H)⁺.

Example 85: 2-(4'-(3-(1-(3-Cyclopropyl-4-(*tert*-butyl)benzyl)-4-ethyl-5-oxo-4,5-dihydro-1*H*-1,2,4-triazol-3-yl)propyl)-[1,1'-biphenyl]-3-yl)acetic acid:



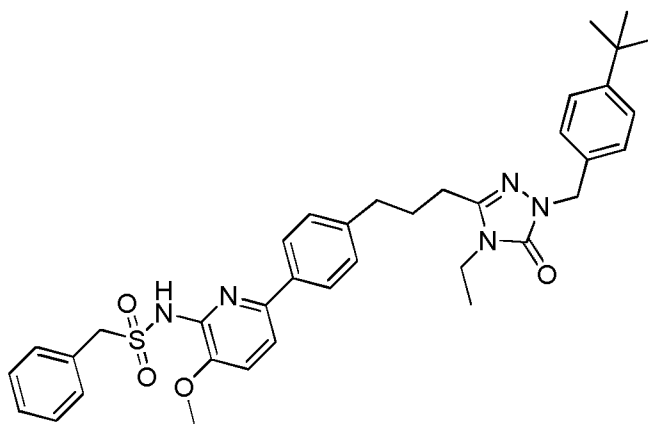
[00255] Prepared using the penultimate intermediate from example 67 with the coupling conditions described in example 22, step 3. Hydrolysis of the resulting ester was then carried out as in example 1, step 2 to deliver the title compound as a white foam. LC-MS: 552 (M+H)⁺.

Example 86: 1-{[4-(*tert*-Butyl)phenyl]methyl}-4-ethyl-3-{3-[4-[5-({[4-(trifluoromethyl)phenyl]sulfonyl}amino)(2-pyridyl)]phenyl]propyl}-1,2,4-triazolin-5-one:



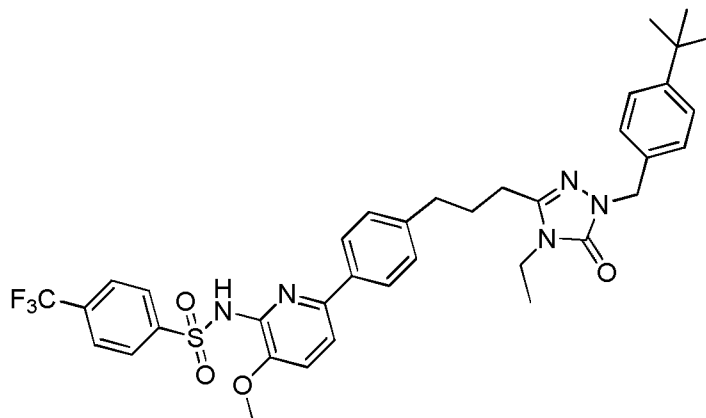
[00256] Prepared in an analogous manner to example 12 using instead 4-(trifluoromethyl)benzenesulfonyl chloride as the electrophile. LC-MS: 678 (M+H)⁺.

Example 87: 1-{[4-(*tert*-Butyl)phenyl]methyl}-4-ethyl-3-{3-[4-(5-methoxy-6-{[benzylsulfonyl]amino}(2-pyridyl))phenyl]propyl}-1,2,4-triazolin-5-one:



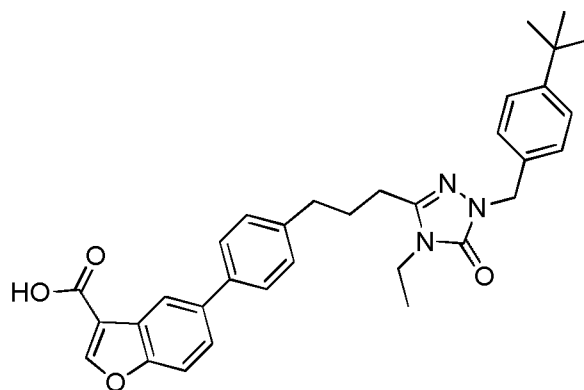
[00257] Prepared in an analogous manner to example 78 using instead 3-{3-[4-(6-amino-5-methoxy(2-pyridyl))phenyl]propyl}-1-[[4-(tert-butyl)phenyl]methyl]-4-ethyl-1,2,4-triazolin-5-one (example 58) as the nucleophile. LC-MS: 654 (M+H)⁺.

Example 88: 1-([4-(tert-Butyl)phenyl]methyl)-4-ethyl-3-(3-{3-[4-(5-methoxy-6-([4-(trifluoromethyl)phenyl]sulfonyl)amino](2-pyridyl)]phenyl}propyl)-1,2,4-triazolin-5-one:



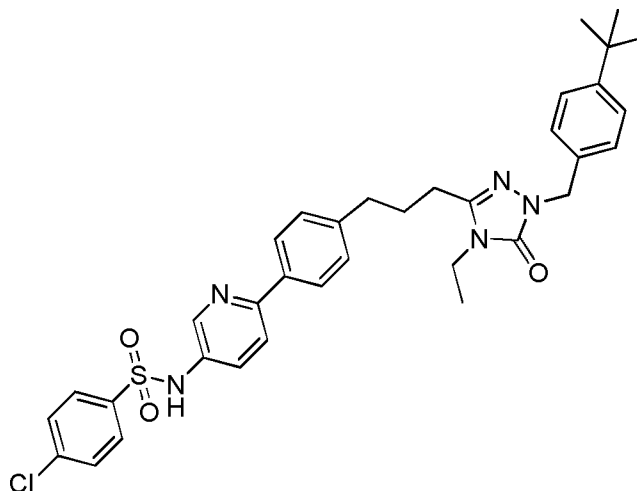
[00258] Prepared in an analogous manner to example 59 using instead 4-(trifluoromethyl)benzenesulfonyl chloride as the electrophile. LC-MS: 708 (M+H)⁺.

Example 89: 5-(4-(3-(1-(4-(tert-Butyl)benzyl)-4-ethyl-5-oxo-4,5-dihydro-1H-1,2,4-triazol-3-yl)propyl)phenyl)benzofuran-3-carboxylic acid:



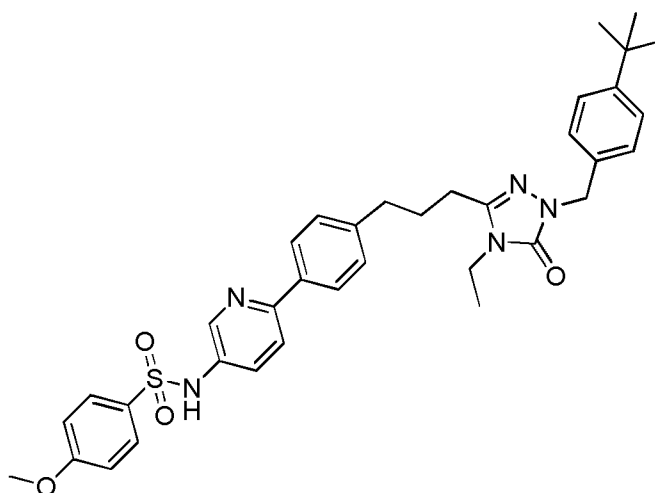
[00259] Prepared in an analogous manner to example 13 but using instead methyl 5-bromobenzofuran-3-carboxylate as the coupling partner in step 1. Hydrolysis of the intermediate ester was carried out as in example 1, step 2. LC-MS: 538 (M+H)⁺.

Example 90: 1-{[4-(*tert*-Butyl)phenyl]methyl}-3-{3-[4-(5-{[(4-chlorophenyl)sulfonyl]amino}(2-pyridyl))phenyl]propyl}-4-ethyl-1,2,4-triazolin-5-one:



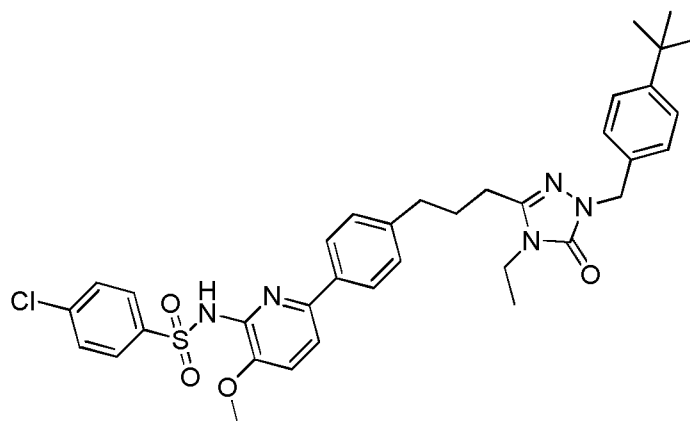
[00260] Prepared in an analogous manner to example 12 using instead 4-chlorobenzenesulfonyl chloride as the electrophile. LC-MS: 645 (M+H)⁺.

Example 91: 1-{[4-(*tert*-Butyl)phenyl]methyl}-4-ethyl-3-{3-[4-(5-{[(4-methoxyphenyl)sulfonyl]amino}(2-pyridyl))phenyl]propyl}-1,2,4-triazolin-5-one:



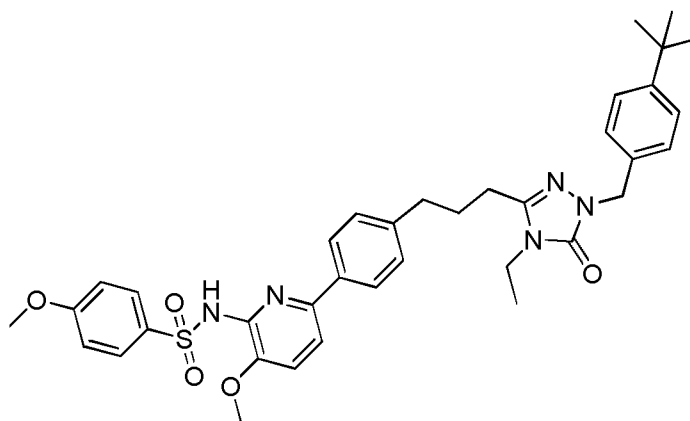
[00261] Prepared in an analogous manner to example 12 using instead 4-methoxybenzenesulfonyl chloride as the electrophile. LC-MS: 640 (M+H)⁺.

Example 92: 1-{[4-(*tert*-Butyl)phenyl]methyl}-3-{3-[4-(6-{[(4-chlorophenyl)sulfonyl]amino}-5-methoxy(2-pyridyl))phenyl]propyl}-4-ethyl-1,2,4-triazolin-5-one:



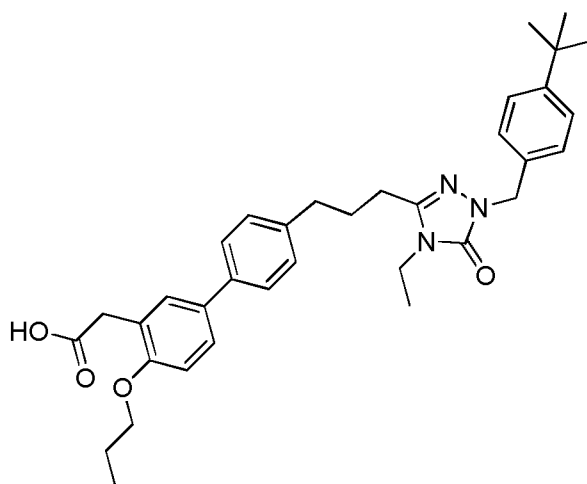
[00262] Prepared in an analogous manner to example 59 using instead 4-chlorobenzenesulfonyl chloride as the electrophile. LC-MS: 675 (M+H)⁺.

Example 93: 1-{[4-(*tert*-Butyl)phenyl]methyl}-4-ethyl-3-{3-[4-(5-methoxy-6-{[4-(4-methoxyphenyl)sulfonyl] amino}(2-pyridyl))phenyl]propyl}-1,2,4-triazolin-5-one:



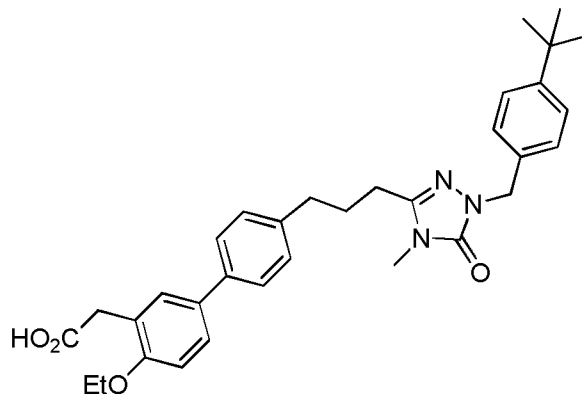
[00263] Prepared in an analogous manner to example 59 using instead 4-methoxybenzenesulfonyl chloride as the electrophile. LC-MS: 670 (M+H)⁺.

Example 94: 2-(4'-(3-(1-(4-(*tert*-Butyl)benzyl)-4-ethyl-5-oxo-4,5-dihydro-1H-1,2,4-triazol-3-yl)propyl)-4-propoxy-[1,1'-biphenyl]-3-yl)acetic acid:



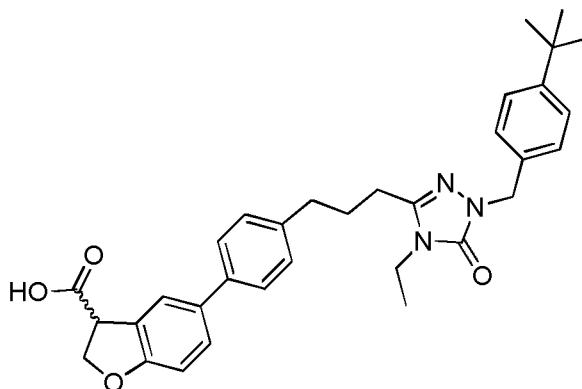
[00264] Prepared in an analogous manner to example 13 but using instead methyl 2-(5-bromo-2-propoxyphenyl)acetate as the coupling partner in step 1. Hydrolysis of the intermediate ester was carried out as in example 1, step 2. LC-MS: 570 (M+H)⁺.

Example 95: 2-(4'-(3-(1-(4-(*tert*-Butyl)benzyl)-4-methyl-5-oxo-4,5-dihydro-1*H*-1,2,4-triazol-3-yl)propyl)-4-ethoxy-[1,1'-biphenyl]-3-yl)acetic acid:



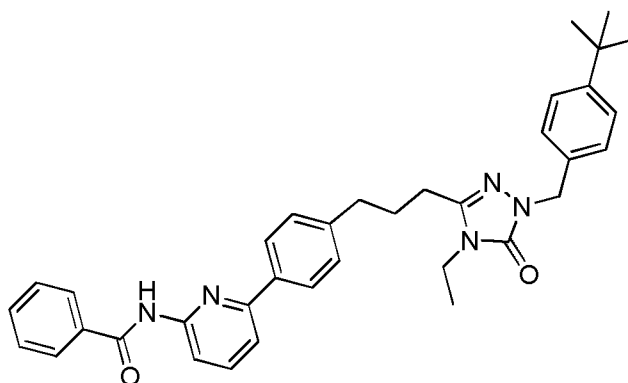
[00265] Prepared in an analogous manner to example 53, using instead methyl iodide as the electrophile in step 3 and methyl 2-(2-ethoxy-5-(4,4,5,5-tetramethyl-1,3,2-dioxaborolan-2-yl)phenyl)acetate as the boronate coupling partner in step 4. LC-MS: 542 (M+H)⁺.

Example 96: (*rac*)-5-(4-(3-(1-(4-(*tert*-Butyl)benzyl)-4-ethyl-5-oxo-4,5-dihydro-1*H*-1,2,4-triazol-3-yl)propyl)phenyl)-2,3-dihydrobenzofuran-3-carboxylic acid:



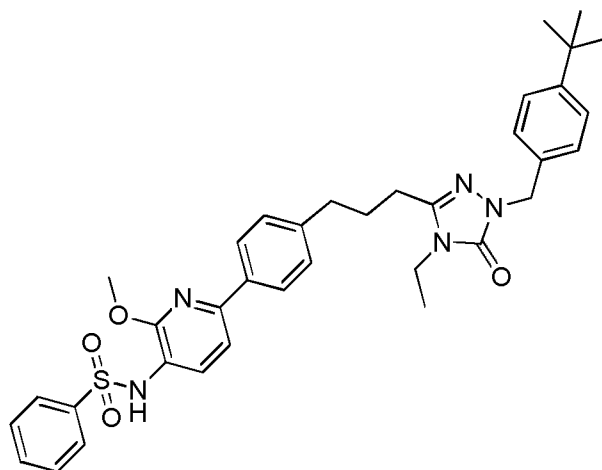
[00266] Prepared in an analogous manner to example 13 but using instead (*rac*)-methyl 5-bromo-2,3-dihydrobenzofuran-3-carboxylate as the coupling partner in step 1. Hydrolysis of the intermediate ester was carried out as in example 1, step 2. LC-MS: 540 (M+H)⁺.

Example 97: *N*-(6-(4-(3-(1-(4-(*tert*-Butyl)phenyl)methyl)-4-ethyl-5-oxo(1,2,4-triazolin-3-yl))propyl)phenyl;(2-pyridyl))benzamide:



[00267] Prepared in an analogous manner to example 4 using instead benzoyl chloride as the electrophile. LC-MS: 574 (M+H)⁺.

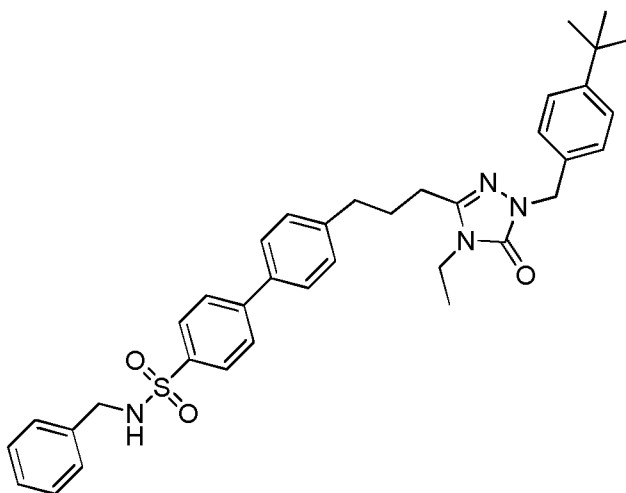
Example 98: 1-{[4-(*tert*-Butyl)phenyl]methyl}-4-ethyl-3-[3-(4-{6-methoxy-5-[(phenylsulfonyl)amino](2-pyridyl)}phenyl)propyl]-1,2,4-triazolin-5-one:



[00268] *Step 1 to 3*; Carried out in an analogous manner as detailed in step 2 to 4 of example 58, using instead 6-chloro-3-nitropyridin-2-ol as the start material in step 2.

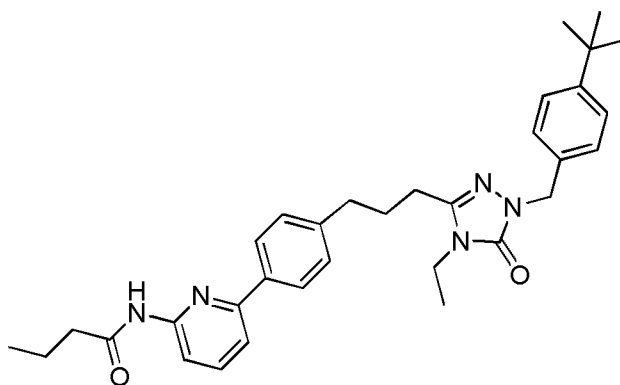
[00269] *Step 4*: Carried out in an analogous manner to example 59 using instead 1-(4-(*tert*-butyl)benzyl)-4-ethyl-3-(3-(4-(6-methoxy-5-nitropyridin-2-yl)phenyl)propyl)-1*H*-1,2,4-triazol-5(4*H*)-one prepared in the previous step as the nucleophile. LC-MS: 640 (M+H)⁺.

Example 99: *N*-benzyl-4'-(3-(1-(4-(*tert*-butyl)benzyl)-4-ethyl-5-oxo-4,5-dihydro-1*H*-1,2,4-triazol-3-yl)propyl)-[1,1'-biphenyl]-4-sulfonamide:



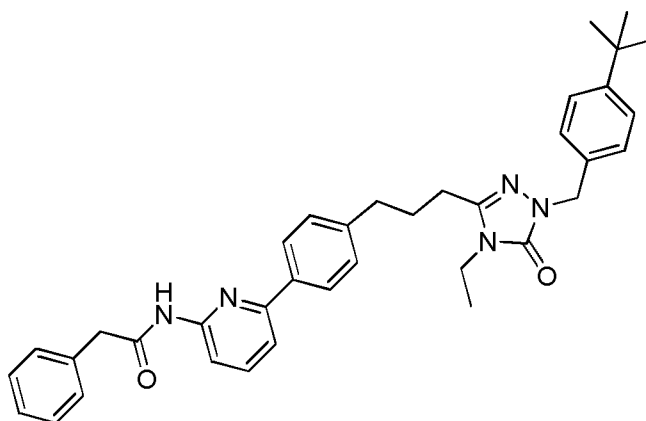
[00270] Prepared in an analogous manner to example 28 but omitting the first step and using instead ethyl *N*-benzyl-4-bromobenzenesulfonamide as the coupling partner in step 2. LC-MS: 623 (M+H)⁺.

Example 100: *N*-(6-{4-[3-(1-{[4-(*tert*-Butyl)phenyl]methyl}-4-ethyl-5-oxo-1,2,4-triazolin-3-yl)propyl]phenyl}-2-pyridyl)butanamide:



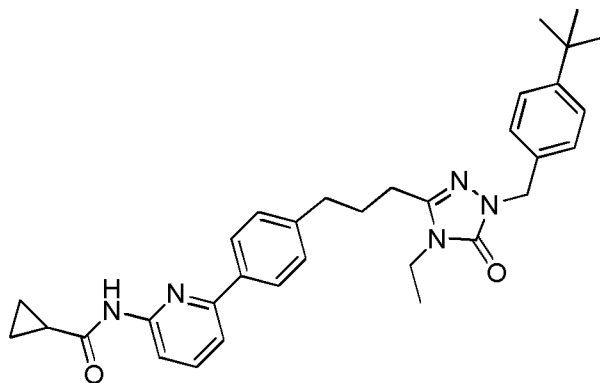
[00271] Prepared in an analogous manner to example 4 using instead butyryl chloride as the electrophile. LC-MS: 540 (M+H)⁺.

Example 101: *N*-(6-{4-[3-(1-{[4-(*tert*-Butyl)phenyl]methyl}-4-ethyl-5-oxo(1,2,4-triazolin-3-yl))propyl]phenyl}-(2-pyridyl))-2-phenylacetamide:



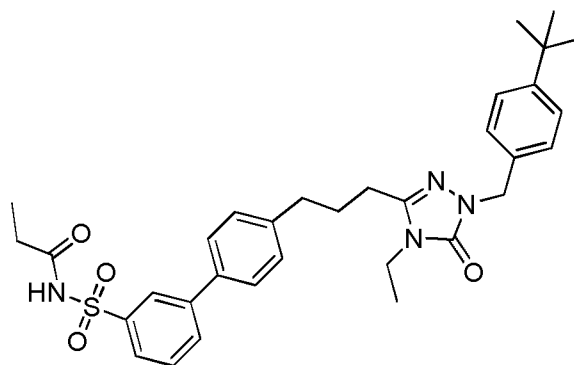
[00272] Prepared in an analogous manner to example 4 using instead phenylacetyl chloride as the electrophile. LC-MS: 588 (M+H)⁺.

Example 102: *N*-(6-{4-[3-(1-{[4-(*tert*-Butyl)phenyl]methyl}-4-ethyl-5-oxo(1,2,4-triazolin-3-yl))propyl]phenyl}(2-pyridyl))cyclopropylcarboxamide:



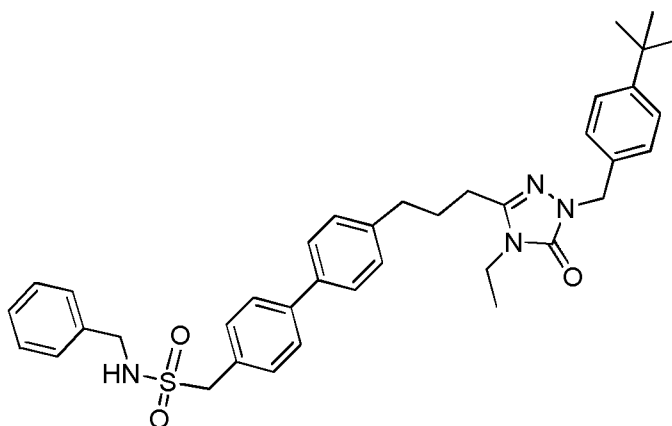
[00273] Prepared in an analogous manner to example 4 using instead phenylacetyl chloride as the electrophile. LC-MS: 538 (M+H)⁺.

Example 103: *N*-((4'-(3-(1-(4-(*tert*-Butyl)benzyl)-4-ethyl-5-oxo-4,5-dihydro-1*H*-1,2,4-triazol-3-yl)propyl)-[1,1'-biphenyl]-3-yl)sulfonyl)propionamide:



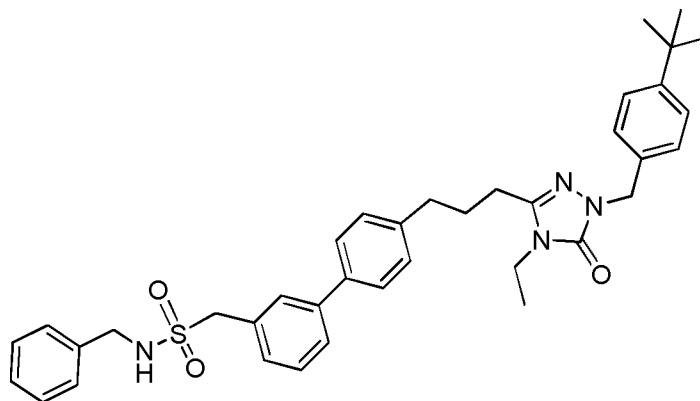
[00274] Prepared in an analogous manner to example 28 but omitting the first step and using instead *N*-((3-bromophenyl)sulfonyl)propionamide as the coupling partner in step 2. LC-MS: 589 (M+H)⁺.

Example 104: *N*-Benzyl-1-(4'-(3-(1-(4-(*tert*-butyl)benzyl)-4-ethyl-5-oxo-4,5-dihydro-1*H*-1,2,4-triazol-3-yl)propyl)-[1,1'-biphenyl]-4-yl)methanesulfonamide:



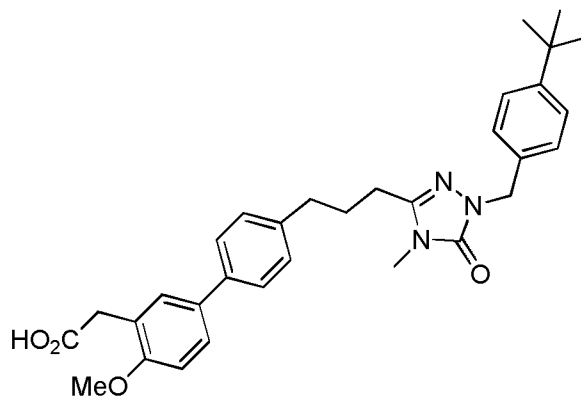
[00275] Prepared in an analogous manner to example 28 but omitting the first step and using instead *N*-benzyl-1-(4-bromophenyl)methanesulfonamide as the coupling partner in step 2. LC-MS: 637 (M+H)⁺.

Example 105: *N*-Benzyl-1-(4'-(3-(1-(4-(*tert*-butyl)benzyl)-4-ethyl-5-oxo-4,5-dihydro-1*H*-1,2,4-triazol-3-yl)propyl)-[1,1'-biphenyl]-3-yl)methanesulfonamide:



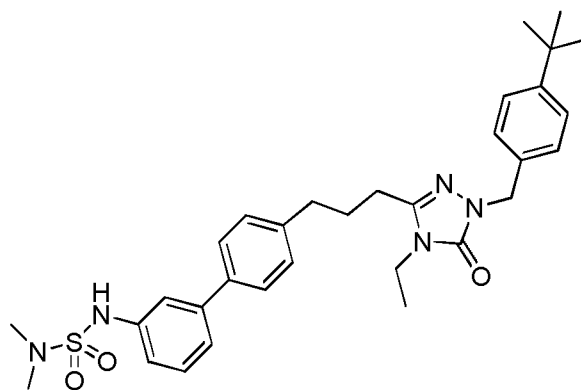
[00276] Prepared in an analogous manner to example 28 but omitting the first step and using instead *N*-benzyl-1-(3-bromophenyl)methanesulfonamide as the coupling partner in step 2. LC-MS: 637 (M+H)⁺.

Example 106: 2-(4'-(3-(1-(4-(*tert*-Butyl)benzyl)-4-methyl-5-oxo-4,5-dihydro-1*H*-1,2,4-triazol-3-yl)propyl)-4-methoxy-[1,1'-biphenyl]-3-yl)acetic acid:



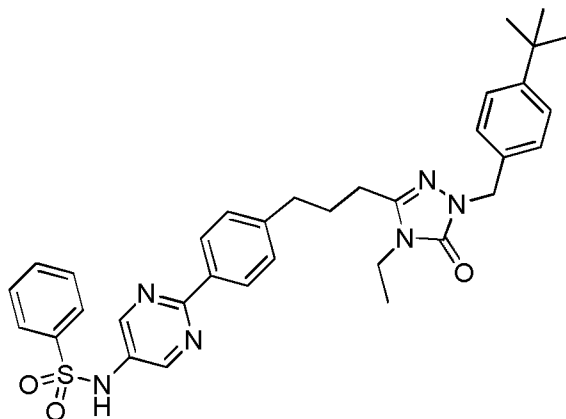
[00277] Prepared in an analogous manner to example 53, using instead methyl iodide as the electrophile in step 3 and methyl 2-(2-methoxy-5-(4,4,5,5-tetramethyl-1,3,2-dioxaborolan-2-yl)phenyl)acetate as the boronate coupling partner in step 4. LC-MS: 528 (M+H)⁺.

Example 107: 3-{3-[4-(3-{[(Dimethylamino)sulfonyl]amino}phenyl)phenyl]propyl}-1-{[4-(*tert*-butyl)phenyl]methyl}-4-ethyl-1,2,4-triazolin-5-one:



[00278] Prepared in an analogous manner to example 28 but omitting the first step and using instead 3-(*N,N*-dimethylsulfamoylamino)phenylboronic acid as the coupling partner in step 2. LC-MS: 576 (M+H)⁺.

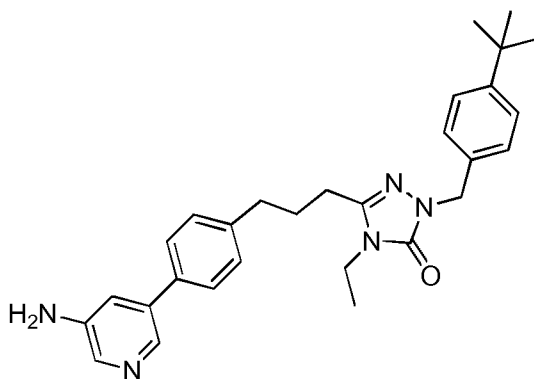
Example 108: *N*-(2-(4-(3-(1-(4-(*tert*-Butyl)benzyl)-4-ethyl-5-oxo-4,5-dihydro-1*H*-1,2,4-triazol-3-yl)propyl)phenyl)pyrimidin-5-yl)benzenesulfonamide:



[00279] *Step 1:* Carried out in an analogous manner to that detailed in example 3, using instead 2-chloropyrimidin-5-amine as the coupling partner.

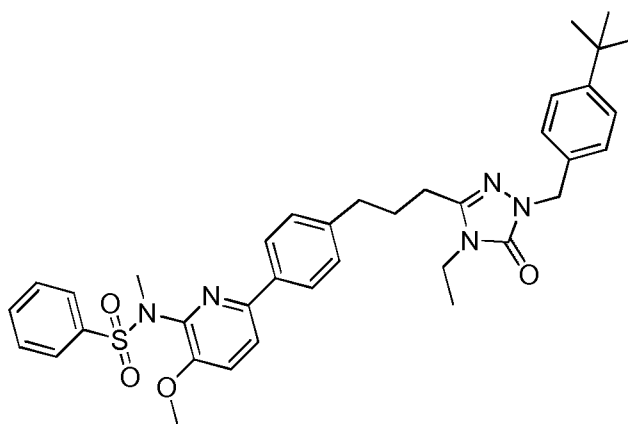
[00280] *Step 2:* Carried out in an analogous manner to that detailed in example 4 using 3-(3-(4-(5-aminopyrimidin-2-yl)phenyl)propyl)-1-(4-(*tert*-butyl)benzyl)-4-ethyl-1*H*-1,2,4-triazol-5(4*H*)-one from the previous step as the starting material. LC-MS: 611 (M+H)⁺.

Example 109: 3-(3-(4-(5-Aminopyridin-3-yl)phenyl)propyl)-1-(4-(*tert*-butyl)benzyl)-4-ethyl-1*H*-1,2,4-triazol-5(4*H*)-one:



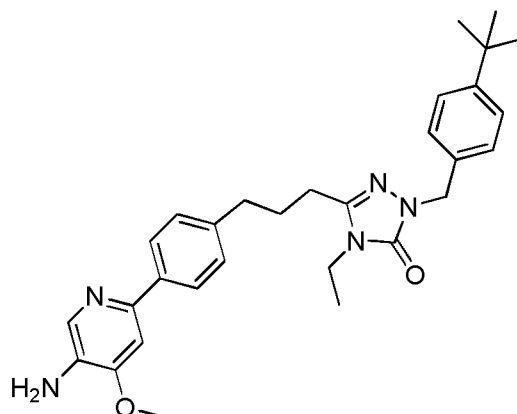
[00281] Prepared in an analogous manner to example 3 but using instead 5-bromopyridin-3-amine as the coupling partner. LC-MS: 470 (M+H)⁺.

Example 110: 1-{[4-(*tert*-Butyl)phenyl]methyl}-4-ethyl-3-[3-(4-{5-methoxy-6-[*N*-methyl(phenylsulfonyl) amino](2-pyridyl)}phenyl)propyl]-1,2,4-triazolin-5-one:



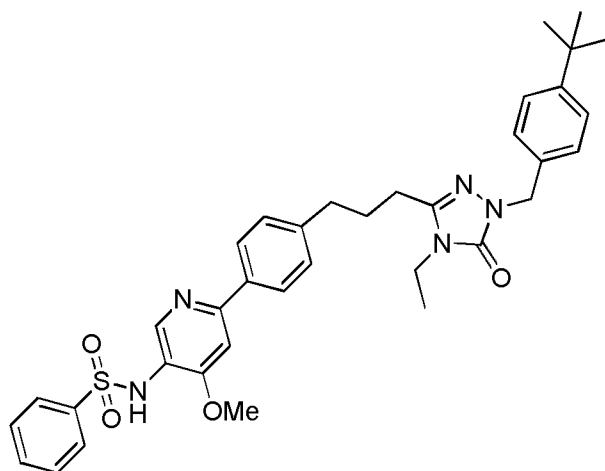
[00282] To a solution of 1-{[4-(*tert*-butyl)phenyl]methyl}-4-ethyl-3-[3-(4-{5-methoxy-6-[(phenylsulfonyl)amino](2-pyridyl)}phenyl)propyl]-1,2,4-triazolin-5-one (45 mg, 0.067 mmol, example 59) in DMF (3 mL) was added potassium carbonate (14 mg, 0.10 mmol) and iodomethane (6 μ L, 0.080 mmol). The resulting mixture was then stirred at room temperature over night. The reaction solution was then diluted with water and back extracted with EtOAc. The combined organic extracts were dried over anhydrous Na₂SO₄, filtered and the filtrate concentrated *in vacuo*. The crude product thus obtained was purified further by flash column chromatography (SiO₂, gradient elution, Hex to 2:1 (v/v) Hex: EtOAc) to afford the titled compound (24 mg, 55 %). LC-MS: 654 (M+H)⁺.

Example 111: 3-{3-[4-(5-Amino-4-methoxy(2-pyridyl))phenyl]propyl}-1-{[4-(*tert*-butyl)phenyl]methyl}-4-ethyl-1,2,4-triazolin-5-one:



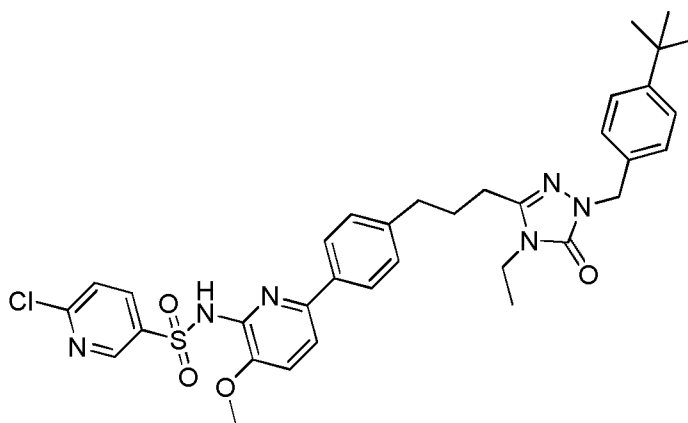
[00283] *Step 1 to 3*; Carried out in an analogous manner as detailed in step 2 to 4 of example 58 but using instead 2-chloro-5-nitropyridin-4-ol (prepared according the the procedure found in *J. Med. Chem. Lett.* **2007**, 50, p. 2-5) as the starting material. LC-MS: 500 (M+H)⁺.

Example 112: 1-{[4-(*tert*-Butyl)phenyl]methyl}-4-ethyl-3-[3-(4-{4-methoxy-5-[(phenylsulfonyl)amino](2-pyridyl)}phenyl)propyl]-1,2,4-triazolin-5-one:



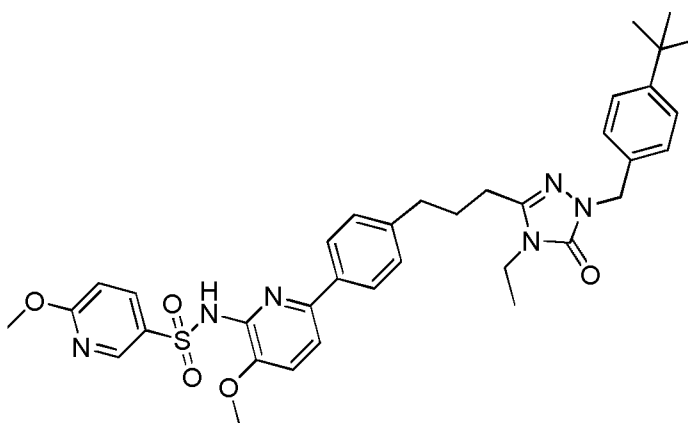
[00284] Prepared in an analogous manner to example 59 but using instead 3-{3-[4-(5-amino-4-methoxy(2-pyridyl))phenyl]propyl}-1-[[4-(*tert*-butyl)phenyl]methyl]-4-ethyl-1,2,4-triazolin-5-one (example 111) as the nucleophile. LC-MS: 640 (M+H)⁺.

Example 113: 1-[[4-(*tert*-Butyl)phenyl]methyl]-3-{3-[4-(6-[[6-chloro(3-pyridyl)]sulfonyl]amino}-5-methoxy(2-pyridyl))phenyl]propyl}-4-ethyl-1,2,4-triazolin-5-one:



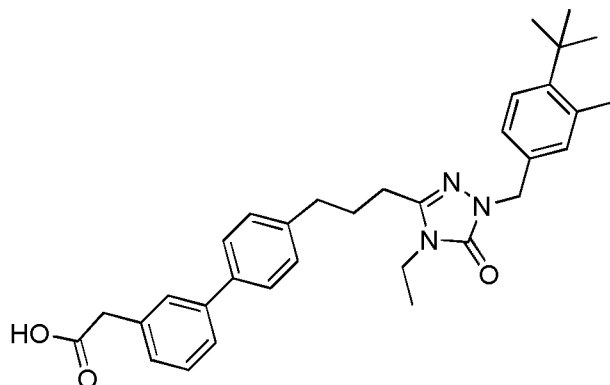
[00285] Prepared in an analogous manner to example 59 using instead 2-chloropyridine-5-sulfonyl chloride as the electrophile. LC-MS: 676 (M+H)⁺.

