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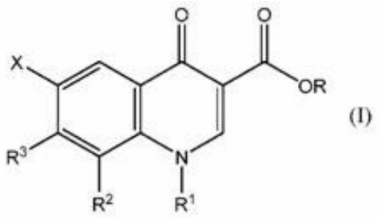
(54)发明名称

喹诺酮化合物

(57)摘要

本发明涉及喹诺酮化合物。本发明提供由式(I)表示的化合物或其盐，其中X是氢原子或氟原子；R是氢原子或烷基；R^1是(1)任选被1至3个卤素原子取代的环丙基或(2)任选被1至3个卤素原子取代的苯基；R^2是烷基、烷氧基、卤代烷氧基、卤素原子、氰基等；和R^3是7-氧代-7,8-二氢-1,8-二氮杂萘基、3-吡啶基等。本发明的化合物具有优良的抗难辨梭菌的抗微生物活性，并有用于预防或治疗如难辨梭菌相关性腹泻的肠道感染。



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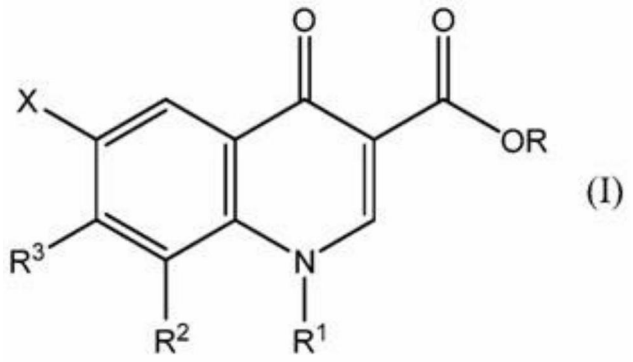
1.由式(I)表示的化合物或其盐



(I)

其中

X是氢原子或氟原子;

R是氢原子或烷基;

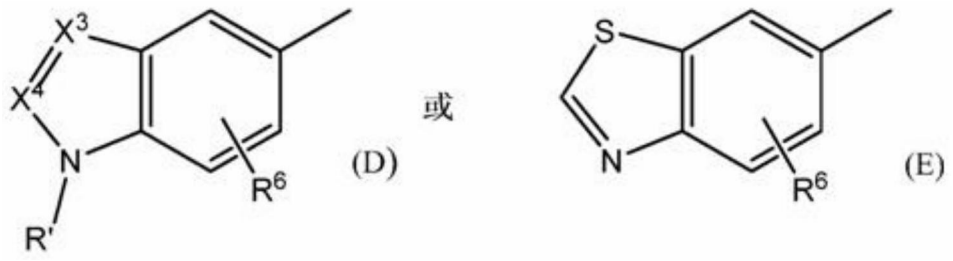
R^1是(1)任选被1至3个卤素原子取代的环丙基或(2)任选被1至3个卤素原子取代的苯基;

R^2是氢原子;任选被1或2个选自卤素原子和羟基的取代基取代的烷基;烷氧基;卤代烷氧基;卤素原子;氰基;环丙基;硝基;氨基;甲酰基;链烯基或炔基;或

R^1和R^2键合以形成任选被烷基取代的5-或6-元的环;

R^3是

(3)下式的基团



(D) 或 (E)

其中

X^3和X^4是N,或

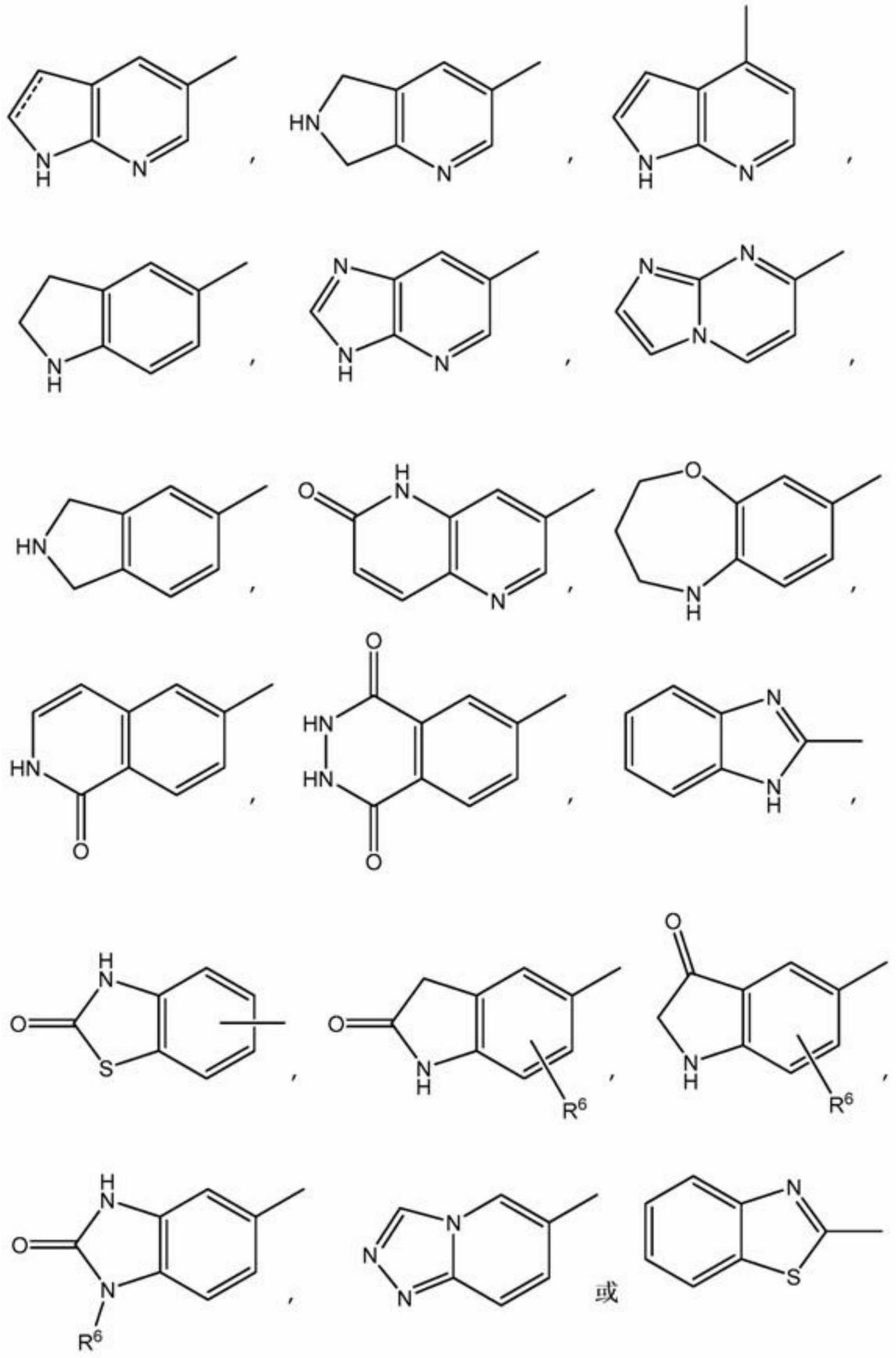
X^3是N和X^4是CR″,其中R″是氢原子、氨基、羟基、任选被1至3个选自烷氧基和二甲基氨基的取代基取代的烷基、或巯基,或

X^3是CH和X^4是N,

R'是氢原子或任选被1至3个选自取代的羟基和氨基的取代基取代的烷基,和

R^6定义如上,

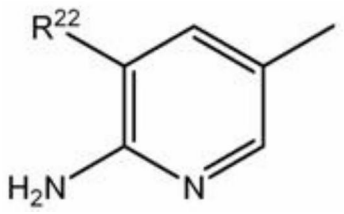
(4)下式的基团



其中

------表示单键或双键，和R^6定义如上，

(5)下式的基团



(d)烷基,其任选被1至3个选自卤素原子、烷基氨基、二烷基氨基和羟基的取代基取代,

(6)任选被卤素原子取代的4-吡啶基,

(8)2-吲哚基、3-吲哚基、5-吲哚基、6-吲哚基、苯并呋喃基、苯并噻吩基、苯并噁唑基或苯并噻唑基,各自任选被1或2个选自下列的取代基取代

(a)卤素原子,

(b)氰基,

(c)硝基,

(d)羟基,

(e)烷基,其任选被1至3个选自氨基、烷氧基羰基氨基、烷基氨基和二烷基氨基的取代基取代,

(f)烷氧基,

(g)甲酰基,

(h)羧基,和

(j)任选被1或2个选自下列的取代基取代的氨基

(i)烷氧基羰基,

(ii)任选被选自下列的取代基取代的烷基羰基

(A)任选被1至3个烷基取代的环烷基氧基,

(B)烷基氨基,

(C)二烷基氨基,

(D)任选被烷氧基羰基取代的环状氨基,和

(E)卤素原子,

(iii)任选被1至3个选自烷基和烷氧基的取代基取代的苯基羰基,

(iv)环烷基羰基,

(v)任选被烷基取代的5-至10-元的芳香族杂环基羰基,所述烷基任选被1至3个卤素原子取代,

(vi)苄基羰基,其任选被1至3个选自卤素原子和烷氧基的取代基取代,

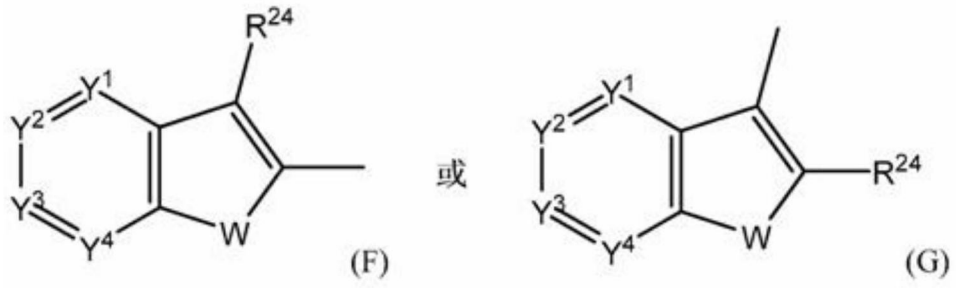
(vii)任选被烷氧基取代的芳基磺酰基,

(viii)环烷基烷基磺酰基,其任选被1至3个选自烷基和氧代的取代基取代,

(ix)任选被1至3个烷基取代的5-至10-元的芳香族杂环基磺酰基,和

(x)-C(=N-CN)-SR^9,其中R^{9}是烷基,

(9)下式的基团



其中

Y^1、Y^2、Y^3和Y^4之一是N或$N^+(-O^-)$，和其余三个各自是$C(R^{25})$、$C(R^{26})$和$C(R^{27})$，

W是O、S、NH或$N(R^{23})$

R^{23}是氢原子或烷基，和

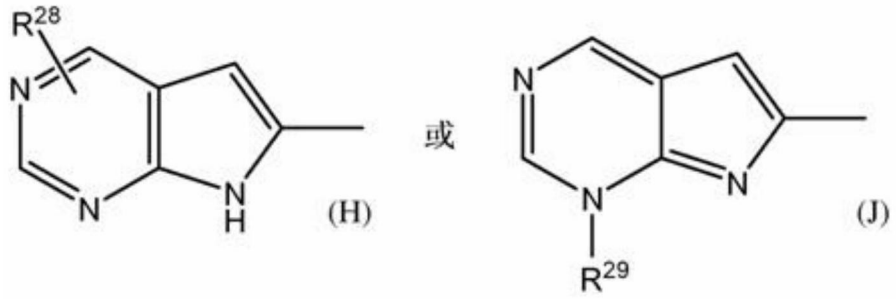
R^{24}、R^{25}、R^{26}和R^{27}各自独立地为，

(a)氢原子，

(b)氰基，或

(c)硝基，

(10)下式的基团

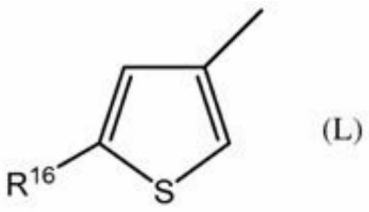


其中

R^{28}是氢原子或羟基，和

R^{29}是氢原子或烷基，

(12)下式的基团



其中R^{16}是

(a)氢原子，

(b)烷基，其任选被1至3个选自氰基、烷基氨基和二烷基氨基的取代基取代，

(c)任选被羧基取代的链烯基，

(d)甲酰基，

(e)羧基，

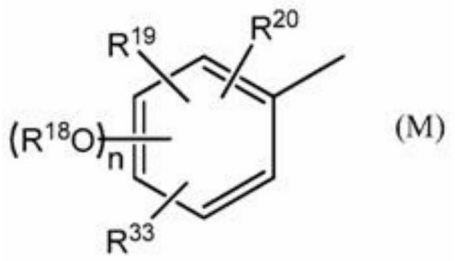
(f)氨基甲酰基，

(g)$-C(R^{17})=N-OH$，其中R^{17}是氢原子、氰基或羟基，

(h)5-至10-元的芳香族杂环基,其任选被烷基、烷氧基羰基、羧基或苯基取代,或

(i)氰基,

(13)下式的基团



(M)

其中

R^{18}是氢原子或任选被1至3个选自卤素原子和苯基的取代基取代的烷基,

n是0或1,

R^{19}、R^{20}和R^{33}各自独立地为,

(a)氢原子,

(b)卤素原子,

(c)氰基,

(d)任选被1至3个选自下列的取代基取代的烷基

(i)卤素原子,

(ii)氰基,

(iii)羟基,

(iv)氨基,

(v)烷基氨基,

(vi)二烷基氨基,和

(vii)任选被烷基取代的环状氨基,

(e)烷氧基,

(f)任选被1或2个选自下列的取代基取代的氨基

(i)任选被环状氨基取代的烷基羰基,

(ii)烷基磺酰基,

(iii)氨基甲酰基,

(iv)烷基、环烷基或环烷基烷基,和

(v)5-至10-元的饱和杂环基,

(g)羧基,

(h)烷氧基羰基,

(i)任选被烷基取代的氨基甲酰基,所述烷基任选被氨基、烷基氨基、二烷基氨基或烷氧基羰基氨基取代,

(j)甲酰基,

(k)任选被烷基取代的5-至10-元的芳香族杂环基,

(l)-CH=N-OR^{21},其中R^{21}是氢原子或任选被烷基氨基或二烷基氨基取代的烷基,

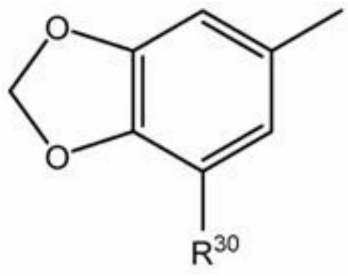
(m)硝基,

(n)任选被氨基取代的5-至10-元的饱和杂环基，

(o)苯基，或

(P)-NHC(SMe)＝CHCN，

(14)下式的基团



(N)