Example 114: 1-[[4-(*tert*-Butyl)phenyl]methyl]-4-ethyl-3-{3-[4-(5-methoxy-6-[[6-methoxy(3-pyridyl)]sulfonyl]amino}(2-pyridyl))phenyl]propyl}-1,2,4-triazolin-5-one:



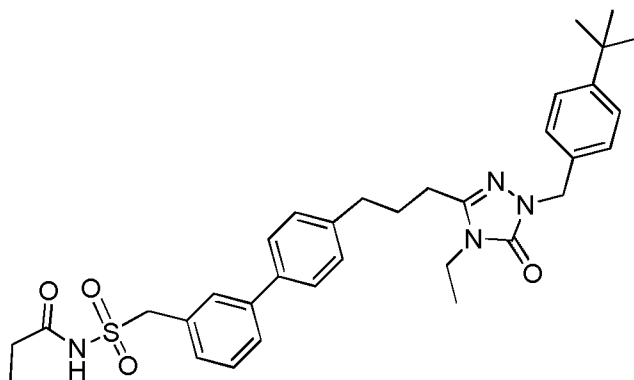
[00286] Prepared in an analogous manner to example 59 using instead 6-methoxypyridine-3-sulfonyl chloride as the electrophile. LC-MS: 671 (M+H)⁺.

Example 115: 2-(4'-(3-(1-(3-Methyl-4-(*tert*-butyl)benzyl)-4-ethyl-5-oxo-4,5-dihydro-1*H*-1,2,4-triazol-3-yl)propyl)-[1,1'-biphenyl]-3-yl)acetic acid:



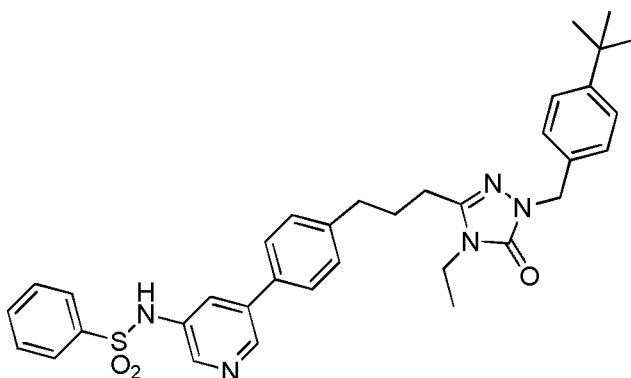
[00287] Prepared using the penultimate intermediate from example 67 and methylboronic acid using the coupling conditions described in example 22, step 3. Hydrolysis of the resulting ester was then carried out as in example 1, step 2 to deliver the title compound as a white foam. LC-MS: 526 (M+H)⁺.

Example 116: *N*-(((4'-(3-(1-(4-(*tert*-Butyl)benzyl)-4-ethyl-5-oxo-4,5-dihydro-1*H*-1,2,4-triazol-3-yl)propyl)-[1,1'-biphenyl]-3-yl)methyl)sulfonyl)propionamide:



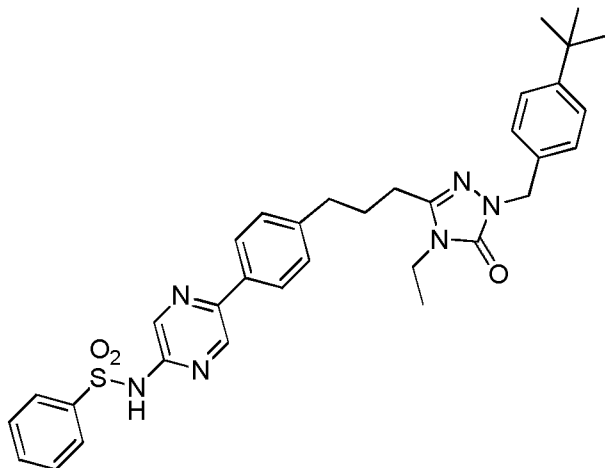
[00288] Prepared in an analogous manner to example 28 but omitting the first step and using instead *N*-((3-bromobenzyl)sulfonyl)propionamide as the coupling partner in step 2. LC-MS: 603 (M+H)⁺.

Example 117: *N*-(5-(4-(3-(1-(4-(*tert*-Butyl)benzyl)-4-ethyl-5-oxo-4,5-dihydro-1*H*-1,2,4-triazol-3-yl)propyl)phenyl)pyridin-3-yl)benzenesulfonamide:



[00289] Prepared in an analogous manner to example 4 but using instead 3-(3-(4-(5-aminopyridin-3-yl)phenyl)propyl)-1-(4-(*tert*-butyl)benzyl)-4-ethyl-1*H*-1,2,4-triazol-5(4*H*)-one (example 109) as the nucleophile. LC-MS: 610 (M+H)⁺.

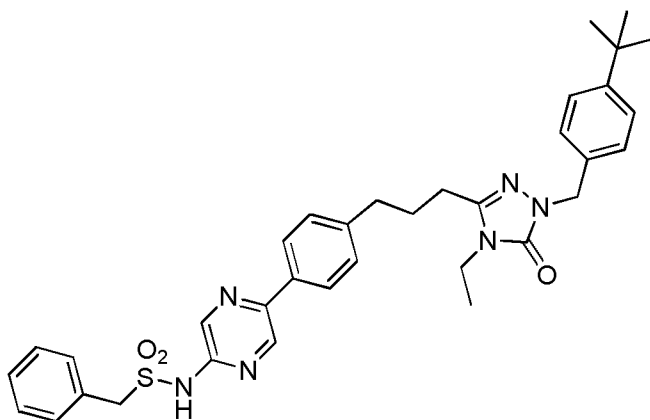
Example 118: *N*-(5-(4-(3-(1-(4-(*tert*-Butyl)benzyl)-4-ethyl-5-oxo-4,5-dihydro-1*H*-1,2,4-triazol-3-yl)propyl)phenyl)pyrazin-2-yl)benzenesulfonamide:



[00290] *Step 1:* Carried out in an analogous manner to that detailed in example 3, using instead 5-chloropyrazin-2-amine as the coupling partner.

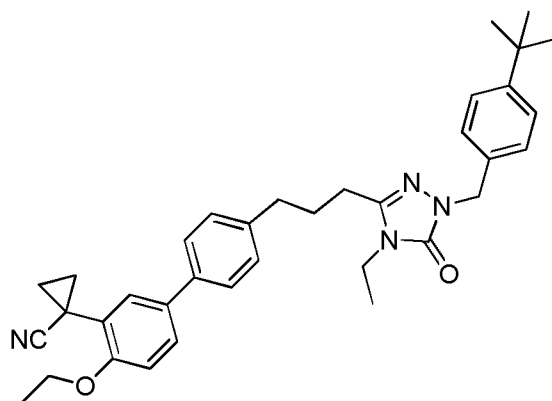
[00291] *Step 2:* Carried out in an analogous manner to that detailed in example 4 using 5-(4-(3-(1-aminopyrazin-2-yl)phenyl)propyl)-1-(4-(*tert*-butyl)benzyl)-4-ethyl-1*H*-1,2,4-triazol-5(4*H*)-one from the previous step as the starting material. LC-MS: 611 (M+H)⁺.

Example 119: *N*-(5-(4-(3-(1-(4-(*tert*-Butyl)benzyl)-4-ethyl-5-oxo-4,5-dihydro-1*H*-1,2,4-triazol-3-yl)propyl)phenyl)pyrazin-2-yl)-1-phenylmethanesulfonamide:



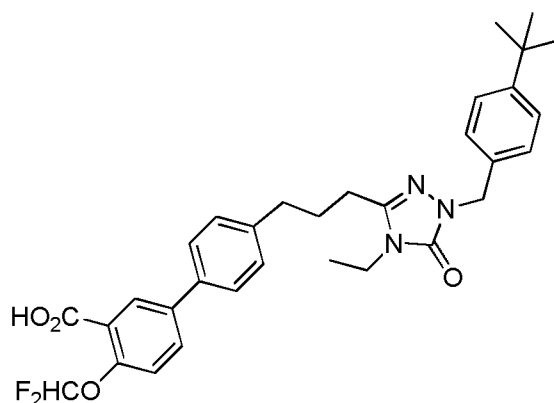
[00292] Prepared in an analogous manner to example 118 but using instead phenylmethanesulfonyl chloride as the electrophile. LC-MS: 625 (M+H)⁺.

Example 120: 1-(4'-(3-(1-(4-(*tert*-Butyl)benzyl)-4-ethyl-5-oxo-4,5-dihydro-1*H*-1,2,4-triazol-3-yl)propyl)-4-ethoxy-[1,1'-biphenyl]-3-yl)cyclopropanecarbonitrile:



[00293] Carried out in an analogous manner as detailed in example 13, step 1, but using instead 1-(5-bromo-2-ethoxyphenyl)cyclopropanecarbonitrile as the coupling partner. LC-MS: 563 (M+H)⁺.

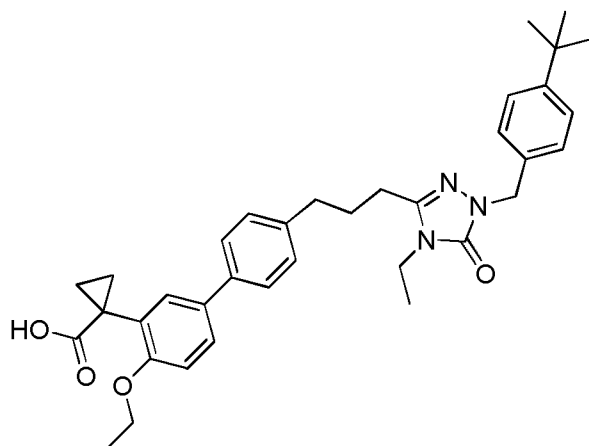
Example 121: 4'-(3-(1-(4-(*tert*-Butyl)benzyl)-4-ethyl-5-oxo-4,5-dihydro-1H-1,2,4-triazol-3-yl)propyl)-4-(difluoromethoxy)-[1,1'-biphenyl]-3-carboxylic acid:



[00294] *Step 1*; To a solution of methyl 5-bromo-2-hydroxybenzoate (409 mg, 1.77 mmol) in DMF (5 mL) was added potassium carbonate (367 mg, 2.67 mmol) and ethyl 2-bromo-2,2-difluoroacetate (280 μ L, 2.13 mmol). The resulting mixture was heated at 80 °C for 24 hrs. The resulting solution was cooled to RT, diluted with ether and washed sequentially with water, 10% aq. HCl, water and brine. The organic extract was then dried over Na₂SO₄, filtered and the filtrate concentrated *in vacuo*. Further purification by way of column chromatography (SiO₂, gradient elution, Hex to 2:1 (v/v) Hex: EtOAc) afforded methyl 5-bromo-2-(difluoromethoxy)benzoate as a yellow oil (250 mg, 50% yield).

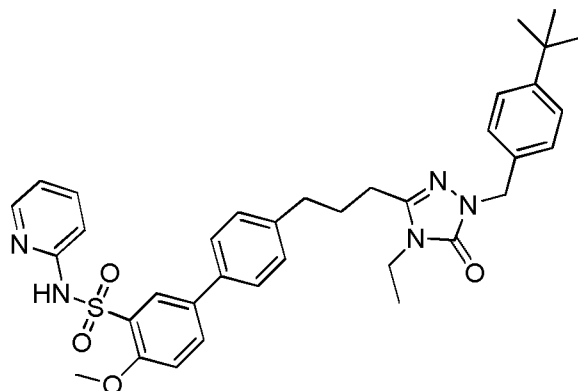
[00295] *Step 2*; Carried out in an analogous manner as detailed in example 13, step 1, but using instead methyl 5-bromo-2-(difluoromethoxy)benzoate as the coupling partner. Hydrolysis of the intermediate ester was carried out as in example 1, step 2. LC-MS: 564 (M+H)⁺.

Example 122: 1-(4'-(3-(1-(4-(*tert*-Butyl)benzyl)-4-ethyl-5-oxo-4,5-dihydro-1H-1,2,4-triazol-3-yl)propyl)-4-ethoxy-[1,1'-biphenyl]-3-yl)cyclopropanecarboxylic acid:



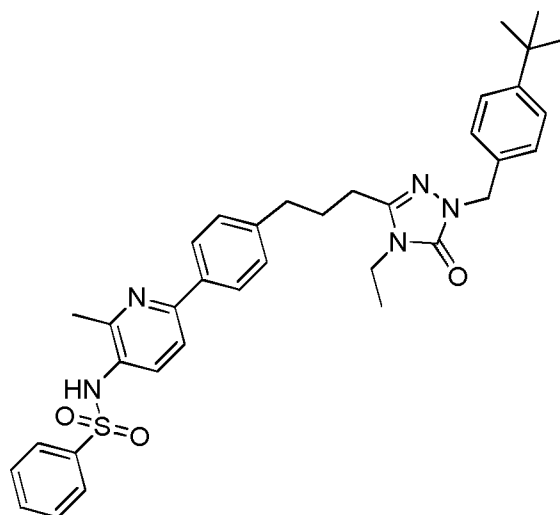
[00296] To a solution of 1-(4'-(3-(1-(4-(*tert*-butyl)benzyl)-4-ethyl-5-oxo-4,5-dihydro-1*H*-1,2,4-triazol-3-yl)propyl)-4-ethoxy-[1,1'-biphenyl]-3-yl)cyclopropanecarbonitrile (example 120; 120 mg, 0.21 mmol) in ethylene glycol (2 mL) and water (2 mL) was added potassium hydroxide (300 mg). The vessel was sealed and heated at 145 °C for 24 hrs. After cooling to RT, the reaction was quenched with 1 N aq. HCl and extracted with EtOAc. The combined organic extracts were washed further with water and brine, dried (MgSO₄), filtered and the filtrate concentrated *in vacuo*. Purification of the crude product thus obtained on silica gel eluting with a gradient of 0 to 6% MeOH in CHCl₃ afforded the title compound. LC-MS: 582 (M+H)⁺.

Example 123: 4'-(3-(1-(4-(*tert*-Butyl)benzyl)-4-ethyl-5-oxo-4,5-dihydro-1*H*-1,2,4-triazol-3-yl)propyl)-4-methoxy-*N*-(pyridin-2-yl)-[1,1'-biphenyl]-3-sulfonamide:



[00297] Prepared in an analogous manner to example 28 but omitting the first step and using instead 4-bromo-2-methoxy-*N*-(pyridin-2-yl)benzenesulfonamide as the coupling partner in step 2. LC-MS: 640 (M+H)⁺.

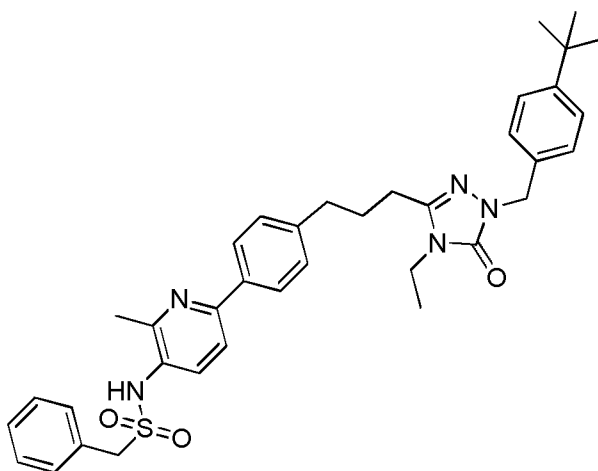
Example 124: 1-{[4-(*tert*-Butyl)phenyl]methyl}-4-ethyl-3-[3-(4-{6-methyl-5-[(phenylsulfonyl)amino](2-pyridyl)}phenyl)propyl]-1,2,4-triazolin-5-one:



[00298] *Step 1 to 2*: Carried out in an analogous manner as detailed in step 3 to 4 of example 58, using instead 6-chloro-2-methyl-3-nitropyridine as the coupling partner in step 3.

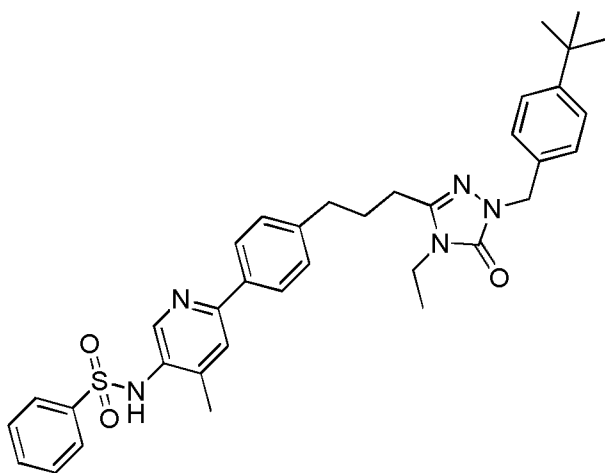
[00299] *Step 3*: Carried out in an analogous manner to example 59 using instead 3-(3-(4-(5-amino-6-methylpyridin-2-yl)phenyl)propyl)-1-(4-(*tert*-butyl)benzyl)-4-ethyl-1*H*-1,2,4-triazol-5(4*H*)-one prepared in the previous step as the nucleophile. LC-MS: 624 (M+H)⁺.

Example 125: 1-{[4-(*tert*-Butyl)phenyl]methyl}-4-ethyl-3-{3-[4-(6-methyl-5-{[benzylsulfonyl]amino}(2-pyridyl))phenyl]propyl}-1,2,4-triazolin-5-one:



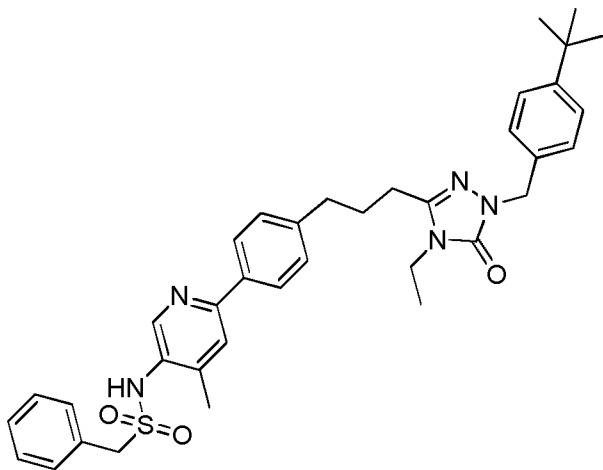
[00300] Prepared in an analogous manner to example 124 but using instead benzylsulfonyl chloride as the electrophile. LC-MS: 638 (M+H)⁺.

Example 126: 1-{[4-(*tert*-Butyl)phenyl]methyl}-4-ethyl-3-[3-(4-{4-methyl-5-[(phenylsulfonyl)amino](2-pyridyl)}phenyl)propyl]-1,2,4-triazolin-5-one:



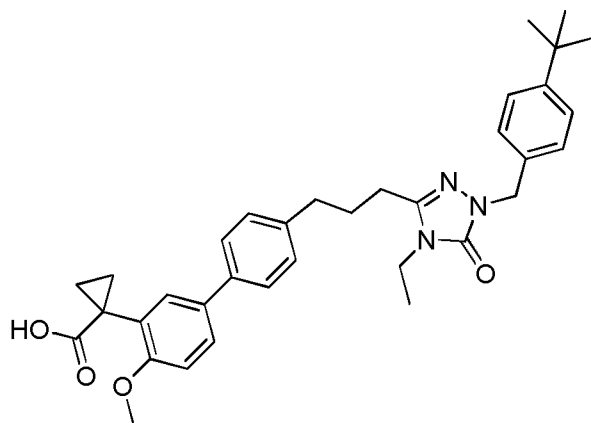
[00301] Prepared in an analogous manner to example 124 but using instead 2-chloro-4-methyl-5-nitropyridine as the coupling partner. LC-MS: 624 (M+H)⁺.

Example 127: 1-([4-(*tert*-Butyl)phenyl]methyl)-4-ethyl-3-{3-[4-(4-methyl-5-{[benzylsulfonyl]amino}(2-pyridyl))phenyl]propyl}-1,2,4-triazolin-5-one:



[00302] Prepared in an analogous manner to example 126 but using instead benzylsulfonyl chloride as the electrophile. LC-MS: 638 (M+H)⁺.

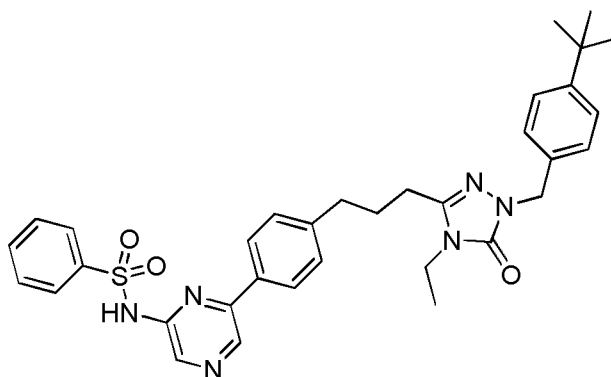
Example 128: 1-(4'-(3-(1-(4-(*tert*-Butyl)benzyl)-4-ethyl-5-oxo-4,5-dihydro-1*H*-1,2,4-triazol-3-yl)propyl)-4-methoxy-[1,1'-biphenyl]-3-yl)cyclopropanecarboxylic acid:



[00303] *Step 1*: Carried out in analogous manner to example 120, step 1 using instead 1-(5-bromo-2-methoxyphenyl)cyclopropanecarbonitrile as the coupling partner.

[00304] *Step 2*: The nitrile prepared from the previous step was combined with excess KOH in ethylene glycol and heated to 160 °C for 16 hrs. The resulting mixture was partitioned between EtOAc and 1 M aq. HCl. The organic phase was separated, washed further with water and brine, dried (MgSO₄), filtered, and concentrated *in vacuo*. The resulting residue was purified on reverse phase HPLC to afford the title compound. LC-MS: 568 (M+H)⁺.

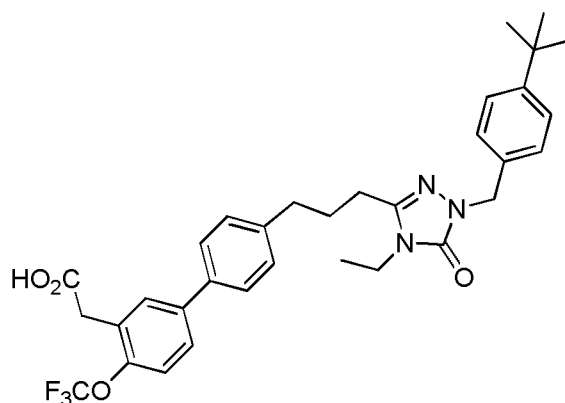
Example 129: N-(6-(4-(3-(1-(4-(*tert*-Butyl)benzyl)-4-ethyl-5-oxo-4,5-dihydro-1*H*-1,2,4-triazol-3-yl)propyl)phenyl)pyrazin-2-yl)benzenesulfonamide:



[00305] *Step 1*: Carried out in an analogous manner to that detailed in example 3, using 6-chloropyrazin-2-amine as the coupling partner.

[00306] *Step 2*: Carried out in an analogous manner to that detailed in example 4 using 3-(3-(4-(6-aminopyrazin-2-yl)phenyl)propyl)-1-(4-(*tert*-butyl)benzyl)-4-ethyl-1*H*-1,2,4-triazol-5(4*H*)-one as the starting material. LC-MS: 611 (M+H)⁺.

Example 130: 2-(4'-(3-(1-(4-(*tert*-Butyl)benzyl)-4-ethyl-5-oxo-4,5-dihydro-1*H*-1,2,4-triazol-3-yl)propyl)-4-(trifluoromethoxy)-[1,1'-biphenyl]-3-yl)acetic acid:



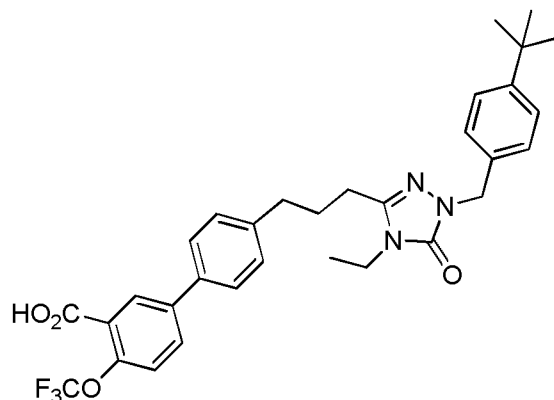
[00307] *Step 1*: To a solution of 5-bromo-2-(trifluoromethoxy)benzoic acid (1.0 g, 3.5 mmol) in THF (20 mL) was added sequentially at -15 °C triethylamine (0.54 mL, 3.9 mmol) and ethyl chloroformate (0.37 mL, 3.9 mmol). The resulting white suspension was stirred at -5 °C for 3 hrs before anhydrous MeCN (20 mL) and trimethylsilyl diazomethane (5.5 mL, 10 mmol, 2 M solution in ether) were added. The now yellow solution was allowed to warm slowly to RT over 16 hrs. The reaction was carefully quenched with the

addition of glacial acetic acid, followed by 10% aq. NaHCO_3 . The aqueous layer was separated and back-extracted with ether. The combined organic extracts were then dried over Na_2SO_4 , filtered and the filtrate concentrated *in vacuo*. Further purification by way of column chromatography (SiO_2 , gradient elution, Hex to 2:1 (v/v) Hex: EtOAc) afforded 1-(5-bromo-2-(trifluoromethoxy)phenyl)-2-diazoethanone as a yellow oil (460 mg, 42% yield).

[00308] *Step 2:* To a solution of 1-(5-bromo-2-(trifluoromethoxy)phenyl)-2-diazoethanone (460 mg, 1.5 mmol) in methanol (5 mL) was added, under gentle sonication, a triethylamine (1 mL) solution of silver benzoate (170 mg, 0.5 eq.) over a period of 5 min. Following the completion of addition, the resulting brown suspension was sonicated for another 2 hrs. The volatiles were then removed *in vacuo* and the resulting residue was taken up in ether. The ether suspension thus obtained was washed sequentially with 10% aq. HCl, 1 N aq. NaOH, water and brine, dried over Na_2SO_4 , filtered and the filtrate concentrated *in vacuo*. Further purification by way of column chromatography (SiO_2 , gradient elution, Hex to 1:1 (v/v) Hex: EtOAc) afforded methyl 2-(5-bromo-2-(trifluoromethoxy)phenyl)acetate as a pale yellow oil (328 mg, 70% yield).

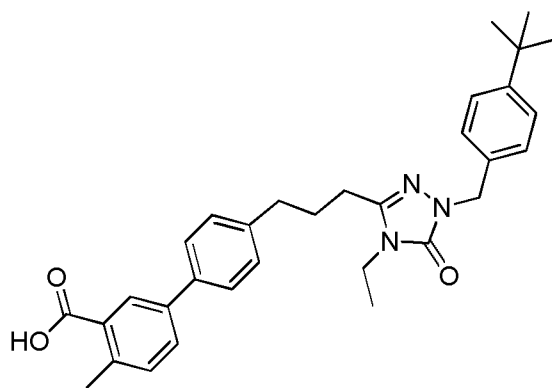
[00309] *Step 3:* Carried out in an analogous manner to example 13, step 1 using methyl 2-(5-bromo-2-(trifluoromethoxy)phenyl)acetate as the coupling partner. Hydrolysis of the intermediate ester was carried out as in example 1, step 2. LC-MS: 596 ($\text{M}+\text{H}$)⁺.

Example 131: 4'-(3-(1-(4-(*tert*-Butyl)benzyl)-4-ethyl-5-oxo-4,5-dihydro-1*H*-1,2,4-triazol-3-yl)propyl)-4-(trifluoromethoxy)-[1,1'-biphenyl]-3-carboxylic acid:



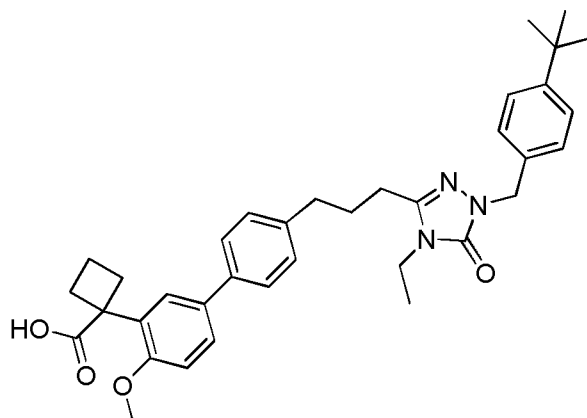
[00310] Prepared in an analogous manner to example 13, step 1 using methyl 5-bromo-2-(trifluoromethoxy)benzoate as the coupling partner. Hydrolysis of the intermediate ester was carried out as in example 1, step 2. LC-MS: 582 ($\text{M}+\text{H}$)⁺.

Example 132: 4'-(3-(1-(4-(*tert*-Butyl)benzyl)-4-ethyl-5-oxo-4,5-dihydro-1*H*-1,2,4-triazol-3-yl)propyl)-4-methyl-[1,1'-biphenyl]-3-carboxylic acid:



[00311] Prepared in an analogous manner to example 13, step 1 using methyl 5-bromo-2-methylbenzoate as the coupling partner. Hydrolysis of the intermediate ester was carried out at 65 °C under similar conditions to example 1, step 2 but using instead a mixture of 3 M aq. NaOH and solid KOH. LC-MS: 512 (M+H)⁺.

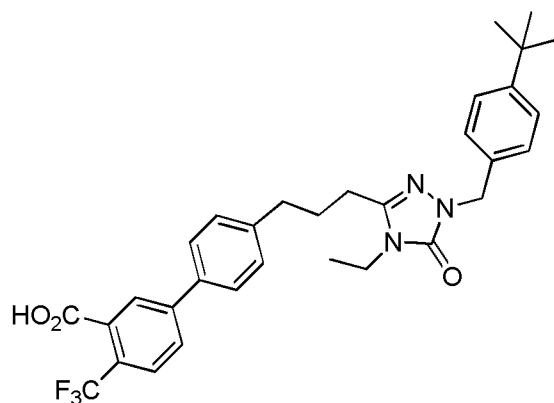
Example 133: 1-(4'-(3-(1-(4-(*tert*-Butyl)benzyl)-4-ethyl-5-oxo-4,5-dihydro-1H-1,2,4-triazol-3-yl)propyl)-4-methoxy-[1,1'-biphenyl]-3-yl)cyclobutanecarboxylic acid:



[00312] *Step 1*: Carried out in analogous manner to example 13, step 1 using instead 1-(5-bromo-2-methoxyphenyl)cyclobutanecarbonitrile as the coupling partner.

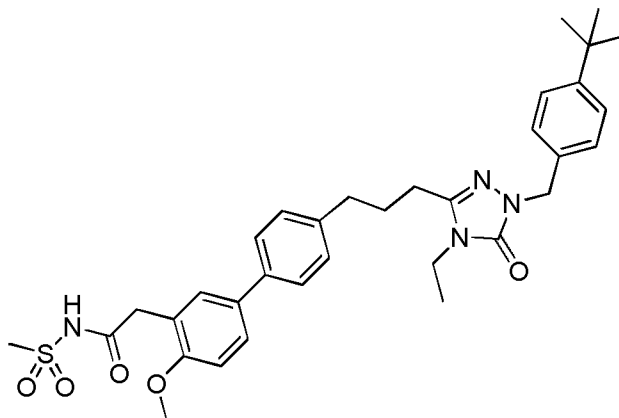
[00313] *Step 2*: The nitrile prepared from the previous step was combined with excess KOH in ethylene glycol and heated to 160 °C for 16 hrs. The resulting mixture was partitioned between EtOAc and 1 M aq. HCl. The organic phase was separated, washed further with water and brine, dried (MgSO₄), filtered, and concentrated *in vacuo*. The resulting residue was purified on reverse phase HPLC to afford the title compound. LC-MS: 582 (M+H)⁺.

Example 134: 4'-(3-(1-(4-(*tert*-Butyl)benzyl)-4-ethyl-5-oxo-4,5-dihydro-1H-1,2,4-triazol-3-yl)propyl)-4-(trifluoromethyl)-[1,1'-biphenyl]-3-carboxylic acid:



[00314] Prepared in an analogous manner to example 13, step 1 using methyl 5-bromo-2-(trifluoromethyl)benzoate as the coupling partner. Hydrolysis of the intermediate ester was carried out as in example 1, step 2. LC-MS: 566 (M+H)⁺.

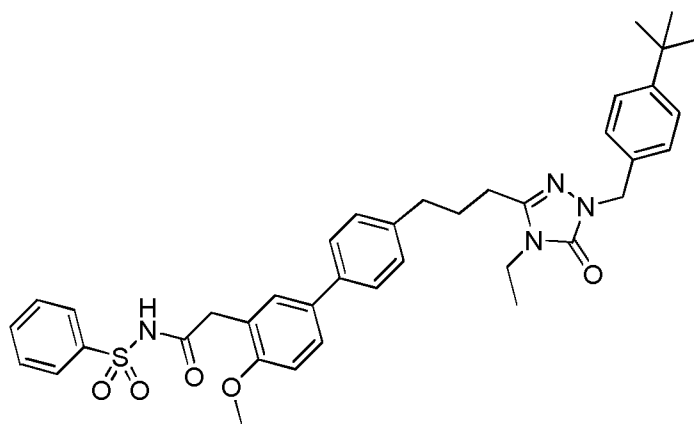
Example 135: 2-(4'-(3-(1-(4-(*tert*-Butyl)benzyl)-4-ethyl-5-oxo-4,5-dihydro-1*H*-1,2,4-triazol-3-yl)propyl)-4-methoxy-[1,1'-biphenyl]-3-yl)-*N*-(methylsulfonyl)acetamide:



[00315] *Step 1*; To a solution of sodium 2-(4'-(3-(1-(4-(*tert*-butyl)benzyl)-4-ethyl-5-oxo-4,5-dihydro-1*H*-1,2,4-triazol-3-yl)propyl)-4-methoxy-[1,1'-biphenyl]-3-yl)acetate (270 mg, 0.48 mmol, example 21) in CH₂Cl₂ (5 mL) at 0 °C was added catalytic amount of DMF, followed by oxalyl chloride (0.21 mL, 2.4 mmol). The reaction was stirred for 30 minutes and then concentrated *in vacuo* to afford the corresponding acid chloride. This was used without further purification.

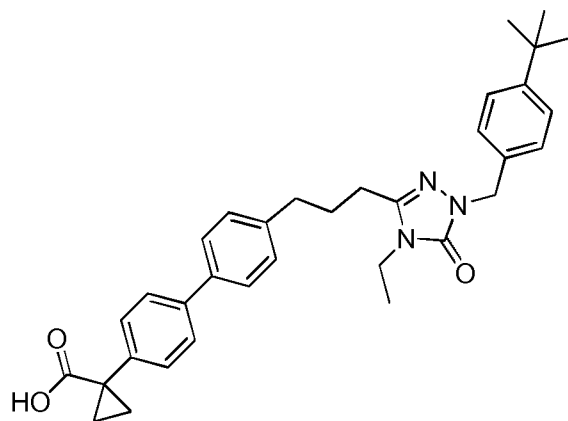
[00316] *Step 2*; To a stirred suspension of methansulfonamide (34 mg, 0.36 mmol) in CH₂Cl₂ (3 mL) was added diisopropylethylamine (0.15 mL, 0.84 mmol) and catalytic amount of 4-dimethylaminopyridine, and the mixture was allowed to stir at ambient temperature for 45 minutes. To the resulting solution was then added a suspension of the acid chloride from step 1 (0.24 mmol) in CH₂Cl₂ and the mixture was stirred for another 2 hrs. The reaction mixture was then partitioned between CH₂Cl₂ and water. The organic phase was separated, washed further with 1 N aq. HCl and water, dried (MgSO₄), filtered, and the filtrate concentrated *in vacuo*. The crude material thus obtained was purified using silica gel chromatography eluting with a gradient of 0 to 100% EtOAc in hexanes to afford the title compound. LC-MS: 619 (M+H)⁺.

Example 136: 2-(4'-(3-(1-(4-(*tert*-Butyl)benzyl)-4-ethyl-5-oxo-4,5-dihydro-1*H*-1,2,4-triazol-3-yl)propyl)-4-methoxy-[1,1'-biphenyl]-3-yl)-*N*-(phenylsulfonyl)acetamide:



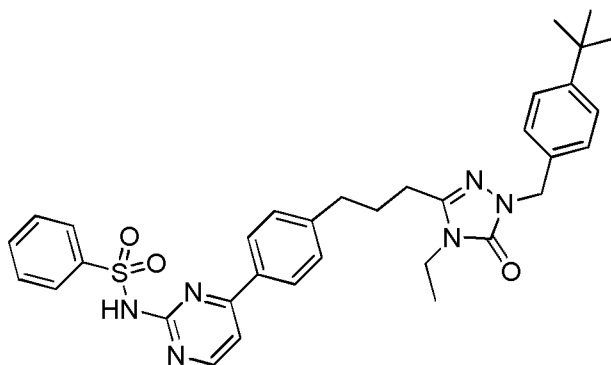
[00317] Prepared in an analogous manner to example 135 using instead benzenesulfonamide as the coupling partner. LC-MS: 681 (M+H)⁺.

Example 137: 1-(4'-(3-(1-(4-(*tert*-Butyl)benzyl)-4-ethyl-5-oxo-4,5-dihydro-1*H*-1,2,4-triazol-3-yl)propyl)-[1,1'-biphenyl]-4-yl)cyclopropanecarboxylic acid:



[00318] Prepared in an analogous manner to that detailed in example 1 using ethyl 1-(4-(4,4,5,5-tetramethyl-1,3,2-dioxaborolan-2-yl)phenyl)cyclopropanecarboxylate as the coupling partner in step 1. LC-MS: 538 (M+H)⁺.

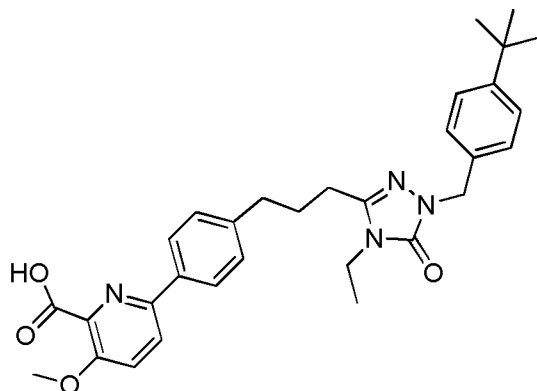
Example 138: *N*-(4-(4-(3-(1-(4-(*tert*-Butyl)benzyl)-4-ethyl-5-oxo-4,5-dihydro-1*H*-1,2,4-triazol-3-yl)propyl)phenyl)pyrimidin-2-yl)benzenesulfonamide:



[00319] *Step 1:* Carried out in an analogous manner to that detailed in example 3, using 2-chloropyrimidin-5-amine as the coupling partner.

[00320] *Step 2*: Carried out in an analogous manner to that detailed in example 4 using 3-(3-(4-(2-aminopyrimidin-4-yl)phenyl)propyl)-1-(4-(*tert*-butyl)benzyl)-4-ethyl-1*H*-1,2,4-triazol-5(4*H*)-one as the starting material. LC-MS: 611 (M+H)⁺.

Example 139: 6-(4-(3-(1-(4-(*tert*-Butyl)benzyl)-4-ethyl-5-oxo-4,5-dihydro-1*H*-1,2,4-triazol-3-yl)propyl)phenyl)-3-methoxypicolinic acid:



[00321] *Step 1*; To a solution of 2-methyl-3-hydroxypyridine (1.00 g, 9.16 mmol) in CH₃CN (25 mL) was added NBS (3.26 g, 18.33 mmol). The resulting mixture was heated at reflux for 1.5 hrs before the volatiles were removed *in vacuo*. The residue thus obtained was diluted with Et₂O and washed sequentially with water and brine. The organic extract was then dried over Na₂SO₄, filtered and the filtrate concentrated *in vacuo*. The crude product thus obtained was purified on silica gel eluting with a solvent gradient of 0 to 35% EtOAc in hexanes to afford 4,6-dibromo-2-methylpyridin-3-ol as a white solid.

[00322] *Step 2*; 4,6-Dibromo-2-methylpyridin-3-ol was converted into 6-bromo-2-methylpyridin-3-ol according to the published procedure found in Meana, A, et al., *Synlet*, **2003**, *11*, p. 1678-1682.

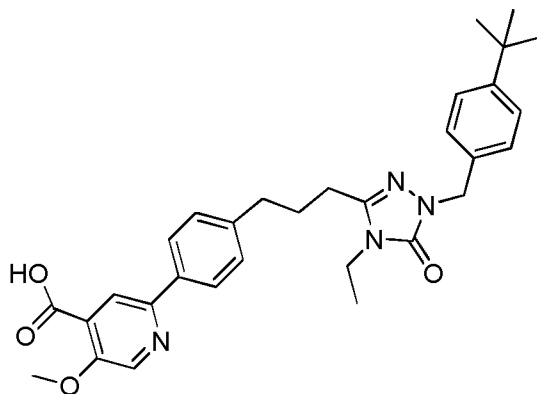
[00323] *Step 3*; To a solution of 6-bromo-2-methylpyridin-3-ol (0.22 g, 1.2 mmol) in CH₃CN (5 mL) was added Cs₂CO₃ (1.14 g, 3.51 mmol) and iodomethane (0.080 mL, 1.3 mmol). The resulting mixture was then stirred at 50 °C for 16 hrs before the volatiles were removed *in vacuo*. The residue thus obtained was diluted with EtOAc and washed sequentially with water and brine. The organic extract was then dried over Na₂SO₄, filtered and the filtrate concentrated *in vacuo*. Crude 6-bromo-3-methoxy-2-methylpyridine thus obtained was used without further purification.

[00324] *Step 4*; 6-Bromo-3-methoxy-2-methylpyridine was converted into 6-bromo-3-methoxypicolinaldehyde in two steps according to the published procedures found in Mandal, A.B., et al., *Tetrahedron Letters* **2005**, *46*, p. 6033-6036.

[00325] *Step 5*; To a solution of 6-bromo-3-methoxypicolinaldehyde (0.13 g, 0.60 mmol) in THF (6 mL) and *t*BuOH (6 mL) was added 2-methyl-2-butene (0.64 mL, 2.41 mmol), followed by an aqueous solution (2 mL) of sodium dihydrogen phosphate (0.29 mg, 2.4 mmol) and NaClO₂ (0.22 mg, 2.4 mol). The resulting mixture was stirred at RT for 16 hrs. The volatiles were then evaporated *in vacuo* and the residue thus obtained was purified on silica gel eluting with a solvent gradient of 0 to 10% MeOH in DCM (with 2% acetic acid as an additive in DCM) to afford 6-bromo-3-methoxypicolinic acid as a solid.

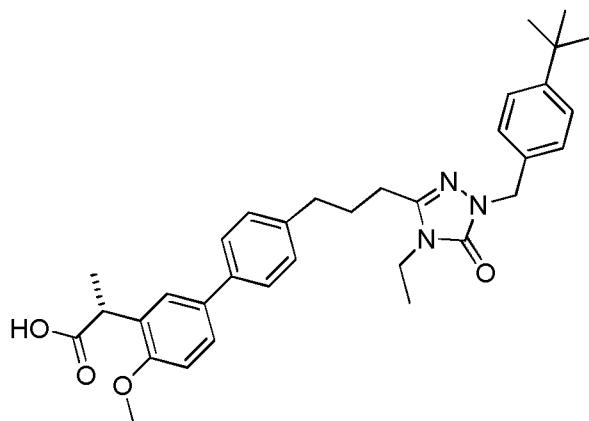
[00326] *Step 6*; Carried out in an analogous manner to that detailed in step 2 of example 28, using instead 6-bromo-3-methoxypicolinic acid as the coupling partner. LC-MS: 529 (M+H)⁺.

Example 140: 2-(4-(3-(1-(4-(*tert*-Butyl)benzyl)-4-ethyl-5-oxo-4,5-dihydro-1*H*-1,2,4-triazol-3-yl)propyl)phenyl)-5-methoxyisonicotinic acid:



[00327] *Step 1 to 4*: Carried out in an analogous manner to that detailed in step 3 to 6 of example 139, but 2-chloro-5-hydroxy-4-methylpyridine as the starting material. LC-MS: 529 (M+H)⁺.

Example 141: (*R*)-2-(4'-(3-(1-(4-(*tert*-Butyl)benzyl)-4-ethyl-5-oxo-4,5-dihydro-1*H*-1,2,4-triazol-3-yl)propyl)-4-methoxy-[1,1'-biphenyl]-3-yl)propanoic acid:



[00328] *Step 1*; To a solution of 2-(5-bromo-2-methoxyphenyl)acetic acid (975 mg, 4.0 mmol) in CH₃CN (15 mL) was added 1,1'-carbonyldiimidazole (1.3 g, 8.0 mmol) and the resulting solution was heated to 70 °C. After 1.5 hrs, (4*R*,5*S*)-4-methyl-5-phenyloxazolidin-2-one (1.4 g, 8.0 mmol) and triethylamine (1.1 mL, 8.0 mmol) were added, and stirring was continued at 70 °C for 2.5 hrs. The reaction mixture was then partitioned between EtOAc and 1 N aq. HCl. The organic phase was separated, washed further with water and brine, dried (Na₂SO₄), filtered and the filtrate concentrated *in vacuo*. The crude material thus obtained was purified using silica gel chromatography eluting with a gradient of 0 to 40% EtOAc in hexanes to deliver (4*R*,5*S*)-3-(2-(5-bromo-2-methoxyphenyl)acetyl)-4-methyl-5-phenyloxazolidin-2-one.

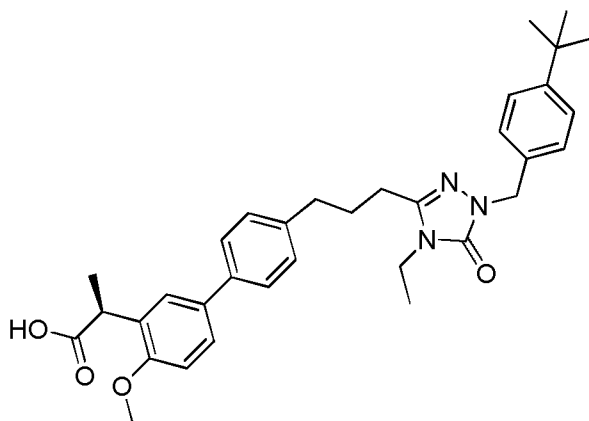
[00329] *Step 2*; To a solution of (4*R*,5*S*)-3-(2-(5-bromo-2-methoxyphenyl)acetyl)-4-methyl-5-phenyloxazolidin-2-one from the previous step (300 mg, 0.74 mmol) in THF (3 mL) at -78 °C was added NaHMDS (1.0 M solution in THF, 0.82 mL, 0.82 mmol). After 20 minutes, iodomethane (51 μL, 0.82 mmol) was added neat, dropwise and the reaction was allowed to warm to room temperature over 2.5 hrs.

The reaction was quenched by the addition of saturated, aqueous NH_4Cl and the resulting suspension was partitioned between EtOAc and 1 N aq. HCl. The organic phase was separated, washed further with water and brine, dried (MgSO_4), filtered and the filtrate concentrated *in vacuo*. The crude material thus obtained was purified further using silica gel chromatography eluting with a gradient of 0 to 30% EtOAc in hexanes to afford (4*R*,5*S*)-3-((*R*)-2-(5-bromo-2-methoxyphenyl)propanoyl)-4-methyl-5-phenyloxazolidin-2-one.

[00330] Step 3: Carried out in an analogous manner to that detailed in example 13, step 1 but using (4*R*,5*S*)-3-((*R*)-2-(5-bromo-2-methoxyphenyl)propanoyl)-4-methyl-5-phenyloxazolidin-2-one as the aryl bromide coupling partner.

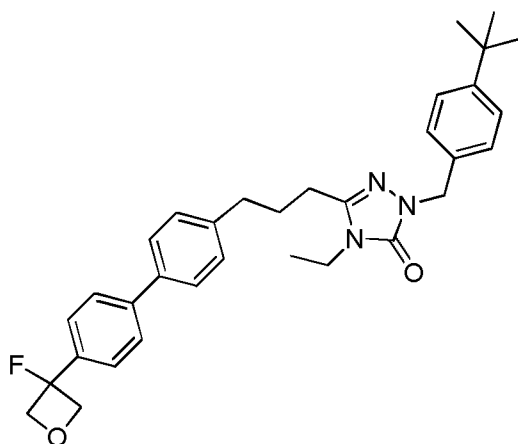
[00331] Step 4: To a solution of (4*R*,5*S*)-3-((*R*)-2-(4'-(3-(1-(4-(*tert*-butyl)benzyl)-4-ethyl-5-oxo-4,5-dihydro-1*H*-1,2,4-triazol-3-yl)propyl)-4-methoxy-[1,1'-biphenyl]-3-yl)propanoyl)-4-methyl-5-phenyloxazolidin-2-one (71 mg, 0.10 mmol) from the previous step in THF (3 mL) and water (1 mL) was added H_2O_2 (56 μL , 0.50 mmol) and lithium hydroxide monohydrate (8.0 mg, 0.20 mmol) at 0 °C. After 30 minutes the reaction was quenched by the addition of aqueous $\text{Na}_2\text{S}_2\text{O}_3$ and the resulting solution was partitioned between EtOAc and 1 N aq. HCl. The organic phase was separated, washed further with water and brine, dried (MgSO_4), filtered and the filtrate concentrated *in vacuo*. The crude material thus obtained was purified on reverse phase HPLC to afford the title compound as a white solid. LC-MS: 556 ($\text{M}+\text{H}$)⁺.

Example 142: (*S*)-2-(4'-(3-(1-(4-(*tert*-Butyl)benzyl)-4-ethyl-5-oxo-4,5-dihydro-1*H*-1,2,4-triazol-3-yl)propyl)-4-methoxy-[1,1'-biphenyl]-3-yl)propanoic acid:



[00332] Prepared in an analogous manner to example 142 using instead (4*S*,5*R*)-4-methyl-5-phenyloxazolidin-2-one as the chiral auxilliary in step 1. LC-MS: 556 ($\text{M}+\text{H}$)⁺.

Example 143: 1-(4-(*tert*-Butyl)benzyl)-4-ethyl-3-(3-(4'-(3-fluorooxetan-3-yl)-[1,1'-biphenyl]-4-yl)propyl)-1*H*-1,2,4-triazol-5(4*H*)-one:

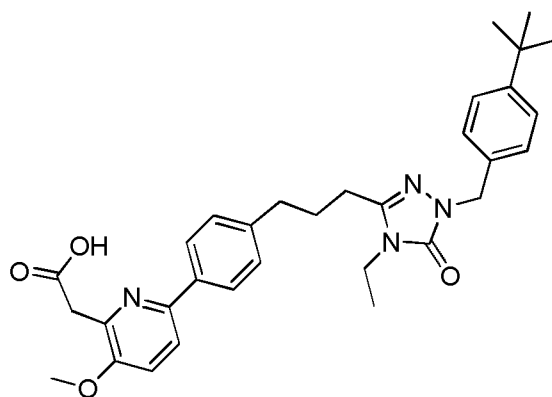


[00333] *Step 1*; To a solution of 4-bromophenyl iodide (2.4 g, 8.5 mmol) and 3-oxetanone (220 μ L, 3.8 mmol) in THF (50 mL) was added at -78°C *n*-BuLi (1.5 mL, 3.8 mmol, 2.5 M solution in hexanes) dropwise over a period of 15 min. The resulting solution was allowed to warm slowly to RT of 3.5 hrs. The crude reaction mixture was then re-cooled to -78°C and carefully quenched with MeOH. The volatiles were then removed *in vacuo* and the resulting residue was partitioned between ether and 10% aq. HCl. The organic extract was then separated, washed further with water, 1 N aq. NaOH, water and brine, dried over Na_2SO_4 , filtered and the filtrate concentrated *in vacuo*. The crude product thus obtained can then be recrystallized from ether and hexanes to furnish 3-(4-bromophenyl)oxetan-3-ol as a white solid (730 mg, 80% yield).

[00334] *Step 2*; To a solution of 3-(4-bromophenyl)oxetan-3-ol (730 mg, 3.2 mmol) in DCM (100 mL) was added at -78°C neat diethylaminosulfur trifluoride (840 μ L, 6.4 mmol) dropwise over 10 min. The resulting mixture was allowed to stir at -78°C for 8 hrs before it was carefully quenched with sat. aq. NaHCO_3 . The organic layer was separated, dried over Na_2SO_4 , filtered and the filtrate concentrated *in vacuo*. Purification by way of column chromatography (SiO_2 , gradient elution, Hex to 1:1 (v/v) Hex: EtOAc) afforded 3-(4-bromophenyl)-3-fluorooxetane as a volatile, colorless oil (370 mg, 50% yield).

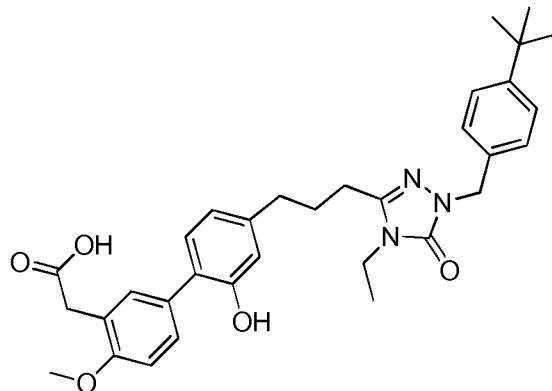
[00335] *Step 3*: Carried out in an analogous manner to example 13, step 1 using instead 3-(4-bromophenyl)-3-fluorooxetane as the coupling partner. LC-MS: 528 ($\text{M}+\text{H}$) $^{+}$.

Example 144: 2-(6-(4-(3-(1-(4-(tert-Butyl)benzyl)-4-ethyl-5-oxo-4,5-dihydro-1H-1,2,4-triazol-3-yl)propyl)phenyl)-3-methoxypyridin-2-yl)acetic acid:



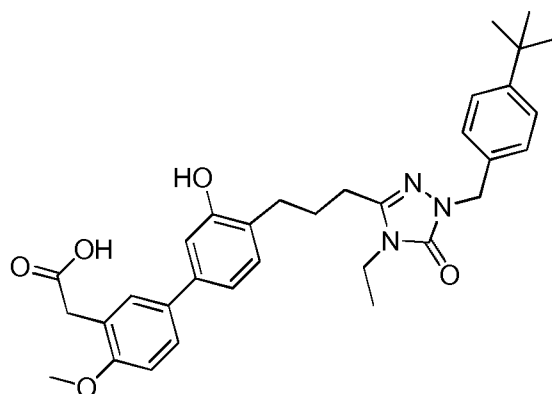
[00336] Prepared in an analogous manner to example 130 using instead 6-bromo-3-methoxypicolinic acid as the starting material. LC-MS: 543 (M+H)⁺.

Example 145: 2-(4'-(3-(1-(4-(*tert*-Butyl)benzyl)-4-ethyl-5-oxo-4,5-dihydro-1*H*-1,2,4-triazol-3-yl)propyl)-2'-hydroxy-4-methoxy-[1,1'-biphenyl]-3-yl)acetic acid:



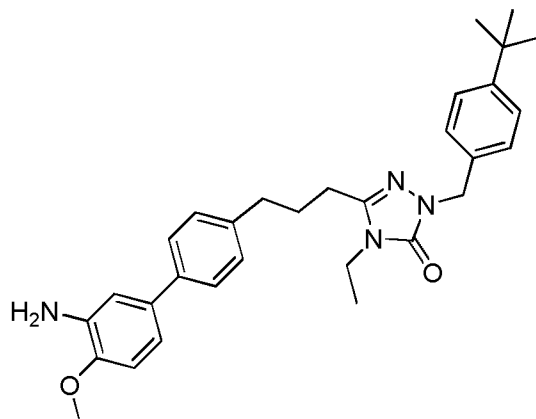
[00337] Prepared in an analogous manner to example 150 using 4-bromo-3-fluorobenzaldehyde as the reactant in step 1. LC-MS: 558 (M+H)⁺.

Example 146: 2-(4'-(3-(1-(4-(*tert*-Butyl)benzyl)-4-ethyl-5-oxo-4,5-dihydro-1*H*-1,2,4-triazol-3-yl)propyl)-3'-hydroxy-4-methoxy-[1,1'-biphenyl]-3-yl)acetic acid:



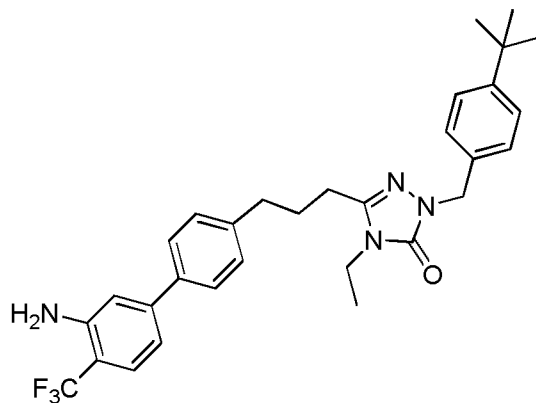
[00338] Prepared in an analogous manner to example 150 using 4-bromo-2-fluorobenzaldehyde as the reactant in step 1. LC-MS: 558 (M+H)⁺.

Example 147: 3-(3-(3'-Amino-4'-methoxy-[1,1'-biphenyl]-4-yl)propyl)-1-(4-(*tert*-butyl)benzyl)-4-ethyl-1*H*-1,2,4-triazol-5(4*H*)-one:



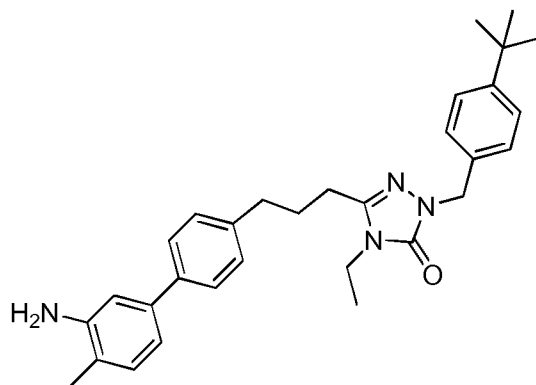
[00339] Prepared in an analogous manner to example 3 using 5-bromo-2-methoxyaniline as the coupling partner. LC-MS: 499 (M+H)⁺.

Example 148: 3-(3-(3'-Amino-4'-(trifluoromethyl)-[1,1'-biphenyl]-4-yl)propyl)-1-(4-(*tert*-butyl)benzyl)-4-ethyl-1*H*-1,2,4-triazol-5(4*H*)-one:



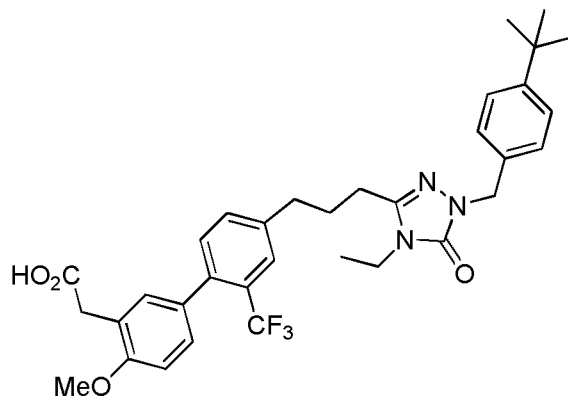
[00340] Prepared in an analogous manner to example 3 using 5-bromo-2-(trifluoromethyl)aniline as the coupling partner. LC-MS: 537 (M+H)⁺.

Example 149: 3-(3-(3'-Amino-4'-methyl-[1,1'-biphenyl]-4-yl)propyl)-1-(4-(*tert*-butyl)benzyl)-4-ethyl-1*H*-1,2,4-triazol-5(4*H*)-one:



[00341] Prepared in an analogous manner to example 3 using 5-bromo-2-methylaniline as the coupling partner. LC-MS: 483 (M+H)⁺.

Example 150: 2-(4'-(3-(1-(4-(*tert*-Butyl)benzyl)-4-ethyl-5-oxo-4,5-dihydro-1*H*-1,2,4-triazol-3-yl)propyl)-4-methoxy-2'-(trifluoromethyl)-[1,1'-biphenyl]-3-yl)acetic acid:

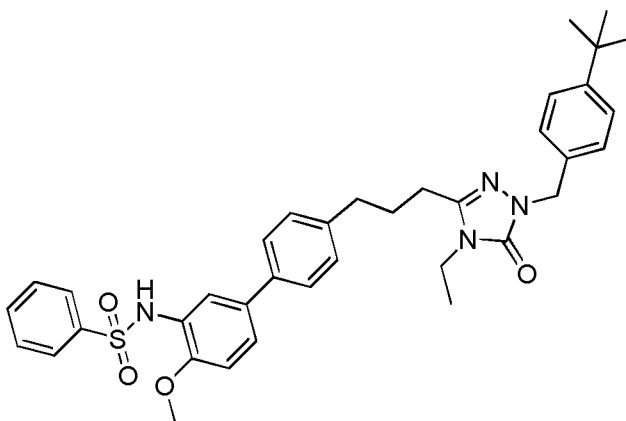


[00342] *Step 1*; To a solution of 4-bromo-3-(trifluoromethyl)benzaldehyde (1.0 g, 4.0 mmol) in DMF (10 mL) was added sodium cyanide (48 mg, 1.0 mmol) in one rapid portion and the resulting dark red suspension was heated at 40 °C for 1 hr. Then, acrylonitrile (0.26 mL, 4 mmol) was added dropwise as a DMF solution (5 mL) to the now dark brown reaction suspension over a period of 15 min. The final reaction mixture was allowed to heat at 40 °C for 14 hrs. The crude reaction mixture was then cooled to RT, carefully quenched with glacial acetic acid and water, and extracted with methyl tert-butyl ether. The combined organic extracts were washed further with water and brine, dried over Na₂SO₄, filtered and the filtrate concentrated *in vacuo* to afford a dark red, viscous oil. Further purification by way of column chromatography (SiO₂, gradient elution, Hex → 1:1 Hex:EtOAc) furnished 4-(4-bromo-3-(trifluoromethyl)phenyl)-4-oxobutanenitrile as an orange oil that solidified upon standing (880 mg, 73% yield).

[00343] *Step 2*; To a solution 4-(4-bromo-3-(trifluoromethyl)phenyl)-4-oxobutanenitrile (880 mg, 2.9 mmol) and hydrazine hydrate (0.34 mL, 7 mmol) in ethylene glycol (5 mL) and water (0.15 mL) was added potassium hydroxide (850 mg, 15 mmol) portionwise over a period of 1.5 h. The resulting red solution was then heated at 195 °C for 16 hrs. The reaction mixture was then cooled to RT, diluted with water and carefully acidified with 2 N aq. HCl until an aqueous pH of ~2 was reached. The resulting suspension was then extracted with EtOAc. The combined organic extracts were washed further with water and brine, dried over Na₂SO₄, and filtered. Concentration of the filtrate concentrated *in vacuo* afforded crude 4-(4-bromo-3-(trifluoromethyl)phenyl)butanoic acid as a beige solid.

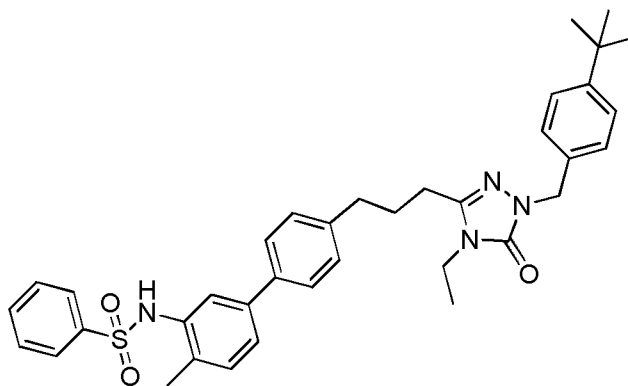
[00344] *Steps 3 to 6*: Carried out in an analogous manner as detailed in steps 3 to 6 of example 27, using instead 4-(4-bromo-3-(trifluoromethyl)phenyl)butanoic acid as the acid coupling partner in step 3 and methyl 2-(2-methoxy-5-(4,4,5,5-tetramethyl-1,3,2-dioxaborolan-2-yl)phenyl)acetate as the boronate coupling partner in step 5. LC-MS: 610 (M+H)⁺.

Example 151: 1-([4-(*tert*-Butyl)phenyl]methyl)-4-ethyl-3-[3-(4-{4-methoxy-3-[(phenylsulfonyl)amino]phenyl}propyl)-1,2,4-triazolin-5-one]



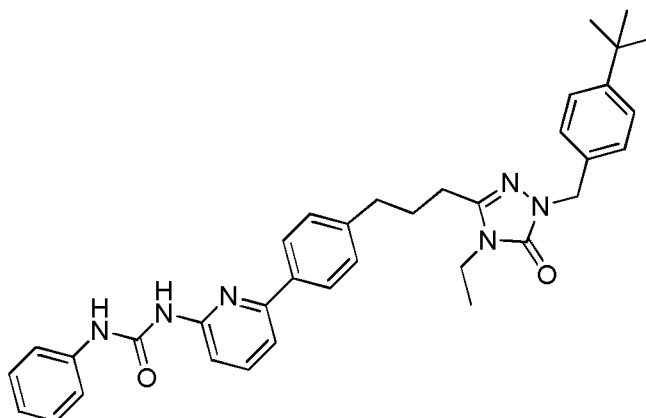
[00345] Prepared in an analogous manner to example 4 using 3-(3-(3'-amino-4'-methoxy-[1,1'-biphenyl]-4-yl)propyl)-1-(4-(*tert*-butyl)benzyl)-4-ethyl-1*H*-1,2,4-triazol-5(4*H*)-one (example 147) as the nucleophile. LC-MS: 639 (M+H)⁺.

Example 152: 1-([4-(*tert*-Butyl)phenyl]methyl)-4-ethyl-3-[3-(4-{4-methyl-3-[(phenylsulfonyl)amino]phenyl}propyl)-1,2,4-triazolin-5-one]:



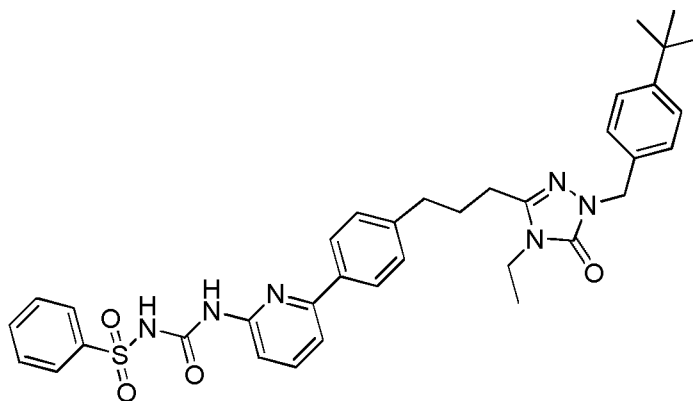
[00346] Prepared in an analogous manner to example 4 using 3-(3-(3'-amino-4'-methyl-[1,1'-biphenyl]-4-yl)propyl)-1-(4-(*tert*-butyl)benzyl)-4-ethyl-1*H*-1,2,4-triazol-5(4*H*)-one (example 149) as the nucleophile. LC-MS: 623 (M+H)⁺.

Example 153: 1-(6-(4-(3-(1-(4-(*tert*-Butyl)benzyl)-4-ethyl-5-oxo-4,5-dihydro-1*H*-1,2,4-triazol-3-yl)propyl)phenyl)pyridin-2-yl)-3-phenylurea:



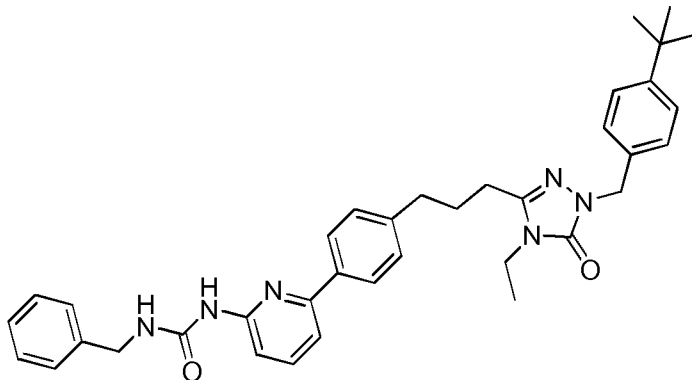
[00347] Prepared in an analogous manner to example 4 using instead phenyl isocyanate as the electrophile and THF as the solvent. LC-MS: 589 (M+H)⁺.

Example 154: *N*-((6-(4-(3-(1-(4-(*tert*-Butyl)benzyl)-4-ethyl-5-oxo-4,5-dihydro-1*H*-1,2,4-triazol-3-yl)propyl)phenyl)pyridin-2-yl)carbamoyl)benzenesulfonamide:



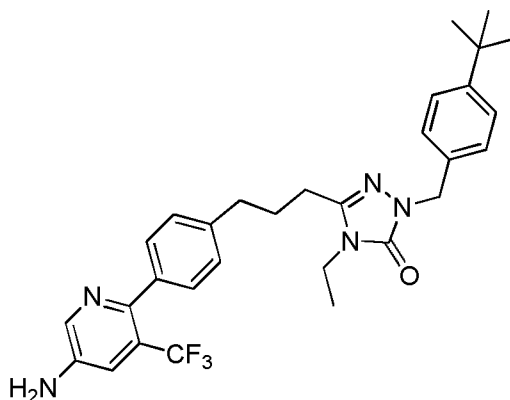
[00348] Prepared in an analogous manner to example 4 using instead benzenesulfonyl isocyanate as the electrophile and THF as the solvent. LC-MS: 653 (M+H)⁺.

Example 155: 1-Benzyl-3-(6-(4-(3-(1-(4-(*tert*-butyl)benzyl)-4-ethyl-5-oxo-4,5-dihydro-1*H*-1,2,4-triazol-3-yl)propyl)phenyl)pyridin-2-yl)urea:



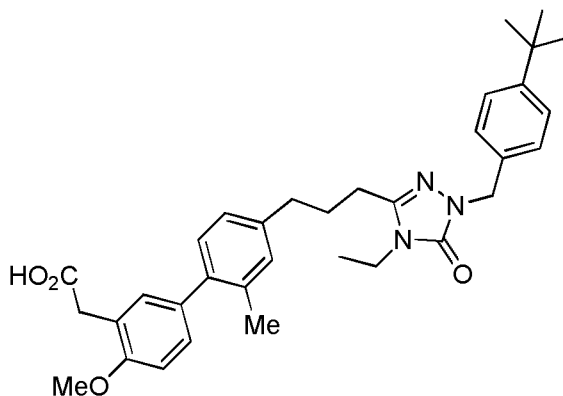
[00349] Prepared in an analogous manner to example 4 using instead benzyl isocyanate as the electrophile and THF as the solvent. LC-MS: 603 (M+H)⁺.

Example 156: 3-(3-{4-[5-Amino-3-(trifluoromethyl)(2-pyridyl)]phenyl}propyl)-1-{[4-(*tert*-butyl)phenyl]methyl}-4-ethyl-1,2,4-triazolin-5-one:



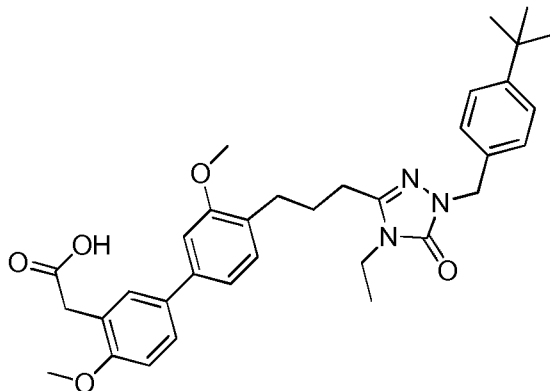
[00350] Prepared in an analogous manner to example 3 using instead 6-chloro-5-(trifluoromethyl)pyridin-2-amine (prepared according to the procedure found in Patent WO 2009/150240A1) as the aryl halide coupling partner. LC-MS: 538 (M+H)⁺.

Example 157: 2-(4'-(3-(1-(4-(*tert*-Butyl)benzyl)-4-ethyl-5-oxo-4,5-dihydro-1*H*-1,2,4-triazol-3-yl)propyl)-4-methoxy-2'-methyl-[1,1'-biphenyl]-3-yl)acetic acid:



[00351] Prepared in an analogous manner to example 150 using instead 4-bromo-3-methylbenzaldehyde as the reactant in step 1. LC-MS: 556 (M+H)⁺.

Example 158: 2-(4'-(3-(1-(4-(*tert*-Butyl)benzyl)-4-ethyl-5-oxo-4,5-dihydro-1*H*-1,2,4-triazol-3-yl)propyl)-3',4-dimethoxy-[1,1'-biphenyl]-3-yl)acetic acid:



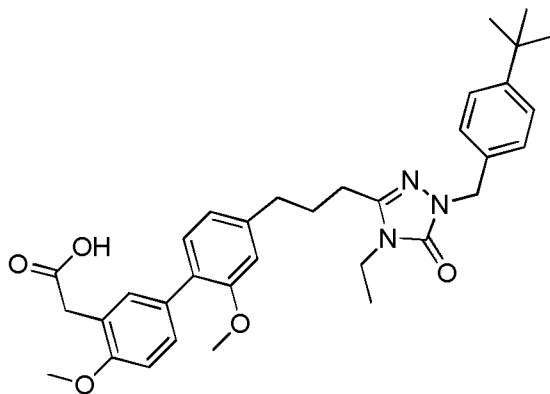
[00352] *Steps 1 to 2:* Carried out in an analogous manner as detailed in steps 1 to 2 of example 150, using 4-bromo-2-fluorobenzaldehyde as the reactant in step 1.

[00353] *Steps 3 to 5:* Carried out in an analogous manner as detailed in steps 3 to 5 of example 27, using instead 4-(4-bromo-2-hydroxyphenyl)butanoic acid as the acid coupling partner in step 3 and methyl 2-(2-methoxy-5-(4,4,5,5-tetramethyl-1,3,2-dioxaborolan-2-yl)phenyl)acetate as the boronate coupling partner in step 5.

[00354] *Step 6:* To a solution of methyl 2-(4'-(3-(1-(4-(*tert*-butyl)benzyl)-4-ethyl-5-oxo-4,5-dihydro-1*H*-1,2,4-triazol-3-yl)propyl)-3'-hydroxy-4-methoxy-[1,1'-biphenyl]-3-yl)acetate (52 mg, 0.091 mmol) in acetone (1 mL) was added potassium carbonate (38 mg, 0.27 mmol, 3 eq) and dimethyl sulfate (10 μ L, 0.11 mmol, 1.2 eq). The reaction vessel was heated to 40 °C for 24 hrs. Additional potassium carbonate (38 mg, 0.27 mmol, 3 eq) and dimethyl sulfate (10 μ L, 0.11 mmol, 1.2 eq) were added and the reaction vessel was heated to 40 °C for an additional 24 hrs and then allowed to cool to RT. The reaction mixture was diluted with water (10 mL) and extracted with EtOAc (3 x 10 mL). The combined organic extracts were washed with brine, dried over MgSO₄, filtered and concentrated. The residue was purified by column chromatography (SiO₂, gradient elution, 9:1 (v/v) Hex: EtOAc to EtOAc) to afford methyl 2-(4'-(3-(1-(4-(*tert*-butyl)benzyl)-4-ethyl-5-oxo-4,5-dihydro-1*H*-1,2,4-triazol-3-yl)propyl)-3',4-dimethoxy-[1,1'-biphenyl]-3-yl)acetate as a colorless oil (23 mg, 43%).

[00355] *Step 7:* Carried out in an analogous manner as detailed in step 2 of example 1. LC-MS: 572 (M+H)⁺.

Example 159: 2-(4'-(3-(1-(4-(*tert*-Butyl)benzyl)-4-ethyl-5-oxo-4,5-dihydro-1*H*-1,2,4-triazol-3-yl)propyl)-2',4-dimethoxy-[1,1'-biphenyl]-3-yl)acetic acid:



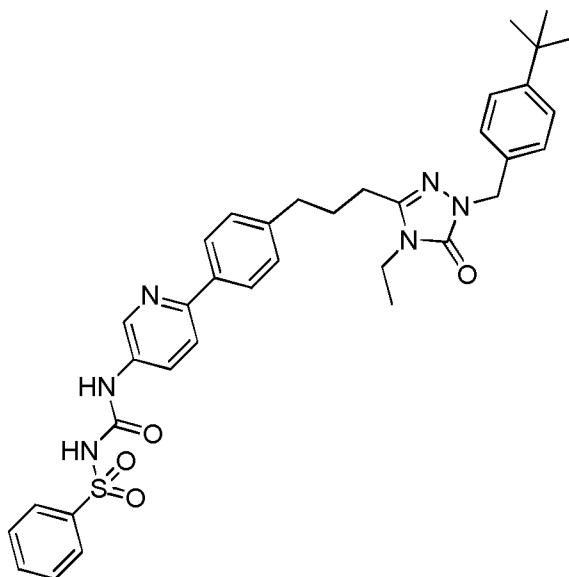
[00356] *Steps 1 to 2:* Carried out in an analogous manner as detailed in steps 1 to 2 of example 150, using 4-bromo-3-fluorobenzaldehyde as the reactant in step 1.

[00357] *Steps 3 to 4:* Carried out in an analogous manner as detailed in steps 3 to 4 of example 27, using instead 4-(4-bromo-3-hydroxyphenyl)butanoic acid as the acid coupling partner in step 3.

[00358] *Step 5:* To a solution of 3-(3-(4-bromo-3-hydroxyphenyl)propyl)-1-(4-(*tert*-butyl)benzyl)-4-ethyl-1*H*-1,2,4-triazol-5(4*H*)-one (123 mg, 0.260 mmol) in acetone (3 mL) was added potassium carbonate (108 mg, 0.78 mmol, 3 eq) and dimethyl sulfate (30 μ L, 0.312 mmol, 1.2 eq). The reaction vessel was heated to 40 °C for 48 hrs. The reaction mixture was diluted with water (20 mL) and extracted with EtOAc (3 x 10 mL). The combined organic extracts were washed with brine, dried over MgSO₄, filtered and concentrated. The residue was purified by column chromatography (SiO₂, gradient elution, 9:1 (v/v) Hex: EtOAc to EtOAc) to afford 3-(3-(4-bromo-3-methoxyphenyl)propyl)-1-(4-(*tert*-butyl)benzyl)-4-ethyl-1*H*-1,2,4-triazol-5(4*H*)-one as a colorless oil (125 mg, 99%).

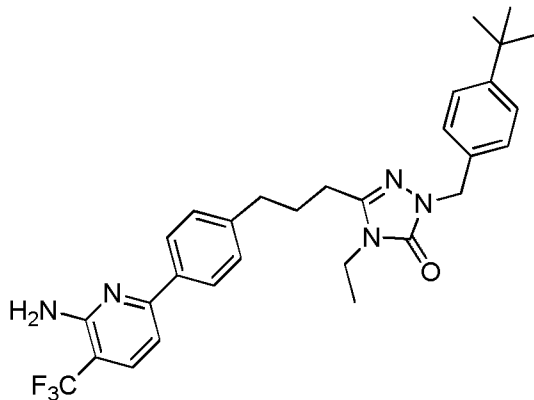
[00359] *Steps 6 to 7:* Carried out in an analogous manner as detailed in steps 5 to 6 of example 27, using instead methyl 2-(2-methoxy-5-(4,4,5,5-tetramethyl-1,3,2-dioxaborolan-2-yl)phenyl)acetate as the boronate coupling partner in step 6. LC-MS: 572 (M+H)⁺.