其中

R^{30}是(a)氢原子，

(b)卤素原子，

(c)氰基，

(d)任选被1至3个选自卤素原子和羟基的取代基取代的烷基，

(e)链烯基，

(f)炔基，

(g)烷氧基，

(h)甲酰基，

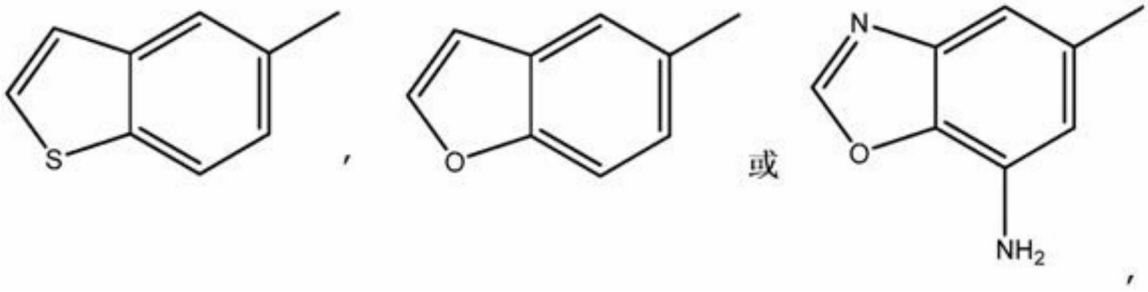
(i)-CH＝N-OH，或

(j)氨基甲酰基，

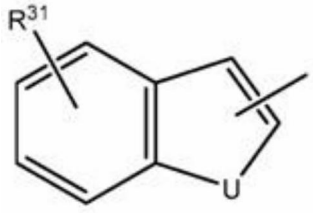
(15)萘基或异色烯基，

(16)喹啉基或异喹啉基、或它们的氧化物衍生物，

(17)下式的基团



(18)下式的基团



其中

U是O或S，和

R^{31}是(a)氢原子，

(b)卤素原子，

(c)任选被1至3个卤素原子取代的烷基，

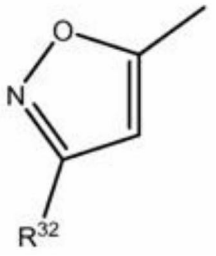
(d)羧基，

(e)硝基，

(f)氰基,或

(g)氨基，

(19)下式的基团

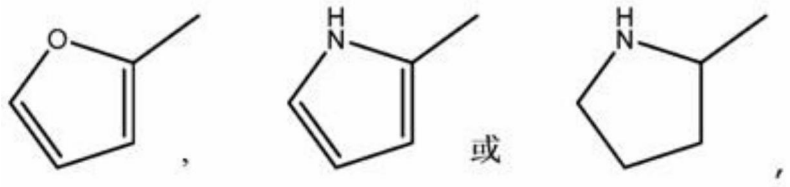


其中

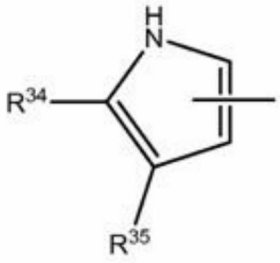
R^{32}是(a)卤素原子，

(b)苯基,或

(c)下式的基团



(20)下式的基团



其中

R^{34}和R^{35}各自独立地为，

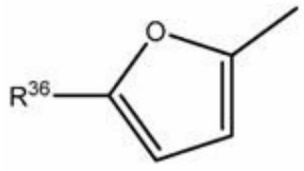
(a)氢原子,或

(b)氨基烷基，

或

R^{34}和R^{35}键合以形成任选被氨基或氧代取代的6-元环，

(21)下式的基团



其中R^{36}是

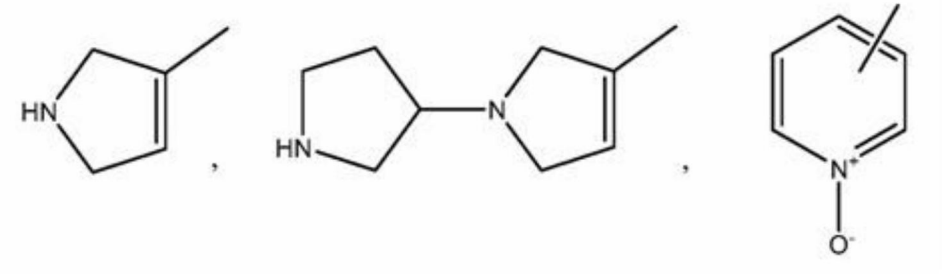
(a)氢原子，

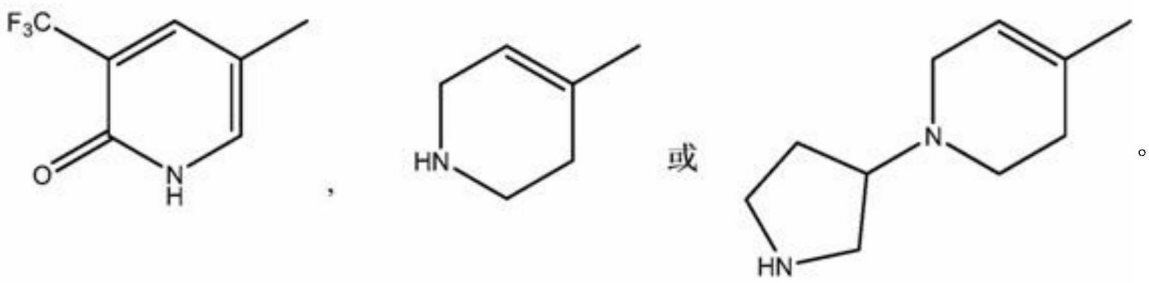
(b)卤素原子，

(c)硝基，或

(d)噻吩基，或

(22)下式的基团

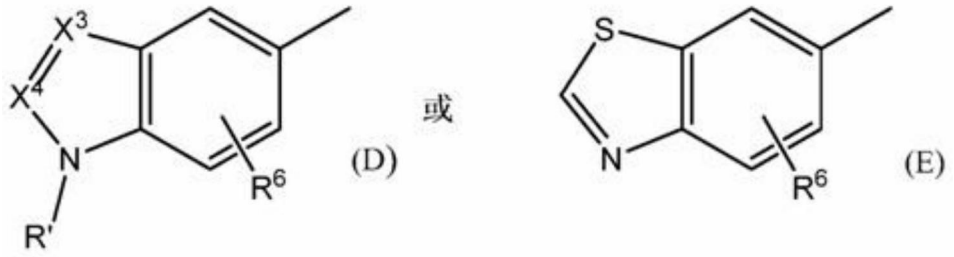




2.权利要求1的化合物或其盐，其中X是氟原子。

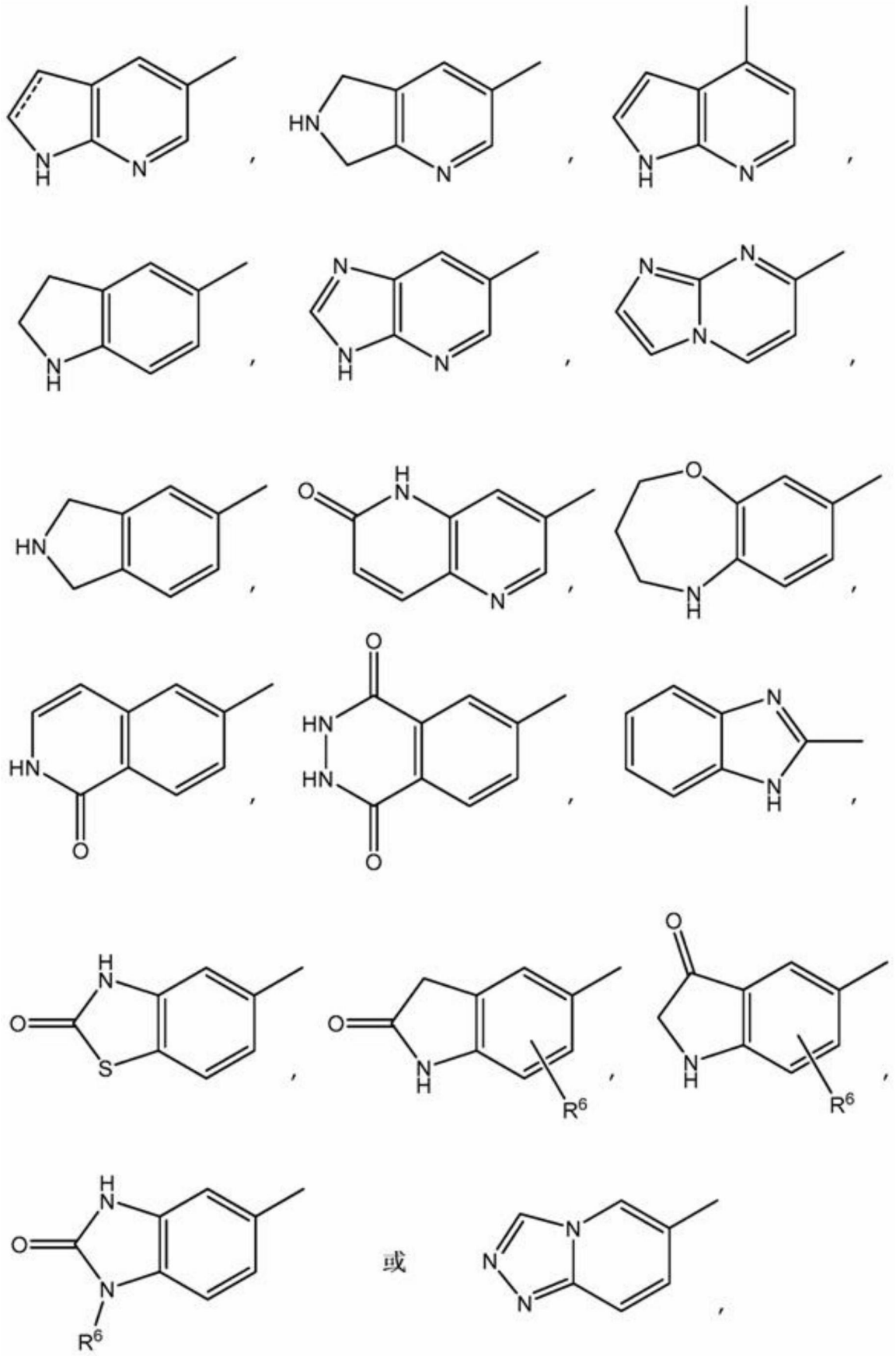
其中X^2、R^6和R^7如权利要求1中所定义。

3.权利要求1的化合物或其盐，其中R^3是下式的基团



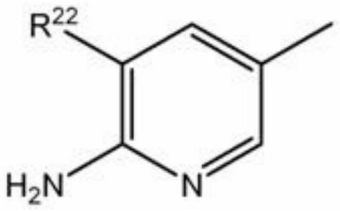
其中X^3、X^4、R^6和R'如权利要求1中所定义。

4.权利要求1的化合物或其盐，其中R^3是下式的基团



其中 ------ 和R^6权利要求项1中所定义。

5.权利要求1的化合物或其盐,其中R^3是下式的基团



其中R^{22}是

(d)烷基,其任选被1至3个选自卤素原子、烷基氨基、二烷基氨基和羟基的取代基取代。

6.权利要求1的化合物或其盐,其中R^3是2-吲哚基,其任选被1或2个选自下列的取代基取代

(a)卤素原子,

(b)氰基,

(c)硝基,

(d)羟基,

(e)烷基,其任选被1至3个选自氨基、烷氧基羰基氨基、烷基氨基和二烷基氨基的取代基取代,

(f)烷氧基,

(g)甲酰基,

(h)羧基,或

(j)任选被1或2个选自下列的取代基取代的氨基

(i)烷氧基羰基,

(ii)任选被选自下列的取代基取代的烷基羰基

(A)任选被1至3个烷基取代的环烷基氧基,

(B)烷基氨基,

(C)二烷基氨基,

(D)任选被烷氧基羰基取代的环状氨基,和

(E)卤素原子,

(iii)任选被1至3个选自烷基和烷氧基的取代基取代的苯基羰基,

(iv)环烷基羰基,

(v)任选被烷基取代的5-至10-元的芳香族杂环基羰基,所述烷基任选被1至3个卤素原子取代,

(vi)苄基羰基,其任选被1至3个选自卤素原子和烷氧基的取代基取代,

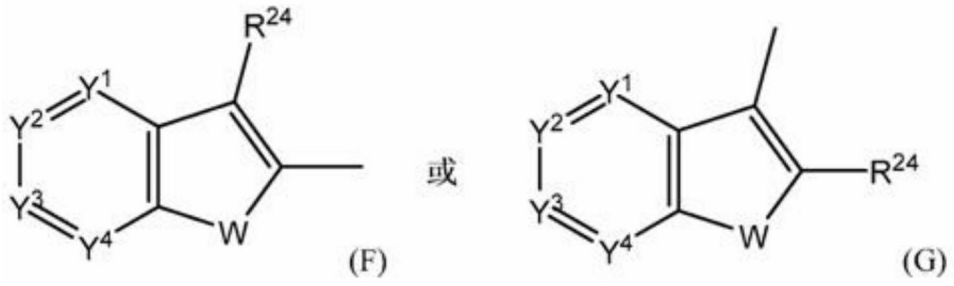
(vii)任选被烷氧基取代的芳基磺酰基,

(viii)环烷基烷基磺酰基,其任选被1至3个选自烷基和氧代的取代基取代,

(ix)任选被1至3个烷基取代的5-至10-元的芳香族杂环基磺酰基,和

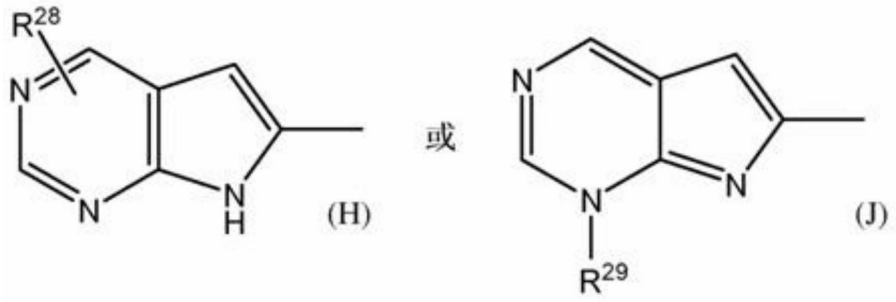
(x)-C(=N-CN)-SR^9,其中R^9是烷基。

7.权利要求1的化合物或其盐,其中R^3是下式的基团



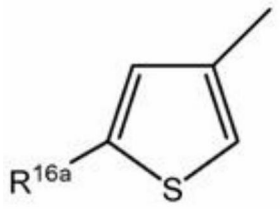
其中Y^1、Y^2、Y^3、Y^4、W和R^{24}如权利要求1中所定义。

8.权利要求1的化合物或其盐，其中R^3是下式的基团



其中R^{28}和R^{29}如权利要求1中所定义。

9.权利要求1的化合物或其盐，其中R^3是下式的基团



其中R^{16a}是

(a)烷基，其任选被1至3个选自氰基、烷基氨基和二烷基氨基的取代基取代，

(b)任选被羧基取代的链烯基，

(c)甲酰基，

(d)羧基，

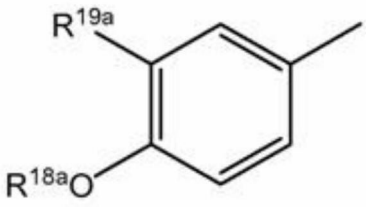
(e)氨基甲酰基，

(f)-C(R^{17})=N-OH，其中R^{17}是氢原子、氰基或羟基，

(g)5-至10-元的芳香族杂环基，其任选被烷基、烷氧基羰基、羧基或苯基取代，或

(h)氰基。

10.权利要求1的化合物或其盐，其中R^3是下式的基团



其中

R^{18a}是烷基，和

R^{19a}是(a)卤素原子，

(b)氰基，

(c)任选被1至3个选自下列的取代基取代的烷基

(i)卤素原子，

(ii)氰基，

(iii)羟基，

(iv)氨基，

(v)烷基氨基，

(vi)二烷基氨基，和

(vii)任选被烷基取代的环状氨基，

(d)烷氧基，

(e)任选被1或2个选自下列的取代基取代的氨基

(i)任选被环状氨基取代的烷基羰基，

(ii)烷基磺酰基，

(iii)氨基甲酰基，和

(iv)烷基或环烷基，

(f)羧基，

(g)烷氧基羰基，

(h)任选被烷基取代的氨基甲酰基，所述烷基任选被氨基、烷基氨基、二烷基氨基或烷氧基羰基氨基取代，

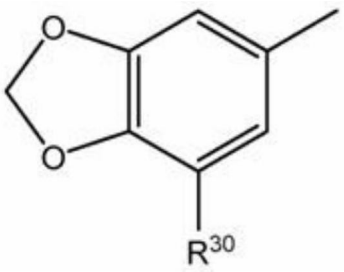
(i)甲酰基，

(j)任选被烷基取代的5-至10-元的芳香族杂环基，

(k)-CH＝N-OR^{21}，其中R^{21}是氢原子或任选被烷基氨基或二烷基氨基取代的烷基，或

(l)硝基。

11.权利要求1的化合物或其盐，其中R^3是下式的基团



(N)

其中R^{30}如权利要求1中所定义盐。

12.权利要求1的化合物或其盐，其中R^3是萘基或异色烯基。

13.权利要求1的化合物或其盐，其中R^3是喹啉基或异喹啉基、或它们的氧化物衍生物。

14.权利要求1的化合物或其盐，其中R是氢原子。

15.权利要求1的化合物或其盐，其中R^1是环丙基、2-氟环丙基或2,4-二氟苯基。

16.权利要求1的化合物或其盐，其中R^2是甲基、甲氧基或氯原子。

17.药物组合物，其包括权利要求1的化合物或其盐和药学上可接受的载体。

18.抗微生物剂，其包括权利要求1的化合物或其盐。

19.权利要求1的化合物或其盐,其用作药物。

20.权利要求1的化合物或其盐,其用作抗微生物剂。

21.权利要求1的化合物或其盐,其在预防或治疗细菌感染中的用途。

22.权利要求1的化合物或其盐在制备用于预防或治疗细菌感染的药物中的用途。

23.预防或治疗细菌感染的方法,其包括给人类或动物施用有效量的权利要求1的化合物或其盐。

喹诺酮化合物

本申请是申请号为201280041352.0(国际申请日为2012年8月30日)、发明名称为“喹诺酮化合物”的进入国家阶段的PCT申请的分案申请

技术领域

[0001] 本发明涉及喹诺酮类化合物及其制药用途。

背景技术

[0002] 难辨梭菌(Clostridium difficile)感染与消费抗生素相关,所述抗生素扰乱肠道的正常微生物菌群,使难辨梭菌自身定居并产生疾病。目前,只有万古霉素或甲硝唑被推荐用于治疗,且许多患者遭受感染复发(Expert Opin.Ther.Patents(2010)20(10),pp.1389-1399)。

[0003] EP2177214A1描述了奥泽沙星对难辨梭菌的用途。

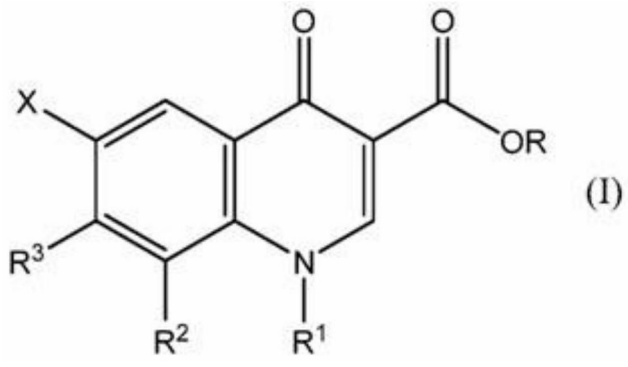
[0004] 一些用作抗菌剂的喹诺酮类化合物披露于JP1-319463 A、WO99/51588、WO99/03465、JP3-66301 B和WO99/07682中。

[0005] 发明概述

本发明的目的是提供新的喹诺酮化合物,其具有优良的抗微生物活性,尤其为优良的抗难辨梭菌的抗微生物活性。本发明另一目的是提供含有所述喹诺酮化合物的药物组合物,其有用于预防或治疗多种感染性疾病,所述感染性疾病包括抗生素相关性腹泻(AAD)诸如难辨梭菌相关性腹泻(CDAD)。本发明再一目的是提供预防或治疗细菌感染包括AAD诸如CDAD的方法,其包括给人类或动物施用所述的喹诺酮化合物。

[0006] 本发明提供如下项1至27中所述的喹诺酮化合物、包括所述化合物的药物组合物、所述化合物的用途、和预防或治疗细菌感染的方法。

[0007] 项1.由式(I)表示的化合物



(I)

其中

X是氢原子或氟原子;

R是氢原子或烷基;

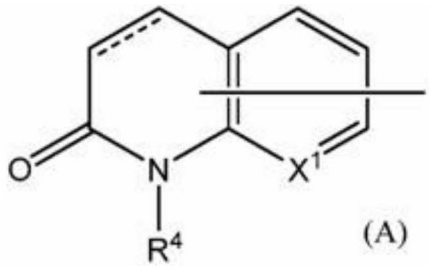
R^1是(1)任选被1至3个卤素原子取代的环丙基或(2)任选被1至3个卤素原子取代的苯基;

R^2是氢原子;任选被1或2个选自卤素原子和羟基的取代基取代的烷基;烷氧基;卤代烷氧基;卤素原子;氰基;环丙基;硝基;氨基;甲酰基;链烯基或炔基;或

R^1和R^2键合以形成任选被烷基取代的5-或6-元的环;

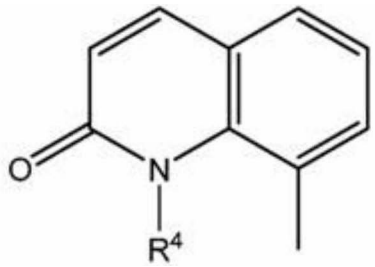
R^3是

(1)下式的稠合杂环基团



(A)

或



(B)

其中

表示单键或双键,

X^1是C(R^5)或N,

R^4是氢原子或烷基,和

R^5是(a)氢原子,

(b)卤素原子,

(c)氰基,

(d)硝基,

(e)羟基,

(f)任选被1至3个卤素原子取代的烷基,

(g)链烯基或炔基,

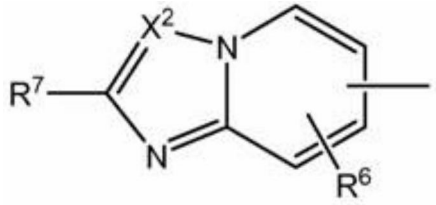
(h)芳基,或

(i)任选被1至3个卤素原子取代的烷氧基,

当X^1是C(R^5)时,R^4和R^5任选地键合以形成任选被氧代取代的5-或6-元的环;

所述的稠合杂环基团任选被1或2个选自卤素原子、氰基、硝基、羟基和烷基的取代基取代,

(2)下式的基团



(C)