Example 160: *N*-((6-(4-(3-(1-(4-(*tert*-Butyl)benzyl)-4-ethyl-5-oxo-4,5-dihydro-1*H*-1,2,4-triazol-3-yl)propyl)phenyl)pyridin-3-yl)carbamoyl)benzenesulfonamide:



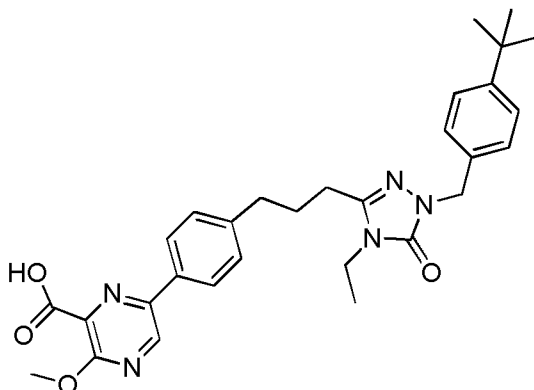
[00360] Prepared in an analogous manner to example 10 using instead benzenesulfonyl isocyanate as the electrophile and THF as the solvent. LC-MS: 653 (M+H)⁺.

Example 161: 3-(3-{4-[6-Amino-5-(trifluoromethyl)(2-pyridyl)]phenyl}propyl)-1-{[4-(tert-butyl)phenyl]methyl}-4-ethyl-1,2,4-triazolin-5-one:



[00361] Prepared in an analogous manner to example 3 using instead 6-chloro-3-(trifluoromethyl)pyridin-2-amine (prepared according to the procedure found in Patent WO 2009/150240A1) as the aryl halide coupling partner. LC-MS: 538 (M+H)⁺.

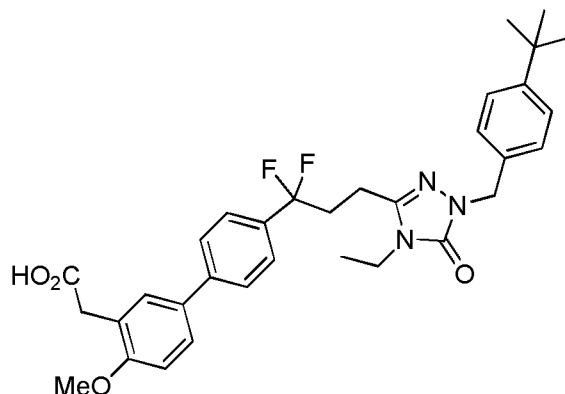
Example 162: 6-(4-(3-(1-(4-(tert-Butyl)benzyl)-4-ethyl-5-oxo-4,5-dihydro-1H-1,2,4-triazol-3-yl)propyl)phenyl)-3-methoxypyrazine-2-carboxylic acid:



[00362] *Step 1*; To a solution of methyl 3-amino-6-bromopyrazine-2-carboxylate (1.00 g, 4.31 mmol) in conc. H₂SO₄ (5.9 mL) at 0 °C was added NaNO₂ (0.60 g, 8.6 mmol) in one rapid portion. The resulting mixture was stirred at 0 °C for 30 minutes and then poured into 53 mL of MeOH. The combined mixture was then heated at reflux for 5 hrs. After cooling to RT and removal of the volatiles *in vacuo*, the resulting residue was taken up in ice-cold water and extracted with chloroform. The combined organic extracts were then washed sequentially with saturated aq. NaHCO₃ solution and water, dried over Na₂SO₄, filtered and the filtrate concentrated *in vacuo*. Further purification by way of column chromatography (SiO₂, gradient elution, Hex → 1:1 Hex:EtOAc) furnished methyl 6-bromo-3-methoxypyrazine-2-carboxylate.

[00363] *Step 2*; Carried out in an analogous manner to example 13 using methyl 6-bromo-3-methoxypyrazine-2-carboxylate from the previous step as the aryl halide coupling partner in step 1. Hydrolysis of the intermediate ester was carried out as in example 1, step 2 to obtain the title compound. LC-MS: 530 (M+H)⁺.

Example 163: 2-(4'-(3-(1-(4-(*tert*-Butyl)benzyl)-4-ethyl-5-oxo-4,5-dihydro-1*H*-1,2,4-triazol-3-yl)-1,1-difluoropropyl)-4-methoxy-[1,1'-biphenyl]-3-yl)acetic acid:



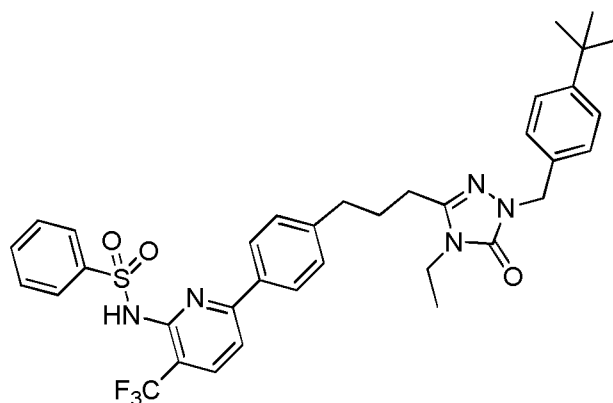
[00364] *Step 1*; Carried in an analogous manner to example 150, step 1 using instead 4-bromobenzaldehyde as the reactant.

[00365] *Step 2*; To a solution 4-(4-bromophenyl)-4-oxobutanenitrile (345 mg, 1.5 mmol) and Deoxyfluor (0.45 mL, 2.5 mmol) in toluene (3 mL) was added several drops of ethanol. The reaction vessel was then sealed and the mixture heated at 80 °C for 16 hrs. After cooling to RT, the reaction was quenched with the addition of 10% aq. NaHCO₃ and then extracted with ether. The combined organic extracts were washed further with 10% aq. HCl, water and brine, dried over Na₂SO₄, filtered and the filtrate concentrated *in vacuo*. Further purification by way of column chromatography (SiO₂, gradient elution, Hex → 1:1 Hex:EtOAc) furnished 4-(4-bromophenyl)-4,4-difluorobutanenitrile as a pale yellow oil (260 mg, 74% yield).

[00366] *Step 3*; To a solution of 4-(4-bromophenyl)-4,4-difluorobutanenitrile (400 mg, 1.5 mmol) in ethylene glycol (8 mL) and water (8 mL) was added potassium hydroxide (250 mg, 6.1 mmol). The resulting mixture was heated at 120 °C for 72 hrs until the reaction was deemed to be complete by LC-MS. After cooling to RT, the reaction was carefully quenched with 1 N aq. HCl and extracted with ether. The combined organic extracts were then washed further with water and brine, dried over Na₂SO₄, and filtered. Concentration of the filtrate *in vacuo* afforded 4-(4-bromophenyl)-4,4-difluorobutanoic acid as a pale yellow solid (354 mg, 83% yield).

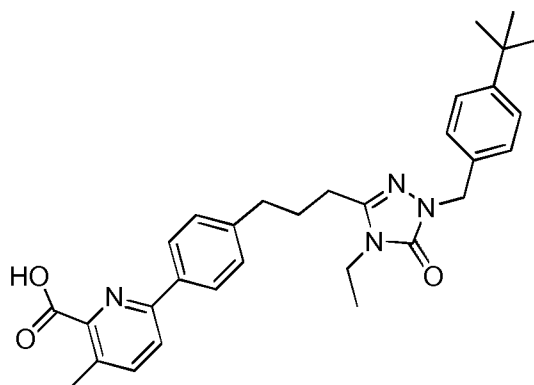
[00367] *Steps 4 to 7*: Carried out in an analogous manner as detailed in steps 3 to 6 of example 27, using instead 4-(4-bromophenyl)-4,4-difluorobutanoic acid as the acid coupling partner in step 3 and methyl 2-(2-methoxy-5-(4,4,5,5-tetramethyl-1,3,2-dioxaborolan-2-yl)phenyl)acetate as the boronate coupling partner in step 5. LC-MS: 578 (M+H)⁺.

Example 164: 1-{[4-(*tert*-Butyl)phenyl]methyl}-4-ethyl-3-[3-(4-{6-[(phenylsulfonyl)amino]-5-(trifluoromethyl)(2-pyridyl)}phenyl)propyl]-1,2,4-triazolin-5-one:



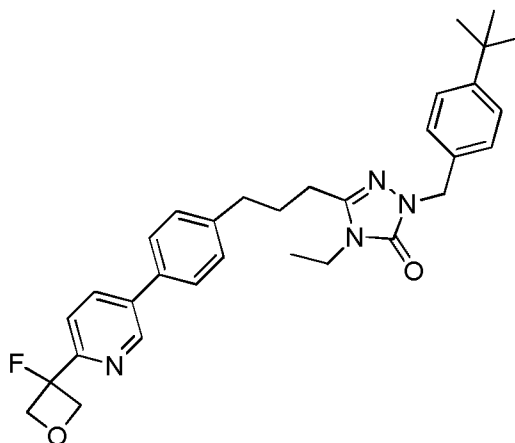
[00368] Prepared in an analogous manner to example 4 using instead 3-(3-{4-[6-amino-5-(trifluoromethyl)(2-pyridyl)]phenyl}propyl)-1-{[4-(*tert*-butyl)phenyl]methyl}-4-ethyl-1,2,4-triazolin-5-one (example 161) as the nucleophile, sodium hydride as the base and DMF as the solvent. LC-MS: 678 (M+H)⁺.

Example 165: 6-(4-(3-(1-(4-(*tert*-Butyl)benzyl)-4-ethyl-5-oxo-4,5-dihydro-1H-1,2,4-triazol-3-yl)propyl)phenyl)-3-methylpicolinic acid:



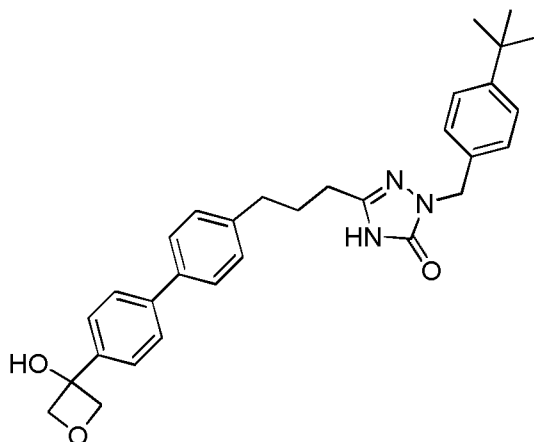
[00369] Prepared in an analogous manner to example 28 but omitting the first step and using instead 6-chloro-3-methylpicolinic acid as the coupling partner in step 2. LC-MS: 513 (M+H)⁺.

Example 166: 1-(4-(*tert*-Butyl)benzyl)-4-ethyl-3-(3-(4-(6-(3-fluorooxetan-3-yl)pyridine-3-yl)phenyl)propyl)-1H-1,2,4-triazol-5(4H)-one:



[00370] Prepared in an analogous manner to example 143 using instead 2,5-dibromopyridine as the substrate in step 1. LC-MS: 529 (M+H)⁺.

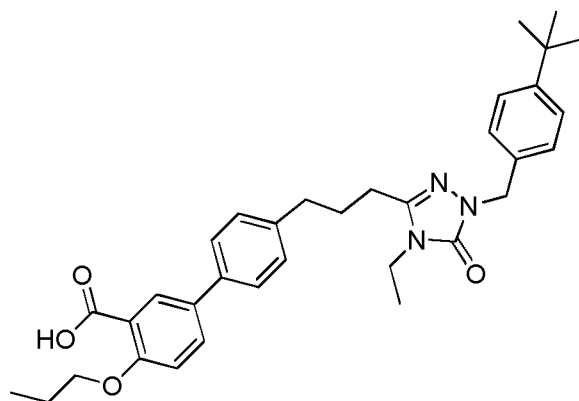
Example 167: 1-(4-(*tert*-Butyl)benzyl)--3-(3-(4'-(3-hydroxyoxetan-3-yl)-[1,1'-biphenyl]-4-yl)propyl)-1*H*-1,2,4-triazol-5(4*H*)-one:



[00371] *Step 1*; To a solution of 3-(4-bromophenyl)-3-fluorooxetane (344 mg, 1.49 mmol, Example 143, step 2) in *p*-dioxane (10 mL) was added potassium acetate (250 mg, 2.53 mmol), bis(pinacolato)diboron (454 mg, 1.79 mmol) and [1,1'-bis(diphenylphosphino)ferrocene]dichloropalladium(II) (55 mg, 0.07 mmol). The solution was degassed by sparging with nitrogen gas for 10 minutes and then heated at 80 °C under a nitrogen atmosphere for 16 hrs. The solvent was evaporated *in vacuo* and the residue thus obtained was partitioned between ether and water. The organic phase was then separated, washed with water and brine, dried (MgSO₄), filtered and the filtrate concentrated *in vacuo*. Further purification by way of column chromatography (SiO₂, gradient elution, Hex → 1:1 Hex:EtOAc) afforded 2-(4-(3-fluorooxetan-3-yl)phenyl)-4,4,5,5-tetramethyl-1,3,2-dioxaborolane as an off-white solid.

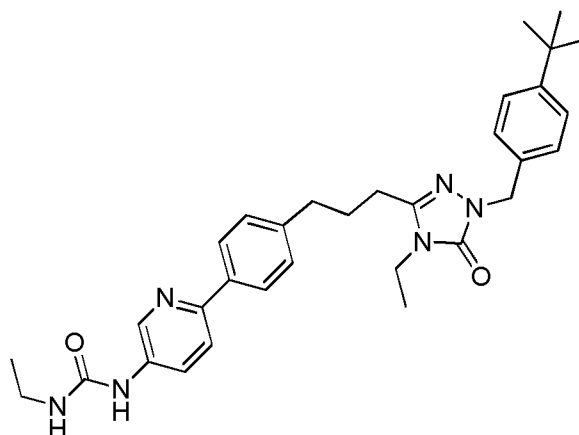
[00372] *Step 2*; To a solution of 3-(3-(4-bromophenyl)propyl)-1-(4-(*tert*-butyl)benzyl)-1*H*-1,2,4-triazol-5(4*H*)-one (77 mg, 0.18 mmol) in DME (3 mL) was added Pd₂dba₃ (5 mg, 0.005 mmol), dicyclohexyl(2',6'-dimethoxybiphenyl-2-yl)phosphine (15 mg, 0.036 mmol), and 2-(4-(3-fluorooxetan-3-yl)phenyl)-4,4,5,5-tetramethyl-1,3,2-dioxaborolane (100 mg, 0.36 mmol) from the previous step. The resulting solution was sub-surface purged with nitrogen gas for 10 min before 0.4 M aq. potassium phosphate (1 mL) was added. The reaction vessel was sealed and heated at 110 °C for 18 hrs. The reaction mixture was then cooled to RT, quenched with 1N aq. HCl and extracted with ether. The combined organic extracts were washed further with 1N aq. HCl, water and finally brine. The organic extract was then dried over sodium sulfate, filtered and concentrated *in vacuo*. Purification by way of reverse-phase column chromatography (SiO₂, gradient elution, 4:1 Hex:EtOAc → EtOAc) afforded the title compound as a white solid (30 mg, 33% yield). LC-MS: 498 (M+H)⁺.

Example 168: 4'-(3-(1-(4-(*tert*-Butyl)benzyl)-4-ethyl-5-oxo-4,5-dihydro-1*H*-1,2,4-triazol-3-yl)propyl)-4-propoxy-[1,1'-biphenyl]-3-carboxylic acid:



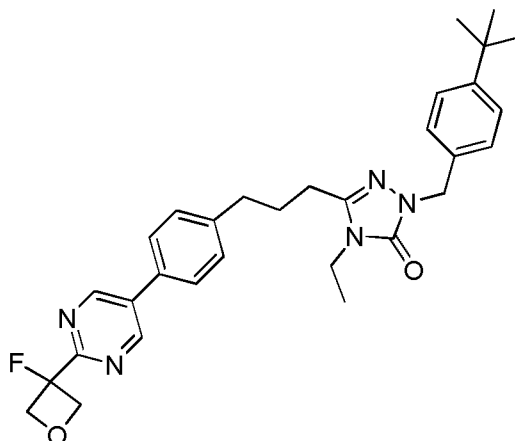
[00373] Prepared in an analogous manner to example 13 but using methyl 5-bromo-2-propoxybenzoate as the aryl halide coupling partner in step 1. Hydrolysis of the intermediate ester was carried out as in example 1, step 2 to obtain the title compound. LC-MS: 556 (M+H)⁺.

Example 169: 1-(6-(4-(3-(1-(4-(*tert*-Butyl)benzyl)-4-ethyl-5-oxo-4,5-dihydro-1*H*-1,2,4-triazol-3-yl)propyl)phenyl)pyridin-3-yl)-3-ethylurea:



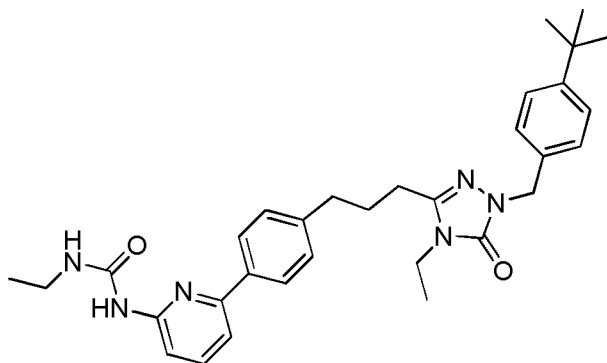
[00374] Prepared in an analogous manner to example 10 using instead ethyl isocyanate as the electrophile and THF as the solvent. LC-MS: 541 (M+H)⁺.

Example 170: 1-(4-(*tert*-Butyl)benzyl)-4-ethyl-3-(3-(4-(2-(3-fluorooxetan-3-yl)pyrimidin-5-yl)phenyl)propyl)-1*H*-1,2,4-triazol-5(4*H*)-one:



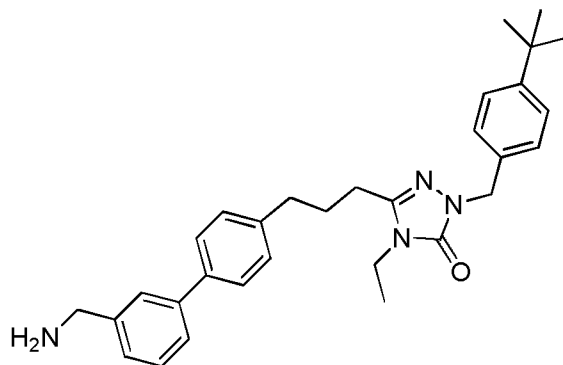
[00375] Prepared in an analogous manner to example 143 using instead 2,5-dibromopyrimidine as the substrate in step 1. LC-MS: 530 (M+H)⁺.

Example 171: 1-(6-(4-(3-(1-(4-(*tert*-Butyl)benzyl)-4-ethyl-5-oxo-4,5-dihydro-1*H*-1,2,4-triazol-3-yl)propyl)phenyl)pyridin-2-yl)-3-ethylurea:



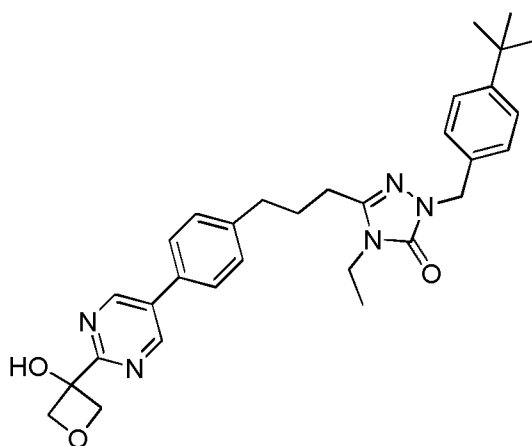
[00376] Prepared in an analogous manner to example 4 using instead ethyl isocyanate as the electrophile and THF as the solvent. LC-MS: 541 (M+H)⁺.

Example 172: 3-(3-(4-[3-(Aminomethyl)phenyl]phenyl)propyl)-1-{[4-(*tert*-butyl)phenyl]methyl}-4-ethyl-1,2,4-triazolin-5-one:



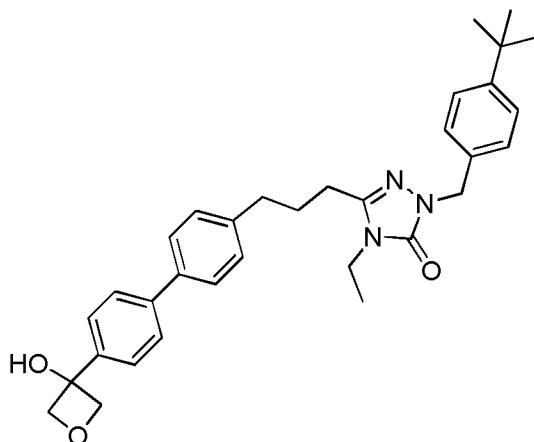
[00377] Prepared in an analogous manner to example 3 using instead 3-bromobenzyl amine as the aryl halide coupling partner. LC-MS: 484 (M+H)⁺.

Example 173: 1-(4-(*tert*-Butyl)benzyl)-4-ethyl-3-(3-(4-(2-(3-hydroxyoxetan-3-yl)pyrimidin-5-yl)phenyl)propyl)-1*H*-1,2,4-triazol-5(4*H*)-one:



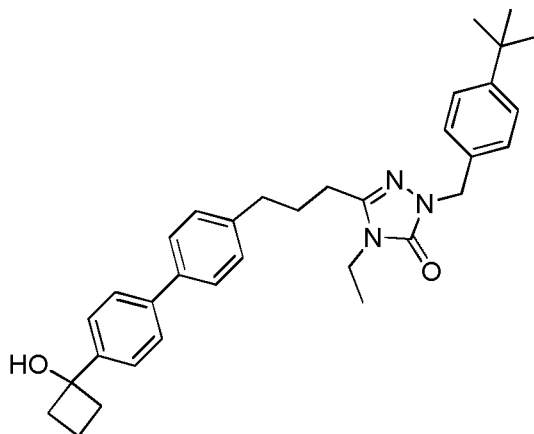
[00378] Prepared in an analogous manner to example 170 but omitting the deoxyfluorination step (i.e. step 2). LC-MS: 528 (M+H)⁺.

Example 174: 1-(4-(*tert*-Butyl)benzyl)-4-ethyl-3-(3-(4'-(3-hydroxyoxetan-3-yl)-[1,1'-biphenyl]-4-yl)propyl)-1*H*-1,2,4-triazol-5(4*H*)-one:



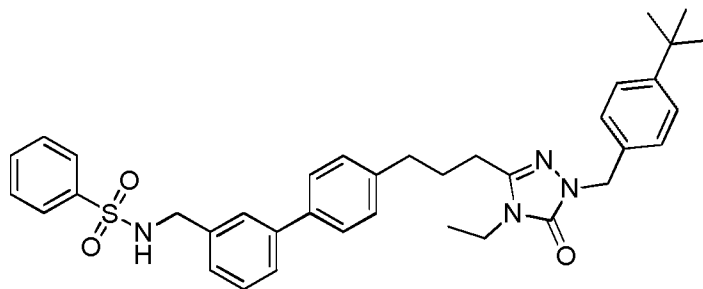
[00379] Prepared in an analogous manner to example 143 but omitting the deoxyfluorination step (i.e. step 2). LC-MS: 526 (M+H)⁺.

Example 176: 1-(4-(*tert*-Butyl)benzyl)-4-ethyl-3-(3-(4'-(1-hydroxycyclobutyl)-[1,1'-biphenyl]-4-yl)propyl)-1*H*-1,2,4-triazol-5(4*H*)-one:



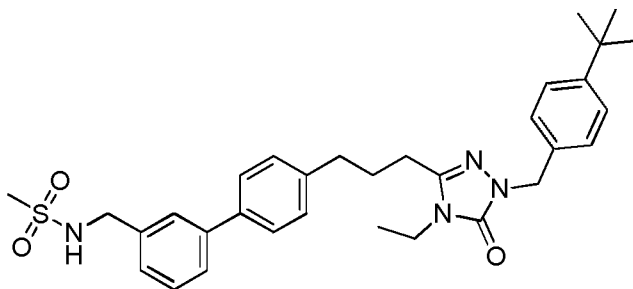
[00380] Prepared in an analogous manner to example 143 using instead cyclobutanone as the substrate in step 1 and omitting the deoxyfluorination step (i.e. step 2). LC-MS: 524 (M+H)⁺.

Example 177: 1-{[4-(*tert*-Butyl)phenyl]methyl}-4-ethyl-3-{3-[4-(3-{[(phenylsulfonyl)amino]methyl}phenyl)phenyl]propyl}-1,2,4-triazolin-5-one:



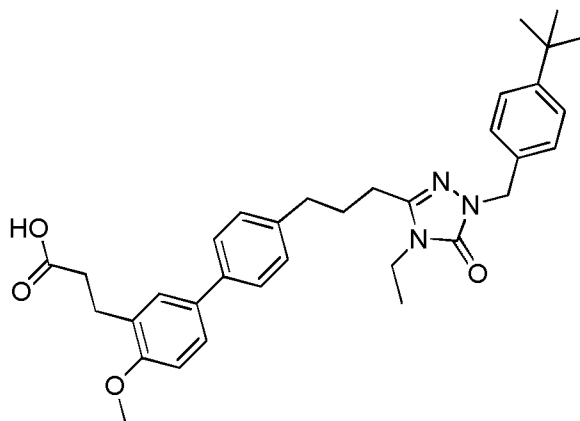
[00381] Prepared in an analogous manner to example 4 using instead 3-(3-{4-[3-(aminomethyl)phenyl]phenyl}propyl)-1-{[4-(*tert*-butyl)phenyl]methyl}-4-ethyl-1,2,4-triazolin-5-one (example 172) as the nucleophile. LC-MS: 624 (M+H)⁺.

Example 178: 1-([4-(*tert*-Butyl)phenyl]methyl)-4-ethyl-3-{3-[4-(3-{[(methylsulfonyl)amino]methyl}phenyl)phenyl]propyl}-1,2,4-triazolin-5-one:



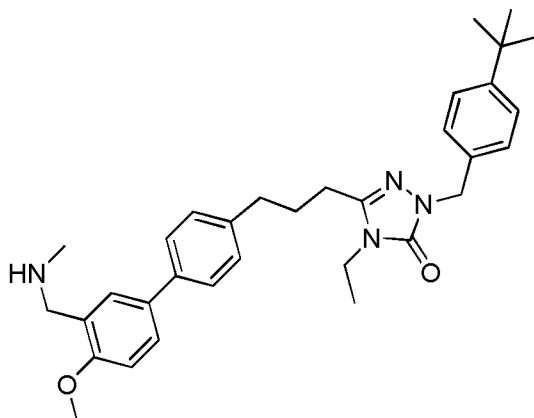
[00382] Prepared in an analogous manner to example 177 using instead methanesulfonyl chloride as the nucleophile. LC-MS: 562 (M+H)⁺.

Example 179: 3-(5-[4-[3-(1-[4-(*tert*-Butyl)phenyl]methyl)-4-ethyl-5-oxo(1,2,4-triazolin-3-yl)]propyl]phenyl)-2-methoxyphenyl)propanoic acid:



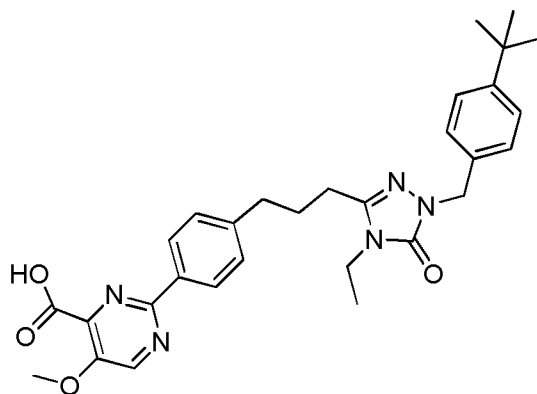
[00383] Prepared in an analogous manner to example 28 but omitting the first step and using instead 3-(5-bromo-2-methoxyphenyl)propanoic acid as the coupling partner in step 2. LC-MS: 556 (M+H)⁺.

Example 180: 1-([4-(*tert*-Butyl)phenyl]methyl)-4-ethyl-3-[3-(4-[4-methoxy-3-[(methylamino)methyl]phenyl]phenyl)propyl]-1,2,4-triazolin-5-one:



[00384] Prepared in an analogous manner to example 3 using instead 5-bromo-2-methoxybenzylmethylamine as the aryl halide coupling partner. LC-MS: 527 (M+H)⁺.

Example 181: 2-(4-(3-(1-(4-(*tert*-Butyl)benzyl)-4-ethyl-5-oxo-4,5-dihydro-1*H*-1,2,4-triazol-3-yl)propyl)phenyl)-5-methoxypyrimidine-4-carboxylic acid:



[00385] *Step 1*; 2,4-Dichloro-5-methoxypyrimidine was converted into 2-chloro-5-methoxy-4-methylpyrimidine according to the published procedure found in WO2010/103334, p 21.

[00386] *Step 2*; To a solution of 2-chloro-5-methoxy-4-methylpyrimidine (0.25 g, 1.58 mmol) in CCl_4 (15 mL) was added NBS (0.337 g, 1.89 mmol) and AIBN (0.026 g, 0.16 mmol). The resulting mixture was heated at reflux for 4 hrs after which an additional amount of NBS (0.056 g, 0.32 mmol) and AIBN (0.013 g, 0.08 mmol) were added. After a further 16 hrs of reflux, the reaction mixture was cooled to RT, filtered through a Na_2SO_4 /paper plug, and the filtrate concentrated *in vacuo*. The residue thus obtained was then re-suspended in Et_2O and re-filtered. Concentration of the resulting filtrate *in vacuo* afforded the crude 4-(bromomethyl)-2-chloro-5-methoxypyrimidine (slightly contaminated with the dibrominated byproduct) which was taken on to the next step.

[00387] *Step 3*; To a solution of 4-(bromomethyl)-2-chloro-5-methoxypyrimidine from the previous step (0.19 g, 0.80 mmol) in MeCN (8 mL) was added sodium acetate (0.098 g, 0.80 mmol) and the resulting mixture was heated at 70 °C for 16 hrs. The volatiles were then removed *in vacuo* and the resulting residue was purified on silica gel, eluting with a solvent gradient of 0 to 50% EtOAc in hexanes, to afford (2-chloro-5-methoxypyrimidin-4-yl)methyl acetate as a solid.

[00388] *Step 4*; Carried out in an analogous manner to example 13, step 1 using instead (2-chloro-5-methoxypyrimidin-4-yl)methyl acetate as the aryl halide coupling partner.

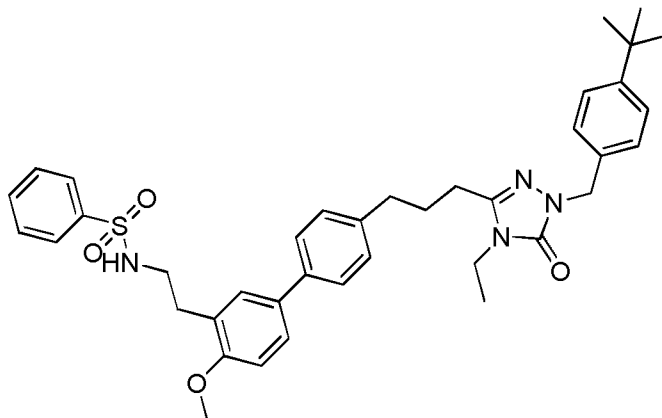
[00389] *Step 5*; To a solution of (2-(4-(3-(1-(4-(*tert*-butyl)benzyl)-4-ethyl-5-oxo-4,5-dihydro-1*H*-1,2,4-triazol-3-yl)propyl)phenyl)-5-methoxypyrimidin-4-yl)methyl acetate from the previous step (0.17 g, 0.31 mmol) in water (2 mL) and MeOH (2 mL) was added K_2CO_3 (0.21 g, 1.52 mmol) in one rapid portion. The reaction mixture was stirred at RT for 16 hrs and then the volatiles were evaporated *in vacuo*. The resulting residue was diluted with water and extracted with dichloromethane. The combined organic extracts were washed further with brine, dried over Na_2SO_4 , filtered and the filtrate concentrated *in vacuo*. Crude 1-(4-(*tert*-butyl)benzyl)-4-ethyl-3-(3-(4-(4-(hydroxymethyl)-5-methoxypyrimidin-2-yl)phenyl)propyl)-1*H*-1,2,4-triazol-5(4*H*)-one thus obtained was used without further purification.

[00390] *Step 6*; To a solution of 1-(4-(*tert*-butyl)benzyl)-4-ethyl-3-(3-(4-(4-(hydroxymethyl)-5-methoxypyrimidin-2-yl)phenyl)propyl)-1*H*-1,2,4-triazol-5(4*H*)-one from the previous step (0.15 g, 0.29 mmol) in DCM (5 mL) was added sodium bicarbonate (0.036 mg, 0.49 mmol) and Dess-Martin periodinane (0.19 mg, 0.44 mmol). The resulting mixture was stirred at RT for 4 hrs after which the reaction was quenched with

the addition of 1:1 (v/v) saturated aq. NaHCO_3 and 10% aq. $\text{Na}_2\text{S}_2\text{O}_3$ (aq.). The aqueous layer was separated and back-extracted with EtOAc. The combined organic extracts were then washed further with water and brine, dried over Na_2SO_4 , filtered, and the filtrate concentrated *in vacuo*. Crude 2-(4-(3-(1-(4-(*tert*-butyl)benzyl)-4-ethyl-5-oxo-4,5-dihydro-1*H*-1,2,4-triazol-3-yl)propyl)phenyl)-5-methoxypyrimidine-4-carbaldehyde thus obtained was used without further purification.

[00391] *Step 7*; To a solution of 2-(4-(3-(1-(4-(*tert*-butyl)benzyl)-4-ethyl-5-oxo-4,5-dihydro-1*H*-1,2,4-triazol-3-yl)propyl)phenyl)-5-methoxypyrimidine-4-carbaldehyde from the previous step (0.12 g, 0.23 mmol) in THF (1.5 mL) and *t*-BuOH (1.5 mL) was added 2-methyl-2-butene (0.25 mL, 2.33 mmol) followed by a premixed aqueous solution (0.5 mL) of sodium dihydrogen phosphate (0.11 mg, 0.94 mmol) and NaClO_2 (0.085 mg, 0.95 mol). The resulting mixture was stirred at RT for 16 hrs. The volatiles were then removed *in vacuo* and the resulting residue was suspended in MeOH. The suspension was then briefly sonicated, filtered and the filtrate concentrated *in vacuo*. This process was subsequently repeated using DCM as the suspending solvent. Further purification by way of reverse phase column chromatography (C_{18} -column, gradient elution, 5:1 (v/v) H_2O : MeCN+0.1% TFA to MeCN+0.1% TFA) afforded the title compound as a white solid. LC-MS: 530 ($\text{M}+\text{H}$)⁺.

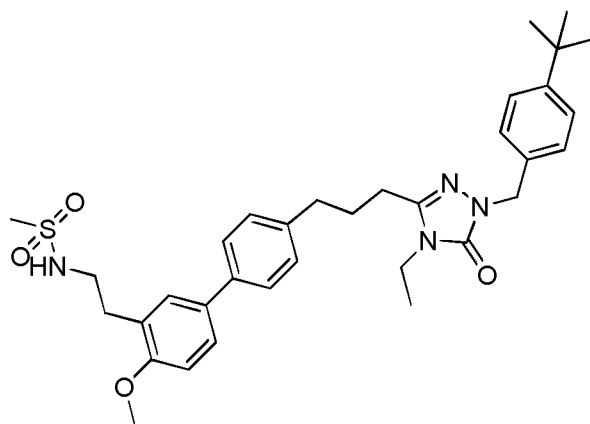
Example 182: 1-([4-(*tert*-Butyl)phenyl]methyl)-4-ethyl-3-{3-[4-(4-methoxy-3-{2-[(phenylsulfonyl)amino] ethyl}phenyl)phenyl]propyl}-1,2,4-triazolin-5-one:



[00392] *Step 1*; Carried out in an analogous manner to example 3 using instead 5-bromo-2-methoxyphenethylamine as the aryl halide coupling partner.

[00393] *Step 2*; Carried out in an analogous manner to example 4 using the amine from the previous step as the nucleophile. LC-MS: 667 ($\text{M}+\text{H}$)⁺.

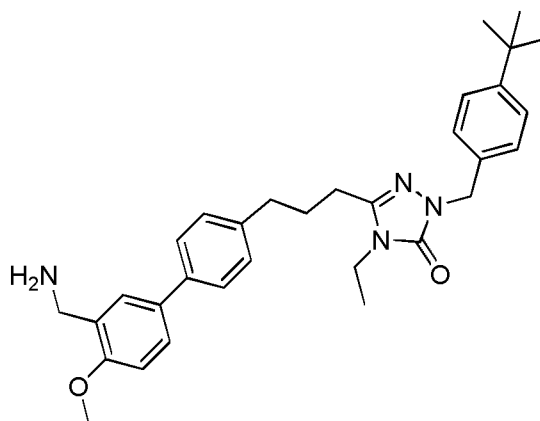
Example 183: 1-([4-(*tert*-Butyl)phenyl]methyl)-4-ethyl-3-{3-[4-(4-methoxy-3-{2-[(methylsulfonyl)amino] ethyl}phenyl)phenyl]propyl}-1,2,4-triazolin-5-one:



[00394] *Step 1*; Carried out in an analogous manner to example 3 using instead 5-bromo-2-methoxyphenethylamine as the aryl halide coupling partner.

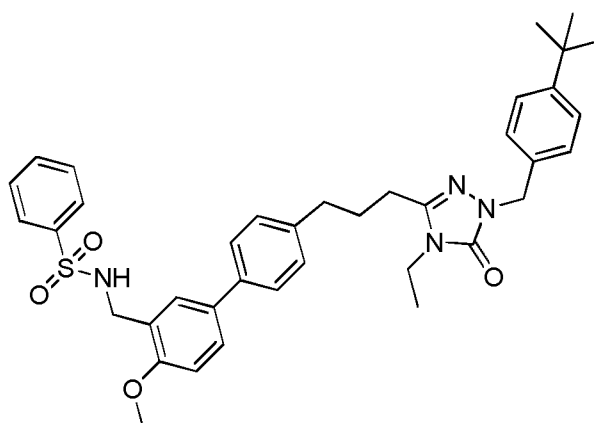
[00395] *Step 2*; Carried out in an analogous manner to example 4 using the amine from the previous step as the nucleophile. LC-MS: 605 (M+H)⁺.

Example 184: 3-(3-{4-[3-(Aminomethyl)-4-methoxyphenyl]phenyl}propyl)-1-{4-(tert-butyl)phenyl}methyl}-4-ethyl-1,2,4-triazolin-5-one:



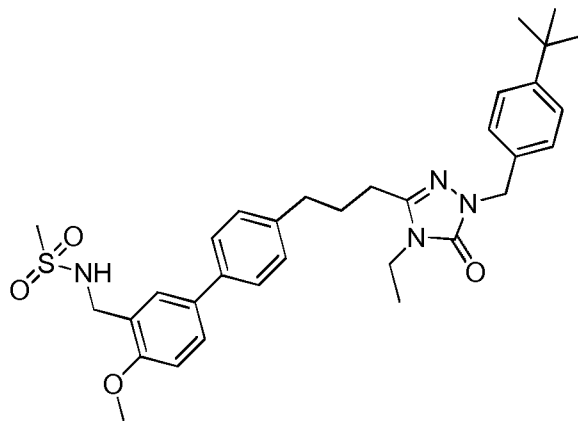
[00396] Prepared in an analogous manner to example 3 using instead (5-bromo-2-methoxyphenyl)methanamine as the aryl halide coupling partner. LC-MS: 513 (M+H)⁺.

Example 185: 1-{4-(tert-Butyl)phenyl}methyl}-4-ethyl-3-{3-[4-(4-methoxy-3-{[(phenylsulfonyl)amino]methyl}phenyl)phenyl]propyl}-1,2,4-triazolin-5-one:



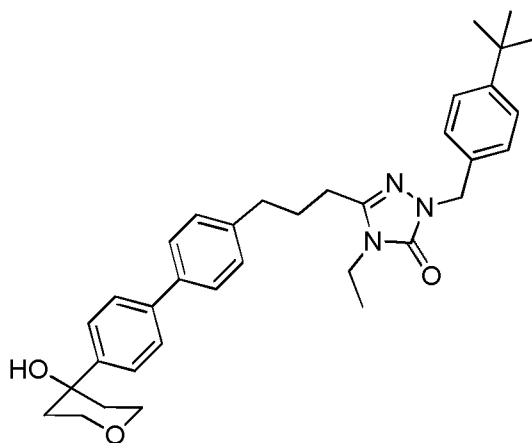
[00397] Prepared in an analogous manner to example 4 using instead 3-(3-{4-[3-(aminomethyl)-4-methoxyphenyl]phenyl}propyl)-1-{[4-(*tert*-butyl)phenyl]methyl}-4-ethyl-1,2,4-triazolin-5-one (example 184) as the nucleophile. LC-MS: 653 (M+H)⁺.

Example 186: 1-{[4-(*tert*-Butyl)phenyl]methyl}-4-ethyl-3-{3-[4-(4-methoxy-3-{[(methylsulfonyl)amino]methyl}phenyl)phenyl]propyl}-1,2,4-triazolin-5-one:



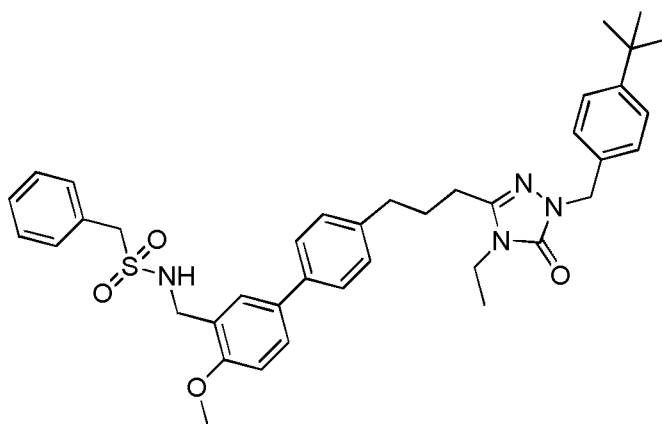
[00398] Prepared in an analogous manner to example 185 using instead methanesulfonyl chloride as the electrophile. LC-MS: 591 (M+H)⁺.

Example 187: 1-(4-(*tert*-Butyl)benzyl)-4-ethyl-3-(3-(4'-(4-hydroxytetrahydro-2*H*-pyran-4-yl)-[1,1'-biphenyl]-4-yl)propyl)-1*H*-1,2,4-triazol-5(4*H*)-one:



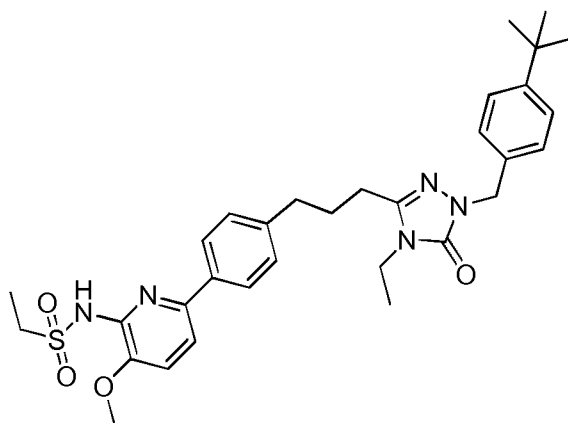
[00399] Prepared in an analogous manner to example 143 using instead dihydro-2*H*-pyran-4(3*H*)-one as the substrate in step 1 and omitting the deoxyfluorination step (i.e. step 2). LC-MS: 554 (M+H)⁺.

Example 188: 1-{[4-(*tert*-Butyl)phenyl]methyl}-4-ethyl-3-(3-{4-[4-methoxy-3-{[(benzylsulfonyl)amino]methyl}phenyl]phenyl}propyl)-1,2,4-triazolin-5-one:



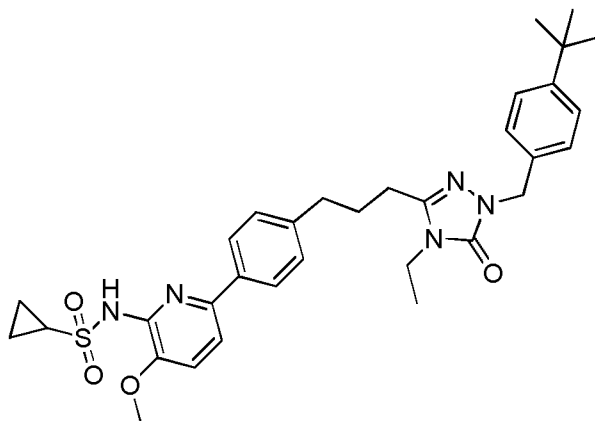
[00400] Prepared in an analogous manner to example 185 using instead phenylmethanesulfonyl chloride as the electrophile. LC-MS: 667 (M+H)⁺.

Example 189: 1-([4-(*tert*-Butyl)phenyl]methyl)-4-ethyl-3-[3-(4-{6-[(ethanesulfonyl)amino]-5-methoxy(2-pyridyl)}phenyl)propyl]-1,2,4-triazolin-5-one:



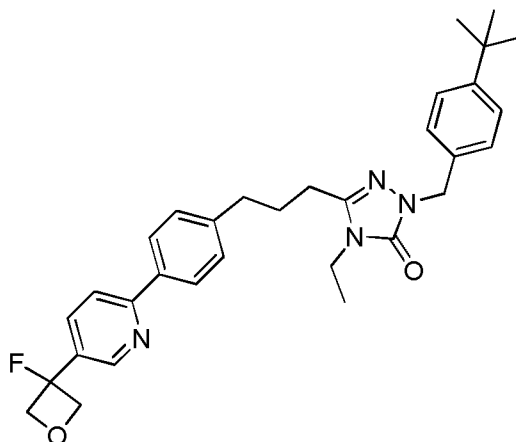
[00401] Prepared in an analogous manner to example 59 using instead ethanesulfonyl chloride as the electrophile. LC-MS: 592 (M+H)⁺.

Example 190: 1-([4-(*tert*-Butyl)phenyl]methyl)-4-ethyl-3-[3-(4-{6-[(cyclopropylsulfonyl)amino]-5-methoxy(2-pyridyl)}phenyl)propyl]-1,2,4-triazolin-5-one:



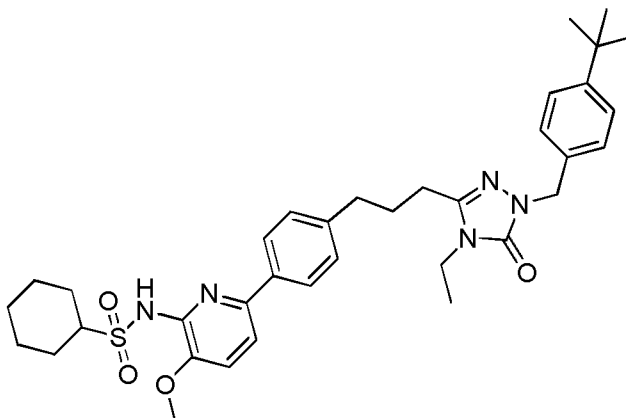
[00402] Prepared in an analogous manner to example 59 using instead cyclopropanesulfonyl chloride as the electrophile. LC-MS: 604 (M+H)⁺.

Example 191: 1-(4-(*tert*-Butyl)benzyl)-4-ethyl-3-(3-(4-(5-(3-fluorooxetan-3-yl)pyridine-2-yl)phenyl)propyl)-1*H*-1,2,4-triazol-5(4*H*)-one:



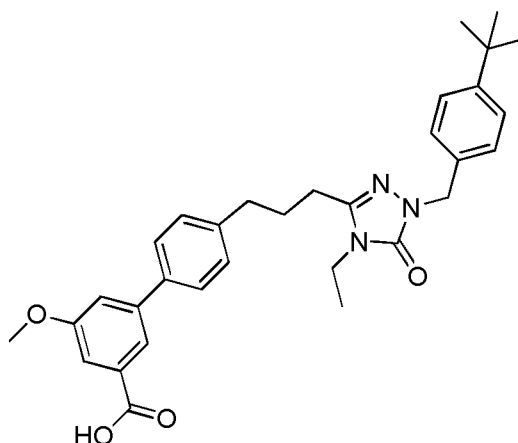
[00403] Prepared in an analogous manner to example 143 using instead 2-chloro-5-iodopyridine as the substrate in step 1. LC-MS: 529 (M+H)⁺.

Example 192: 1-{[4-(*tert*-Butyl)phenyl]methyl}-4-ethyl-3-[3-(4-{6-[(cyclohexylsulfonyl)amino]-5-methoxy(2-pyridyl)}phenyl)propyl]-1,2,4-triazolin-5-one:



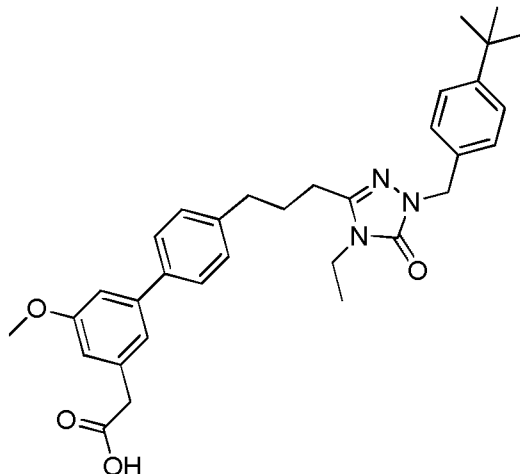
[00404] Prepared in an analogous manner to example 59 using instead cyclohexanesulfonyl chloride as the electrophile, benzene as the solvent and KHMDS as the base. LC-MS: 646 (M+H)⁺.

Example 193: 3-{4-[3-(1-{[4-(*tert*-Butyl)phenyl]methyl}-4-ethyl-5-oxo(1,2,4-triazolin-3-yl))propyl]phenyl}-5-methoxybenzoic acid:



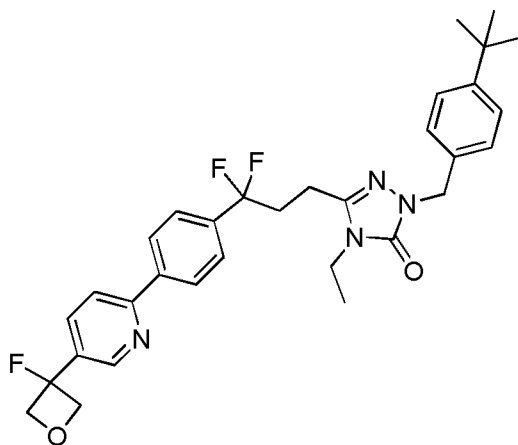
[00405] Prepared in an analogous manner to example 28 but omitting the first step and using instead 3-bromo-5-methoxybenzoic acid as the coupling partner in step 2. LC-MS: 528 (M+H)⁺.

Example 194: 2-(3-{4-[3-(1-{[4-(*tert*-Butyl)phenyl]methyl}-4-ethyl-5-oxo(1,2,4-triazolin-3-yl))propyl]phenyl}-5-methoxyphenyl)acetic acid:



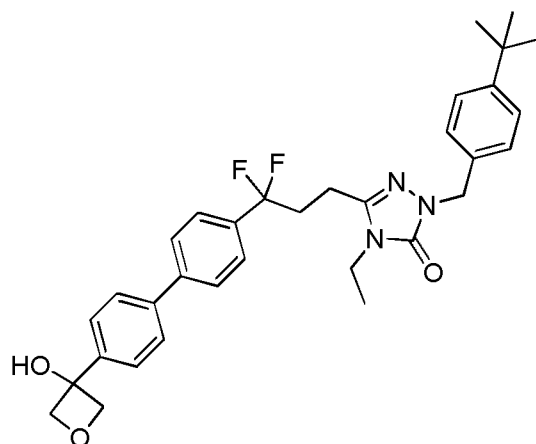
[00406] Prepared in an analogous manner to example 130 using instead 3-bromo-5-methoxybenzoic acid as the starting material. LC-MS: 542 (M+H)⁺.

Example 195: 1-(4-(*tert*-Butyl)benzyl)-3-(3,3-difluoro-3-(4-(5-(3-fluorooxetan-3-yl)pyridine-2-yl)phenyl)propyl)-4-ethyl-1*H*-1,2,4-triazol-5(4*H*)-one:



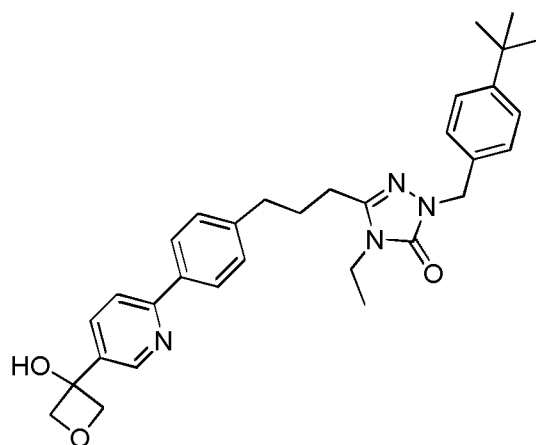
[00407] Prepared in an analogous manner to example 191 but using instead 3-(3-(4-bromophenyl)-3,3-difluoropropyl)-1-(4-*tert*-butyl)benzyl)-4-ethyl-1*H*-1,2,4-triazol-5(4*H*)-one (example 163, step 5) as the aryl bromide coupling partner in step 3. LC-MS: 563 (M+H)⁺.

Example 196: 1-(4-(*tert*-Butyl)benzyl)-3-(3,3-difluoro-3-(4'-(3-hydroxyoxetan-3-yl)-[1,1'-biphenyl]-4-yl)propyl)-4-ethyl-1*H*-1,2,4-triazol-5(4*H*)-one:



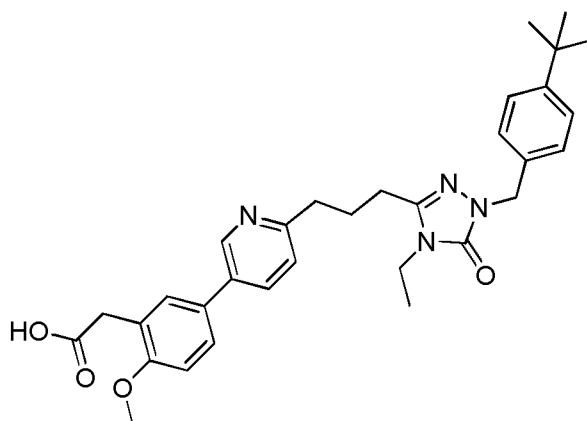
[00408] Prepared in an analogous manner to example 174 but using instead 3-(3-(4-bromophenyl)-3,3-difluoropropyl)-1-(4-*tert*-butylbenzyl)-4-ethyl-1*H*-1,2,4-triazol-5(4*H*)-one (example 163, step 5) as the aryl bromide coupling partner in step 3. LC-MS: 562 (M+H)⁺.

Example 197: 1-(4-(*tert*-Butyl)benzyl)-4-ethyl-3-(3-(4-(5-(3-hydroxyoxetan-3-yl)pyridine-2-yl)phenyl)propyl)-1*H*-1,2,4-triazol-5(4*H*)-one:



[00409] Prepared in an analogous manner to example 191 but omitting the deoxyfluorination step (i.e. step 2). LC-MS: 527 (M+H)⁺.

Example 198: 2-(5-(6-(3-(1-(4-(*tert*-Butyl)benzyl)-4-ethyl-5-oxo-4,5-dihydro-1*H*-1,2,4-triazol-3-yl)propyl)pyridin-3-yl)-2-methoxyphenyl)acetic acid:



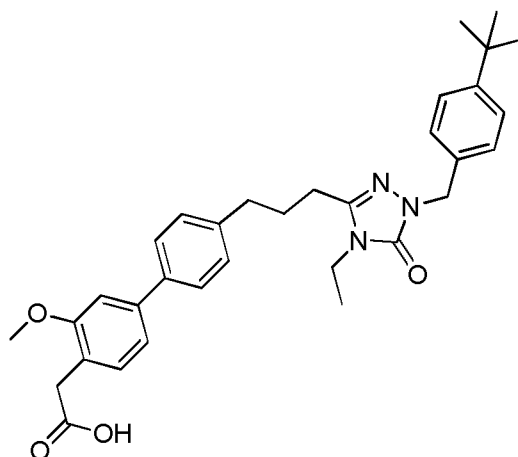
[00410] *Step 1:* To a degassed solution (via sub-surface purge with nitrogen) of 2,5-dibromopyridine (2.0 g, 8.44 mmol) in THF (60 mL) was added Pd(PPh₃)₄ (150 mg), followed by dropwise addition of 4-ethoxy-4-oxobutylzinc(II) bromide (0.5 M in THF, 16.9 mL, 8.45 mmol). After stirring at room temperature for 2 hrs, the reaction solution was poured into to a mixture of ice and 1 N aq. HCl. The organic layer was separated and the aqueous layer was back-extracted with EtOAc. The combined organic extracts were then dried over MgSO₄, filtered and the filtrate concentrated *in vacuo*. Purification by way of column chromatography (SiO₂, gradient elution, Hex → 3:1 Hex:EtOAc) afforded ethyl 4-(5-bromopyridin-2-yl)butanoate.

[00411] *Step 2:* To a solution of ethyl 4-(5-bromopyridin-2-yl)butanoate from the previous step (1.6 g, 5.9 mmol) in THF (20 mL), MeOH (5 mL) and water (5 mL) was added lithium hydroxide monohydrate (400 mg). When the hydrolysis was deemed to be complete by TLC analysis (~1 hr), the volatiles were removed *in vacuo* and the resulting aqueous suspension was acidified to pH of ~4 with the addition of solid citric acid. The resulting mixture was then extracted with EtOAc. The combined organic extracts were dried over MgSO₄, filtered and the filtrate concentrated *in vacuo*. Crude 4-(5-bromopyridin-2-yl)butanoic acid was used without further purification.

[00412] *Step 3:* To a solution of 4-(5-bromopyridin-2-yl)butanoic acid from the previous step (500 mg, 2.1 mmol) in DMF (10 mL) was added HATU (888 mg, 2.33 mmol), followed by diisopropylethylamine (1.1 mL, 6.14 mmol). After stirring at RT for 30 min, 1-(4-(*tert*-butyl)benzyl)-*N*-ethylhydrazinecarboxamide, monomethanesulfonate (743 mg, 2.15 mmol) was then added and the resulting golden yellow solution was allowed to stir at RT for another 16 hrs. After the coupling was deemed to be complete by LC-MS, the reaction mixture was diluted with EtOAc and washed further with water and brine. The organic phase thus obtained was then dried over MgSO₄, filtered and the filtrate concentrated *in vacuo*. The resulting residue was re-dissolved in EtOAc (20 mL) and added camphorsulfonic acid (476 mg, 2.05 mmol) added. After heating at reflux for 16 hrs, the reaction was quenched with the addition of saturated aq. NaHCO₃. The organic phase was then separated, dried (MgSO₄), filtered and the filtrate concentrated *in vacuo*. Further purification by way of column chromatography (SiO₂, gradient elution, Hex → 3:1 Hex:EtOAc) afforded 3-(3-(5-bromopyridin-2-yl)propyl)-1-(4-(*tert*-butyl)benzyl)-4-ethyl-1*H*-1,2,4-triazol-5(4*H*)-one as a colorless solid.

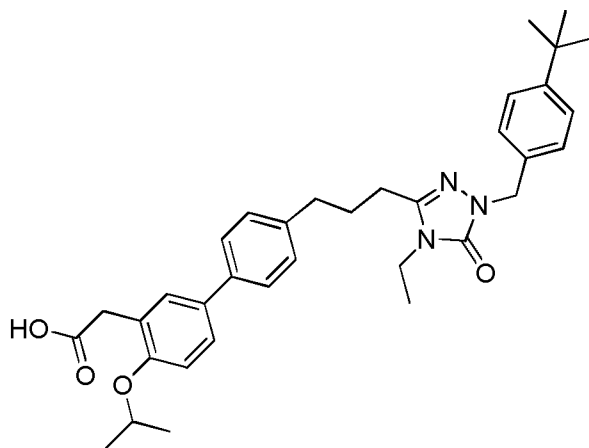
[00413] *Step 4:* Carried out as in example 1 using 3-(3-(5-bromopyridin-2-yl)propyl)-1-(4-(*tert*-butyl)benzyl)-4-ethyl-1*H*-1,2,4-triazol-5(4*H*)-one from the previous step and methyl 2-(2-methoxy-5-(4,4,5,5-tetramethyl-1,3,2-dioxaborolan-2-yl)phenyl)acetate as coupling partners. LC-MS: 543 (M+H)⁺.

Example 199: 2-(4'-(3-(1-(4-(*tert*-Butyl)benzyl)-4-ethyl-5-oxo-4,5-dihydro-1*H*-1,2,4-triazol-3-yl)propyl)-3-methoxy-[1,1'-biphenyl]-4-yl)acetic acid:



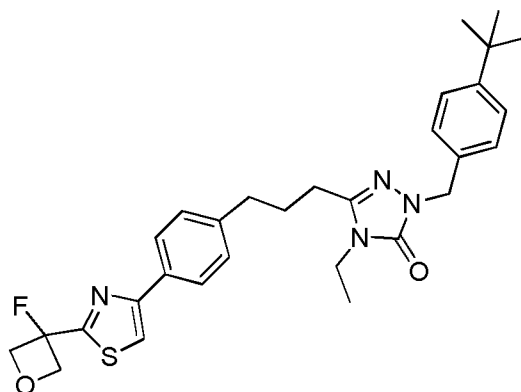
[00414] Prepared in an analogous manner to example 13 using instead 2-(4-bromo-2-methoxyphenyl)acetonitrile as the aryl halide coupling partner. LC-MS: 542 (M+H)⁺.

Example 200: 2-(4'-(3-(1-(4-(*tert*-Butyl)benzyl)-4-ethyl-5-oxo-4,5-dihydro-1H-1,2,4-triazol-3-yl)propyl)-4-isopropoxy-[1,1'-biphenyl]-3-yl)acetic acid:



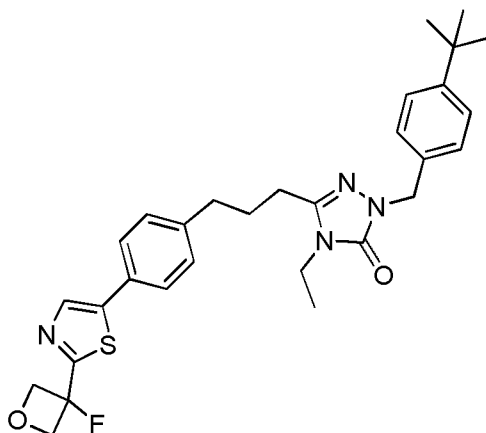
[00415] Prepared in an analogous manner to example 13 using instead 2-(5-bromo-2-isopropoxyphenyl)acetonitrile as the aryl halide coupling partner. LC-MS: 570 (M+H)⁺.

Example 201: 1-(4-(*tert*-Butyl)benzyl)-4-ethyl-3-(3-(4-(2-(3-fluorooxetan-3-yl)thiazol-4-yl)phenyl)propyl)-1H-1,2,4-triazol-5(4H)-one:



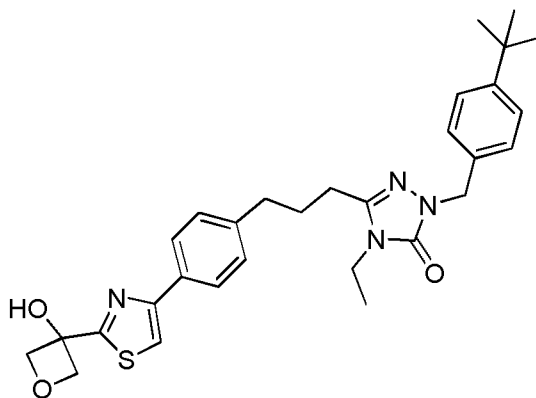
[00416] Prepared in an analogous manner to example 143 using instead 2,4-dibromothiazole as the substrate. diethyl ether as the solvent and -100 °C as the reaction temperature in step 1. LC-MS: 535 (M+H)⁺.

Example 202: 1-(4-(*tert*-Butyl)benzyl)-4-ethyl-3-(3-(4-(2-(3-fluorooxetan-3-yl)thiazol-5-yl)phenyl)propyl)-1*H*-1,2,4-triazol-5(4*H*)-one:



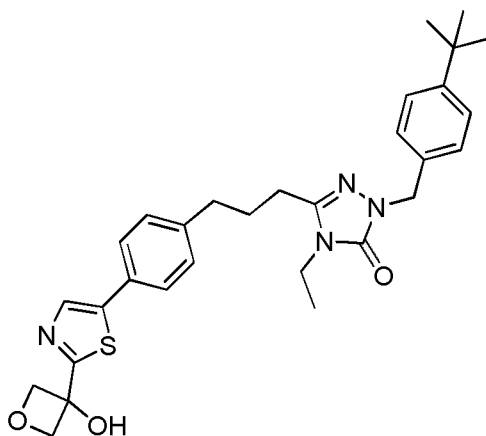
[00417] Prepared in an analogous manner to example 143 using instead 2,5-dibromothiazole as the substrate, diethyl ether as the solvent and -100 °C as the reaction temperature in step 1. LC-MS: 535 (M+H)⁺.

Example 203: 1-(4-(*tert*-Butyl)benzyl)-4-ethyl-3-(3-(4-(2-(3-hydroxyoxetan-3-yl)thiazol-4-yl)phenyl)propyl)-1*H*-1,2,4-triazol-5(4*H*)-one:



[00418] Prepared in an analogous manner to example 201 but omitting the deoxygenation step (i.e. step 2). LC-MS: 533 (M+H)⁺.

Example 204: 1-(4-(*tert*-Butyl)benzyl)-4-ethyl-3-(3-(4-(2-(3-hydroxyoxetan-3-yl)thiazol-5-yl)phenyl)propyl)-1*H*-1,2,4-triazol-5(4*H*)-one:



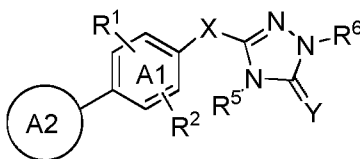
[00419] Prepared in an analogous manner to example 202 but omitting the deoxyfluorination step (i.e. step 2). LC-MS: 533 (M+H)⁺.

[00420] While preferred embodiments of the present invention have been shown and described herein, it will be obvious to those skilled in the art that such embodiments are provided by way of example only. Numerous variations, changes, and substitutions will now occur to those skilled in the art without departing from the invention. It should be understood that various alternatives to the embodiments of the invention described herein may be employed in practicing the invention. It is intended that the following claims define the scope of the invention and that methods and structures within the scope of these claims and their equivalents be covered thereby.

CLAIMS

WHAT IS CLAIMED IS:

1. A compound of Formula I

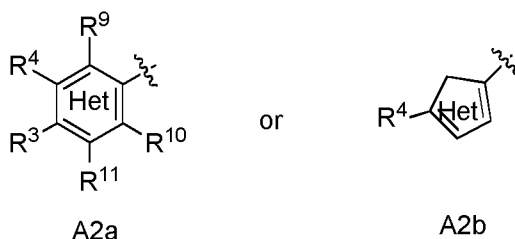


Formula I

or a pharmaceutical acceptable salt thereof wherein:

A1 is phenyl or a 6 membered heteroaromatic ring having 1, 2 or 3 N in the heteroaromatic ring;

A2 is selected from A2a or A2b



wherein A2a phenyl or a 6-membered heteroaromatic ring having 1, 2 or 3 N in the heteroaromatic ring, and A2b is a 5-membered heteroaromatic ring having 1, 2 or 3 heteroatoms independently selected from O, S and N;

X is selected from the group consisting of $-(CH_2)_m-$, $-(CH_2)_m-O-(CH_2)_n-$, $-(CH_2)_m-NH-(CH_2)_n-$, $-(CH_2)_m-S(=O)_o-(CH_2)_n-$, optionally mono or di-substituted with halogen, wherein m and n are independently 0, 1, 2, 3 or 4, and each o is independently 0, 1 or 2;

Y is O or S;

R^1 and R^2 are each independently selected from the group consisting of

- (a) hydrogen,
- (b) halogen,
- (c) CN,
- (d) $-CF_3$,
- (e) $-C_{1-6}$ alkyl,
- (f) $-C_{1-6}$ alkyl- $C(=O)OH$,
- (g) $-O-(R^7)$,
- (h) $-S(=O)_oR^7$,
- (i) $-N(R^7)(R^8)$,
- (j) $-N(R^7)-C(=O)-(R^8)$,
- (k) $-N(R^7)-C(=O)-O-(R^8)$,
- (l) $-N(R^7)S(=O)_2(R^8)$,

- (m) $-C_{3-6}\text{cycloalkyl}$,
- (n) $-C(=O)(R^7)$,
- (o) aryl,
- (p) heteroaryl,
- (q) $-OC(=O)N(R^7)(R^8)$,
- (r) $-S(=O)_2N(R^7)(R^8)$,
- (s) $-C(=O)N(R^7)(R^8)$, and
- (t) $-C(R^7)(R^8)OH$,

wherein the alkyl portion of choices (e) and (f), and the cycloalkyl portion of choice (m) are optionally substituted with halogen, and

wherein the aryl of choice (o) and the heteroaryl of choice (p) are optionally mono- or di-substituted with substituents selected from the group consisting of halogen, nitro, C_{1-6} alkyl, C_{1-6} alkoxy, halo C_{1-6} alkyl, C_{3-6} cycloalkyl, C_{3-6} cycloalkoxy, $-NH(C_{1-6}\text{alkyl})$, $-NH(C_{3-6}\text{cycloalkyl})$, $-N(C_{1-6}\text{alkyl})_2$, $-N(C_{3-6}\text{cycloalkyl})_2$, $-S(=O)_oC_{1-6}\text{alkyl}$, $-S(=O)_oC_{3-6}\text{cycloalkyl}$ and CN;

R^3 is selected from the group consisting of:

- (a) hydrogen,
- (b) halogen,
- (c) CN,
- (d) $-CF_3$,
- (e) $-C_{1-6}\text{alkyl}$,
- (f) $-C_{1-6}\text{alkyl}-C(=O)OH$,
- (g) $-O-(R^7)$,
- (h) $-S(=O)_oR^7$,
- (i) $-N(R^7)(R^8)$,
- (j) $-N(R^7)-C(=O)-(R^8)$,
- (k) $-N(R^7)-C(=O)-O-(R^8)$,
- (l) $-N(R^7)S(=O)_2(R^8)$,
- (m) $-C_{3-6}\text{cycloalkyl}$,
- (n) $-C(=O)(R^7)$,
- (o) aryl,
- (p) heteroaryl,
- (q) $-OC(=O)N(R^7)(R^8)$,
- (r) $-S(=O)_2N(R^7)(R^8)$,
- (s) $-C(=O)N(R^7)(R^8)$,
- (t) $-C(R^7)(R^8)OH$,
- (u) $-C_{1-6}\text{alkyl}-S(=O)_2N(R^7)(R^8)$,
- (v) $-C_{3-6}\text{cycloalkyl}-S(=O)_2N(R^7)(R^8)$,

- (w) $-\text{C}_{3-6}\text{cycloalkyl}-\text{C}(=\text{O})\text{OH}$,
- (x) heterocycle,
- (y) $-\text{C}_{1-6}\text{alkyl}-\text{C}(=\text{O})-\text{N}(\text{R}^7)(\text{R}^8)$,
- (z) $-\text{C}_{3-6}\text{cycloalkyl}-\text{C}(=\text{O})-\text{N}(\text{R}^7)(\text{R}^8)$,
- (aa) $-\text{C}(=\text{O})\text{OH}$,
- (bb) $-\text{C}_{1-6}\text{alkyl}-(\text{R}^7)$,
- (cc) $-\text{C}_{3-6}\text{cycloalkyl}-(\text{R}^7)$,
- (dd) $-\text{N}(\text{R}^7)-\text{C}(=\text{O})-\text{NH}(\text{R}^8)$, and
- (ee) $-\text{N}(\text{R}^7)-\text{C}(=\text{O})\text{N}(\text{R}^7)-\text{S}(=\text{O})_2(\text{R}^8)$,

wherein the alkyl portion of choices (e), (f), (u), (y) and (bb), and the cycloalkyl portion of choices (m), (v), (w), (z) and (cc), are optionally substituted with halogen, oxo or hydroxyl, and

wherein the aryl of choice (o), heteroaryl of choice (p), and the heterocycle of choice (x) are optionally mono- or di-substituted with substituents selected from the group consisting of halogen, nitro, $\text{C}_{1-6}\text{alkyl}$, $\text{C}_{1-6}\text{alkoxy}$, halo $\text{C}_{1-6}\text{alkyl}$, $\text{C}_{3-6}\text{cycloalkyl}$, $\text{C}_{3-6}\text{cycloalkoxy}$, $-\text{NH}(\text{C}_{1-6}\text{alkyl})$, $-\text{NH}(\text{C}_{3-6}\text{cycloalkyl})$, $-\text{N}(\text{C}_{1-6}\text{alkyl})_2$, $-\text{N}(\text{C}_{3-6}\text{cycloalkyl})_2$, $-\text{S}(=\text{O})_2\text{C}_{1-6}\text{alkyl}$, $-\text{S}(=\text{O})_2\text{C}_{3-6}\text{cycloalkyl}$, hydroxyl and CN;

R^4 is selected from the group consisting of:

- (a) hydrogen,
- (b) $-\text{N}(\text{R}^7)(\text{R}^8)$,
- (c) $-\text{N}(\text{R}^7)\text{S}(=\text{O})_2\text{R}^8$,
- (d) $-\text{N}(\text{R}^7)-\text{C}(=\text{O})\text{R}^8$,
- (e) $-\text{N}(\text{R}^7)\text{C}(=\text{O})\text{OR}^8$,
- (f) $-\text{S}(=\text{O})_2\text{R}^7$,
- (g) $-\text{S}(=\text{O})_2\text{N}(\text{R}^7)(\text{R}^8)$,
- (h) $-\text{C}(=\text{O})\text{R}^7$,
- (i) $-\text{C}(=\text{O})\text{N}(\text{R}^7)(\text{R}^8)$,
- (j) $-\text{OC}(=\text{O})\text{N}(\text{R}^7)(\text{R}^8)$,
- (k) $-\text{O}-\text{R}^7$,
- (l) $-\text{C}(\text{R}^7)(\text{R}^8)\text{OH}$,
- (m) $-\text{C}_{1-4}\text{alkyl}-\text{C}(=\text{O})\text{NHS}(=\text{O})_2\text{R}^7$,
- (n) $-\text{C}_{1-4}\text{alkyl}-\text{S}(=\text{O})_2\text{NHC}(=\text{O})\text{R}^7$,
- (o) $-\text{C}_{1-6}\text{alkyl}-\text{C}(=\text{O})-\text{N}(\text{R}^7)(\text{R}^8)$,
- (p) $-\text{C}_{1-4}\text{alkyl}-\text{N}(\text{R}^7)\text{C}(=\text{O})(\text{R}^8)$,
- (q) $-\text{C}_{1-4}\text{alkyl}-\text{N}(\text{R}^7)\text{S}(=\text{O})_2(\text{R}^8)$,
- (r) $-\text{C}_{1-4}\text{alkyl}-\text{S}(=\text{O})_2\text{N}(\text{R}^7)(\text{R}^8)$,
- (s) $-\text{C}_{1-4}\text{alkyl}-\text{N}(\text{R}^7)\text{C}(=\text{O})\text{O}(\text{R}^8)$,
- (t) $-\text{C}_{1-4}\text{alkyl}-\text{O}-\text{C}(=\text{O})\text{N}(\text{R}^7)(\text{R}^8)$,
- (u) $-\text{C}_{1-4}\text{alkyl}-\text{C}(=\text{O})(\text{R}^7)$,

- (v) $-C_{1-4}alkyl-C(R^7)(R^8)OH$,
- (w) $-C_{1-4}alkylO(R^7)$,
- (x) $-C_{1-6}alkyl-C(=O)OH$,
- (y) $-C_{2-6}alkenyl-C(=O)OH$,
- (z) $-C_{3-6}cycloalkyl-C(=O)OH$,
- (aa) $-C_{3-6}cycloalkyl-C(=O)NHS(=O)_2R^7$,
- (bb) $-C_{3-6}cycloalkyl-S(=O)_2NHC(=O)R^7$,
- (cc) $-C_{3-6}cycloalkyl-C(=O)-N(R^7)(R^8)$,
- (dd) $-C_{3-6}cycloalkyl-N(R^7)C(=O)(R^8)$,
- (ee) $-C_{3-6}cycloalkyl-N(R^7)S(=O)_2(R^8)$,
- (ff) $-C_{3-6}cycloalkyl-S(=O)_2N(R^7)(R^8)$,
- (gg) $-C_{3-6}cycloalkyl-N(R^7)C(=O)O(R^8)$,
- (hh) $-C_{3-6}cycloalkyl-O-C(=O)N(R^7)(R^8)$,
- (ii) $-C_{3-6}cycloalkyl-C(=O)(R^7)$,
- (jj) $-C_{3-6}cycloalkyl-C(R^7)(R^8)OH$,
- (kk) $-C_{3-6}cycloalkylO(R^7)$,
- (ll) $-C(=O)OH$,
- (mm) aryl,
- (nn) heteroaryl,
- (oo) $-C(=O)NR^7S(=O)_2(R^8)$,
- (pp) $-S(=O)_2N(R^7)C(=O)(R^8)$,
- (qq) $-C_{1-4}alkyl-R^7$,
- (rr) $-C_{3-6}cycloalkyl-R^7$,
- (ss) $-N(R^7)S(=O)_2N(R^8)_2$,
- (tt) $-N(R^7)-C(=O)N(R^7)-S(=O)_2(R^8)$,
- (uu) $-N(R^7)C(=O)NH(R^8)$, and
- (vv) heterocycle,

wherein the alkyl portion of choices (m), (n), (o), (p), (q), (r), (s), (t), (u), (v), (w), (x) and (qq), the alkenyl portion of choice (y), and the cycloalkyl portion of choices (z), (aa), (bb), (cc), (dd), (ee), (ff), (gg), (hh), (ii), (jj), (kk) and (rr), are optionally mono- or di-substituted with halogen, $-C_{1-6}alkyl$, $-C_{3-6}cycloalkyl$, $-C_{1-6}alkoxy$, $-C_{3-6}cycloalkoxy$, aryl, $-C_{1-6}alkylaryl$, hydroxyl or oxo, and

wherein the aryl of choice (mm), the heteroaryl of choice (nn), and the heterocycle of choice (vv) are optionally mono- or di-substituted with substituents selected from the group consisting of halogen, nitro, $C_{1-6}alkyl$, $C_{1-6}alkoxy$, halo $C_{1-6}alkyl$, $C_{3-6}cycloalkyl$, $C_{3-6}cycloalkoxy$, $-NH(C_{1-6}alkyl)$, $-NH(C_{3-6}cycloalkyl)$, $-N(C_{1-6}alkyl)_2$, $-N(C_{3-6}cycloalkyl)_2$, $-S(=O)_6C_{1-6}alkyl$, $-S(=O)_6C_{3-6}cycloalkyl$, hydroxyl and CN, or

wherein R^3 and R^4 are joined together to form a 5- or 6-membered heterocyclic ring, said ring having one heteroatom selected from O and N, wherein said ring is optionally substituted with $-C(=O)OH$ or $-C_{1-6}alkyl-C(=O)OH$, with the proviso that at least one of R^3 and R^4 is other than hydrogen;

R^5 is selected from the group consisting of:

- (a) hydrogen,
- (b) $-C_{1-6}alkyl$,
- (c) $-C_{1-4}alkyl(R^7)$,
- (d) $-C_{1-4}alkylCN$,
- (e) $-C_{1-4}alkylO(R^7)$,
- (f) $-aryl$,
- (g) $-heteroaryl$,
- (h) $-C_{3-6}cycloalkyl$,
- (i) $-C_{3-6}cycloalkylCN$,
- (j) $-C_{3-6}cycloalkyl(R^7)$,
- (k) $-C_{3-6}cycloalkylO(R^7)$, and
- (l) $-C_{2-6}alkenyl$,

wherein the alkyl portion of choices (b), (c), (d), and (e), the alkenyl of choice (l), and the cycloalkyl portion of choices (h), (i), (j) and (k), is optionally substituted with halogen or $C_{1-4}alkyl$, and

wherein the aryl of choice (f) and the heteroaryl of choice (g), are optionally mono- or di-substituted with substituents selected from the group consisting of halogen, nitro, $C_{1-6}alkyl$, CF_3 , $C_{1-6}alkoxy$, halo $C_{1-6}alkyl$, aryl, heteroaryl, $C_{3-6}cycloalkyl$, $C_{3-6}cycloalkoxy$, and CN;

R^6 is selected from the group consisting of:

- (a) hydrogen,
- (b) $-C_{1-6}alkyl$,
- (c) $-C_{1-6}alkylaryl$,
- (d) $-C_{1-6}alkylheteroaryl$,
- (e) $-S(=O)_oC_{1-6}alkyl(R^7)$,
- (f) $-C(=O)C_{1-6}alkyl(R^7)$,
- (g) $-C_{3-6}cycloalkyl$,
- (h) aryl,
- (i) heteroaryl,
- (j) $-C(=O)C_{3-6}cycloalkyl(R^7)$,
- (k) $-S(=O)_oC_{3-6}cycloalkyl(R^7)$,
- (l) $-C_{1-6}alkyl(R^7)$,

wherein the alkyl portion of choices (b), (c), (d), (e), (f), and (l), and the cycloalkyl portion of choices (g), (j), and (k), are optionally substituted with halogen or $C_{1-4}alkyl$, and

wherein the aryl of choices (c) and (h), and the heteroaryl of choices (d) and (i), are optionally mono- or di-substituted with substituents selected from the group consisting of halogen, nitro, CF₃, C₁₋₆alkyl, C₁₋₆alkoxy, halo C₁₋₆alkyl, C₃₋₆cycloalkyl, C₃₋₆cycloalkoxy, aryl, heteroaryl, -NH(C₁₋₆alkyl), -NH(C₃₋₆cycloalkyl), -N(C₁₋₆alkyl)₂, -N(C₃₋₆cycloalkyl)₂, -S(=O)₀C₁₋₆alkyl, -S(=O)₀C₃₋₆cycloalkyl, (heterocyclyl optionally substituted with hydroxyl) or halogen, and CN;

R⁷ and R⁸ are each independently selected from the following:

- (a) hydrogen,
- (b) C₁₋₆alkyl,
- (c) C₃₋₆cycloalkyl,
- (d) aryl,
- (e) heteroaryl,
- (f) -C₁₋₆alkylaryl,
- (g) -C₁₋₆alkylheteroaryl,
- (h) cyano,
- (i) -aryl-aryl,
- (j) -aryl-heteroaryl,
- (k) -NH₂,
- (l) -NH(C₁₋₃alkyl), and
- (m) -N(C₁₋₃alkyl)₂,

wherein the alkyl portion of choices (b), (f), (g), (l) and (m), and the cycloalkyl portion of choice (c), are each optionally mono-, di- or tri-substituted with halogen, hydroxyl, C₁₋₆alkyl, C₁₋₆alkoxy, C₃₋₆cycloalkyl or C₃₋₆cycloalkoxy, and

wherein the aryl portion of choices (d), (f), (i) and (j), and the heteroaryl portion of choices (e), (g) and (j), are each optionally mono- or di-substituted with substituents selected from the group consisting of halogen, nitro, C₁₋₆alkyl, C₁₋₆alkoxy, haloC₁₋₆alkyl, C₃₋₆cycloalkyl, C₃₋₆cycloalkoxy, -NH(C₁₋₃alkyl), -NH(C₃₋₆cycloalkyl), -N(C₁₋₃alkyl)₂, -N(C₃₋₆cycloalkyl)₂, -S(=O)₀C₁₋₄alkyl, -S(=O)₀C₃₋₆cycloalkyl, -C(=O)C₁₋₄alkyl, aryl, heteroaryl, -O-heteroaryl-CF₃, hydroxyl, CN, and -(C=O)OH;

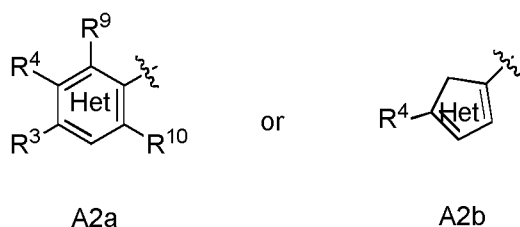
R⁹, R¹⁰ and R¹¹ are each independently selected from the group consisting of:

- (a) hydrogen,
- (b) -C₁₋₆alkyl,
- (c) -C₃₋₆cycloalkyl,
- (d) halogen, and
- (e) O-(R⁷),

wherein the alkyl of choice (b) and the cycloalkyl of choice (c), are each optionally mono-, di- or tri-substituted with halogen.