其中

X^2是C(R^8)或N,和

R^6、R^7和R^8各自独立地为,

(a)氢原子,

(b)卤素原子,

(c)氰基,

(d)硝基，

(e)氨基，

(f)烷基，其任选被1至3个选自卤素原子、烷氧基和氨基的取代基取代，

(g)链烯基，

(h)炔基，

(i)芳基，

(j)甲酰基或CH＝N-OH，

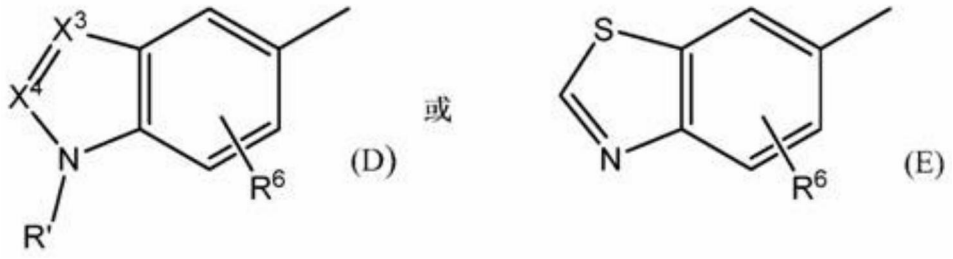
(k)羧基，

(l)氨基甲酰基，

(m)任选被烷基取代的5-至10-元的芳香族杂环基，或

(n)链烯基氧基，

(3)下式的基团



其中

X^3和X^4是N，或

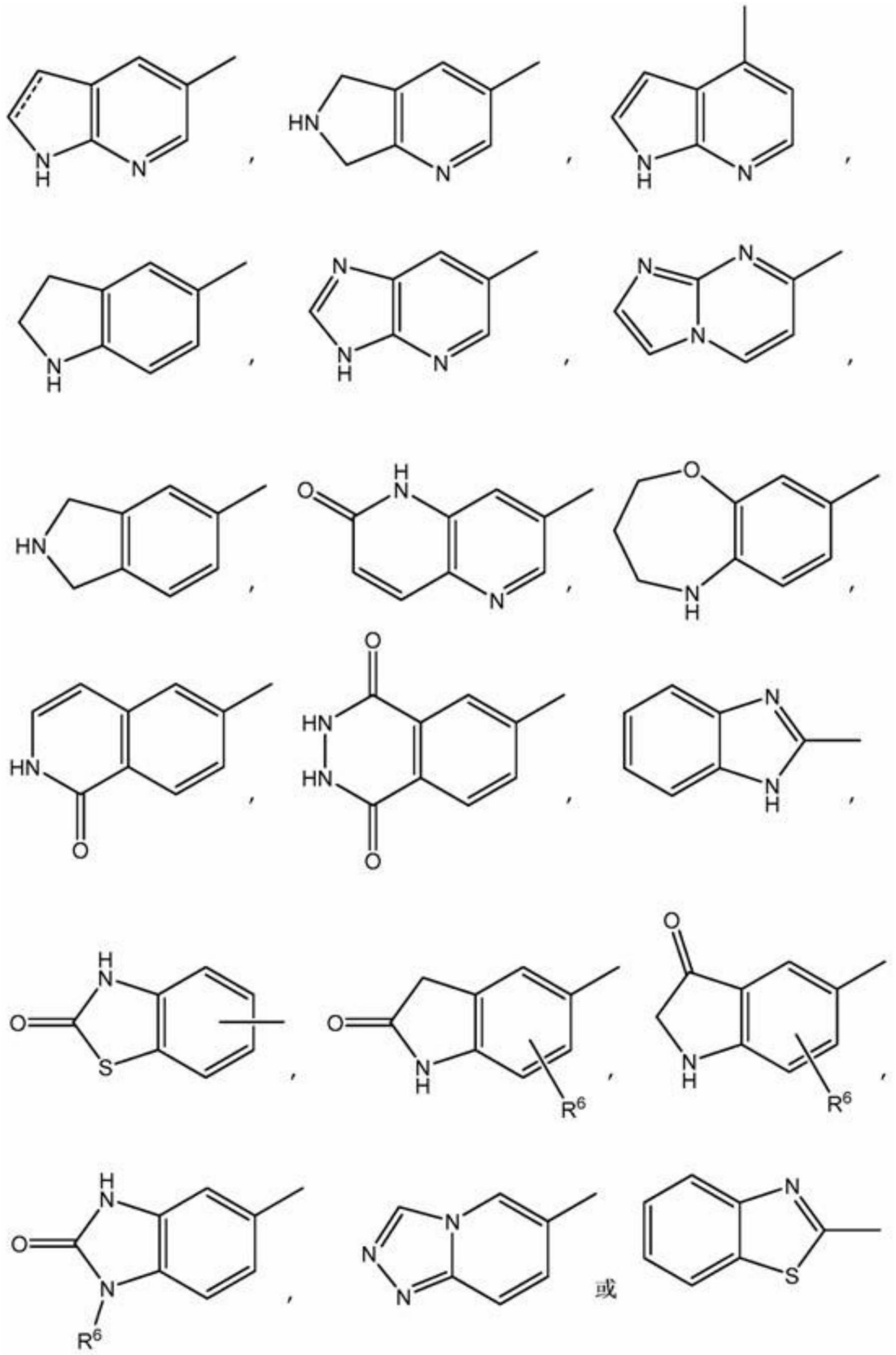
X^3是N和X^4是CR″，其中R″是氢原子、氨基、羟基、任选被1至3个选自烷氧基和二甲基氨基的取代基取代的烷基、或巯基，或

X^3是CH和X^4是N，

R'是氢原子或任选被1至3个选自取代的羟基和氨基的取代基取代的烷基，和

R^6定义如上，

(4)下式的基团



其中

------表示单键或双键，和R^6定义如上，

(5)3-吡啶基，其任选被1或2个选自下列的取代基取代

(a)卤素原子，

(b)氰基，

(c)硝基，

(d)羟基，

(e)氨基，

(f)烷基，其任选被1至3个选自卤素原子、烷基氨基、二烷基氨基和羟基的取代基取代，

(g)链烯基、炔基

(h)芳基，

(i)环烷基，

(j)烷氧基，

(k)烷基氨基，

(1)二烷基氨基，

(m)任选被1至3个卤素原子取代的苯基氨基，

(n)任选被烷氧基羰基取代的环状氨基，

(o)甲酰基，

(p)任选被烷基取代的氨基甲酰基，所述烷基任选被羟基取代，和

(q)任选被烷基取代的5-至10-元的芳香族杂环基，

(6)任选被卤素原子取代的4-吡啶基，

(7)5-嘧啶基，其任选被1或2个选自氨基、烷基氨基、二烷基氨基和羧基的取代基取代，

(8)2-吲哚基、3-吲哚基、5-吲哚基、6-吲哚基、苯并呋喃基、苯并噻吩基、苯并噁唑基或苯并噻唑基，各自任选被1或2个选自下列的取代基取代

(a)卤素原子，

(b)氰基，

(c)硝基，

(d)羟基，

(e)烷基，其任选被1至3个选自氨基、烷氧基羰基氨基、烷基氨基和二烷基氨基的取代基取代，

(f)烷氧基，

(g)甲酰基，

(h)羧基，和

(j)任选被1或2个选自下列的取代基取代的氨基

(i)烷氧基羰基，

(ii)任选被选自下列的取代基取代的烷基羰基

(A)任选被1至3个烷基取代的环烷基氧基，

(B)烷基氨基，

(C)二烷基氨基，

(D)任选被烷氧基羰基取代的环状氨基，和

(E)卤素原子，

(iii)任选被1至3个选自烷基和烷氧基的取代基取代的苯基羰基，

(iv)环烷基羰基，

(v)任选被烷基取代的5-至10-元的芳香族杂环基羰基，所述烷基任选被1至3个卤素原子取代，

(vi)苄基羰基，其任选被1至3个选自卤素原子和烷氧基的取代基取代，

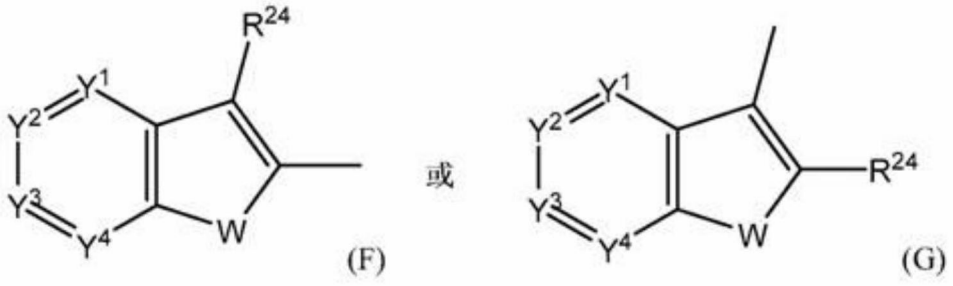
(vii)任选被烷氧基取代的芳基磺酰基，

(viii)环烷基烷基磺酰基，其任选被1至3个选自烷基和氧代的取代基取代，

(ix)任选被1至3个烷基取代的5-至10-元的芳香族杂环基磺酰基，和

(x)-C(=N-CN)-SR^9，其中R^{9}是烷基，

(9)下式的基团



其中

Y^1、Y^2、Y^{3}和Y^{4}之一是N或N$^+$(-O$^-$)，和其余三个各自是C(R^{25})、C(R^{26})和C(R^{27})，

W是O、S、NH或N(R^{23})

R^{23}是氢原子或烷基，和

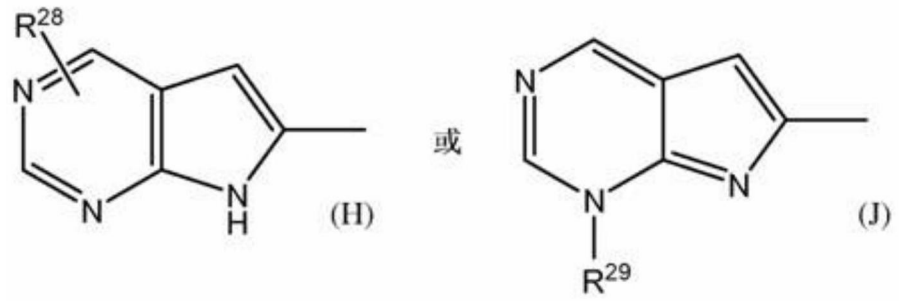
R^{24}、R^{25}、R^{26}和R^{27}各自独立地为，

(a)氢原子，

(b)氰基，或

(c)硝基，

(10)下式的基团

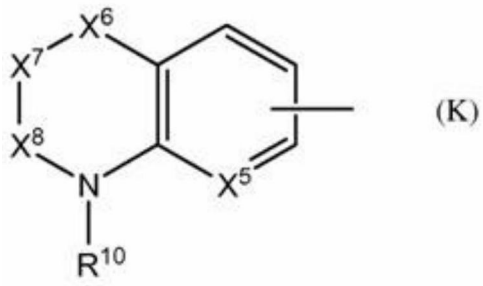


其中

R^{28}是氢原子或羟基，和

R^{29}是氢原子或烷基，

(11)下式的基团



(K)

其中

X^5是C(R^{11})或N,

X^6是CH_2、C(=0)、O、S、SO_2或N(R^{12}),

X^7是CH(R^{13})、C(=0)或N(R^{14}),

X^8是CH(R^{15})或C(=0),

R^{10}、R^{12}和R^{14}各自独立地为,

(a)氢原子或

(b)烷基,和

R^{11}、R^{13}和R^{15}各自独立地为,

(a)氢原子,

(b)卤素原子,

(c)氰基,

(d)硝基,

(e)氨基,

(f)烷基氨基,

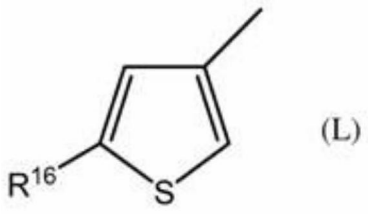
(g)二烷基氨基,

(h)任选被羟基取代的烷基,或

(i)链烯基,

当X^5是C(R^{11})时,R^{1U}和R^{11}任选地键合以形成任选被烷基或氧代取代的5-或6-元的环,以及当X^6是N(R^{12})和X^7是CH(R^{13})时,R^{12}和R^{13}任选地键合以形成5-或6-元的环,

(12)下式的基团



(L)

其中R^{16}是

(a)氢原子,

(b)烷基,其任选被1至3个选自氰基、烷基氨基和二烷基氨基的取代基取代,

(c)任选被羧基取代的链烯基,

(d)甲酰基,

(e)羧基,

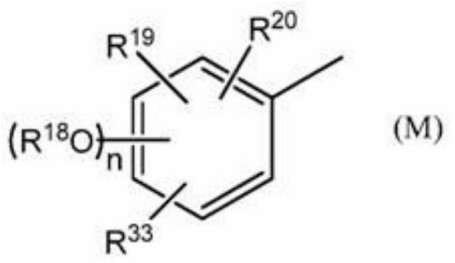
(f)氨基甲酰基,

(g)-C(R^{17})=N-OH,其中R^{17}是氢原子、氰基或羟基,

(h)5-至10-元的芳香族杂环基,其任选被烷基、烷氧基羰基、羧基或苯基取代,或

(i)氰基,

(13)下式的基团



(M)

其中

R^{18}是氢原子或任选被1至3个选自卤素原子和苯基的取代基取代的烷基,

n是0或1,

R^{19}、R^{20}和R^{33}各自独立地为,

(a)氢原子,

(b)卤素原子,

(c)氰基,

(d)任选被1至3个选自下列的取代基取代的烷基

(i)卤素原子,

(ii)氰基,

(iii)羟基,

(iv)氨基,

(v)烷基氨基,

(vi)二烷基氨基,和

(vii)任选被烷基取代的环状氨基,

(e)烷氧基,

(f)任选被1或2个选自下列的取代基取代的氨基

(i)任选被环状氨基取代的烷基羰基,

(ii)烷基磺酰基,

(iii)氨基甲酰基,

(iv)烷基、环烷基或环烷基烷基,和

(v)5-至10-元的饱和杂环基,

(g)羧基,

(h)烷氧基羰基,

(i)任选被烷基取代的氨基甲酰基,所述烷基任选被氨基、烷基氨基、二烷基氨基或烷氧基羰基氨基取代,

(j)甲酰基,

(k)任选被烷基取代的5-至10-元的芳香族杂环基,

(l)-CH=N-OR^{21},其中R^{21}是氢原子或任选被烷基氨基或二烷基氨基取代的烷基,

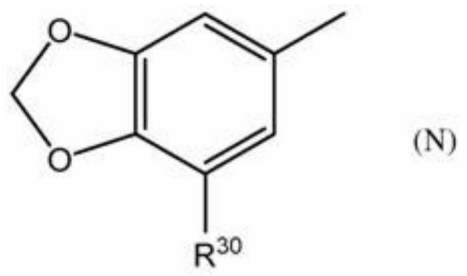
(m)硝基，

(n)任选被氨基取代的5-至10-元的饱和杂环基，

(o)苯基，或

(P)-NHC(SMe)＝CHCN，

(14)下式的基团



(N)