2. The compound of claim 1, or a pharmaceutically acceptable salt thereof, wherein:

A2 is selected from A2a or A2b



wherein A2a is phenyl or a 6-membered heteroaromatic ring having 1, 2 or 3 N in the heteroaromatic ring, and

A2b is a 5-membered heteroaromatic ring having 1, 2 or 3 heteroatoms independently selected from O, S and N;

X is selected from the group consisting of $-(CH_2)_m-$, $-(CH_2)_m-O-(CH_2)_n-$, $-(CH_2)_m-NH-(CH_2)_n-$, $-(CH_2)_m-S(=O)_o-(CH_2)_n-$ wherein m and n are independently 0, 1, 2, 3 or 4, and each o is independently 0, 1 or 2;

R^3 is selected from the group consisting of:

- (a) hydrogen,
- (b) halogen,
- (c) CN,
- (d) $-CF_3$,
- (e) $-C_{1-6}$ alkyl,
- (f) $-C_{1-6}$ alkyl- $C(=O)OH$,
- (g) $-O-(R^7)$,
- (h) $-S(=O)_oR^7$,
- (i) $-N(R^7)(R^8)$,
- (j) $-N(R^7)-C(=O)-(R^8)$,
- (k) $-N(R^7)-C(=O)-O-(R^8)$,
- (l) $-N(R^7)S(=O)_2(R^8)$,
- (m) $-C_{3-6}$ cycloalkyl,
- (n) $-C(=O)(R^7)$,
- (o) aryl,
- (p) heteroaryl,
- (q) $-OC(=O)N(R^7)(R^8)$,
- (r) $-S(=O)_2N(R^7)(R^8)$,
- (s) $-C(=O)N(R^7)(R^8)$, and
- (t) $-C(R^7)(R^8)OH$,

wherein the alkyl portion of choices (e) and (f), and the cycloalkyl portion of choice (m), are optionally substituted with halogen, and

wherein the aryl of choice (o) and heteroaryl of choice (p) are optionally mono- or di-substituted with substituents selected from the group consisting of halogen, nitro, C_{1-6} alkyl, C_{1-6} alkoxy, halo C_{1-6} alkyl, C_{3-}

cycloalkyl, C₃₋₆cycloalkoxy, -NH(C₁₋₆alkyl), -NH(C₃₋₆cycloalkyl), -N(C₁₋₆alkyl)₂, -N(C₃₋₆cycloalkyl)₂, -S(=O)_nC₁₋₆alkyl, -S(=O)_nC₃₋₆cycloalkyl and CN;

R⁴ is selected from the group consisting of:

- (a) hydrogen,
- (b) -N(R⁷)(R⁸),
- (c) -N(R⁷)S(=O)₂R⁸,
- (d) -N(R⁷)-C(=O)R⁸,
- (e) -N(R⁷)C(=O)OR⁸,
- (f) -S(=O)₂R⁷,
- (g) -S(=O)₂N(R⁷)(R⁸),
- (h) -C(=O)R⁷,
- (i) -C(=O)N(R⁷)(R⁸),
- (j) -OC(=O)N(R⁷)(R⁸),
- (k) -O-R⁷,
- (l) -C(R⁷)(R⁸)OH,
- (m) -C₁₋₄alkyl-C(=O)NHS(=O)₂R⁷,
- (n) -C₁₋₄alkyl-S(=O)₂NHC(=O)R⁷,
- (o) -C₁₋₄alkyl-C(=O)-N(R⁷)(R⁸),
- (p) -C₁₋₄alkyl-N(R⁷)C(=O)(R⁸),
- (q) -C₁₋₄alkyl-N(R⁷)S(=O)₂(R⁸),
- (r) -C₁₋₄alkyl-S(=O)₂N(R⁷)(R⁸),
- (s) -C₁₋₄alkyl-N(R⁷)C(=O)O(R⁸),
- (t) -C₁₋₄alkyl-O-C(=O)N(R⁷)(R⁸),
- (u) -C₁₋₄alkyl-C(=O)(R⁷),
- (v) -C₁₋₄alkyl-C(R⁷)(R⁸)OH,
- (w) -C₁₋₄alkylO(R⁷),
- (x) -C₁₋₆alkyl-C(=O)OH,
- (y) -C₂₋₆alkenyl-C(=O)OH,
- (z) -C₃₋₆cycloalkyl-C(=O)OH,
- (aa) -C₃₋₆cycloalkyl-C(=O)NHS(=O)₂R⁷,
- (bb) -C₃₋₆cycloalkyl-S(=O)₂NHC(=O)R⁷,
- (cc) -C₃₋₆cycloalkyl-C(=O)-N(R⁷)(R⁸),
- (dd) -C₃₋₆cycloalkyl-N(R⁷)C(=O)(R⁸),
- (ee) -C₃₋₆cycloalkyl-N(R⁷)S(=O)₂(R⁸),
- (ff) -C₃₋₆cycloalkyl-S(=O)₂N(R⁷)(R⁸),
- (gg) -C₃₋₆cycloalkyl-N(R⁷)C(=O)O(R⁸),
- (hh) -C₃₋₆cycloalkyl-O-C(=O)N(R⁷)(R⁸)

- (ii) $-C_{3-6}\text{cycloalkyl}-C(=O)(R^7)$,
- (jj) $-C_{3-6}\text{cycloalkyl}-C(R^7)(R^8)OH$,
- (kk) $-C_{3-6}\text{cycloalkyl}O(R^7)$,
- (ll) $-C(=O)OH$,
- (mm) aryl,
- (nn) heteroaryl,
- (oo) $-C(=O)N(R^7)S(=O)_2(R^8)$, and
- (pp) $-S(=O)_2N(R^7)C(=O)(R^8)$,

wherein the alkyl portion of choices (m), (n), (o), (p), (q), (r), (s), (t), (u), (v), (w) and (x), the alkenyl portion of choice (y), and the cycloalkyl portion of choices (z), (aa), (bb), (cc), (dd), (ee), (ff), (gg), (hh), (ii), (jj) and (kk), are optionally mono- or di-substituted with halo, C_{1-6} alkyl, C_{3-6} cycloalkyl, C_{1-6} alkoxy, or C_{3-6} cycloalkoxy, and

wherein the aryl of choice (mm) and the heteroaryl of choice (nn) are optionally mono- or di-substituted with substituents selected from the group consisting of halogen, nitro, C_{1-6} alkyl, C_{1-6} alkoxy, halo C_{1-6} alkyl, C_{3-6} cycloalkyl, C_{3-6} cycloalkoxy, $-NH(C_{1-6}\text{alkyl})$, $-NH(C_{3-6}\text{cycloalkyl})$, $-N(C_{1-6}\text{alkyl})_2$, $-N(C_{3-6}\text{cycloalkyl})_2$, $-S(=O)_n C_{1-6}\text{alkyl}$, $-S(=O)_n C_{3-6}\text{cycloalkyl}$ and CN;

with the proviso that at least one of R^3 and R^4 is other than hydrogen;

R^5 is selected from the group consisting of:

- (a) hydrogen,
- (b) $-C_{1-6}\text{alkyl}$,
- (c) $-C_{1-4}\text{alkyl}(R^7)$,
- (d) $-C_{1-4}\text{alkyl}CN$,
- (e) $-C_{1-4}\text{alkyl}O(R^7)$,
- (f) aryl,
- (g) heteroaryl,
- (h) $-C_{3-6}\text{cycloalkyl}$,
- (i) $-C_{3-6}\text{cycloalkyl}CN$,
- (j) $-C_{3-6}\text{cycloalkyl}(R^7)$, and
- (k) $-C_{3-6}\text{cycloalkyl}O(R^7)$,

wherein the alkyl portion of choices (b), (c), (d) and (e), and the cycloalkyl portion of choices (h), (i), (j) and (k), are optionally substituted with halogen or C_{1-4} alkyl, and

wherein the aryl of choice (f) and the heteroaryl of choice (g), are optionally mono- or di-substituted with substituents selected from the group consisting of halogen, nitro, C_{1-6} alkyl, CF_3 , C_{1-6} alkoxy, halo C_{1-6} alkyl, aryl, heteroaryl, C_{3-6} cycloalkyl, C_{3-6} cycloalkoxy, and CN;

R^6 is selected from the group consisting of:

- (a) hydrogen,
- (b) $-C_{1-6}\text{alkyl}$,

- (c) -C₁₋₆alkylaryl,
- (d) -C₁₋₆alkylheteroaryl,
- (e) -S(=O)₀C₁₋₆alkyl(R⁷),
- (f) -C(=O)C₁₋₆alkyl(R⁷),
- (g) -C₃₋₆cycloalkyl,
- (h) aryl,
- (i) heteroaryl,
- (j) -C(O)C₃₋₆cycloalkyl(R⁷),
- (k) -S(=O)₀C₃₋₆cycloalkyl(R⁷), and
- (l) -C₁₋₆alkyl (R⁷),

wherein the alkyl portion of choices (b), (c), (d), (e), (f), and (l), and the cycloalkyl portion of choices (g), (j), and (k), are optionally substituted with halogen or C₁₋₄alkyl, and

wherein the aryl of choices (c) and (h), and the heteroaryl of choices (d) and (i), are optionally mono- or di-substituted with substituents selected from halogen, nitro, CF₃, C₁₋₆alkyl, C₁₋₆alkoxy, halo C₁₋₆alkyl, C₃₋₆cycloalkyl, C₃₋₆cycloalkoxy, aryl, heteroaryl, -NH(C₁₋₆alkyl), -NH(C₃₋₆cycloalkyl), -N(C₁₋₆alkyl)₂, -N(C₃₋₆cycloalkyl)₂, -S(=O)₀C₁₋₆alkyl, -S(=O)₀C₃₋₆cycloalkyl, and CN;

R⁷ and R⁸ are each independently selected from the group consisting of:

- (a) hydrogen,
- (b) -C₁₋₆alkyl,
- (c) -C₃₋₆cycloalkyl,
- (d) aryl,
- (e) heteroaryl,
- (f) -C₁₋₆alkylaryl, and
- (g) -C₁₋₆alkylheteroaryl,

wherein the alkyl of choices (b), (f) and (g), and the cycloalkyl portion of (c), are each optionally mono-, di- or tri-substituted with halogen, and

wherein the aryl portion of choices (d) and (f), and the heteroaryl portion of choices (e) and (g), are each optionally mono- or di-substituted with substituents selected from the group consisting of halogen, nitro, C₁₋₆alkyl, C₁₋₆alkoxy, haloC₁₋₆alkyl, C₃₋₆cycloalkyl, C₃₋₆cycloalkoxy, -NH(C₁₋₃alkyl), -NH(C₃₋₆cycloalkyl), -N(C₁₋₃alkyl)₂, -N(C₃₋₆cycloalkyl)₂, -S(=O)₀C₁₋₄alkyl, -S(=O)₀C₃₋₆cycloalkyl, aryl, heteroaryl, hydroxyl and CN;

R⁹ and R¹⁰ are each independently selected from the group consisting of:

- (a) hydrogen,
- (b) -C₁₋₆alkyl,
- (c) -C₃₋₆cycloalkyl, and
- (d) halogen,

wherein the alkyl of choice (b) and the cycloalkyl of choice (c), are each optionally mono-, di- or tri-substituted with halogen.

3. The compound according Claim 1 or Claim 2, or a pharmaceutically acceptable salt thereof, wherein:
X is selected from the group consisting of $-(CH_2)_m-$, and $-(CH_2)_m-S(=O)_o-(CH_2)_n-$, where $m + n$ is 2, 3 or 4 and wherein o is 0, 1 or 2.

4. The compound according Claim 3, or a pharmaceutically acceptable salt thereof, wherein:
X is $-CH_2CH_2CH_2-$.

5. The compound according Claim 1 or Claim 2, or a pharmaceutically acceptable salt thereof, wherein:
A1 is a substituted phenyl or substituted pyridine.

6. The compound according Claim 1 or Claim 2, or a pharmaceutically acceptable salt thereof, wherein:
A2 is A2a.

7. The compound according Claim 6, or a pharmaceutically acceptable salt thereof, wherein:
A2a is a substituted phenyl or substituted pyridine.

8. The compound according Claim 1 or Claim 2, or a pharmaceutically acceptable salt thereof, wherein:
Y is O.

9. The compound according Claim 1 or Claim 2, or a pharmaceutically acceptable salt thereof, wherein:
 R^1 and R^2 are each independently selected from the group consisting of:

- (a) hydrogen,
- (b) halogen,
- (c) CN,
- (d) CF_3 ,
- (e) C_{1-6} alkyl,
- (g) $-O-(R^7)$, and
- (h) $-N(R^7)(R^8)$,

wherein the alkyl portion of choice (e), is optionally substituted with halogen.

10. The compound according Claim 9, or a pharmaceutically acceptable salt thereof, wherein:
 R^1 and R^2 are each hydrogen.

11. A compound according Claim 1 or Claim 2, or a pharmaceutically acceptable salt thereof, wherein:

R³ is selected from the group consisting of:

- (a) -O-(R⁷),
- (b) -N(R⁷)-C(=O)-O-(R⁸),
- (c) -N(R⁷)S(=O)₂(R⁸),
- (d) -C(=O)(R⁷),
- (e) aryl,
- (f) heteroaryl,
- (g) -OC(=O)N(R⁷)(R⁸),
- (h) -C(R⁷)(R⁸)OH, and
- (i) hydrogen,

wherein the aryl of choice (e) and the heteroaryl of choice (f) are optionally mono- or di-substituted with substituents selected from the group consisting of halogen, nitro, C₁₋₆alkyl, C₁₋₆alkoxy, halo C₁₋₆alkyl, C₃₋₆cycloalkyl, C₃₋₆cycloalkoxy, -NH(C₁₋₆alkyl), -NH(C₃₋₆cycloalkyl), -N(C₁₋₆alkyl)₂, -N(C₃₋₆cycloalkyl)₂, -S(=O)_oC₁₋₆alkyl, -S(=O)_oC₃₋₆cycloalkyl and CN.

12. The compound according Claim 1 or Claim 2, or a pharmaceutically acceptable salt thereof, wherein:

R³ is selected from the group consisting of:

- (a) -O-(R⁷),
- (b) -N(R⁷)-C(=O)-O-(R⁸),
- (c) -N(R⁷)S(=O)₂(R⁸),
- (d) -C(=O)(R⁷),
- (e) aryl,
- (f) heteroaryl,
- (g) -OC(=O)N(R⁷)(R⁸), and
- (h) -C(R⁷)(R⁸)OH,

wherein the aryl of choice (e) and the heteroaryl of choice (f) are optionally mono- or di-substituted with substituents selected from the group consisting of halogen, nitro, C₁₋₆alkyl, C₁₋₆alkoxy, halo C₁₋₆alkyl, C₃₋₆cycloalkyl, C₃₋₆cycloalkoxy, -NH(C₁₋₆alkyl), -NH(C₃₋₆cycloalkyl), -N(C₁₋₆alkyl)₂, -N(C₃₋₆cycloalkyl)₂, -S(=O)_oC₁₋₆alkyl, -S(=O)_oC₃₋₆cycloalkyl and CN.

13. The compound according Claim 10 or Claim 11, or a pharmaceutically acceptable salt thereof, wherein:

R³ is selected from the group consisting of:

- (a) hydrogen,
- (b) -O-(R⁷), and
- (c) -N(R⁷)S(=O)₂(R⁸).

14. The compound according Claim 1 or Claim 2, or a pharmaceutically acceptable salt thereof, wherein:

R^4 is selected from the group consisting of:

- (a) hydrogen,
- (b) $-N(R^7)(R^8)$,
- (c) $-N(R^7)S(=O)_2R^8$,
- (d) $-S(=O)_2N(R^7)(R^8)$,
- (e) $-C(=O)N(R^7)(R^8)$,
- (f) $-C_{1-4}alkyl-C(=O)NHS(=O)_2R^7$,
- (g) $-C_{1-4}alkyl-S(=O)_2NHC(=O)R^7$,
- (h) $-C_{1-4}alkyl-C(=O)-N(R^7)(R^8)$,
- (i) $-C_{1-4}alkyl-N(R^7)S(=O)_2(R^8)$,
- (j) $-C_{1-4}alkyl-S(=O)_2N(R^7)(R^8)$,
- (k) $-C_{1-6}alkyl-C(=O)OH$,
- (l) $-C_{3-6}cycloalkyl-C(=O)OH$,
- (m) $-C_{3-6}cycloalkyl-C(=O)NHS(=O)_2R^7$,
- (n) $-C_{3-6}cycloalkyl-S(=O)_2NHC(=O)R^7$,
- (o) $-C_{3-6}cycloalkyl-C(=O)-N(R^7)(R^8)$,
- (p) $-C_{3-6}cycloalkyl-N(R^7)C(=O)(R^8)$,
- (q) $-C_{3-6}cycloalkyl-N(R^7)S(=O)_2(R^8)$,
- (r) $-C_{3-6}cycloalkyl-S(=O)_2N(R^7)(R^8)$,
- (s) $-C(=O)OH$,
- (t) $-C(=O)NR^7S(=O)_2(R^8)$,
- (u) $-C_{1-4}alkyl-N(R^7)-C(=O)R^8$, and
- (v) $-S(=O)_2N(R^7)C(=O)R^8$,

wherein the alkyl portion of choices (f), (g), (h), (i), (j), (k) and (u), and the cycloalkyl portion of choices (l), (m), (n), (o), (p), (q) and (r), are optionally mono- or di-substituted with halogen, $C_{1-6}alkyl$, $C_{3-6}cycloalkyl$, $C_{1-6}alkoxy$, or $C_{3-6}cycloalkoxy$.

15. The compound according Claim 14, or a pharmaceutically acceptable salt thereof, wherein:

R^4 is selected from the group consisting of:

- (a) hydrogen,
- (b) $-N(R^7)S(=O)_2R^8$
- (c) $-C_{1-6}alkyl-C(=O)OH$,
- (d) $-C_{3-6}cycloalkyl-C(=O)OH$,
- (e) $-C(=O)OH$,
- (f) $-C(=O)N(R^7)S(=O)_2(R^8)$, and
- (g) $-S(=O)_2N(R^7)C(=O)R^8$,

wherein the alkyl portion of choice (c) and the cycloalkyl portion of choice (d), are optionally mono- or di-substituted with halogen, C₁₋₆alkyl, C₃₋₆cycloalkyl, C₁₋₆alkoxy, or C₃₋₆cycloalkoxy.

16. The compound according Claim 1 or Claim 2, or a pharmaceutically acceptable salt thereof, wherein: R⁵ is C₁₋₆alkyl, optionally substituted with halogen or C₁₋₄alkyl.

17. The compound according Claim 1 or Claim 2, or a pharmaceutically acceptable salt thereof, wherein: R⁶ is selected from the group consisting of:

- (a) -C₁₋₆alkylaryl,
- (b) -C₁₋₆alkylheteroaryl, and
- (c) -C₃₋₆cycloalkyl,

wherein the alkyl portion of choices (a) and (b), and the cycloalkyl portion of choice (c), are optionally substituted with halogen or C₁₋₄alkyl, and the aryl portion of choice (a) and the heteroaryl portion of choice (b), are optionally mono- or di-substituted with substituents selected from the group consisting of halogen, nitro, CF₃, C₁₋₆alkyl, C₁₋₆alkoxy, halo C₁₋₆alkyl, C₃₋₆cycloalkyl, C₃₋₆cycloalkoxy, aryl, heteroaryl, -NH(C₁₋₆alkyl), -NH(C₃₋₆cycloalkyl), -N(C₁₋₆alkyl)₂, -N(C₃₋₆cycloalkyl)₂, -S(=O)₀C₁₋₆alkyl, -S(=O)₀C₃₋₆cycloalkyl and CN.

18. The compound according to Claim 17, or a pharmaceutically acceptable salt thereof, wherein: R⁶ is selected from the group consisting of:

- (a) -C₁₋₆alkylaryl, and
- (b) -C₁₋₆alkylheteroaryl,

wherein the alkyl portion of choices (a) and (b), is optionally substituted with halogen or C₁₋₄alkyl, and the aryl portion of choice (a) and the heteroaryl portion of choice (b), are optionally mono- or di-substituted with substituents selected from the group consisting of halogen, nitro, CF₃, C₁₋₆alkyl, C₁₋₆alkoxy, halo C₁₋₆alkyl, C₃₋₆cycloalkyl, C₃₋₆cycloalkoxy, aryl, heteroaryl, -NH(C₁₋₆alkyl), -NH(C₃₋₆cycloalkyl), -N(C₁₋₆alkyl)₂, -N(C₃₋₆cycloalkyl)₂, -S(=O)₀C₁₋₆alkyl, -S(=O)₀C₃₋₆cycloalkyl and CN.

19. The compound according Claim 1 or Claim 2, or a pharmaceutically acceptable salt thereof, wherein: R⁷ is selected from hydrogen and C₁₋₄alkyl optionally substituted with halo;

R⁸ is selected from hydrogen, C₁₋₄alkyl optionally substituted with halo, and aryl optionally mono or di-substituted with substituents selected from the group consisting of halogen, nitro, C₁₋₆alkyl, C₁₋₆alkoxy, haloC₁₋₆alkyl, C₃₋₆cycloalkyl, C₃₋₆cycloalkoxy, -NH(C₁₋₃alkyl), NH(C₃₋₆cycloalkyl), -N(C₁₋₃alkyl)₂, -N(C₃₋₆cycloalkyl)₂, -S(=O)₀C₁₋₄alkyl, S(=O)₀C₃₋₆cycloalkyl, aryl, heteroaryl, hydroxyl and CN.

20. The compound according Claim 1 or Claim 2, or a pharmaceutically acceptable salt thereof, wherein: R⁹ and R¹⁰ are each independently hydrogen or F.

21. The compound according to Claim 1 or Claim 2, or a pharmaceutically acceptable salt thereof, wherein:
X is selected from the group consisting of $-(CH_2)_m-$, and $-(CH_2)_m-S(=O)_o-(CH_2)_n-$, where $m + n$ is 2, 3 or 4
and wherein o is 0, 1 or 2;

Y is O or S;

A1 is a substituted phenyl or pyridine;

A2 is A2a;

R^1 and R^2 are each independently selected from the group consisting of:

- (a) hydrogen,
- (b) halogen,
- (c) CN,
- (d) CF_3 ,
- (e) C_{1-6} alkyl,
- (g) $-O-(R^7)$, and
- (h) $-N(R^7)(R^8)$,

wherein the alkyl portion of choice (e) is optionally substituted with halogen;

R^3 is selected from the group consisting of:

- (a) $-O-(R^7)$,
- (b) $-N(R^7)-C(=O)-O-(R^8)$,
- (c) $-N(R^7)S(=O)_2(R^8)$,
- (d) $-C(=O)(R^7)$,
- (e) aryl,
- (f) heteroaryl,
- (g) $-OC(=O)N(R^7)(R^8)$,
- (h) $-C(R^7)(R^8)OH$, and
- (i) hydrogen,

wherein aryl of choice (e) and heteroaryl of choice (f) are optionally mono- or di-substituted with substituents selected from the group consisting of halogen, nitro, C_{1-6} alkyl, C_{1-6} alkoxy, halo C_{1-6} alkyl, C_{3-6} cycloalkyl, C_{3-6} cycloalkoxy, $-NH(C_{1-6}alkyl)$, $-NH(C_{3-6}cycloalkyl)$, $-N(C_{1-6}alkyl)_2$, $-N(C_{3-6}cycloalkyl)_2$, $-S(=O)_oC_{1-6}alkyl$, $-S(=O)_oC_{3-6}cycloalkyl$ and CN;

R^4 is selected from the group consisting of:

- (a) hydrogen,
- (b) $-N(R^7)(R^8)$,
- (c) $-N(R^7)S(=O)_2R^8$,
- (d) $-S(=O)_2N(R^7)(R^8)$,
- (e) $-C(=O)N(R^7)(R^8)$,
- (f) $-C_{1-4}alkyl-C(=O)NHS(=O)_2R^7$,

- (g) $-C_{1-4}\text{alkyl}-S(=O)_2NHC(=O)R^7$,
- (h) $-C_{1-4}\text{alkyl}-C(=O)-N(R^7)(R^8)$,
- (i) $-C_{1-4}\text{alkyl}-N(R^7)S(=O)_2(R^8)$,
- (j) $-C_{1-4}\text{alkyl}-S(=O)_2N(R^7)(R^8)$,
- (k) $-C_{1-6}\text{alkyl}-C(=O)OH$,
- (l) $-C_{3-6}\text{cycloalkyl}-C(=O)OH$,
- (m) $-C_{3-6}\text{cycloalkyl}-C(=O)NHS(=O)_2R^7$,
- (n) $-C_{3-6}\text{cycloalkyl}-S(=O)_2NHC(=O)R^7$,
- (o) $-C_{3-6}\text{cycloalkyl}-C(=O)-N(R^7)(R^8)$,
- (p) $-C_{3-6}\text{cycloalkyl}-N(R^7)C(=O)(R^8)$,
- (q) $-C_{3-6}\text{cycloalkyl}-N(R^7)S(=O)_2(R^8)$,
- (r) $-C_{3-6}\text{cycloalkyl}-S(=O)_2N(R^7)(R^8)$,
- (s) $-C(=O)OH$,
- (t) $-C(=O)NR^7S(=O)_2(R^8)$,
- (u) $-C_{1-4}\text{alkyl}-N(R^7)-C(=O)R^8$, and
- (v) $-S(=O)_2N(R^7)C(=O)R^8$,

wherein the alkyl portion of choices (f), (g), (h), (i), (j), (k) and (u), and the cycloalkyl portion of choices (l), (m), (n), (o), (p), (q) and (r), are optionally mono- or di-substituted with halogen, $C_{1-6}\text{alkyl}$, $C_{3-6}\text{cycloalkyl}$, $C_{1-6}\text{alkoxy}$, or $C_{3-6}\text{cycloalkoxy}$;

R^5 is $C_{1-6}\text{alkyl}$, optionally substituted with halogen or $C_{1-4}\text{alkyl}$;

R^6 is selected from the group consisting of:

- (a) $-C_{1-6}\text{alkylaryl}$,
- (b) $-C_{1-6}\text{alkylheteroaryl}$, and
- (c) $-C_{3-6}\text{cycloalkyl}$,

wherein the alkyl portion of choices (a) and (b), and the cycloalkyl portion of choice (c), are optionally substituted with halogen or $C_{1-4}\text{alkyl}$, and the aryl portion of choice (a) and the heteroaryl portion of choice (b), are optionally mono- or di-substituted with substituents selected from the group consisting of halogen, nitro, CF_3 , $C_{1-6}\text{alkyl}$, $C_{1-6}\text{alkoxy}$, halo $C_{1-6}\text{alkyl}$, $C_{3-6}\text{cycloalkyl}$, $C_{3-6}\text{cycloalkoxy}$, aryl, heteroaryl, $-NH(C_{1-6}\text{alkyl})$, $-NH(C_{3-6}\text{cycloalkyl})$, $-N(C_{1-6}\text{alkyl})_2$, $-N(C_{3-6}\text{cycloalkyl})_2$, $-S(=O)_oC_{1-6}\text{alkyl}$, $-S(=O)_oC_{3-6}\text{cycloalkyl}$ and CN;

R^7 is selected from the group consisting of hydrogen and $C_{1-4}\text{alkyl}$ optionally substituted with halogen;

R^8 is selected from the group consisting of hydrogen, $C_{1-4}\text{alkyl}$ optionally substituted with halogen, and aryl optionally mono- or di-substituted with substituents selected from halogen, nitro, $C_{1-6}\text{alkyl}$, $C_{1-6}\text{alkoxy}$, halo $C_{1-6}\text{alkyl}$, $C_{3-6}\text{cycloalkyl}$, $C_{3-6}\text{cycloalkoxy}$, $-NH(C_{1-3}\text{alkyl})$, $-NH(C_{3-6}\text{cycloalkyl})$, $-N(C_{1-3}\text{alkyl})_2$, $-N(C_{3-6}\text{cycloalkyl})_2$, $-S(=O)_oC_{1-4}\text{alkyl}$, $-S(=O)_oC_{3-6}\text{cycloalkyl}$, aryl, heteroaryl, hydroxyl and CN;

and

R^9 and R^{10} are each independently hydrogen or F.

22. The compound according to Claim 1 or Claim 2, or a pharmaceutically acceptable salt thereof, wherein:
X is selected from the group consisting of $-(CH_2)_m-$, and $-(CH_2)_m-S(=O)_o-(CH_2)_n-$, where $m + n$ is 2, 3 or 4
and wherein o is 0, 1 or 2;

Y is O or S;

A1 is a substituted phenyl or pyridine;

A2 is A2a;

R^1 and R^2 are each independently selected from the group consisting of:

- (a) hydrogen,
- (b) halogen,
- (c) CN,
- (d) CF_3 ,
- (e) C_{1-6} alkyl,
- (g) $-O-(R^7)$, and
- (h) $-N(R^7)(R^8)$,

wherein the alkyl portion of choice (e) is optionally substituted with halogen;

R^3 is selected from the group consisting of:

- (a) $-O-(R^7)$,
- (b) $-N(R^7)-C(=O)-O-(R^8)$,
- (c) $-N(R^7)S(=O)_2(R^8)$,
- (d) $-C(=O)(R^7)$,
- (e) aryl,
- (f) heteroaryl,
- (g) $-OC(=O)N(R^7)(R^8)$, and
- (h) $-C(R^7)(R^8)OH$,

wherein aryl of choice (e) and heteroaryl of choice (f) are optionally mono- or di-substituted with substituents selected from the group consisting of halogen, nitro, C_{1-6} alkyl, C_{1-6} alkoxy, halo C_{1-6} alkyl, C_{3-6} cycloalkyl, C_{3-6} cycloalkoxy, $-NH(C_{1-6}alkyl)$, $-NH(C_{3-6}cycloalkyl)$, $-N(C_{1-6}alkyl)_2$, $-N(C_{3-6}cycloalkyl)_2$, $-S(=O)_oC_{1-6}alkyl$, $-S(=O)_oC_{3-6}cycloalkyl$ and CN;

R^4 is selected from the group consisting of:

- (a) hydrogen,
- (b) $-N(R^7)(R^8)$,
- (c) $-N(R^7)S(=O)_2R^8$,
- (d) $-S(=O)_2N(R^7)(R^8)$,
- (e) $-C(=O)N(R^7)(R^8)$,
- (f) $-C_{1-4}alkyl-C(=O)NHS(=O)_2R^7$,
- (g) $-C_{1-4}alkyl-S(=O)_2NHC(=O)R^7$,

- (h) $-C_{1-4}\text{alkyl}-C(=O)-N(R^7)(R^8)$,
- (i) $-C_{1-4}\text{alkyl}-N(R^7)S(=O)_2(R^8)$,
- (j) $-C_{1-4}\text{alkyl}-S(=O)_2N(R^7)(R^8)$,
- (k) $-C_{1-6}\text{alkyl}-C(=O)OH$,
- (l) $-C_{3-6}\text{cycloalkyl}-C(=O)OH$,
- (m) $-C_{3-6}\text{cycloalkyl}-C(=O)NHS(=O)_2R^7$,
- (n) $-C_{3-6}\text{cycloalkyl}-S(=O)_2NHC(=O)R^7$,
- (o) $-C_{3-6}\text{cycloalkyl}-C(=O)-N(R^7)(R^8)$,
- (p) $-C_{3-6}\text{cycloalkyl}-N(R^7)C(=O)(R^8)$,
- (q) $-C_{3-6}\text{cycloalkyl}-N(R^7)S(=O)_2(R^8)$,
- (r) $-C_{3-6}\text{cycloalkyl}-S(=O)_2N(R^7)(R^8)$,
- (s) $-C(=O)OH$,
- (t) $-C(=O)NR^7S(=O)_2(R^8)$,
- (u) $-C_{1-4}\text{alkyl}-N(R^7)-C(=O)R^8$, and
- (v) $-S(=O)_2N(R^7)C(=O)R^8$,

wherein the alkyl portion of choices (f), (g), (h), (i), (j), (k) and (u), and the cycloalkyl portion of choices (l), (m), (n), (o), (p), (q) and (r), are optionally mono- or di-substituted with halogen, $C_{1-6}\text{alkyl}$, $C_{3-6}\text{cycloalkyl}$, $C_{1-6}\text{alkoxy}$, or $C_{3-6}\text{cycloalkoxy}$;

R^5 is $C_{1-6}\text{alkyl}$, optionally substituted with halogen or $C_{1-4}\text{alkyl}$;

R^6 is selected from the group consisting of:

- (a) $-C_{1-6}\text{alkylaryl}$,
- (b) $-C_{1-6}\text{alkylheteroaryl}$, and
- (c) $-C_{3-6}\text{cycloalkyl}$,

wherein the alkyl portion of choices (a) and (b), and the cycloalkyl portion of choice (c), are optionally substituted with halogen or $C_{1-4}\text{alkyl}$, and the aryl portion of choice (a) and the heteroaryl portion of choice (b), are optionally mono- or di-substituted with substituents selected from the group consisting of halogen, nitro, CF_3 , $C_{1-6}\text{alkyl}$, $C_{1-6}\text{alkoxy}$, halo $C_{1-6}\text{alkyl}$, $C_{3-6}\text{cycloalkyl}$, $C_{3-6}\text{cycloalkoxy}$, aryl, heteroaryl, $-NH(C_{1-6}\text{alkyl})$, $-NH(C_{3-6}\text{cycloalkyl})$, $-N(C_{1-6}\text{alkyl})_2$, $-N(C_{3-6}\text{cycloalkyl})_2$, $-S(=O)_oC_{1-6}\text{alkyl}$, $-S(=O)_oC_{3-6}\text{cycloalkyl}$ and CN;

R^7 is selected from hydrogen and $C_{1-4}\text{alkyl}$ optionally substituted with halogen;

R^8 is selected from hydrogen, $C_{1-4}\text{alkyl}$ optionally substituted with halogen, and aryl optionally mono- or di-substituted with substituents selected from the group consisting of halogen, nitro, $C_{1-6}\text{alkyl}$, $C_{1-6}\text{alkoxy}$, halo $C_{1-6}\text{alkyl}$, $C_{3-6}\text{cycloalkyl}$, $C_{3-6}\text{cycloalkoxy}$, $-NH(C_{1-3}\text{alkyl})$, $-NH(C_{3-6}\text{cycloalkyl})$, $-N(C_{1-3}\text{alkyl})_2$, $-N(C_{3-6}\text{cycloalkyl})_2$, $-S(=O)_oC_{1-4}\text{alkyl}$, $-S(=O)_oC_{3-6}\text{cycloalkyl}$, aryl, heteroaryl, hydroxyl and CN;

and

R^9 and R^{10} are each independently hydrogen or F.

23. The compound according to Claim 21 or Claim 22, or a pharmaceutically acceptable salt thereof, wherein:

X is $-\text{CH}_2\text{CH}_2\text{CH}_2-$;

Y is O;

A1 is a substituted phenyl or substituted pyridine;

A2 is A2a, and A2a is a substituted phenyl or substituted pyridine;

R^1 and R^2 are each hydrogen;

R^3 is selected from the group consisting of:

- (a) hydrogen,
- (b) $-\text{O}-(\text{R}^7)$, and
- (c) $-\text{N}(\text{R}^7)\text{S}(=\text{O})_2(\text{R}^8)$;

R^4 is selected from the group consisting of:

- (a) hydrogen,
- (b) $-\text{N}(\text{R}^7)\text{S}(=\text{O})_2\text{R}^8$,
- (c) $-\text{C}_{1-6}\text{alkyl}-\text{C}(=\text{O})\text{OH}$,
- (d) $-\text{C}_{3-6}\text{cycloalkyl}-\text{C}(=\text{O})\text{OH}$,
- (e) $-\text{C}(=\text{O})\text{OH}$,
- (f) $-\text{C}(=\text{O})\text{N}(\text{R}^7)\text{S}(=\text{O})_2(\text{R}^8)$, and
- (g) $-\text{S}(=\text{O})_2\text{N}(\text{R}^7)\text{C}(=\text{O})\text{R}^8$,

wherein the alkyl portion of choice (c) and the cycloalkyl portion of choices (d), are optionally mono- or di-substituted with halogen, $\text{C}_{1-6}\text{alkyl}$, $\text{C}_{3-6}\text{cycloalkyl}$, $\text{C}_{1-6}\text{alkoxy}$, or $\text{C}_{3-6}\text{cycloalkoxy}$;

R^5 is $\text{C}_{1-6}\text{alkyl}$, optionally substituted with halogen or $\text{C}_{1-4}\text{alkyl}$;

R^6 is selected from the group consisting of:

- (a) $-\text{C}_{1-6}\text{alkylaryl}$, and
- (b) $-\text{C}_{1-6}\text{alkylheteroaryl}$,

wherein the alkyl portion of choices (a) and (b), are optionally substituted with halogen or $\text{C}_{1-4}\text{alkyl}$, and the aryl portion of choice (a) and the heteroaryl portion of choice (b), are optionally mono- or di-substituted with substituents selected from the group consisting of halogen, nitro, CF_3 , $\text{C}_{1-6}\text{alkyl}$, $\text{C}_{1-6}\text{alkoxy}$, halo $\text{C}_{1-6}\text{alkyl}$, $\text{C}_{3-6}\text{cycloalkyl}$, $\text{C}_{3-6}\text{cycloalkoxy}$, aryl, heteroaryl, $-\text{NH}(\text{C}_{1-6}\text{alkyl})$, $-\text{NH}(\text{C}_{3-6}\text{cycloalkyl})$, $-\text{N}(\text{C}_{1-6}\text{alkyl})_2$, $-\text{N}(\text{C}_{3-6}\text{cycloalkyl})_2$, $-\text{S}(=\text{O})_6\text{C}_{1-6}\text{alkyl}$, $-\text{S}(=\text{O})_6\text{C}_{3-6}\text{cycloalkyl}$ and CN;

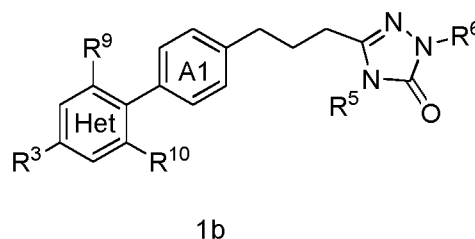
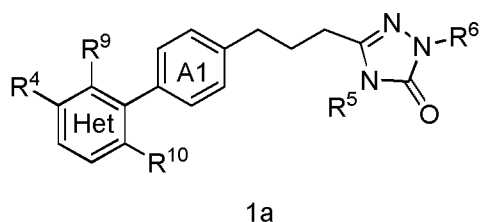
R^7 is selected from hydrogen and $\text{C}_{1-4}\text{alkyl}$ optionally substituted with halogen;

R^8 is selected from hydrogen, $\text{C}_{1-4}\text{alkyl}$ optionally substituted with halogen, and aryl optionally mono- or di-substituted with substituents selected from halogen, nitro, $\text{C}_{1-6}\text{alkyl}$, $\text{C}_{1-6}\text{alkoxy}$, halo $\text{C}_{1-6}\text{alkyl}$, $\text{C}_{3-6}\text{cycloalkyl}$, $\text{C}_{3-6}\text{cycloalkoxy}$, $-\text{NH}(\text{C}_{1-3}\text{alkyl})$, $-\text{NH}(\text{C}_{3-6}\text{cycloalkyl})$, $-\text{N}(\text{C}_{1-3}\text{alkyl})_2$, $-\text{N}(\text{C}_{3-6}\text{cycloalkyl})_2$, $-\text{S}(=\text{O})_6\text{C}_{1-4}\text{alkyl}$, $-\text{S}(=\text{O})_6\text{C}_{3-6}\text{cycloalkyl}$, aryl, heteroaryl, hydroxyl and CN;

and

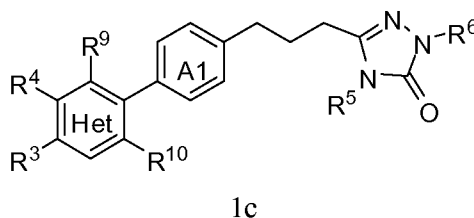
R^9 and R^{10} are each independently hydrogen or F.

24. The compound according to Claim 1 or Claim 2, wherein the compound has the following structure Formula 1a or Formula 1b



or is a pharmaceutically acceptable salt thereof.

25. The compound according to Claim 1 or Claim 2, wherein the compound has the following structure of Formula 1c



or is a pharmaceutically acceptable salt thereof.

26. The compound according to Claim 24 or Claim 25, or a pharmaceutically acceptable salt thereof, wherein:

A1 is a phenyl or pyridine;

Het is A2a, where A2a is substituted phenyl, or substituted pyridine;

R³ is selected from the group consisting of:

- (a) -O-(R⁷),
- (b) -N(R⁷)-C(=O)-O-(R⁸),
- (c) -N(R⁷)S(=O)₂(R⁸),
- (d) -C(=O)(R⁷),
- (e) aryl,
- (f) heteroaryl,
- (g) -OC(=O)N(R⁷)(R⁸),
- (h) -C(R⁷)(R⁸)OH, and
- (i) hydrogen,

wherein aryl of choice (e) and heteroaryl of choice (f) are optionally mono- or di-substituted with substituents selected from the group consisting of halogen, nitro, C₁₋₆alkyl, C₁₋₆alkoxy, halo C₁₋₆alkyl, C₃₋₆cycloalkyl, C₃₋₆cycloalkoxy, -NH(C₁₋₆alkyl), -NH(C₃₋₆cycloalkyl), -N(C₁₋₆alkyl)₂, -N(C₃₋₆cycloalkyl)₂, -S(=O)₂C₁₋₆alkyl, -S(=O)₂C₃₋₆cycloalkyl and CN;

R⁴ is selected from the group consisting of:

- (a) hydrogen,
- (b) -N(R⁷)(R⁸),
- (c) N(R⁷)S(=O)₂R⁸,
- (d) -S(=O)₂N(R⁷)(R⁸),
- (e) -C(=O)N(R⁷)(R⁸),
- (f) -C₁₋₄alkyl-C(=O)NHS(=O)₂R⁷,
- (g) -C₁₋₄alkyl-S(=O)₂NHC(=O)R⁷,
- (h) -C₁₋₄alkyl-C(=O)-N(R⁷)(R⁸),
- (i) -C₁₋₄alkyl-N(R⁷)-C(=O)R⁸,
- (j) -C₁₋₄alkyl-N(R⁷)S(=O)₂(R⁸),
- (k) -C₁₋₄alkyl-S(=O)₂N(R⁷)(R⁸),
- (l) -C₁₋₆alkyl-C(=O)OH,
- (m) -C₃₋₆cycloalkyl-C(=O)OH,
- (n) -C₃₋₆cycloalkyl-C(=O)NHS(=O)₂R⁷,
- (o) -C₃₋₆cycloalkyl-S(=O)₂NHC(=O)R⁷,
- (p) -C₃₋₆cycloalkyl-C(=O)-N(R⁷)(R⁸),
- (q) -C₃₋₆cycloalkyl-N(R⁷)C(=O)(R⁸),
- (r) -C₃₋₆cycloalkyl-N(R⁷)S(=O)₂(R⁸),
- (s) -C₃₋₆cycloalkyl-S(=O)₂N(R⁷)(R⁸),
- (t) -C(=O)OH,
- (u) -C(=O)N(R⁷)S(=O)₂(R⁸), and
- (v) -S(=O)₂N(R⁷)C(=O)R⁸,

wherein the alkyl portion of choices (f), (g), (h), (i), (j), (k) and (l), and the cycloalkyl portion of choices (m), (n), (o), (p), (q), (r) and (s), are optionally mono- or di-substituted with halogen, C₁₋₆alkyl, C₃₋₆cycloalkyl, C₁₋₆alkoxy, or C₃₋₆cycloalkoxy;

R₅ is C₁₋₆alkyl, optionally substituted with halogen or C₁₋₄alkyl;

R₆ is selected from the group consisting of:

- (a) -C₁₋₆alkylaryl,
- (b) -C₁₋₆alkylheteroaryl, and
- (c) -C₃₋₆cycloalkyl,

wherein the alkyl portion of choices (a) and (b), and the cycloalkyl portion of choice (c), are optionally substituted with halogen or C₁₋₄alkyl, and the aryl portion of choice (a) and the heteroaryl portion of choice (b), are optionally mono- or di-substituted with substituents selected from the group consisting of halogen, nitro, -CF₃, C₁₋₆alkyl, C₁₋₆alkoxy, halo C₁₋₆alkyl, C₃₋₆cycloalkyl, C₃₋₆cycloalkoxy, aryl, heteroaryl, -NH(C₁₋₆alkyl), -NH(C₃₋₆cycloalkyl), -N(C₁₋₆alkyl)₂, -N(C₃₋₆cycloalkyl)₂, -S(=O)₆C₁₋₆alkyl, -S(=O)₆C₃₋₆cycloalkyl and CN;

R⁷ is selected from hydrogen and C₁₋₄alkyl optionally substituted with halogen;

R⁸ is selected from hydrogen, C₁₋₄alkyl optionally substituted with halogen, and aryl optionally mono- or di-substituted with substituents selected from the group consisting of halogen, nitro, C₁₋₆alkyl, C₁₋₆alkoxy, haloC₁₋₆alkyl, C₃₋₆cycloalkyl, C₃₋₆cycloalkoxy, -NH(C₁₋₃alkyl), -NH(C₃₋₆cycloalkyl), -N(C₁₋₃alkyl)₂, -N(C₃₋₆cycloalkyl)₂, -S(=O)₂C₁₋₄alkyl, -S(=O)₂C₃₋₆cycloalkyl, aryl, heteroaryl, hydroxyl and CN;

and

R⁹ and R¹⁰ are each independently hydrogen or F.

27. The compound according to Claim 24 or Claim 25, or a pharmaceutically acceptable salt thereof, wherein:

A1 is a phenyl or pyridine;

Het is A2a, where A2a is substituted phenyl, or substituted pyridine;

R³ is selected from the group consisting of:

- (a) -O-(R⁷),
- (b) -N(R⁷)-C(=O)-O-(R⁸),
- (c) -N(R⁷)S(=O)₂(R⁸),
- (d) -C(=O)(R⁷),
- (e) aryl,
- (f) heteroaryl,
- (g) -OC(=O)N(R⁷)(R⁸), and
- (h) -C(R⁷)(R⁸)OH,

wherein aryl of choice (e) and heteroaryl of choice (f) are optionally mono- or di-substituted with substituents selected from the group consisting of halogen, nitro, C₁₋₆alkyl, C₁₋₆alkoxy, halo C₁₋₆alkyl, C₃₋₆cycloalkyl, C₃₋₆cycloalkoxy, -NH(C₁₋₆alkyl), -NH(C₃₋₆cycloalkyl), -N(C₁₋₆alkyl)₂, -N(C₃₋₆cycloalkyl)₂, -S(=O)₂C₁₋₆alkyl, -S(=O)₂C₃₋₆cycloalkyl and CN;

R⁴ is selected from the group consisting of:

- (a) hydrogen,
- (b) -N(R⁷)(R⁸),
- (c) N(R⁷)S(=O)₂R⁸,
- (d) -S(=O)₂N(R⁷)(R⁸),
- (e) -C(=O)N(R⁷)(R⁸),
- (f) -C₁₋₄alkyl-C(=O)NHS(=O)₂R⁷,
- (g) -C₁₋₄alkyl-S(=O)₂NHC(=O)R⁷,
- (h) -C₁₋₄alkyl-C(=O)-N(R⁷)(R⁸),
- (i) -C₁₋₄alkyl-N(R⁷)-C(=O)R⁸,
- (j) -C₁₋₄alkyl-N(R⁷)S(=O)₂(R⁸),
- (k) -C₁₋₄alkyl-S(=O)₂N(R⁷)(R⁸),

- (l) $-C_{1-6}\text{alkyl}-C(=O)OH$,
- (m) $-C_{3-6}\text{cycloalkyl}-C(=O)OH$,
- (n) $-C_{3-6}\text{cycloalkyl}-C(=O)NHS(=O)_2R^7$,
- (o) $-C_{3-6}\text{cycloalkyl}-S(=O)_2NHC(=O)R^7$,
- (p) $-C_{3-6}\text{cycloalkyl}-C(=O)-N(R^7)(R^8)$,
- (q) $-C_{3-6}\text{cycloalkyl}-N(R^7)C(=O)(R^8)$,
- (r) $-C_{3-6}\text{cycloalkyl}-N(R^7)S(=O)_2(R^8)$,
- (s) $-C_{3-6}\text{cycloalkyl}-S(=O)_2N(R^7)(R^8)$,
- (t) $-C(=O)OH$,
- (u) $-C(=O)N(R^7)S(=O)_2(R^8)$, and
- (v) $-S(=O)_2N(R^7)C(=O)R^8$,

wherein the alkyl portion of choices (f), (g), (h), (i), (j), (k) and (l), and the cycloalkyl portion of choices (m), (n), (o), (p), (q), (r) and (s), are optionally mono- or di-substituted with halogen, $C_{1-6}\text{alkyl}$, $C_{3-6}\text{cycloalkyl}$, $C_{1-6}\text{alkoxy}$, or $C_{3-6}\text{cycloalkoxy}$;

R_5 is $C_{1-6}\text{alkyl}$, optionally substituted with halogen or $C_{1-4}\text{alkyl}$;

R_6 is selected from the group consisting of:

- (a) $-C_{1-6}\text{alkylaryl}$,
- (b) $-C_{1-6}\text{alkylheteroaryl}$, and
- (c) $-C_{3-6}\text{cycloalkyl}$,

wherein the alkyl portion of choices (a) and (b), and the cycloalkyl portion of choice (c), are optionally substituted with halogen or $C_{1-4}\text{alkyl}$, and the aryl portion of choice (a) and the heteroaryl portion of choice (b), are optionally mono- or di-substituted with substituents selected from the group consisting of halogen, nitro, $-CF_3$, $C_{1-6}\text{alkyl}$, $C_{1-6}\text{alkoxy}$, halo $C_{1-6}\text{alkyl}$, $C_{3-6}\text{cycloalkyl}$, $C_{3-6}\text{cycloalkoxy}$, aryl, heteroaryl, $-NH(C_{1-6}\text{alkyl})$, $-NH(C_{3-6}\text{cycloalkyl})$, $-N(C_{1-6}\text{alkyl})_2$, $-N(C_{3-6}\text{cycloalkyl})_2$, $-S(=O)_oC_{1-6}\text{alkyl}$, $-S(=O)_oC_{3-6}\text{cycloalkyl}$ and CN;

R^7 is selected from hydrogen and $C_{1-4}\text{alkyl}$ optionally substituted with halogen;

R^8 is selected from hydrogen, $C_{1-4}\text{alkyl}$ optionally substituted with halogen, and aryl optionally mono- or di-substituted with substituents selected from the group consisting of halogen, nitro, $C_{1-6}\text{alkyl}$, $C_{1-6}\text{alkoxy}$, halo $C_{1-6}\text{alkyl}$, $C_{3-6}\text{cycloalkyl}$, $C_{3-6}\text{cycloalkoxy}$, $-NH(C_{1-3}\text{alkyl})$, $-NH(C_{3-6}\text{cycloalkyl})$, $-N(C_{1-3}\text{alkyl})_2$, $-N(C_{3-6}\text{cycloalkyl})_2$, $-S(=O)_oC_{1-4}\text{alkyl}$, $-S(=O)_oC_{3-6}\text{cycloalkyl}$, aryl, heteroaryl, hydroxyl and CN;

and

R^9 and R^{10} are each independently hydrogen or F.

28. The compound according to Claim 26 or Claim 27, or a pharmaceutically acceptable salt thereof, wherein:

A1 is a phenyl or pyridine;

Het is A2a, and A2a is a substituted phenyl, substituted pyridine;

R³ is selected from the group consisting of:

- (a) hydrogen,
- (b) -O-(R⁷), and
- (c) -N(R⁷)S(=O)₂(R⁸);

R⁴ is selected from the group consisting of

- (a) hydrogen,
- (b) N(R⁷)S(=O)₂R⁸,
- (c) -C₁₋₆alkyl-C(=O)OH,
- (d) -C₃₋₆cycloalkyl-C(=O)OH,
- (e) -C(=O)OH,
- (f) -C(=O)N(R⁷)S(=O)₂(R⁸), and
- (g) -S(=O)₂N(R⁷)C(=O)R⁸,

wherein the alkyl portion of choice (c) and the cycloalkyl portion of choice (d), are optionally mono- or di-substituted with halogen, C₁₋₆alkyl, C₃₋₆cycloalkyl, C₁₋₆alkoxy, or C₃₋₆cycloalkoxy,

R⁵ is C₁₋₆alkyl, optionally substituted with halogen or C₁₋₄alkyl;

R⁶ is selected from the group consisting of:

- (a) -C₁₋₆alkylaryl, and
- (b) -C₁₋₆alkylheteroaryl,

wherein the alkyl portion of choices (a) and (b) are optionally substituted with halogen or C₁₋₄alkyl, and the aryl portion of choice (a) and the heteroaryl portion of choice (b), are optionally mono- or di-substituted with substituents selected from the group consisting of halogen, nitro, CF₃, C₁₋₆alkyl, C₁₋₆alkoxy, halo C₁₋₆alkyl, C₃₋₆cycloalkyl, C₃₋₆cycloalkoxy, aryl, heteroaryl, -NH(C₁₋₆alkyl), -NH(C₃₋₆cycloalkyl), -N(C₁₋₆alkyl)₂, -N(C₃₋₆cycloalkyl)₂, -S(=O)₆C₁₋₆alkyl, -S(=O)₆C₃₋₆cycloalkyl and CN;

R⁷ is selected from hydrogen and C₁₋₄alkyl optionally substituted with halogen;

R⁸ is selected from hydrogen, C₁₋₄alkyl optionally substituted with halogen, and aryl optionally mono- or di-substituted with substituents selected from the group consisting of halogen, nitro, C₁₋₆alkyl, C₁₋₆alkoxy, haloC₁₋₆alkyl, C₃₋₆cycloalkyl, C₃₋₆cycloalkoxy, -NH(C₁₋₃alkyl), -NH(C₃₋₆cycloalkyl), -N(C₁₋₃alkyl)₂, -N(C₃₋₆cycloalkyl)₂, -S(=O)₆C₁₋₄alkyl, -S(=O)₆C₃₋₆cycloalkyl, aryl, heteroaryl, hydroxyl and CN;

and

R⁹ and R¹⁰ are each independently hydrogen or F.

29. The compound according to Claim 2 selected from the group consisting of:

2-(4'-(3-(1-(4-(*tert*-Butyl)benzyl)-4-ethyl-5-oxo-4,5-dihydro-1*H*-1,2,4-triazol-3-yl)propyl)-[1,1'-biphenyl]-3-yl)acetic acid;

4'-(3-(1-(4-(*tert*-Butyl)benzyl)-4-ethyl-5-oxo-4,5-dihydro-1*H*-1,2,4-triazol-3-yl)propyl)-[1,1'-biphenyl]-3-carboxylic acid;

3-(3-(4-(6-Aminopyridin-2-yl)phenyl)propyl)-1-(4-(*tert*-butyl)benzyl)-4-ethyl-1*H*-1,2,4-triazol-5(4*H*)-one;

N-(6-(4-(3-(1-(4-(*tert*-Butyl)benzyl)-4-ethyl-5-oxo-4,5-dihydro-1*H*-1,2,4-triazol-3-yl)propyl)phenyl)pyridin-2-yl)benzenesulfonamide;

3-(3-(4-(5-Aminopyridin-2-yl)phenyl)propyl)-1-(4-(*tert*-butyl)benzyl)-4-ethyl-1*H*-1,2,4-triazol-5(4*H*)-one;

3-(3-(3'-Amino-[1,1'-biphenyl]-4-yl)propyl)-1-(4-(*tert*-butyl)benzyl)-4-ethyl-1*H*-1,2,4-triazol-5(4*H*)-one;

N-(4'-(3-(1-(4-(*tert*-Butyl)benzyl)-4-ethyl-5-oxo-4,5-dihydro-1*H*-1,2,4-triazol-3-yl)propyl)-[1,1'-biphenyl]-3-yl)-4-methylbenzenesulfonamide;

2-(4'-(3-(1-(4-(*tert*-Butyl)benzyl)-4-ethyl-5-oxo-4,5-dihydro-1*H*-1,2,4-triazol-3-yl)propyl)-[1,1'-biphenyl]-3-yl)-*N*-(phenylsulfonyl)acetamide;

4'-(3-(1-(4-(*tert*-Butyl)benzyl)-4-ethyl-5-oxo-4,5-dihydro-1*H*-1,2,4-triazol-3-yl)propyl)-*N*-(phenylsulfonyl)-[1,1'-biphenyl]-3-carboxamide;

N-(6-(4-(3-(1-(4-(*tert*-Butyl)benzyl)-4-ethyl-5-oxo-4,5-dihydro-1*H*-1,2,4-triazol-3-yl)propyl)phenyl)pyridin-3-yl)benzenesulfonamide;

3-(3-(4-(4-Aminopyridin-2-yl)phenyl)propyl)-1-(4-(*tert*-butyl)benzyl)-4-ethyl-1*H*-1,2,4-triazol-5(4*H*)-one;

N-(6-(4-(3-(1-(4-(*tert*-Butyl)benzyl)-4-ethyl-5-oxo-4,5-dihydro-1*H*-1,2,4-triazol-3-yl)propyl)phenyl)pyridin-3-yl)methanesulfonamide;

1-(4'-(3-(1-(4-(*tert*-Butyl)benzyl)-4-ethyl-5-oxo-4,5-dihydro-1*H*-1,2,4-triazol-3-yl)propyl)-[1,1'-biphenyl]-3-yl)cyclopropanecarboxylic acid;

1-(4'-(3-(1-(4-(*tert*-butyl)benzyl)-4-ethyl-5-oxo-4,5-dihydro-1*H*-1,2,4-triazol-3-yl)propyl)-[1,1'-biphenyl]-3-yl)cyclopropanecarboxamide;

2-(4'-(3-(1-(4-(*tert*-Butyl)benzyl)-4-ethyl-5-oxo-4,5-dihydro-1*H*-1,2,4-triazol-3-yl)propyl)-[1,1'-biphenyl]-3-yl)-2-methylpropanamide;

N-(2-(4-(3-(1-(4-(*tert*-Butyl)benzyl)-4-ethyl-5-oxo-4,5-dihydro-1*H*-1,2,4-triazol-3-yl)propyl)phenyl)pyridin-4-yl)benzenesulfonamide;

N-(6-(4-(3-(1-(4-(*tert*-Butyl)benzyl)-4-ethyl-5-oxo-4,5-dihydro-1*H*-1,2,4-triazol-3-yl)propyl)phenyl)pyridin-4-yl)methanesulfonamide;

2-(4'-(3-(1-(4-(*tert*-Butyl)benzyl)-4-ethyl-5-oxo-4,5-dihydro-1*H*-1,2,4-triazol-3-yl)propyl)-2-fluoro-[1,1'-biphenyl]-3-yl)acetic acid;

2-(4'-(3-(1-(4-(*tert*-Butyl)benzyl)-4-ethyl-5-oxo-4,5-dihydro-1*H*-1,2,4-triazol-3-yl)propyl)-6-fluoro-[1,1'-biphenyl]-3-yl)acetic acid;

2-(4'-(3-(1-(4-(*tert*-Butyl)benzyl)-4-ethyl-5-oxo-4,5-dihydro-1*H*-1,2,4-triazol-3-yl)propyl)-6-methoxy-[1,1'-biphenyl]-3-yl)acetic acid;

2-(4'-(3-(1-(4-(*tert*-Butyl)benzyl)-4-ethyl-5-oxo-4,5-dihydro-1*H*-1,2,4-triazol-3-yl)propyl)-4-methoxy-[1,1'-biphenyl]-3-yl)acetic acid;

2-(4'-(3-(1-(4-Cyclopropylbenzyl)-4-ethyl-5-oxo-4,5-dihydro-1*H*-1,2,4-triazol-3-yl)propyl)-[1,1'-biphenyl]-3-yl)acetic acid;

2-(4'-(3-(1-Benzyl-4-ethyl-5-oxo-4,5-dihydro-1*H*-1,2,4-triazol-3-yl)propyl)-[1,1'-biphenyl]-3-yl)acetic acid;

2-(4'-(3-(4-Ethyl-5-oxo-1-(4-(trifluoromethyl)benzyl)-4,5-dihydro-1*H*-1,2,4-triazol-3-yl)propyl)-[1,1'-biphenyl]-3-yl)acetic acid;

tert-Butyl (2-(4-(3-(1-(4-(*tert*-butyl)benzyl)-4-ethyl-5-oxo-4,5-dihydro-1*H*-1,2,4-triazol-3-yl)propyl)phenyl)oxazol-4-yl)carbamate;

2-(4'-(3-(1-(4-Cyclohexylbenzyl)-4-ethyl-5-oxo-4,5-dihydro-1*H*-1,2,4-triazol-3-yl)propyl)-[1,1'-biphenyl]-3-yl)acetic acid;

2-(4'(((1-(4-(*tert*-Butyl)benzyl)-4-ethyl-5-oxo-4,5-dihydro-1*H*-1,2,4-triazol-3-yl)methoxy)methyl)-[1,1'-biphenyl]-3-yl)acetic acid;

2-(4'-(3-(1-(4-(*tert*-Butyl)benzyl)-4-ethyl-5-oxo-4,5-dihydro-1*H*-1,2,4-triazol-3-yl)propyl)-[1,1'-biphenyl]-3-yl)-2,2-difluoroacetic acid;

3-(3-(3'-(1*H*-Tetrazol-5-yl)-[1,1'-biphenyl]-4-yl)propyl)-1-(4-(*tert*-butyl)benzyl)-4-ethyl-1*H*-1,2,4-triazol-5(4*H*)-one;

2-(4'-(2-((1-(4-(*tert*-butyl)benzyl)-4-ethyl-5-oxo-4,5-dihydro-1*H*-1,2,4-triazol-3-yl)methyl)cyclopropyl)-[1,1'-biphenyl]-3-yl)acetic acid;

2-(4'-(3-(1-(4-(*tert*-Butyl)benzyl)-4-isopropyl-5-oxo-4,5-dihydro-1*H*-1,2,4-triazol-3-yl)propyl)-[1,1'-biphenyl]-3-yl)acetic acid;

2-(4'-(3-(1-(4-(*tert*-Butyl)benzyl)-5-oxo-4-phenyl-4,5-dihydro-1*H*-1,2,4-triazol-3-yl)propyl)-[1,1'-biphenyl]-3-yl)acetic acid;

2-(4'-(3-(1-(4-(*tert*-Butyl)benzyl)-4-ethyl-5-oxo-4,5-dihydro-1*H*-1,2,4-triazol-3-yl)propyl)-4-fluoro-[1,1'-biphenyl]-3-yl)acetic acid;

3-(4'-(3-(1-(4-(*tert*-Butyl)benzyl)-4-ethyl-5-oxo-4,5-dihydro-1*H*-1,2,4-triazol-3-yl)propyl)-[1,1'-biphenyl]-3-yl)acrylic acid;

2-(4'-(3-(1-(4-(*tert*-Butyl)benzyl)-4-ethyl-5-oxo-4,5-dihydro-1*H*-1,2,4-triazol-3-yl)propyl)-[1,1'-biphenyl]-3-yl)cyclopropanecarboxylic acid;

3-(4'-(3-(1-(4-(*tert*-Butyl)benzyl)-4-ethyl-5-oxo-4,5-dihydro-1*H*-1,2,4-triazol-3-yl)propyl)-[1,1'-biphenyl]-3-yl)propanoic acid;

2-(4'-(3-(1-(4-Bromobenzyl)-4-ethyl-5-oxo-4,5-dihydro-1*H*-1,2,4-triazol-3-yl)propyl)-[1,1'-biphenyl]-3-yl)acetic acid;

2-(4'-(3-(1-(4-(*tert*-Butyl)benzyl)-4-ethyl-5-oxo-4,5-dihydro-1*H*-1,2,4-triazol-3-yl)propyl)-4-ethoxy-[1,1'-biphenyl]-3-yl)acetic acid;

or a pharmaceutically acceptable salt thereof.

30. The compound according to Claim 1 selected from the group consisting of:

2-(4-(4-(3-(1-(4-(*tert*-Butyl)benzyl)-4-ethyl-5-oxo-4,5-dihydro-1*H*-1,2,4-triazol-3-yl)propyl)phenyl)thiophen-2-yl)acetic acid;

1-{[4-(*tert*-Butyl)phenyl]methyl}-4-ethyl-3-[3-(4-{4-[(methylsulfonyl)amino](2-pyridyl)} phenyl)propyl]-1,2,4-triazolin-5-one;

4'-(3-(1-(4-(*tert*-Butyl)benzyl)-4-ethyl-5-oxo-4,5-dihydro-1*H*-1,2,4-triazol-3-yl)propyl)-5-(trifluoromethyl)-[1,1'-biphenyl]-3-carboxylic acid;

1-{[4-(*tert*-Butyl)phenyl]methyl}-3-[3-(4-{6-[(cyclopropylsulfonyl)amino](2-pyridyl)}phenyl)propyl]-4-ethyl-1,2,4-triazolin-5-one;

2-(5-{4-[3-(1-{[4-(*tert*-Butyl)phenyl]methyl}-4-ethyl-5-oxo-1,2,4-triazolin-3-yl)propyl]phenyl}-2-pyridyl)acetic acid;

2-(3-{4-[3-(1-{[4-(*tert*-Butyl)phenyl]methyl}-4-ethyl-5-oxo-1,2,4-triazolin-3-yl)propyl]phenyl}phenyl)propanoic acid;

2-(2-{4-[3-(1-{[4-(*tert*-Butyl)phenyl]methyl}-4-ethyl-5-oxo-1,2,4-triazolin-3-yl)propyl]phenyl}-4-pyridyl)acetic acid;

2-(3-{4-[3-(1-{[4-(*tert*-Butyl)phenyl]methyl}-4-ethyl-5-oxo-1,2,4-triazolin-3-yl)propyl]phenyl}phenyl)butanoic acid;

2-(3-{4-[3-(1-{[4-(*tert*-Butyl)phenyl]methyl}-4-ethyl-5-oxo(1,2,4-triazolin-3-yl))propyl]phenyl}phenyl)-3-phenylpropanoic acid;

2-(6-{4-[3-(1-{[4-(*tert*-Butyl)phenyl]methyl}-4-ethyl-5-oxo(1,2,4-triazolin-3-yl))propyl]phenyl}-4-(trifluoromethyl)-2-pyridyl)acetic acid;

2-(4'-(3-(1-(4-(*tert*-Butyl)benzyl)-4-ethyl-5-oxo-4,5-dihydro-1*H*-1,2,4-triazol-3-yl)propyl)-4-(cyclopropylmethoxy)-[1,1'-biphenyl]-3-yl)acetic acid;

2-(6-{4-[3-(1-{[4-(*tert*-Butyl)phenyl]methyl}-4-ethyl-5-oxo-1,2,4-triazolin-3-yl)propyl]phenyl}-2-pyridyl)acetic acid;

2-(4'-(3-(1-(4-(*tert*-Butyl)benzyl)-4-ethyl-5-oxo-4,5-dihydro-1*H*-1,2,4-triazol-3-yl)propyl)-[1,1'-biphenyl]-4-yl)-*N*-cyclopropyl-2-hydroxyacetamide;

2-(4'-(3-(1-(4-(*tert*-Butyl)benzyl)-4-ethyl-5-oxo-4,5-dihydro-1*H*-1,2,4-triazol-3-yl)propyl)-[1,1'-biphenyl]-4-yl)-*N*-cyclopropyl-2-oxoacetamide;

2-(4'-(3-(1-(4-(*tert*-Butyl)benzyl)-4-(cyclopropylmethyl)-5-oxo-4,5-dihydro-1*H*-1,2,4-triazol-3-yl)propyl)-[1,1'-biphenyl]-3-yl)acetic acid;

2-(4'-(3-(1-((5-(*tert*-Butyl)thiophen-2-yl)methyl)-4-ethyl-5-oxo-4,5-dihydro-1*H*-1,2,4-triazol-3-yl)propyl)-[1,1'-biphenyl]-3-yl)acetic acid;

2-(4'-(3-(1-(4-(*tert*-Butyl)benzyl)-5-oxo-4-(2,2,2-trifluoroethyl)-4,5-dihydro-1*H*-1,2,4-triazol-3-yl)propyl)-4-methoxy-[1,1'-biphenyl]-3-yl)acetic acid;

2-(4'-(3-(1-(4-(*tert*-Butyl)benzyl)-4-ethyl-5-oxo-4,5-dihydro-1*H*-1,2,4-triazol-3-yl)propyl)-[1,1'-biphenyl]-3-yl)-*N*-cyclopropyl-2-hydroxyacetamide;

2-(4'-(3-(1-(4-(*tert*-Butyl)benzyl)-4-ethyl-5-oxo-4,5-dihydro-1*H*-1,2,4-triazol-3-yl)propyl)-[1,1'-biphenyl]-3-yl)-*N*-cyclopropyl-2-oxoacetamide;

3-{3-[4-(6-Amino-5-methoxy(2-pyridyl))phenyl]propyl}-1-{[4-(*tert*-butyl)phenyl]methyl}-4-ethyl-1,2,4-triazolin-5-one;

1- {[4-(*tert*-Butyl)phenyl]methyl}-4-ethyl-3-[3-(4-{5-methoxy-6-[(phenylsulfonyl)amino](2-pyridyl)})phenyl]propyl]-1,2,4-triazolin-5-one;

3-{3-[4-(6-Amino-5-ethoxy(2-pyridyl))phenyl]propyl}-1-[4-(*tert*-butyl)phenyl]methyl}-4-ethyl-1,2,4-triazolin-5-one;

2-(5-{4-[3-(1-[4-(*tert*-Butyl)phenyl]methyl)-4-ethyl-5-oxo(1,2,4-triazolin-3-yl)]propyl}phenyl)-2-ethylthiophenyl)acetic acid;

1-[4-(*tert*-Butyl)phenyl]methyl}-3-[3-(4-{5-ethoxy-6-[(phenylsulfonyl)amino](2-pyridyl)})phenyl]propyl]-4-ethyl-1,2,4-triazolin-5-one;

2-(4'-(3-(4-Ethyl-1-(4-(3-fluorooxetan-3-yl)benzyl)-5-oxo-4,5-dihydro-1*H*-1,2,4-triazol-3-yl)propyl)-[1,1'-biphenyl]-3-yl)acetic acid;

2-(5-{4-[3-(1-[4-(*tert*-Butyl)phenyl]methyl)-4-ethyl-5-oxo(1,2,4-triazolin-3-yl)]propyl}phenyl)-2-methylthiophenyl)acetic acid;

4'-(3-(1-(4-(*tert*-Butyl)benzyl)-4-ethyl-5-oxo-4,5-dihydro-1*H*-1,2,4-triazol-3-yl)propyl)-4-methoxy-[1,1'-biphenyl]-3-carboxylic acid;

4'-(3-(1-(4-(*tert*-Butyl)benzyl)-4-ethyl-5-oxo-4,5-dihydro-1*H*-1,2,4-triazol-3-yl)propyl)-4-ethoxy-[1,1'-biphenyl]-3-carboxylic acid;

2-(4'-(3-(1-(3-Bromo-4-(*tert*-butyl)benzyl)-4-ethyl-5-oxo-4,5-dihydro-1*H*-1,2,4-triazol-3-yl)propyl)-[1,1'-biphenyl]-3-yl)acetic acid;

2-(4'-(3-(1-(4-(*tert*-Butyl)benzyl)-5-oxo-4-propyl-4,5-dihydro-1*H*-1,2,4-triazol-3-yl)propyl)-4-ethoxy-[1,1'-biphenyl]-3-yl)acetic acid;

2-(4'-(3-(4-Butyl-1-(4-(*tert*-butyl)benzyl)-5-oxo-4,5-dihydro-1*H*-1,2,4-triazol-3-yl)propyl)-4-ethoxy-[1,1'-biphenyl]-3-yl)acetic acid;

5-(4-(3-(1-(4-(*tert*-Butyl)benzyl)-4-ethyl-5-oxo-4,5-dihydro-1*H*-1,2,4-triazol-3-yl)propyl)phenyl)-1*H*-indole-3-carboxylic acid;

1-[4-(*tert*-Butyl)phenyl]methyl}-4-ethyl-3-{3-[4-(5-{[(4-propylphenyl)sulfonyl]amino}(2-pyridyl))phenyl]propyl}-1,2,4-triazolin-5-one;

1-[4-(*tert*-Butyl)phenyl]methyl}-4-ethyl-3-{3-[4-(6-{[(4-propylphenyl)sulfonyl]amino}(2-pyridyl))phenyl]propyl}-1,2,4-triazolin-5-one;

1-[4-(*tert*-Butyl)phenyl]methyl}-4-ethyl-3-(3-{4-[6-({[4-(4-methylphenyl)phenyl]sulfonyl}amino)(2-pyridyl)]phenyl}propyl)-1,2,4-triazolin-5-one;

1-[4-(*tert*-Butyl)phenyl]methyl}-4-ethyl-3-(3-{4-[6-({[4-(4-methoxyphenyl)phenyl]sulfonyl}amino)(2-pyridyl)]phenyl}propyl)-1,2,4-triazolin-5-one;

1-Acetyl-5-[(6-{4-[3-(1-[4-(*tert*-butyl)phenyl]methyl)-4-ethyl-5-oxo(1,2,4-triazolin-3-yl)]propyl}phenyl)(3-pyridyl)amino]sulfonyl]indoline;

2-(4'-(3-(4-Allyl-1-(4-(*tert*-butyl)benzyl)-5-oxo-4,5-dihydro-1*H*-1,2,4-triazol-3-yl)propyl)-4-methoxy-[1,1'-biphenyl]-3-yl)acetic acid;

1- {[4-(*tert*-Butyl)phenyl]methyl}-4-ethyl-3-[3-(4-{[4-(trifluoromethyl)(2-pyridyloxy)]phenyl} sulfonyl)amino](2-pyridyl)} phenyl)propyl]-1,2,4-triazolin-5-one;

1- {[4-(*tert*-Butyl)phenyl]methyl}-4-ethyl-3-{3-[4-(6-{[benzylsulfonyl]amino}(2-pyridyl))phenyl]propyl}-1,2,4-triazolin-5-one;

1- {[4-(*tert*-Butyl)phenyl]methyl}-4-ethyl-3-{3-[4-(5-{[benzylsulfonyl]amino}(2-pyridyl))phenyl]propyl}-1,2,4-triazolin-5-one;

2-(4'-(3-(1-(4-(*tert*-Butyl)benzyl)-5-oxo-4-propyl-4,5-dihydro-1*H*-1,2,4-triazol-3-yl)propyl)-4-methoxy-[1,1'-biphenyl]-3-yl)acetic acid;