其中

R^{30}是(a)氢原子，

(b)卤素原子，

(c)氰基，

(d)任选被1至3个选自卤素原子和羟基的取代基取代的烷基，

(e)链烯基，

(f)炔基，

(g)烷氧基，

(h)甲酰基，

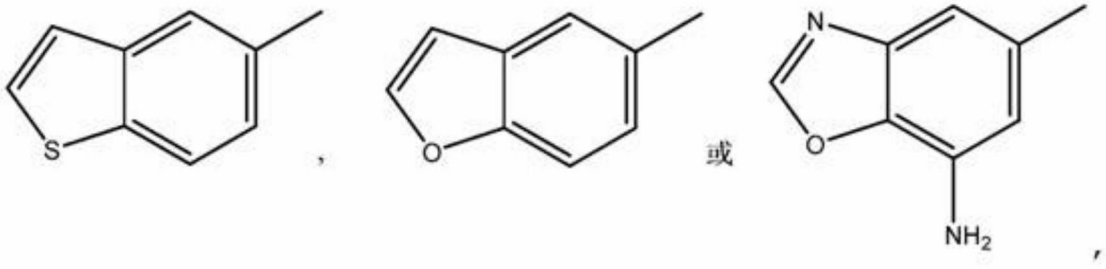
(i)-CH＝N-OH,或

(j)氨基甲酰基，

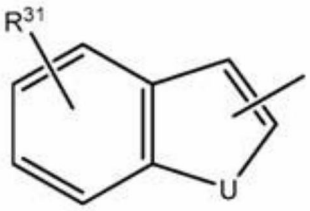
(15)萘基或异色烯基(isochromenyl)，

(16)喹啉基或异喹啉基、或它们的氧化物衍生物，

(17)下式的基团



(18)下式的基团



其中

U是O或S,和

R^{31}是(a)氢原子，

(b)卤素原子，

(c)任选被1至3个卤素原子取代的烷基，

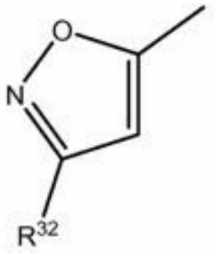
(d)羧基，

(e)硝基，

(f)氰基,或

(g)氨基，

(19)下式的基团

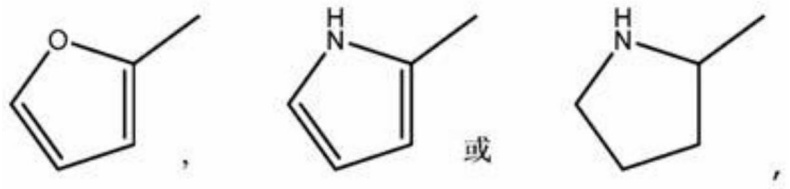


其中

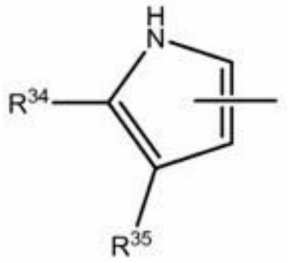
R^{32}是(a)卤素原子，

(b)苯基,或

(c)下式的基团



(20)下式的基团



其中

R^{34}和R^{35}各自独立地为，

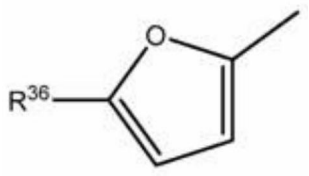
(a)氢原子,或

(b)氨基烷基，

或

R^{34}和R^{35}键合以形成任选被氨基或氧代取代的6-元环，

(21)下式的基团



其中R^{36}是

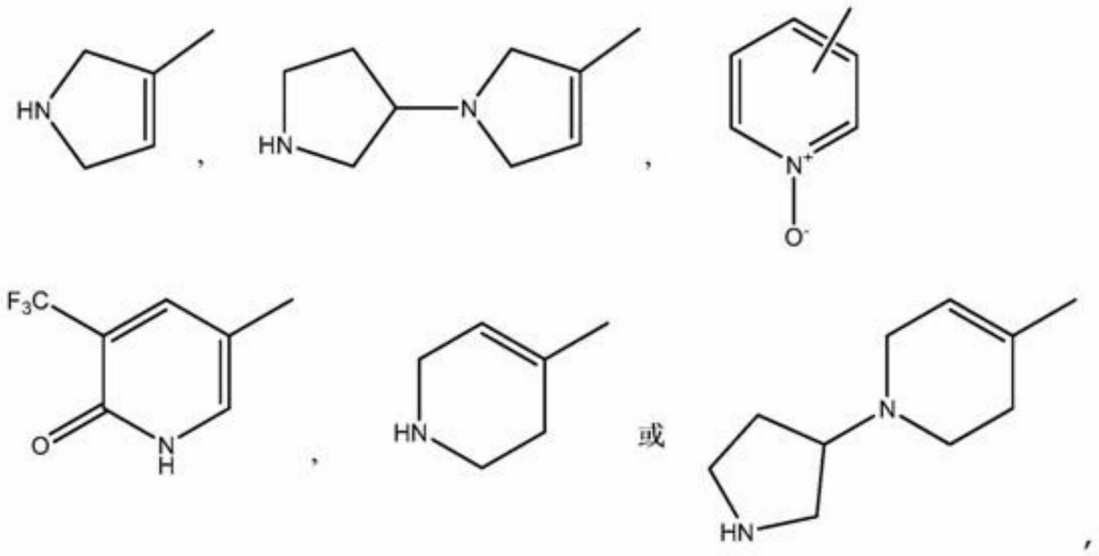
(a)氢原子，

(b)卤素原子，

(c)硝基，或

(d)噻吩基，或

(22)下式的基团



或其盐。

[0008] 项1A.项1的化合物，其中

X是氢原子或氟原子；

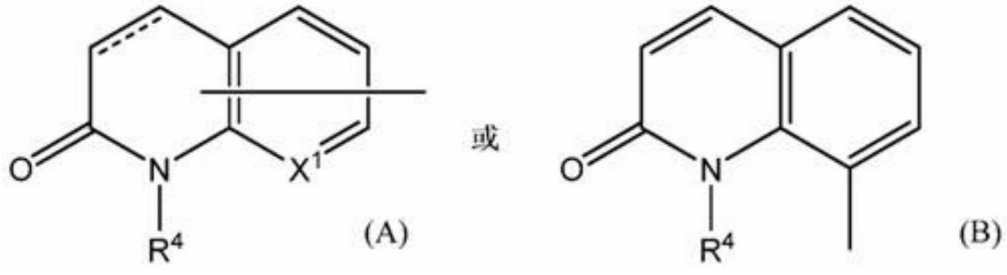
R是氢原子或烷基；

R^1是(1)任选被1至3个卤素原子取代的环丙基或(2)任选被1至3个卤素原子取代的苯基；

R^2是烷基、烷氧基、卤代烷氧基、氯原子或氰基；或R^1和R^2键合以形成任选被烷基取代的5-或6-元的环；和

R^3是

(1)下式的稠合杂环基团



其中

------表示单键或双键，

X^1是C(R^5)或N，

R^4是氢原子或烷基，和

R^5是(a)氢原子，

(b)卤素原子，

(c)氰基，

(d)硝基，

(e)羟基，

(f)任选被1至3个卤素原子取代的烷基，

(g)链烯基或炔基，

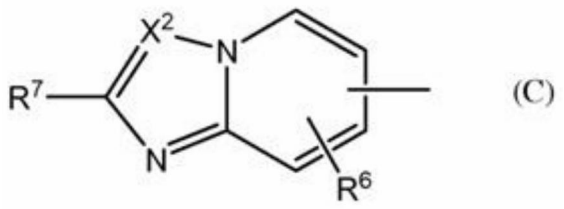
(h)芳基，或

(i)任选被1至3个卤素原子取代的烷氧基，

当X^1是C(R^5)时，R^4和R^5任选地键合以形成任选被氧代取代的5-或6-元的环；

所述的稠合杂环基团任选被1或2个选自卤素原子、氰基、硝基、羟基和烷基的取代基取代，

(2)下式的基团



(C)

其中

X^2是C(R^8)或N，和

R^6、R^7和R^8各自独立地为，

(a)氢原子，

(b)卤素原子，

(c)氰基，

(d)硝基，

(e)氨基，

(f)烷基，其任选被1至3个选自卤素原子、烷氧基和氨基的取代基取代，

(g)链烯基，

(h)炔基，

(i)芳基，

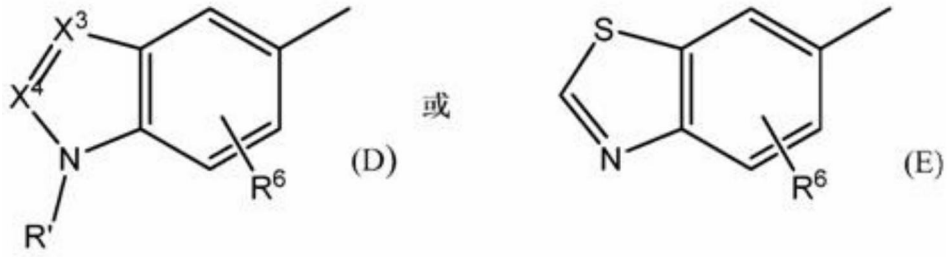
(j)甲酰基或CH＝N-OH，

(k)羧基，

(1)氨基甲酰基，或

(m)任选被烷基取代的5-至10-元的芳香族杂环基，

(3)下式的基团



其中

X^3和X^4是N,或

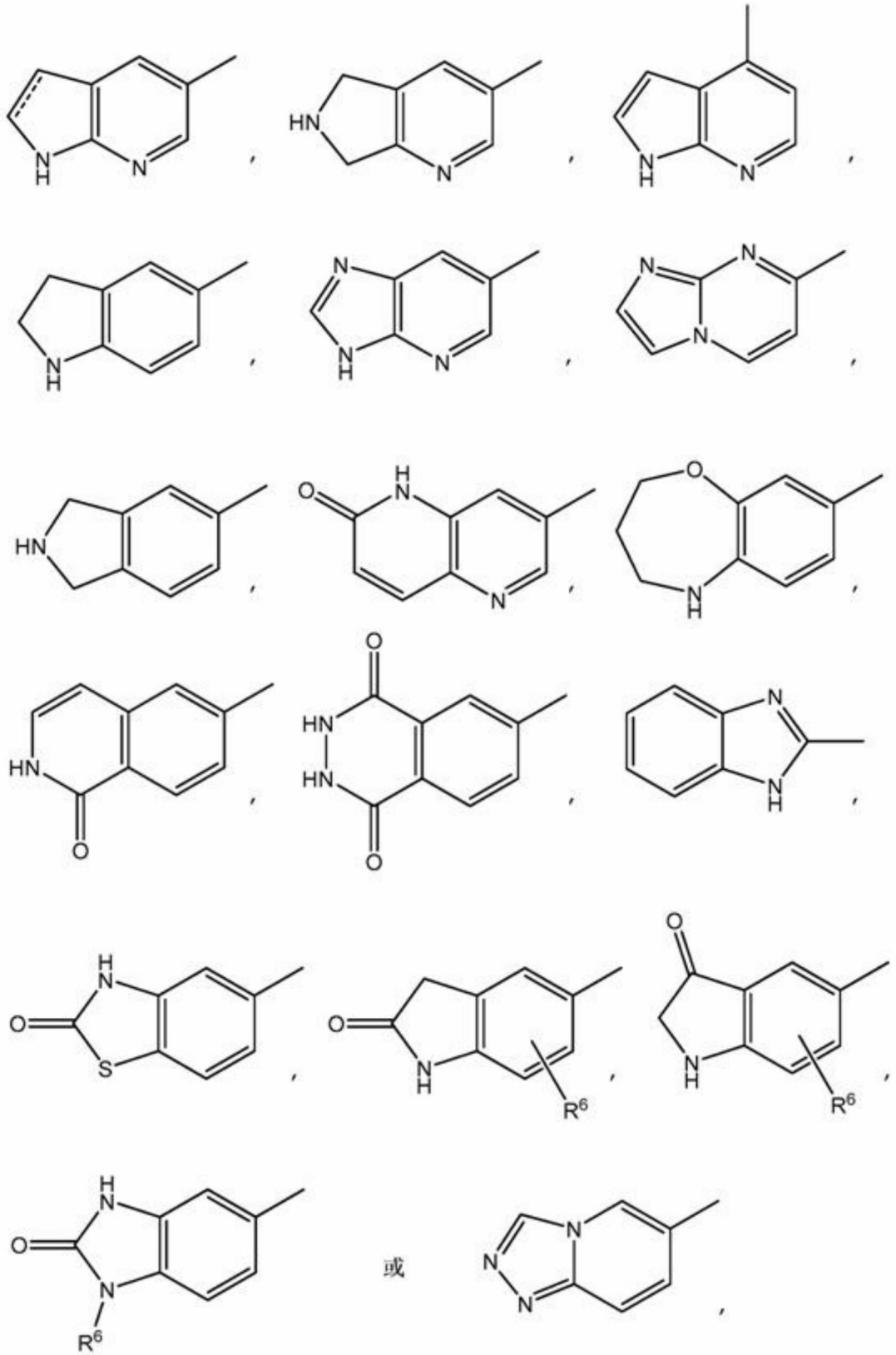
X^3是N和X^4是CR″,其中R″是氢原子、氨基、羟基、烷基或巯基,或

X^3是CH和X^4是N,

R'是氢原子或任选被1至3个选自取代的羟基和氨基的取代基取代的烷基,和

R^6定义如上,

(4)下式的基团



其中

------表示单键或双键，和R^6定义如上，

(5)3-吡啶基，其任选被1或2个选自下列的取代基取代

(a)卤素原子，

(b)氰基，

(c)硝基，

(d)羟基，

(e)氨基，

(f)烷基，其任选被1至3个选自卤素原子、烷基氨基、二烷基氨基和羟基的取代基取代，

(g)链烯基或炔基，

(h)芳基，

(i)环烷基，

(j)烷氧基，

(k)烷基氨基，

(1)二烷基氨基，

(m)任选被1至3个卤素原子取代的苯基氨基，

(n)任选被烷氧基羰基取代的环状氨基，

(o)甲酰基，

(p)任选被烷基取代的氨基甲酰基，所述烷基任选被羟基取代，和

(q)任选被烷基取代的5-至10-元的芳香族杂环基，

(6)任选被卤素原子取代的4-吡啶基，

(7)5-嘧啶基，其任选被1或2个选自氨基、烷基氨基、二烷基氨基和羧基的取代基取代，

(8)2-吲哚基、3-吲哚基、5-吲哚基、6-吲哚基、苯并呋喃基、苯并噻吩基、苯并噁唑基或苯并噻唑基，各自任选被1或2个选自下列的取代基取代

(a)卤素原子，

(b)氰基，

(c)硝基，

(d)羟基，

(e)烷基，其任选被1至3个选自氨基、烷氧基羰基氨基、烷基氨基和二烷基氨基的取代基取代，

(f)烷氧基，

(g)甲酰基，

(h)羧基，和

(j)任选被1或2个选自下列的取代基取代的氨基

(i)烷氧基羰基，

(ii)任选被选自下列的取代基取代的烷基羰基

(A)任选被1至3个烷基取代的环烷基氧基，

(B)烷基氨基，

(C)二烷基氨基，

(D)任选被烷氧基羰基取代的环状氨基，和

(E)卤素原子，

(iii)任选被1至3个选自烷基和烷氧基的取代基取代的苯基羰基，

(iv)环烷基羰基，

(v)任选被烷基取代的5-至10-元的芳香族杂环基羰基,所述烷基任选被1至3个卤素原子取代,

(vi)苄基羰基,其任选被1至3个选自卤素原子和烷氧基的取代基取代,

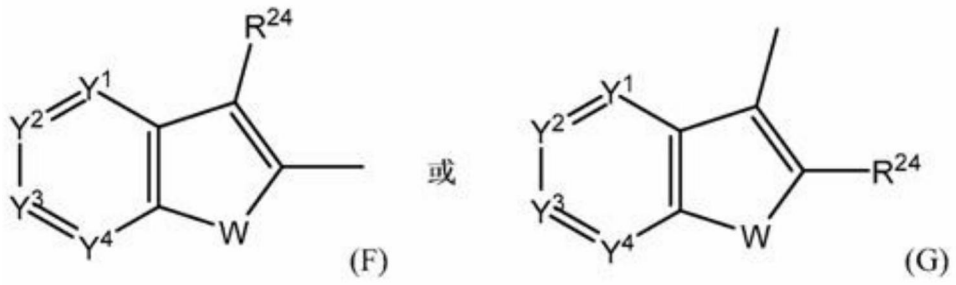
(vii)任选被烷氧基取代的芳基磺酰基,

(viii)环烷基烷基磺酰基,其任选被1至3个选自烷基和氧代的取代基取代,

(ix)任选被1至3个烷基取代的5-至10-元的芳香族杂环基磺酰基,和

(x)-C(=N-CN)-SR^9,其中R^9是烷基,

(9)下式的基团



其中

Y^1、Y^2、Y^3和Y^4之一是N或$N^+(-O^-)$,和其余三个各自是C(R^{25})、C(R^{26})和C(R^{27}),

W是O、S或N(R^{23})

R^{23}是氢原子或烷基,和

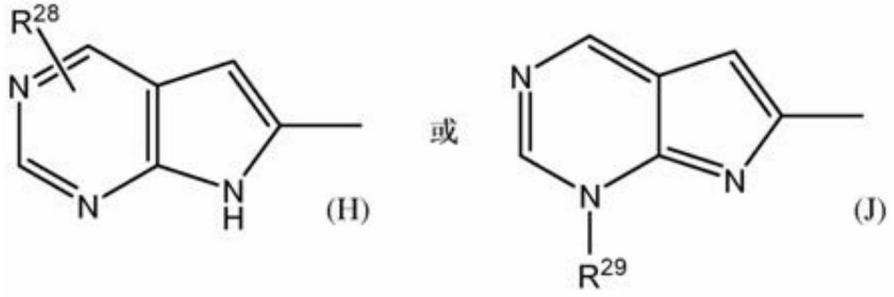
R^{24}、R^{25}、R^{26}和R^{27}各自独立地为,

(a)氢原子,

(b)氰基,或

(c)硝基,

(10)下式的基团

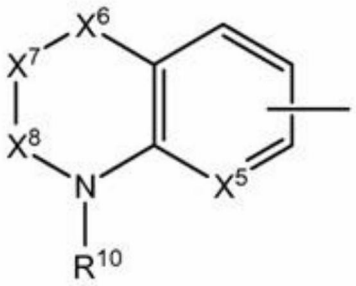


其中

R^{28}是氢原子或羟基,和

R^{29}是氢原子或烷基,

(11)下式的基团



(K)

其中

X^5是C(R^{11})或N，

X^6是CH_2、C(=0)、O、S、SO_2或N(R^{12})，

X^7是CH(R^{13})、C(=0)或N(R^{14})，

X^8是CH(R^{15})或C(=0)，

R^{10}、R^{12}和R^{14}各自独立地为，

(a)氢原子或

(b)烷基，和

R^{11}、R^{13}和R^{15}各自独立地为，

(a)氢原子，

(b)卤素原子，

(c)氰基，

(d)硝基，

(e)氨基，

(f)烷基氨基，

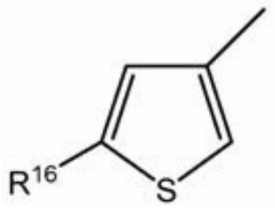
(g)二烷基氨基，

(h)任选被羟基取代的烷基，或

(i)链烯基，

当X^5是C(R^{11})时，R^{1U}和R^{11}任选地键合以形成任选被烷基或氧代取代的5-或6-元的环，以及当X^6是N(R^{12})和X^7是CH(R^{13})时，R^{12}和R^{13}任选地键合以形成5-或6-元的环，

(12)下式的基团



(L)

其中R^{16}是

(a)氢原子，

(b)烷基，其任选被1至3个选自氰基、烷基氨基和二烷基氨基的取代基取代，

(c)任选被羧基取代的链烯基，

(d)甲酰基，

(e)羧基，

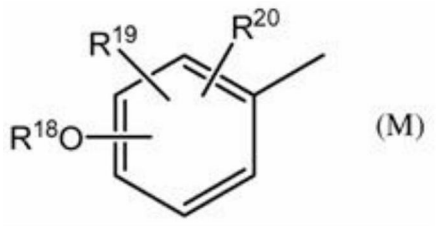
(f)氨基甲酰基，

(g)-C(R^{17})=N-OH,其中R^{17}是氢原子、氰基或羟基,

(h)5-至10-元的芳香族杂环基,其任选被烷基、烷氧基羰基、羧基或苯基取代,或

(i)氰基,

(13)下式的基团



(M)

其中

R^{18}是氢原子或任选被1至3个选自卤素原子和苯基的取代基取代的烷基,和

R^{19}和R^{20}各自独立地为,

(a)氢原子,

(b)卤素原子,

(c)氰基,

(d)任选被1至3个选自下列的取代基取代的烷基

(i)卤素原子,

(ii)氰基,

(iii)羟基,

(iv)氨基,

(v)烷基氨基,

(vi)二烷基氨基,和

(vii)任选被烷基取代的环状氨基,

(e)烷氧基,

(f)任选被1或2个选自下列的取代基取代的氨基

(i)任选被环状氨基取代的烷基羰基,

(ii)烷基磺酰基,

(iii)氨基甲酰基,和

(iv)烷基或环烷基,

(g)羧基,

(h)烷氧基羰基,

(i)任选被烷基取代的氨基甲酰基,所述烷基任选被氨基、烷基氨基、二烷基氨基或烷氧基羰基氨基取代,

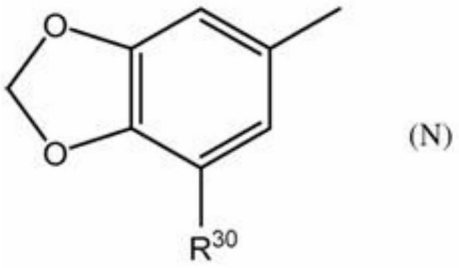
(j)甲酰基,

(k)任选被烷基取代的5-至10-元的芳香族杂环基,

(l)-CH=N-OR^{21},其中R^{21}是氢原子或任选被烷基氨基或二烷基氨基取代的烷基,或

(m)硝基,

(14)下式的基团



(N)

其中

R^{30}是(a)氢原子，

(b)卤素原子，

(c)氰基，

(d)任选被1至3个选自卤素原子和羟基的取代基取代的烷基，

(e)链烯基，

(f)炔基，

(g)烷氧基，

(h)甲酰基,或

(i)-CH=N-OH,

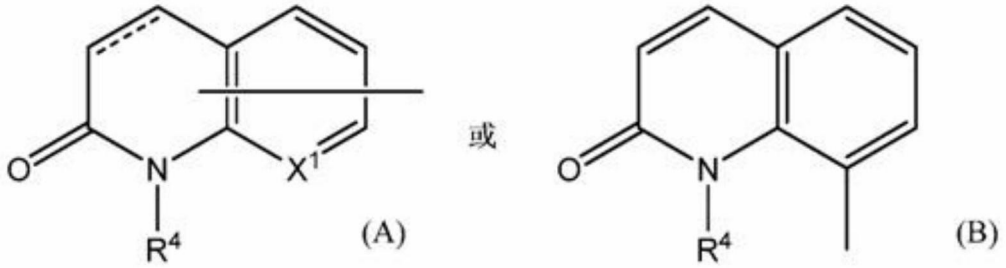
(15)萘基或异色烯基,或

(16)喹啉基或异喹啉基、或它们的氧化物衍生物，

或其盐。

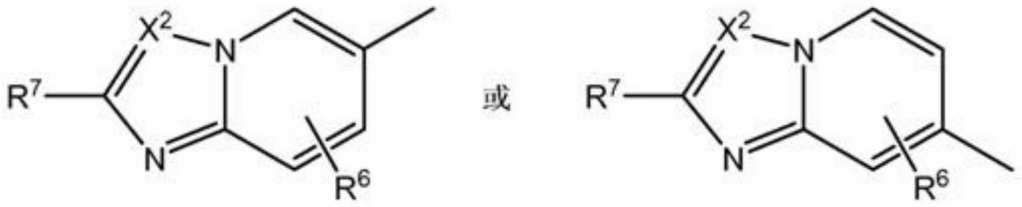
[0009] 项2.项1或1A的化合物或其盐,其中X是氟原子。

[0010] 项3.项1或1A的化合物或其盐,其中R^3是下式的稠合杂环基团



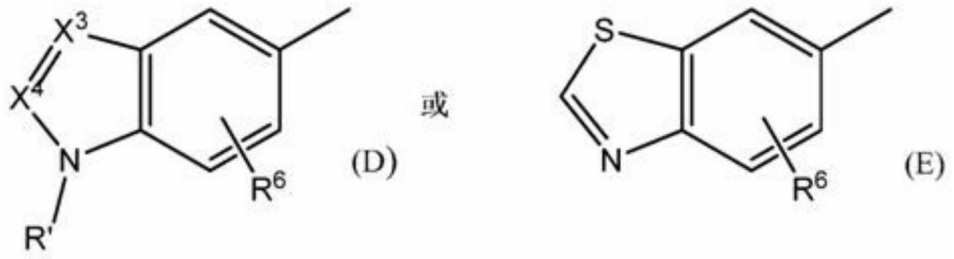
其中------、X^1和R^4如项1中所定义,且所述的稠合杂环基团任选被1或2个选自卤素原子、氰基、硝基、羟基和烷基的取代基取代。