N-(2-(4-(3-(1-(4-(*tert*-Butyl)benzyl)-4-ethyl-5-oxo-4,5-dihydro-1*H*-1,2,4-triazol-3-yl)propyl)phenyl)pyrimidin-4-yl)benzenesulfonamide;

1- {[4-(*tert*-Butyl)phenyl]methyl}-4-ethyl-3-(3-{4-[6-({[4-(trifluoromethyl)phenyl]sulfonyl} amino)(2-pyridyl)]phenyl} propyl)-1,2,4-triazolin-5-one;

1- {[4-(*tert*-Butyl)phenyl]methyl}-3-{3-[4-(6-{[(4-chlorophenyl)sulfonyl]amino}(2-pyridyl))phenyl]propyl}-4-ethyl-1,2,4-triazolin-5-one;

1- {[4-(*tert*-Butyl)phenyl]methyl}-4-ethyl-3-{3-[4-(6-{[(4-methoxyphenyl)sulfonyl]amino}(2-pyridyl))phenyl]propyl}-1,2,4-triazolin-5-one;

2-(4'-(3-(1-(3-Cyclopropyl-4-(*tert*-butyl)benzyl)-4-ethyl-5-oxo-4,5-dihydro-1*H*-1,2,4-triazol-3-yl)propyl)-[1,1'-biphenyl]-3-yl)acetic acid;

1- {[4-(*tert*-Butyl)phenyl]methyl}-4-ethyl-3-(3-{4-[5-({[4-(trifluoromethyl)phenyl]sulfonyl} amino)(2-pyridyl)]phenyl} propyl)-1,2,4-triazolin-5-one;

1- {[4-(*tert*-Butyl)phenyl]methyl}-4-ethyl-3-{3-[4-(5-methoxy-6-{[benzylsulfonyl]amino}(2-pyridyl))phenyl]propyl}-1,2,4-triazolin-5-one;

1- {[4-(*tert*-Butyl)phenyl]methyl}-4-ethyl-3-(3-{4-[5-methoxy-6-({[4-(trifluoromethyl)phenyl]sulfonyl} amino)(2-pyridyl)]phenyl} propyl)-1,2,4-triazolin-5-one;

5-(4-(3-(1-(4-(*tert*-Butyl)benzyl)-4-ethyl-5-oxo-4,5-dihydro-1*H*-1,2,4-triazol-3-yl)propyl)phenyl)benzofuran-3-carboxylic acid;

1- {[4-(*tert*-Butyl)phenyl]methyl}-3-{3-[4-(5-{[(4-chlorophenyl)sulfonyl]amino}(2-pyridyl))phenyl]propyl}-4-ethyl-1,2,4-triazolin-5-one;

1- {[4-(*tert*-Butyl)phenyl]methyl}-4-ethyl-3-{3-[4-(5-{[(4-methoxyphenyl)sulfonyl]amino}(2-pyridyl))phenyl]propyl}-1,2,4-triazolin-5-one;

1- {[4-(*tert*-Butyl)phenyl]methyl}-3-{3-[4-(6-{[(4-chlorophenyl)sulfonyl]amino}-5-methoxy(2-pyridyl))phenyl]propyl}-4-ethyl-1,2,4-triazolin-5-one;

1- {[4-(*tert*-Butyl)phenyl]methyl}-4-ethyl-3-{3-[4-(5-methoxy-6-{[(4-methoxyphenyl)sulfonyl] amino}(2-pyridyl))phenyl]propyl}-1,2,4-triazolin-5-one;

2-(4'-(3-(1-(4-(*tert*-Butyl)benzyl)-4-ethyl-5-oxo-4,5-dihydro-1*H*-1,2,4-triazol-3-yl)propyl)-4-propoxy-[1,1'-biphenyl]-3-yl)acetic acid;

2-(4'-(3-(1-(4-(*tert*-Butyl)benzyl)-4-methyl-5-oxo-4,5-dihydro-1*H*-1,2,4-triazol-3-yl)propyl)-4-ethoxy-[1,1'-biphenyl]-3-yl)acetic acid;

(*rac*)-5-(4-(3-(1-(4-(*tert*-Butyl)benzyl)-4-ethyl-5-oxo-4,5-dihydro-1*H*-1,2,4-triazol-3-yl)propyl)phenyl)-2,3-dihydrobenzofuran-3-carboxylic acid;

N-(6-{4-[3-(1-{[4-(*tert*-Butyl)phenyl]methyl}-4-ethyl-5-oxo(1,2,4-triazolin-3-yl))propyl]phenyl}(2-pyridyl))benzamide;

1-{[4-(*tert*-Butyl)phenyl]methyl}-4-ethyl-3-[3-(4-{6-methoxy-5-[(phenylsulfonyl)amino](2-pyridyl)}phenyl)propyl]-1,2,4-triazolin-5-one;

N-benzyl-4'-(3-(1-(4-(*tert*-butyl)benzyl)-4-ethyl-5-oxo-4,5-dihydro-1*H*-1,2,4-triazol-3-yl)propyl)-[1,1'-biphenyl]-4-sulfonamide;

N-(6-{4-[3-(1-{[4-(*tert*-Butyl)phenyl]methyl}-4-ethyl-5-oxo-1,2,4-triazolin-3-yl)propyl]phenyl}-2-pyridyl)butanamide;

N-(6-{4-[3-(1-{[4-(*tert*-Butyl)phenyl]methyl}-4-ethyl-5-oxo(1,2,4-triazolin-3-yl))propyl]phenyl}(2-pyridyl))-2-phenylacetamide;

N-(6-{4-[3-(1-{[4-(*tert*-Butyl)phenyl]methyl}-4-ethyl-5-oxo(1,2,4-triazolin-3-yl))propyl]phenyl}(2-pyridyl))cyclopropylcarboxamide;

N-((4'-(3-(1-(4-(*tert*-Butyl)benzyl)-4-ethyl-5-oxo-4,5-dihydro-1*H*-1,2,4-triazol-3-yl)propyl)-[1,1'-biphenyl]-3-yl)sulfonyl)propionamide;

N-Benzyl-1-(4'-(3-(1-(4-(*tert*-butyl)benzyl)-4-ethyl-5-oxo-4,5-dihydro-1*H*-1,2,4-triazol-3-yl)propyl)-[1,1'-biphenyl]-4-yl)methanesulfonamide;

N-Benzyl-1-(4'-(3-(1-(4-(*tert*-butyl)benzyl)-4-ethyl-5-oxo-4,5-dihydro-1*H*-1,2,4-triazol-3-yl)propyl)-[1,1'-biphenyl]-3-yl)methanesulfonamide;

2-(4'-(3-(1-(4-(*tert*-Butyl)benzyl)-4-methyl-5-oxo-4,5-dihydro-1*H*-1,2,4-triazol-3-yl)propyl)-4-methoxy-[1,1'-biphenyl]-3-yl)acetic acid;

3-{3-[4-(3-{[(Dimethylamino)sulfonyl]amino}phenyl)phenyl]propyl}-1-{[4-(*tert*-butyl)phenyl]methyl}-4-ethyl-1,2,4-triazolin-5-one;

N-(2-(4-(3-(1-(4-(*tert*-Butyl)benzyl)-4-ethyl-5-oxo-4,5-dihydro-1*H*-1,2,4-triazol-3-yl)propyl)phenyl)pyrimidin-5-yl)benzenesulfonamide;

3-(3-(4-(5-Aminopyridin-3-yl)phenyl)propyl)-1-(4-(*tert*-butyl)benzyl)-4-ethyl-1*H*-1,2,4-triazol-5(4*H*)-one;

1-{[4-(*tert*-Butyl)phenyl]methyl}-4-ethyl-3-[3-(4-{5-methoxy-6-[*N*-methyl(phenylsulfonyl) amino](2-pyridyl)}phenyl)propyl]-1,2,4-triazolin-5-one;

3-{3-[4-(5-Amino-4-methoxy(2-pyridyl))phenyl]propyl}-1-{[4-(*tert*-butyl)phenyl]methyl}-4-ethyl-1,2,4-triazolin-5-one;

1-{[4-(*tert*-Butyl)phenyl]methyl}-4-ethyl-3-[3-(4-{4-methoxy-5-[(phenylsulfonyl)amino](2-pyridyl)}phenyl)propyl]-1,2,4-triazolin-5-one;

1-{[4-(*tert*-Butyl)phenyl]methyl}-3-{3-[4-(6-{[(6-chloro(3-pyridyl))sulfonyl]amino}-5-methoxy(2-pyridyl))phenyl]propyl}-4-ethyl-1,2,4-triazolin-5-one;

1-{[4-(*tert*-Butyl)phenyl]methyl}-4-ethyl-3-{3-[4-(5-methoxy-6-{[(6-methoxy(3-pyridyl))sulfonyl]amino}(2-pyridyl))phenyl]propyl}-1,2,4-triazolin-5-one;

2-(4'-(3-(1-(3-Methyl-4-(*tert*-butyl)benzyl)-4-ethyl-5-oxo-4,5-dihydro-1*H*-1,2,4-triazol-3-yl)propyl)-[1,1'-biphenyl]-3-yl)acetic acid;

N-(((4'-(3-(1-(4-(*tert*-Butyl)benzyl)-4-ethyl-5-oxo-4,5-dihydro-1*H*-1,2,4-triazol-3-yl)propyl)-[1,1'-biphenyl]-3-yl)methyl)sulfonyl)propionamide;

N-(5-(4-(3-(1-(4-(*tert*-Butyl)benzyl)-4-ethyl-5-oxo-4,5-dihydro-1*H*-1,2,4-triazol-3-yl)propyl)phenyl)pyridin-3-yl)benzenesulfonamide;

N-(5-(4-(3-(1-(4-(*tert*-Butyl)benzyl)-4-ethyl-5-oxo-4,5-dihydro-1*H*-1,2,4-triazol-3-yl)propyl)phenyl)pyrazin-2-yl)benzenesulfonamide;

N-(5-(4-(3-(1-(4-(*tert*-Butyl)benzyl)-4-ethyl-5-oxo-4,5-dihydro-1*H*-1,2,4-triazol-3-yl)propyl)phenyl)pyrazin-2-yl)-1-phenylmethanesulfonamide;

1-(4'-(3-(1-(4-(*tert*-Butyl)benzyl)-4-ethyl-5-oxo-4,5-dihydro-1*H*-1,2,4-triazol-3-yl)propyl)-4-ethoxy-[1,1'-biphenyl]-3-yl)cyclopropanecarbonitrile;

4'-(3-(1-(4-(*tert*-Butyl)benzyl)-4-ethyl-5-oxo-4,5-dihydro-1*H*-1,2,4-triazol-3-yl)propyl)-4-(difluoromethoxy)-[1,1'-biphenyl]-3-carboxylic acid;

1-(4'-(3-(1-(4-(*tert*-Butyl)benzyl)-4-ethyl-5-oxo-4,5-dihydro-1*H*-1,2,4-triazol-3-yl)propyl)-4-ethoxy-[1,1'-biphenyl]-3-yl)cyclopropanecarboxylic acid;

4'-(3-(1-(4-(*tert*-Butyl)benzyl)-4-ethyl-5-oxo-4,5-dihydro-1*H*-1,2,4-triazol-3-yl)propyl)-4-methoxy-*N*-(pyridin-2-yl)-[1,1'-biphenyl]-3-sulfonamide;

1-{[4-(*tert*-Butyl)phenyl]methyl}-4-ethyl-3-[3-(4-{6-methyl-5-[(phenylsulfonyl)amino]}(2-pyridyl))phenyl]propyl]-1,2,4-triazolin-5-one;

1-{[4-(*tert*-Butyl)phenyl]methyl}-4-ethyl-3-{3-[4-(6-methyl-5-{[benzylsulfonyl]amino}(2-pyridyl))phenyl]propyl}-1,2,4-triazolin-5-one;

1-{[4-(*tert*-Butyl)phenyl]methyl}-4-ethyl-3-[3-(4-{4-methyl-5-[(phenylsulfonyl)amino]}(2-pyridyl))phenyl]propyl]-1,2,4-triazolin-5-one;

1-{[4-(*tert*-Butyl)phenyl]methyl}-4-ethyl-3-{3-[4-(4-methyl-5-{[benzylsulfonyl]amino}(2-pyridyl))phenyl]propyl}-1,2,4-triazolin-5-one;

1-(4'-(3-(1-(4-(*tert*-Butyl)benzyl)-4-ethyl-5-oxo-4,5-dihydro-1*H*-1,2,4-triazol-3-yl)propyl)-4-methoxy-[1,1'-biphenyl]-3-yl)cyclopropanecarboxylic acid;

N-(6-(4-(3-(1-(4-(*tert*-Butyl)benzyl)-4-ethyl-5-oxo-4,5-dihydro-1*H*-1,2,4-triazol-3-yl)propyl)phenyl)pyrazin-2-yl)benzenesulfonamide;

2-(4'-(3-(1-(4-(*tert*-Butyl)benzyl)-4-ethyl-5-oxo-4,5-dihydro-1*H*-1,2,4-triazol-3-yl)propyl)-4-(trifluoromethoxy)-[1,1'-biphenyl]-3-yl)acetic acid;

4'-(3-(1-(4-(*tert*-Butyl)benzyl)-4-ethyl-5-oxo-4,5-dihydro-1*H*-1,2,4-triazol-3-yl)propyl)-4-(trifluoromethoxy)-[1,1'-biphenyl]-3-carboxylic acid;

4'-(3-(1-(4-(*tert*-Butyl)benzyl)-4-ethyl-5-oxo-4,5-dihydro-1*H*-1,2,4-triazol-3-yl)propyl)-4-methyl-[1,1'-biphenyl]-3-carboxylic acid;

1-(4'-(3-(1-(4-(*tert*-Butyl)benzyl)-4-ethyl-5-oxo-4,5-dihydro-1*H*-1,2,4-triazol-3-yl)propyl)-4-methoxy-[1,1'-biphenyl]-3-yl)cyclobutanecarboxylic acid;

4'-(3-(1-(4-(*tert*-Butyl)benzyl)-4-ethyl-5-oxo-4,5-dihydro-1*H*-1,2,4-triazol-3-yl)propyl)-4-(trifluoromethyl)-[1,1'-biphenyl]-3-carboxylic acid;

2-(4'-(3-(1-(4-(*tert*-Butyl)benzyl)-4-ethyl-5-oxo-4,5-dihydro-1*H*-1,2,4-triazol-3-yl)propyl)-4-methoxy-[1,1'-biphenyl]-3-yl)-*N*-(methylsulfonyl)acetamide;

2-(4'-(3-(1-(4-(*tert*-Butyl)benzyl)-4-ethyl-5-oxo-4,5-dihydro-1*H*-1,2,4-triazol-3-yl)propyl)-4-methoxy-[1,1'-biphenyl]-3-yl)-*N*-(phenylsulfonyl)acetamide;

1-(4'-(3-(1-(4-(*tert*-Butyl)benzyl)-4-ethyl-5-oxo-4,5-dihydro-1*H*-1,2,4-triazol-3-yl)propyl)-[1,1'-biphenyl]-4-yl)cyclopropanecarboxylic acid;

N-(4-(4-(3-(1-(4-(*tert*-Butyl)benzyl)-4-ethyl-5-oxo-4,5-dihydro-1*H*-1,2,4-triazol-3-yl)propyl)phenyl)pyrimidin-2-yl)benzenesulfonamide;

6-(4-(3-(1-(4-(*tert*-Butyl)benzyl)-4-ethyl-5-oxo-4,5-dihydro-1*H*-1,2,4-triazol-3-yl)propyl)phenyl)-3-methoxyipicolinic acid;

2-(4-(3-(1-(4-(*tert*-Butyl)benzyl)-4-ethyl-5-oxo-4,5-dihydro-1*H*-1,2,4-triazol-3-yl)propyl)phenyl)-5-methoxyisonicotinic acid;

(*R*)-2-(4'-(3-(1-(4-(*tert*-Butyl)benzyl)-4-ethyl-5-oxo-4,5-dihydro-1*H*-1,2,4-triazol-3-yl)propyl)-4-methoxy-[1,1'-biphenyl]-3-yl)propanoic acid;

(*S*)-2-(4'-(3-(1-(4-(*tert*-Butyl)benzyl)-4-ethyl-5-oxo-4,5-dihydro-1*H*-1,2,4-triazol-3-yl)propyl)-4-methoxy-[1,1'-biphenyl]-3-yl)propanoic acid;

1-(4-(*tert*-Butyl)benzyl)-4-ethyl-3-(3-(4'-(3-fluorooxetan-3-yl)-[1,1'-biphenyl]-4-yl)propyl)-1*H*-1,2,4-triazol-5(4*H*)-one;

2-(6-(4-(3-(1-(4-(*tert*-Butyl)benzyl)-4-ethyl-5-oxo-4,5-dihydro-1*H*-1,2,4-triazol-3-yl)propyl)phenyl)-3-methoxypyridin-2-yl)acetic acid;

2-(4'-(3-(1-(4-(*tert*-Butyl)benzyl)-4-ethyl-5-oxo-4,5-dihydro-1*H*-1,2,4-triazol-3-yl)propyl)-2'-hydroxy-4-methoxy-[1,1'-biphenyl]-3-yl)acetic acid;

2-(4'-(3-(1-(4-(*tert*-Butyl)benzyl)-4-ethyl-5-oxo-4,5-dihydro-1*H*-1,2,4-triazol-3-yl)propyl)-3'-hydroxy-4-methoxy-[1,1'-biphenyl]-3-yl)acetic acid;

3-(3-(3'-Amino-4'-methoxy-[1,1'-biphenyl]-4-yl)propyl)-1-(4-(*tert*-butyl)benzyl)-4-ethyl-1*H*-1,2,4-triazol-5(4*H*)-one;

3-(3-(3'-Amino-4'-(trifluoromethyl)-[1,1'-biphenyl]-4-yl)propyl)-1-(4-(*tert*-butyl)benzyl)-4-ethyl-1*H*-1,2,4-triazol-5(4*H*)-one;

3-(3-(3'-Amino-4'-methyl-[1,1'-biphenyl]-4-yl)propyl)-1-(4-(*tert*-butyl)benzyl)-4-ethyl-1*H*-1,2,4-triazol-5(4*H*)-one;

2-(4'-(3-(1-(4-(*tert*-Butyl)benzyl)-4-ethyl-5-oxo-4,5-dihydro-1*H*-1,2,4-triazol-3-yl)propyl)-4-methoxy-2'-(trifluoromethyl)-[1,1'-biphenyl]-3-yl)acetic acid;

1-{[4-(*tert*-Butyl)phenyl]methyl}-4-ethyl-3-[3-(4-{4-methoxy-3-[(phenylsulfonyl)amino]phenyl}phenyl)propyl]-1,2,4-triazolin-5-one;

1-{[4-(*tert*-Butyl)phenyl]methyl}-4-ethyl-3-[3-(4-{4-methyl-3-[(phenylsulfonyl)amino]phenyl}phenyl)propyl]-1,2,4-triazolin-5-one;

1-(6-(4-(3-(1-(4-(*tert*-Butyl)benzyl)-4-ethyl-5-oxo-4,5-dihydro-1*H*-1,2,4-triazol-3-yl)propyl)phenyl)pyridin-2-yl)-3-phenylurea;

N-((6-(4-(3-(1-(4-(*tert*-Butyl)benzyl)-4-ethyl-5-oxo-4,5-dihydro-1*H*-1,2,4-triazol-3-yl)propyl)phenyl)pyridin-2-yl)carbamoyl)benzenesulfonamide;

1-Benzyl-3-(6-(4-(3-(1-(4-(*tert*-butyl)benzyl)-4-ethyl-5-oxo-4,5-dihydro-1*H*-1,2,4-triazol-3-yl)propyl)phenyl)pyridin-2-yl)urea;

3-(3-{4-[5-Amino-3-(trifluoromethyl)(2-pyridyl)]phenyl}propyl)-1-{[4-(*tert*-butyl)phenyl]methyl}-4-ethyl-1,2,4-triazolin-5-one;

2-(4'-(3-(1-(4-(*tert*-Butyl)benzyl)-4-ethyl-5-oxo-4,5-dihydro-1*H*-1,2,4-triazol-3-yl)propyl)-4-methoxy-2'-methyl-[1,1'-biphenyl]-3-yl)acetic acid;

2-(4'-(3-(1-(4-(*tert*-Butyl)benzyl)-4-ethyl-5-oxo-4,5-dihydro-1*H*-1,2,4-triazol-3-yl)propyl)-3',4-dimethoxy-[1,1'-biphenyl]-3-yl)acetic acid;

2-(4'-(3-(1-(4-(*tert*-Butyl)benzyl)-4-ethyl-5-oxo-4,5-dihydro-1*H*-1,2,4-triazol-3-yl)propyl)-2',4-dimethoxy-[1,1'-biphenyl]-3-yl)acetic acid;

N-((6-(4-(3-(1-(4-(*tert*-Butyl)benzyl)-4-ethyl-5-oxo-4,5-dihydro-1*H*-1,2,4-triazol-3-yl)propyl)phenyl)pyridin-3-yl)carbamoyl)benzenesulfonamide;

3-(3-{4-[6-Amino-5-(trifluoromethyl)(2-pyridyl)]phenyl}propyl)-1-{[4-(*tert*-butyl)phenyl]methyl}-4-ethyl-1,2,4-triazolin-5-one;

6-(4-(3-(1-(4-(*tert*-Butyl)benzyl)-4-ethyl-5-oxo-4,5-dihydro-1*H*-1,2,4-triazol-3-yl)propyl)phenyl)-3-methoxypyrazine-2-carboxylic acid;

2-(4'-(3-(1-(4-(*tert*-Butyl)benzyl)-4-ethyl-5-oxo-4,5-dihydro-1*H*-1,2,4-triazol-3-yl)-1,1-difluoropropyl)-4-methoxy-[1,1'-biphenyl]-3-yl)acetic acid;

1-{[4-(*tert*-Butyl)phenyl]methyl}-4-ethyl-3-[3-(4-{6-[(phenylsulfonyl)amino]-5-(trifluoromethyl)(2-pyridyl)}phenyl)propyl]-1,2,4-triazolin-5-one;

6-(4-(3-(1-(4-(*tert*-Butyl)benzyl)-4-ethyl-5-oxo-4,5-dihydro-1*H*-1,2,4-triazol-3-yl)propyl)phenyl)-3-methylpicolinic acid;

1-(4-(*tert*-Butyl)benzyl)-4-ethyl-3-(3-(4-(6-(3-fluorooxetan-3-yl)pyridine-3-yl)phenyl)propyl)-1*H*-1,2,4-triazol-5(4*H*)-one;

1-(4-(*tert*-Butyl)benzyl)-3-(3-(4'-(3-hydroxyoxetan-3-yl)-[1,1'-biphenyl]-4-yl)propyl)-1*H*-1,2,4-triazol-5(4*H*)-one;

4'-(3-(1-(4-(*tert*-Butyl)benzyl)-4-ethyl-5-oxo-4,5-dihydro-1*H*-1,2,4-triazol-3-yl)propyl)-4-propoxy-[1,1'-biphenyl]-3-carboxylic acid;

1-(6-(4-(3-(1-(4-(*tert*-Butyl)benzyl)-4-ethyl-5-oxo-4,5-dihydro-1*H*-1,2,4-triazol-3-yl)propyl)phenyl)pyridin-3-yl)-3-ethylurea;

1-(4-(*tert*-Butyl)benzyl)-4-ethyl-3-(3-(4-(2-(3-fluorooxetan-3-yl)pyrimidin-5-yl)phenyl)propyl)-1*H*-1,2,4-triazol-5(4*H*)-one;

1-(6-(4-(3-(1-(4-(*tert*-Butyl)benzyl)-4-ethyl-5-oxo-4,5-dihydro-1*H*-1,2,4-triazol-3-yl)propyl)phenyl)pyridin-2-yl)-3-ethylurea;

3-(3-{4-[3-(Aminomethyl)phenyl]phenyl}propyl)-1-{[4-(*tert*-butyl)phenyl]methyl}-4-ethyl-1,2,4-triazolin-5-one;

1-(4-(*tert*-Butyl)benzyl)-4-ethyl-3-(3-(4-(2-(3-hydroxyoxetan-3-yl)pyrimidin-5-yl)phenyl)propyl)-1*H*-1,2,4-triazol-5(4*H*)-one;

1-(4-(*tert*-Butyl)benzyl)-4-ethyl-3-(3-(4'-(3-hydroxyoxetan-3-yl)-[1,1'-biphenyl]-4-yl)propyl)-1*H*-1,2,4-triazol-5(4*H*)-one;

1-(4-(*tert*-Butyl)benzyl)-4-ethyl-3-(3-(4'-(1-hydroxycyclobutyl)-[1,1'-biphenyl]-4-yl)propyl)-1*H*-1,2,4-triazol-5(4*H*)-one;

1-{[4-(*tert*-Butyl)phenyl]methyl}-4-ethyl-3-{3-[4-(3-{[(phenylsulfonyl)amino]methyl}phenyl)phenyl]propyl}-1,2,4-triazolin-5-one;

1-{[4-(*tert*-Butyl)phenyl]methyl}-4-ethyl-3-{3-[4-(3-{[(methylsulfonyl)amino]methyl}phenyl)phenyl]propyl}-1,2,4-triazolin-5-one;

3-(5-{4-[3-(1-{[4-(*tert*-Butyl)phenyl]methyl}-4-ethyl-5-oxo(1,2,4-triazolin-3-yl))propyl]phenyl}-2-methoxyphenyl)propanoic acid;

1-{[4-(*tert*-Butyl)phenyl]methyl}-4-ethyl-3-[3-(4-{4-methoxy-3-[(methylamino)methyl]phenyl}phenyl)propyl]-1,2,4-triazolin-5-one;

2-(4-(3-(1-(4-(*tert*-Butyl)benzyl)-4-ethyl-5-oxo-4,5-dihydro-1*H*-1,2,4-triazol-3-yl)propyl)phenyl)-5-methoxypyrimidine-4-carboxylic acid;

1-{[4-(*tert*-Butyl)phenyl]methyl}-4-ethyl-3-{3-[4-(4-methoxy-3-{2-[(phenylsulfonyl)amino]ethyl}phenyl)phenyl]propyl}-1,2,4-triazolin-5-one;

1-{[4-(*tert*-Butyl)phenyl]methyl}-4-ethyl-3-{3-[4-(4-methoxy-3-{2-[(methylsulfonyl)amino]ethyl}phenyl)phenyl]propyl}-1,2,4-triazolin-5-one;

3-(3-{4-[3-(Aminomethyl)-4-methoxyphenyl]phenyl}propyl)-1-{[4-(*tert*-butyl)phenyl]methyl}-4-ethyl-1,2,4-triazolin-5-one;

1-{[4-(*tert*-Butyl)phenyl]methyl}-4-ethyl-3-{3-[4-(4-methoxy-3-{[(phenylsulfonyl)amino]methyl}phenyl)phenyl]propyl}-1,2,4-triazolin-5-one;

1-{[4-(*tert*-Butyl)phenyl]methyl}-4-ethyl-3-{3-[4-(4-methoxy-3-{[(methylsulfonyl)amino]methyl}phenyl)phenyl]propyl}-1,2,4-triazolin-5-one;

1-(4-(*tert*-Butyl)benzyl)-4-ethyl-3-(3-(4'-(4-hydroxytetrahydro-2*H*-pyran-4-yl)-[1,1'-biphenyl]-4-yl)propyl)-1*H*-1,2,4-triazol-5(4*H*)-one;

1-{[4-(*tert*-Butyl)phenyl]methyl}-4-ethyl-3-(3-{4-[4-methoxy-3-({[benzylsulfonyl]amino}methyl)phenyl]phenyl}propyl)-1,2,4-triazolin-5-one;

1-{[4-(*tert*-Butyl)phenyl]methyl}-4-ethyl-3-[3-(4-{6-[(ethylsulfonyl)amino]-5-methoxy(2-pyridyl)}phenyl)propyl]-1,2,4-triazolin-5-one;

1-{[4-(*tert*-Butyl)phenyl]methyl}-4-ethyl-3-[3-(4-{6-[(cyclopropylsulfonyl)amino]-5-methoxy(2-pyridyl)}phenyl)propyl]-1,2,4-triazolin-5-one;

1-(4-(*tert*-Butyl)benzyl)-4-ethyl-3-(3-(4-(5-(3-fluorooxetan-3-yl)pyridine-2-yl)phenyl)propyl)-1*H*-1,2,4-triazol-5(4*H*)-one;

1-{[4-(*tert*-Butyl)phenyl]methyl}-4-ethyl-3-[3-(4-{6-[(cyclohexylsulfonyl)amino]-5-methoxy(2-pyridyl)}phenyl)propyl]-1,2,4-triazolin-5-one;

3-{4-[3-(1-{[4-(*tert*-Butyl)phenyl]methyl}-4-ethyl-5-oxo(1,2,4-triazolin-3-yl))propyl]phenyl}-5-methoxybenzoic acid;

2-(3-{4-[3-(1-{[4-(*tert*-Butyl)phenyl]methyl}-4-ethyl-5-oxo(1,2,4-triazolin-3-yl))propyl]phenyl}-5-methoxyphenyl)acetic acid;

1-(4-(*tert*-Butyl)benzyl)-3-(3,3-difluoro-3-(4-(5-(3-fluorooxetan-3-yl)pyridine-2-yl)phenyl)propyl)-4-ethyl-1*H*-1,2,4-triazol-5(4*H*)-one;

1-(4-(*tert*-Butyl)benzyl)-3-(3,3-difluoro-3-(4'-(3-hydroxyoxetan-3-yl)-[1,1'-biphenyl]-4-yl)propyl)-4-ethyl-1*H*-1,2,4-triazol-5(4*H*)-one;

1-(4-(*tert*-Butyl)benzyl)-4-ethyl-3-(3-(4-(5-(3-hydroxyoxetan-3-yl)pyridine-2-yl)phenyl)propyl)-1*H*-1,2,4-triazol-5(4*H*)-one;

2-(5-(6-(3-(1-(4-(*tert*-Butyl)benzyl)-4-ethyl-5-oxo-4,5-dihydro-1*H*-1,2,4-triazol-3-yl)propyl)pyridin-3-yl)-2-methoxyphenyl)acetic acid;

2-(4'-(3-(1-(4-(*tert*-Butyl)benzyl)-4-ethyl-5-oxo-4,5-dihydro-1*H*-1,2,4-triazol-3-yl)propyl)-3-methoxy-[1,1'-biphenyl]-4-yl)acetic acid;

2-(4'-(3-(1-(4-(*tert*-Butyl)benzyl)-4-ethyl-5-oxo-4,5-dihydro-1*H*-1,2,4-triazol-3-yl)propyl)-4-isopropoxy-[1,1'-biphenyl]-3-yl)acetic acid;

1-(4-(*tert*-Butyl)benzyl)-4-ethyl-3-(3-(4-(2-(3-fluorooxetan-3-yl)thiazol-4-yl)phenyl)propyl)-1*H*-1,2,4-triazol-5(4*H*)-one;

1-(4-(*tert*-Butyl)benzyl)-4-ethyl-3-(3-(4-(2-(3-fluorooxetan-3-yl)thiazol-5-yl)phenyl)propyl)-1*H*-1,2,4-triazol-5(4*H*)-one;

1-(4-(*tert*-Butyl)benzyl)-4-ethyl-3-(3-(4-(2-(3-hydroxyoxetan-3-yl)thiazol-4-yl)phenyl)propyl)-1*H*-1,2,4-triazol-5(4*H*)-one; and

1-(4-(*tert*-Butyl)benzyl)-4-ethyl-3-(3-(4-(2-(3-hydroxyoxetan-3-yl)thiazol-5-yl)phenyl)propyl)-1*H*-1,2,4-triazol-5(4*H*)-one;

or a pharmaceutically acceptable salt thereof.

31. A pharmaceutical composition comprising a compound according to any one of Claims 1-30, or a pharmaceutically acceptable salt thereof, and at least one pharmaceutically acceptable carrier.
32. A method of treating a cancer in a mammal which is negatively impacted by diminution in its metabolism of fatty acid oxidation, comprising administration of a therapeutically effective amount of a compound of any one of Claims 1-30, or a pharmaceutically acceptable salt thereof, to the mammal in need thereof.
33. The method according to Claim 32, wherein the cancer is selected from prostate, breast, ovarian, liver, kidney, colon, pancreatic, human chronic lymphocytic leukemia, and melanoma.
34. A method of treating cancer in a mammal comprising the administration of a therapeutically effective amount of a compound according to any one of Claims 1-30, or a pharmaceutically acceptable salt thereof, to the mammal in need thereof.
35. The method according to Claim 34, wherein the cancer is prostate, breast, ovarian, liver, kidney, colon, pancreatic, human chronic lymphocytic leukemia, or melanoma.
36. A method of treating viral infection in a mammal comprising the administration of a therapeutically effective amount of a compound according to any one of Claims 1-30, or a pharmaceutically acceptable salt thereof, to the mammal in need thereof.
37. The method of treating viral infection of claim 36, wherein the viral infection is hepatitis C virus (HCV) infection or human immunodeficiency virus (HIV) infection.
38. A method of treating a metabolic disorder in a mammal comprising the administration of a therapeutically effective amount of a compound according to any one of Claims 1-30, or a pharmaceutically acceptable salt thereof, to the mammal in need thereof.
39. A method of preventing the onset of and/or recurrence of cancer in a mammal through the administration of a therapeutically effective amount of a compound according to any one of Claims 1-30, or a pharmaceutically acceptable salt thereof, to the mammal in need thereof.
40. The method of claim 39, wherein the cancer is a leukemia.
41. The method of claim 39, wherein the cancer is acute or chronic myeloid leukemia.

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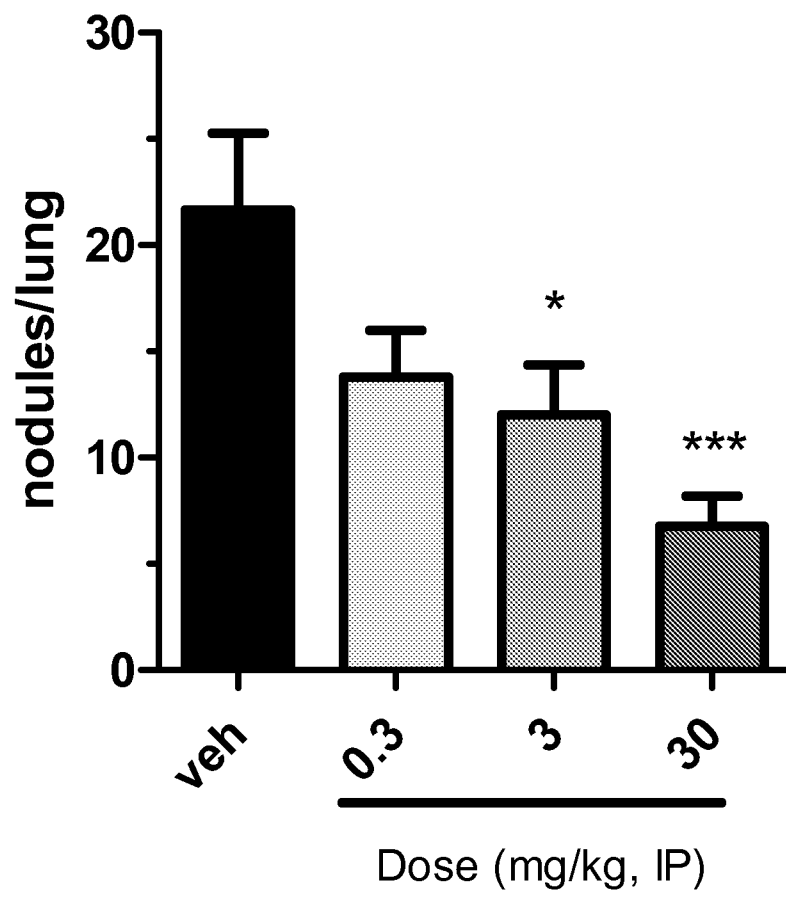


FIG. 1

INTERNATIONAL SEARCH REPORT

International application No.
PCT/US2013/029713**A. CLASSIFICATION OF SUBJECT MATTER****C07D 249/12(2006.01)i, C07D 401/10(2006.01)i, A61K 31/4196(2006.01)i, A61P 31/14(2006.01)i, A61P 35/00(2006.01)i**

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

C07D 249/12; A01N 43/64; A61K 31/415; A61K 31/41; C07D 401/10; A61K 31/4196; A61P 31/14; A61P 35/00

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Korean utility models and applications for utility models

Japanese utility models and applications for utility models

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)

eKOMPASS(KIPO internal) & Keywords: triazolone, cancer, PPAR

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	US 7816522 B2 (CLARK, R. et al.) 19 October 2010 See claims 1-5.	1-31
A	WO 2011-103546 A1 (GLAXOSMITHKLINE LLC) 25 August 2011 See claim 1.	1-31
A	AMMAZZALORSO, A. et al., Benzothiazole-based N-(phenylsulfonyl)amides as a novel family of PPARα antagonist, Bioorganic & Medicinal Chemistry Letters, 2011, Vol.21, pp.4869-4872 See page 4870, figure 1.	1-31
A	XU, Y. et al., Design and Synthesis of a Potent and Selective Triazolone-Based Peroxisome Proliferator-Activated Receptor α agonist, Journal of Medicinal Chemistry, 2003, Vol.46, pp.5121-5124 See page 5121, chart 1.	1-31



Further documents are listed in the continuation of Box C.



See patent family annex.

* Special categories of cited documents:

"A" document defining the general state of the art which is not considered to be of particular relevance

"E" earlier application or patent but published on or after the international filing date

"L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of citation or other special reason (as specified)

"O" document referring to an oral disclosure, use, exhibition or other means

"P" document published prior to the international filing date but later than the priority date claimed

"T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention

"X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone

"Y" document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art

"&" document member of the same patent family

Date of the actual completion of the international search

28 June 2013 (28.06.2013)

Date of mailing of the international search report

28 June 2013 (28.06.2013)

Name and mailing address of the ISA/KR

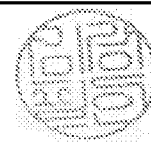
Korean Intellectual Property Office
189 Cheongsa-ro, Seo-gu, Daejeon Metropolitan City,
302-701, Republic of Korea

Facsimile No. 82-42-472-7140

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INTERNATIONAL SEARCH REPORTInternational application No.
PCT/US2013/029713**Box No. II Observations where certain claims were found unsearchable (Continuation of item 2 of first sheet)**

This international search report has not been established in respect of certain claims under Article 17(2)(a) for the following reasons:

1. ☒ Claims Nos.: 32-41
because they relate to subject matter not required to be searched by this Authority, namely:
Claims 32-41 pertain to methods for treatment of the human body by therapy, and thus relate to a subject matter which this International Searching Authority is not required to search under Article 17(2)(a)(i) of the PCT and Rule 39.1(iv) of the Regulations under the PCT.
2. ☐ Claims Nos.:
because they relate to parts of the international application that do not comply with the prescribed requirements to such an extent that no meaningful international search can be carried out, specifically:
3. ☐ Claims Nos.:
because they are dependent claims and are not drafted in accordance with the second and third sentences of Rule 6.4(a).

Box No. III Observations where unity of invention is lacking (Continuation of item 3 of first sheet)

This International Searching Authority found multiple inventions in this international application, as follows:

1. ☐ As all required additional search fees were timely paid by the applicant, this international search report covers all searchable claims.
2. ☐ As all searchable claims could be searched without effort justifying an additional fee, this Authority did not invite payment of any additional fee.
3. ☐ As only some of the required additional search fees were timely paid by the applicant, this international search report covers only those claims for which fees were paid, specifically claims Nos.:
4. ☐ No required additional search fees were timely paid by the applicant. Consequently, this international search report is restricted to the invention first mentioned in the claims; it is covered by claims Nos.:

Remark on Protest

- ☐ The additional search fees were accompanied by the applicant's protest and, where applicable, the payment of a protest fee.
- ☐ The additional search fees were accompanied by the applicant's protest but the applicable protest fee was not paid within the time limit specified in the invitation.
- ☐ No protest accompanied the payment of additional search fees.

INTERNATIONAL SEARCH REPORT

Information on patent family members

International application No.

PCT/US2013/029713

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