[0011] 项4.项1或1A的化合物或其盐,其中R^3是下式的基团



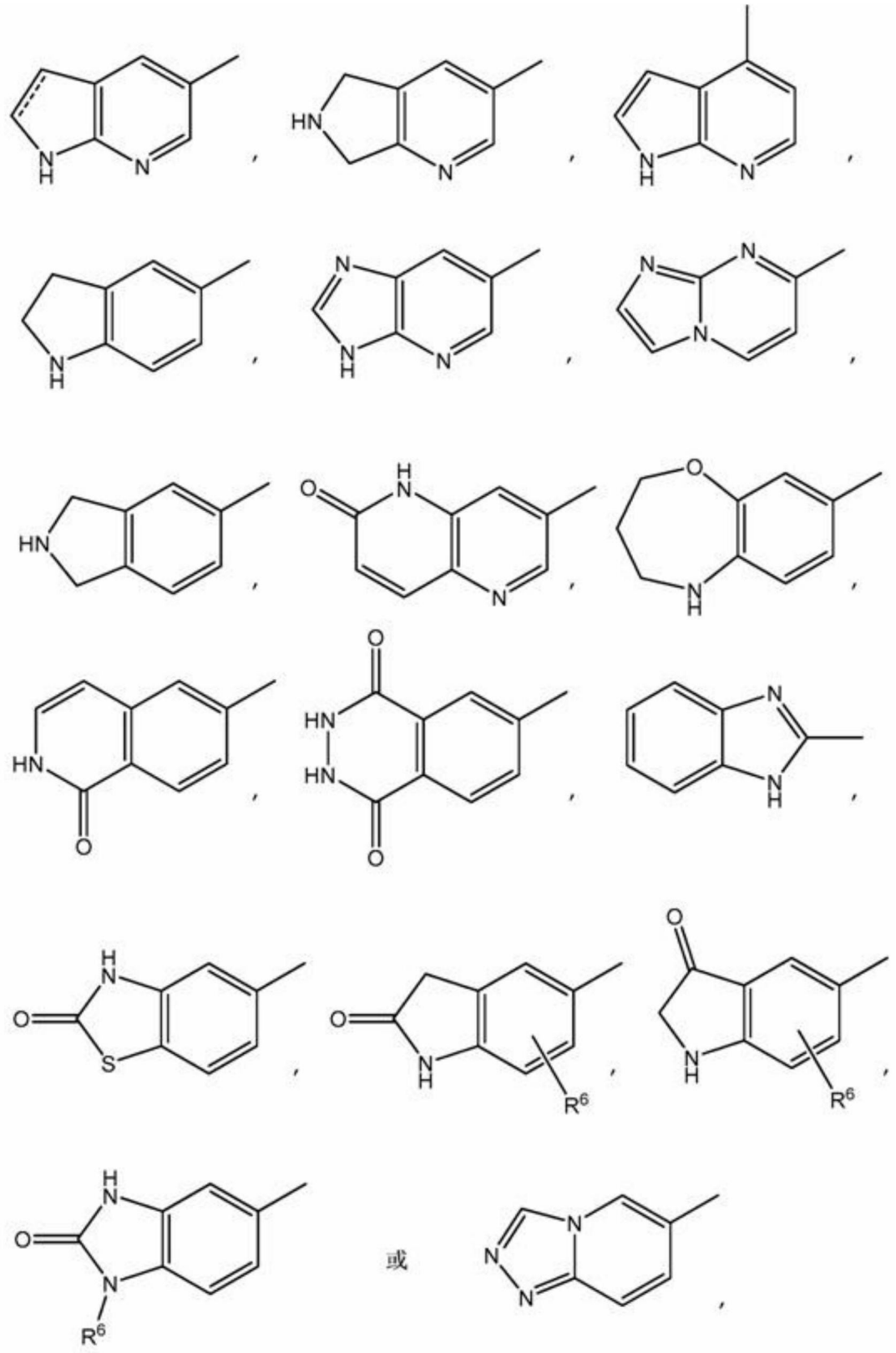
其中X^2、R^6和R^7如项1中所定义。

[0012] 项5.项1或1A的化合物或其盐,其中R^3是下式的基团



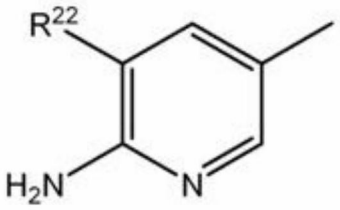
其中X^3、X^4、R^6和R'如项1中所定义。

[0013] 项6.项1或1A的化合物或其盐,其中R^3是下式的基团



其中 ------ 和R^6如项1中所定义。

[0014] 项7.项1或1A的化合物,其中R^3是下式的基团



其中R^{22}是

(a)卤素原子，

(b)氰基，

(c)硝基，

(d)烷基，其任选被1至3个选自卤素原子、烷基氨基、二烷基氨基和羟基的取代基取代，

(e)链烯基或炔基，

(f)芳基，

(g)环烷基，

(h)烷氧基，

(i)甲酰基，或

(j)任选被烷基取代的氨基甲酰基，所述烷基任选被羟基取代，

或其盐。

[0015] 项8.项1或1A的化合物或其盐，其中R^3是被1或2个选自氨基、烷基氨基、二烷基氨基和羧基的取代基取代的5-嘧啶基。

[0016] 项9.项1或1A的化合物，其中R^3是2-吲哚基，其任选被1或2个选自下列的取代基取代

(a)卤素原子，

(b)氰基，

(c)硝基，

(d)羟基，

(e)烷基，其任选被1至3个选自氨基、烷氧基羰基氨基、烷基氨基和二烷基氨基的取代基取代，

(f)烷氧基，

(g)甲酰基，

(h)羧基，和

(j)任选被1或2个选自下列的取代基取代的氨基

(i)烷氧基羰基，

(ii)任选被选自下列的取代基取代的烷基羰基

(A)任选被1至3个烷基取代的环烷基氧基，

(B)烷基氨基，

(C)二烷基氨基，

(D)任选被烷氧基羰基取代的环状氨基，和

(E)卤素原子，

(iii)任选被1至3个选自烷基和烷氧基的取代基取代的苯基羰基，

(iv)环烷基羰基，

(v)任选被烷基取代的5-至10-元的芳香族杂环基羰基，所述烷基任选被1至3个卤素原子取代，

(vi)苄基羰基，其任选被1至3个选自卤素原子和烷氧基的取代基取代，

(vii)任选被烷氧基取代的芳基磺酰基，

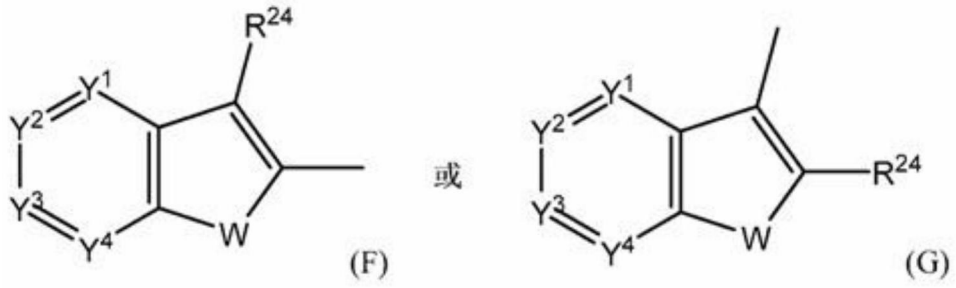
(viii)环烷基烷基磺酰基，其任选被1至3个选自烷基和氧代的取代基取代，

(ix)任选被1至3个烷基取代的5-至10-元的芳香族杂环基磺酰基，和

(x)-C(=N-CN)-SR^9，其中R^9是烷基，

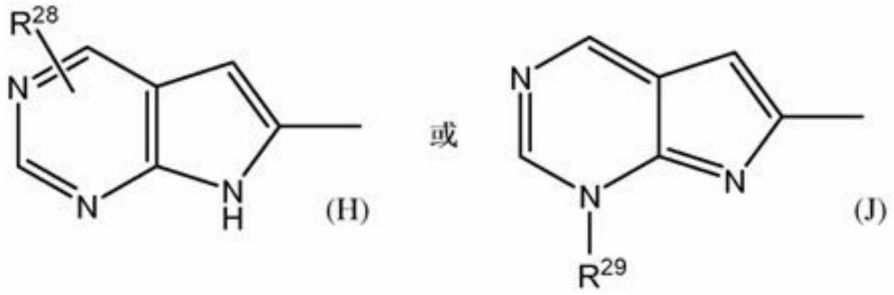
或其盐。

[0017] 项10.项1或1A的化合物或其盐，其中R^3是下式的基团



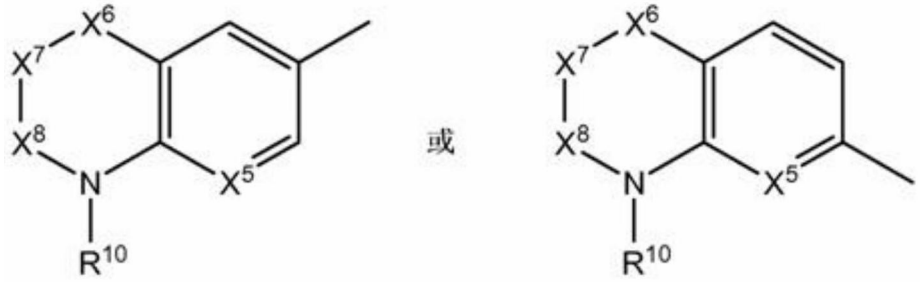
其中Y^1、Y^2、Y^3、Y^4、W和R^{24}如项1中所定义。

[0018] 项11.项1或1A的化合物或其盐，其中R^3是下式的基团



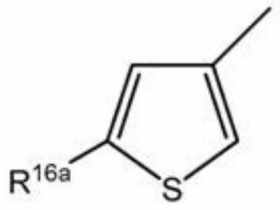
其中R^{28}和R^{29}如项1中所定义。

[0019] 项12.项1或1A的化合物或其盐，其中R^3是下式的基团



其中X^5、X^6、X^7、X^8和R^{10}如项1中所定义。

[0020] 项13.项1或1A的化合物，其中R^3是下式的基团



其中R^{16a}是

(a)烷基,其任选被1至3个选自氰基、烷基氨基和二烷基氨基的取代基取代,

(b)任选被羧基取代的链烯基,

(c)甲酰基,

(d)羧基,

(e)氨基甲酰基,

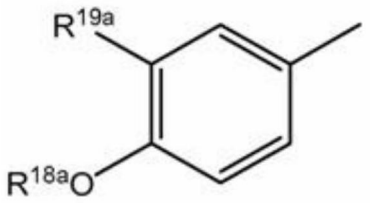
(f)-C(R^{17})=N-OH,其中R^{17}是氢原子、氰基或羟基,

(g)5-至10-元的芳香族杂环基,其任选被烷基、烷氧基羰基、羧基或苯基取代,或

(h)氰基,

或其盐。

[0021] 项14.项1或1A的化合物,其中R^3是下式的基团



其中

R^{18a}是烷基,和

R^{19a}是(a)卤素原子,

(b)氰基,

(c)任选被1至3个选自下列的取代基取代的烷基

(i)卤素原子,

(ii)氰基,

(iii)羟基,

(iv)氨基,

(v)烷基氨基,

(vi)二烷基氨基,和

(vii)任选被烷基取代的环状氨基,

(d)烷氧基,

(e)任选被1或2个选自下列的取代基取代的氨基

(i)任选被环状氨基取代的烷基羰基,

(ii)烷基磺酰基,

(iii)氨基甲酰基,和

(iv)烷基或环烷基,

(f)羧基,

(g)烷氧基羰基，

(h)任选被烷基取代的氨基甲酰基，所述烷基任选被氨基、烷基氨基、二烷基氨基或烷氧基羰基氨基取代

(i)甲酰基，

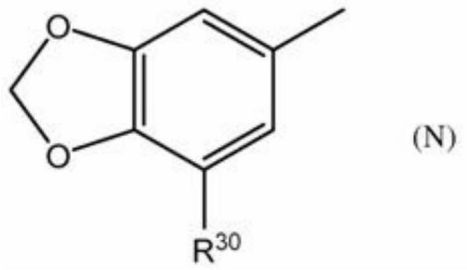
(j)任选被烷基取代的5-至10-元的芳香族杂环基，

(k)-CH=N-OR^{21}，其中R^{21}是氢原子或任选被烷基氨基或二烷基氨基取代的烷基，或

(l)硝基，

或其盐。

[0022] 项15.项1或1A的化合物或其盐，其中R^{3}是下式的基团



(N)

其中R^{30}如项1中所定义。

[0023] 项16.项1或1A的化合物或其盐，其中R^{3}是萘基或异色烯基。

[0024] 项17.项1或1A的化合物或其盐，其中R^{3}是喹啉基或异喹啉基、或它们的氧化物衍生物。

[0025] 项18.项1或1A的化合物或其盐，其中R是氢原子。

[0026] 项19.项1或1A的化合物或其盐，其中R^{1}是环丙基、2-氟环丙基或2,4-二氟苯基。

[0027] 项20.项1或1A的化合物或其盐，其中R^{2}是甲基、甲氧基或氯原子。

[0028] 项21.药物组合物，其包括项1或1A的化合物或其盐和药学上可接受的载体。

[0029] 项22.抗微生物剂，其包括项1或1A的化合物或其盐。

[0030] 项23.项1或1A的化合物或其盐，用作药物。

[0031] 项24.项1或1A的化合物或其盐，用作抗微生物剂。

[0032] 项25.项1或1A的化合物或其盐，其在预防或治疗细菌感染中的用途。

[0033] 项26.项1或1A的化合物或其盐在制备用于预防或治疗细菌感染的药物中的用途。

[0034] 项27.预防或治疗细菌感染的方法，其包括给人类或动物施用有效量的项1或1A的化合物或其盐。

[0035] 式(I)的化合物或其盐(在下文中有时简称为化合物(I))对各种革兰氏阳性和革兰氏阴性菌具有优异的抗菌活性，并有用于预防或治疗由各种细菌引起的人类、其他动物和鱼类的各种感染性疾病，以及也用作医疗器械等的外部抗微生物剂或消毒剂。

[0036] 附图简述

图1是曲线图，显示出实验实施例2中给动物施用化合物2-18的结果。

[0037] 图2是曲线图，显示出实验实施例2中给动物施用万古霉素的结果。

[0038] 发明详述

式(I)中基团的具体实例如下。

[0039] “卤素原子”的实例包括氟原子、氯原子、溴原子、和碘原子。

[0040] 在“烷基氨基”、“二烷基氨基”、“烷基羰基”、“环烷基烷基磺酰基”、“环烷基烷基”、“氨基烷基”和“烷基磺酰基”中的“烷基”和“烷基”部分的实例包括直链或支链的C_{1-6}烷基，如甲基、乙基、丙基、异丙基、丁基、异丁基、仲丁基、叔丁基、戊基、1-乙基丙基、异戊基、新戊基、叔戊基、己基、1,2,2-三甲基丙基、3,3-二甲基丁基、2-乙基丁基、异己基、3-甲基戊基等。

[0041] “链烯基”的实例包括直链或支链的C_{2-6}烯基，如乙烯基、1-丙烯基、2-丙烯基、1-丁烯基、2-丁烯基、3-丁烯基、1-甲基-2-丙烯基、2-戊烯基、2-己烯基等。

[0042] “炔基”的实例包括直链或支链的C_{2-6}炔基，如乙炔基、2-丙炔基、2-丁炔基、3-丁炔基、1-甲基-2-丙炔基、2-戊炔基、2-己炔基等。

[0043] “卤代烷氧基”、“烷氧基羰基”和“烷氧基羰基氨基”中的“烷氧基”和“烷氧基”部分的实例包括直链或支链的C_{1-6}烷氧基，如甲氧基、乙氧基、丙氧基、异丙氧基、丁氧基、异丁氧基、仲丁氧基、叔丁氧基、戊氧基、异戊氧基、新戊氧基、叔戊氧基、己氧基、异己氧基、3-甲基戊氧基等。

[0044] “卤代烷氧基”的实例包括被1至3个卤素原子取代的直链或支链的C_{1-6}烷氧基。其实例包括氟甲氧基、二氟甲氧基、三氟甲氧基、氯甲氧基、二氯甲氧基、三氯甲氧基、溴甲氧基、二溴甲氧基、二氯氟甲氧基、2,2,2-三氟乙氧基、2-氯乙氧基、3,3,3-三氟丙氧基、2-氯丙氧基、3-氯丙氧基、3-溴丙氧基、4,4,4-三氟丁氧基、2-氯丁氧基、4-氯丁氧基、4-溴丁氧基、5,5,5-三氟戊氧基、5-氯戊氧基、6,6,6-三氟己氧基、6-氯己氧基等。其优选的实例包括二氟甲氧基。

[0045] “链烯基氧基”的实例包括直链或支链的C_{2-6}链烯氧基，如乙烯氧基、1-丙烯氧基、2-丙烯氧基、1-丁烯氧基、2-丁烯氧基、3-丁烯氧基、1-甲基-2-丙烯氧基、2-戊烯氧基、2-己烯氧基等。

[0046] “芳基磺酰基”中的“芳基”和“芳基”部分的实例包括C_{6-14}(优选C_{6-10})芳基，如苯基、萘基(例如1-萘基、2-萘基)等。其优选的实例包括苯基。

[0047] 在“5-至10-元的芳香族杂环基羰基”和“5-至10-元的芳香族杂环基磺酰基”中的“5-至10-元的芳香族杂环基”和“5-至10-元的芳香族杂环基”部分的实例包括5-至10-元(优选5-或6-元)的芳香族杂环基团，其含有1至4个(优选1至3个，更优选1或2个)选自氮原子、氧原子和硫原子的杂原子。其实例包括呋喃基、噻吩基、吡咯基、吡唑基、咪唑基、三唑基(例如，1,2,3-三唑基、1,2,4-三唑基)、四唑基、异噁唑基、噁唑基、呋咱基(furazanyl)、异噻唑基、噻唑基、吡啶基(例如，2-吡啶基、3-吡啶基、4-吡啶基)、哒嗪基、嘧啶基、吡嗪基、苯并呋喃基、异苯并呋喃基、苯并[b]噻吩基、苯并[c]噻吩基、吲哚基、异吲哚基、中氮茚基、吲唑基、苯并咪唑基、苯并三唑基、苯并噁唑基、1,2-苯并异噁唑基、苯并噻唑基、1,2-苯并异噻唑基、嘌呤基、喹啉基、异喹啉基、喹嗪基、噌啉基(cinnolinyl)、喹唑啉基、喹喔啉基、酞嗪基、二氮杂萘基、蝶啶基等。其优选的实例包括吡咯基、咪唑基、噁唑基、三唑基(例如，1,2,3-三唑基、1,2,4-三唑基)、四唑基、吡啶基(例如，2-吡啶基、3-吡啶基、4-吡啶基)、苯并咪唑基等。

[0048] “烷基氨基”的实例包括C_{1-6}烷基氨基，如甲基氨基、乙基氨基、丙基氨基、异丙基氨基、丁基氨基、异丁基氨基、仲丁基氨基、叔丁基氨基、戊基氨基、异戊基氨基、新戊基氨基、叔戊基氨基、己基氨基等。

[0049] “二烷基氨基”的实例包括二(C_{1-6}烷基)氨基，如二甲基氨基、二乙基氨基、二丙基氨基、二异丙基氨基、二丁基氨基、二异丁基氨基、二(仲丁基)氨基、二(叔丁基)氨基、二戊基氨基、二(叔戊基)氨基、二己基氨基、乙基甲基氨基等。

[0050] “氨基烷基”的实例包括氨基-C_{1-6}烷基，如氨基甲基、2-氨基乙基、3-氨基丙基、4-氨基丁基、5-氨基戊基、6-氨基己基等。

[0051] 在“环烷基氧基”、“环烷基羰基”、“环烷基烷基”和“环烷基烷基磺酰基”中的“环烷基”和“环烷基”部分的实例包括C_{3-8}环烷基，如环丙基、环丁基、环戊基、环己基、环庚基、环辛基、降冰片烷基(例如2-降冰片烷基(norbornanyl))等。

[0052] “环烷基烷基”的实例包括C_{3-8}环烷基-C_{1-6}烷基，如环丙基甲基、环丁基甲基、环戊基甲基、环己基甲基、环庚基甲基、环辛基甲基、降冰片烷基甲基(例如降冰片烷-2-基甲基)等。

[0053] “环状氨基”的实例包括4-至7-元(优选5-或6-元)的环状氨基，其含有一个氮原子并任选地进一步含有一个选自氮原子、氧原子和硫原子的杂原子。其实例包括1-氮杂环丁烷基、1-吡咯烷基、1-咪唑烷基、1-吡唑烷基、哌啶子基、1-哌嗪基、吗啉代、硫代吗啉代、1-氮杂环庚烷基、1,4-氧杂氮杂环庚烷-4-基(1,4-oxazepan-4-yl)等。其优选的实例包括1-吡咯烷基、哌啶子基、1-哌嗪基、吗啉代、硫代吗啉代等。

[0054] “烷氧基羰基”的实例包括C_{1-6}烷氧基-羰基，其中烷氧基部分是C_{1-6}烷氧基。其实例包括甲氧基羰基、乙氧基羰基、丙氧基羰基、异丙氧基羰基、丁氧基羰基、异丁氧基羰基、仲丁氧基羰基、叔丁氧基羰基、戊氧基羰基、己氧基羰基等。

[0055] “烷氧基羰基氨基”的实例包括C_{1-6}烷氧基-羰基氨基，其中烷氧基部分是C_{1-6}烷氧基。其实例包括甲氧基羰基氨基、乙氧基羰基氨基、丙氧基羰基氨基、异丙氧羰基氨基、丁氧基羰基氨基、异丁氧基羰基氨基、仲丁氧基羰基氨基、叔丁氧基羰基氨基、戊氧基羰基氨基、己氧基羰基氨基等。

[0056] “烷基羰基”的实例包括C_{1-6}烷基-羰基，其中烷基部分是C_{1-6}烷基。其实例包括乙酰基、乙基羰基、丙基羰基、异丙基羰基、丁基羰基、异丁基羰基、仲丁基羰基、叔丁基羰基、戊基羰基、己基羰基等。

[0057] “环烷基氧基”的实例包括C_{3-8}环烷基氧基，如环丙基氧基、环丁基氧基、环戊基氧基、环己基氧基、环庚基氧基、环辛基氧基等。

[0058] “环烷基羰基”的实例包括C_{3-8}环烷基-羰基，如环丙基羰基、环丁基羰基、环戊基羰基、环己基羰基、环庚基羰基、环辛基等。

[0059] “5-至10-元的芳香族杂环基羰基”的实例包括5-至10-元(优选5-或6-元)的芳香族杂环基羰基，其中杂环基部分含有1至4个(优选1至3个，更优选1或2个)选自氮原子、氧原子和硫原子的杂原子。杂环基部分的实例与上述的5-至10-元的芳香族杂环基的实例相同。“5-至10-元的芳香族杂环基羰基”优选的实例包括吡啶基羰基(例如，2-吡啶基羰基、3-吡啶基羰基、4-吡啶基羰基)。

[0060] “芳基磺酰基”的实例包括C_{6-14}(优选C_{6-10})芳基磺酰基，如苯基磺酰基、萘基磺酰基(例如，1-萘基磺酰基、2-萘基磺酰基)等。其优选的实例包括苯基磺酰基。

[0061] “环烷基烷基磺酰基”的实例包括C_{3-8}环烷基-C_{1-6}烷基磺酰基，如环丙基甲基磺酰基、环丁基甲基磺酰基、环戊基甲基磺酰基、环己基甲基磺酰基、环庚基甲基磺酰基、环辛基

甲基磺酰基、降冰片烷基甲基磺酰基(例如降冰片烷-2-基甲基磺酰基)等。

[0062] “5-至10-元的芳香族杂环基磺酰基”的实例包括5-至10-元(优选5-或6-元)的芳香族杂环基磺酰基,其中杂环基部分含有1至4个(优选1至3个,更优选1或2个)选自氮原子、氧原子和硫原子的杂原子。杂环基部分的实例与上述的5-至10-元的芳香族杂环基的实例相同。“5-至10-元的芳香族杂环基磺酰基”优选的实例包括咪唑基磺酰基。

[0063] “烷基磺酰基”的实例包括C_{1-6}烷基磺酰基,其中烷基部分是C_{1-6}烷基。其实例包括甲基磺酰基、乙基磺酰基、丙基磺酰基、异丙基磺酰基、丁基磺酰基、异丁基磺酰基、仲丁基磺酰基、叔丁基磺酰基、戊基磺酰基、己基磺酰基等。

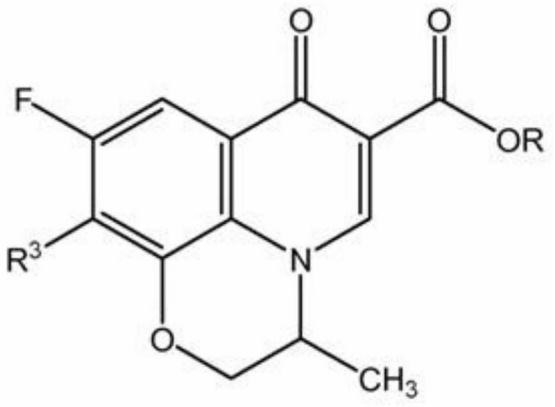
[0064] “任选被1至3个卤素原子取代的环丙基”的实例包括任选被1个氟原子取代的环丙基,例如环丙基、2-氟环丙基等。

[0065] “任选被1至3个卤素原子取代的苯基”的实例包括被2个氟原子取代的苯基,如2,4-二氟苯基等。

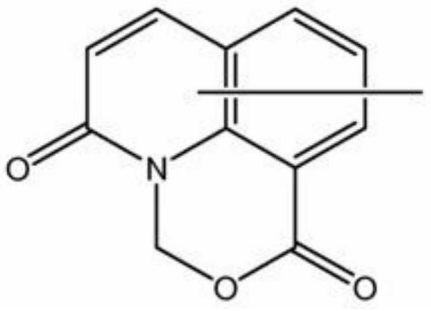
[0066] “5-至10-元的饱和杂环基”的实例包括5-至10-元(优选5-或6-元)的饱和杂环基,其含有1至4个(优选1至3个,更优选1或2个)选自氮原子、氧原子和硫原子的杂原子。其实例包括吡咯烷基、哌啶基、哌嗪基、吗啉基、硫代吗啉基等。

[0067] 由R^{34}和R^{35}形成的“任选被氨基或氧代取代的6-元环”的实例包括任选含有一个氮原子的6-元环,且所述环任选被氨基或氧代取代。其实例包括环己烯和二氢吡啶,各自任选被氨基或氧代取代。

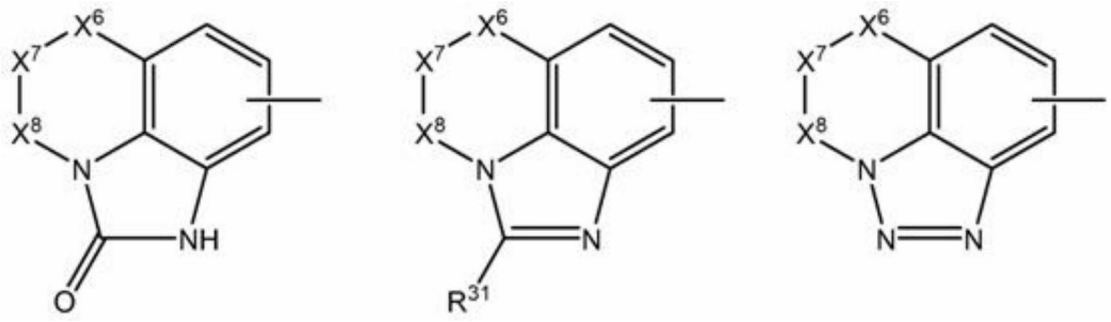
[0068] 由R^1和R^2形成的“任选被烷基取代的5-或6-元的环”的实例包括5-或6-元(优选6-元)的环,其含有一个氮原子并任选进一步含有一个氧原子,且所述环任选被烷基取代。优选地,R^1和R^2任选地键合以形成-O-CH_2-CH(CH_3)-,其中氧原子键合到如下所示的喹诺酮环的苯环上。



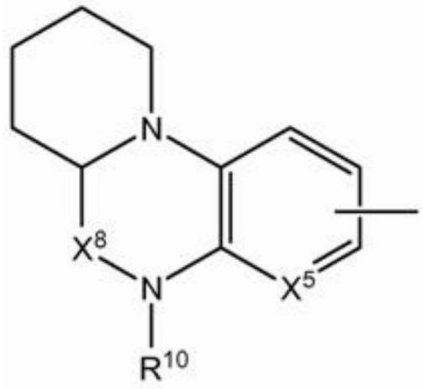
[0069] 由R^4和R^5形成的“任选被氧代取代的5-或6-元的环”的实例包括5-或6-元(优选6-元)的环,其含有一个氮原子并任选进一步含有一个氧原子,且所述环任选被氧代取代。优选地,R^4和R^5任选地键合以形成-CH_2-O-(C=O)-,其中羰基键合到如下所示的喹诺酮环的苯基环上。



[0070] 由R^{10}和R^{11}形成的“任选被烷基或氧代取代的5-或6-元环”的实例包括5-或6-元(优选5-元)的环,其含有2或3个氮原子,且所述环任选被烷基或氧代取代。优选地,R^{10}和R^{11}任选地键合以形成-(C=O)-NH-、-C(R^{31})=N-或-N=N-,其中R^{31}是氢原子或烷基,和氮原子键合到如下所示的稠环的苯基环上。



[0071] 由R^{12}和R^{13}形成的“5-或6-元的环”的实例包括任选含有一个氮原子的5-或6-元(优选6-元)的环。优选地,R^{12}和R^{13}任选地键合以形成如下所示的-$(CH_2)_4$-。



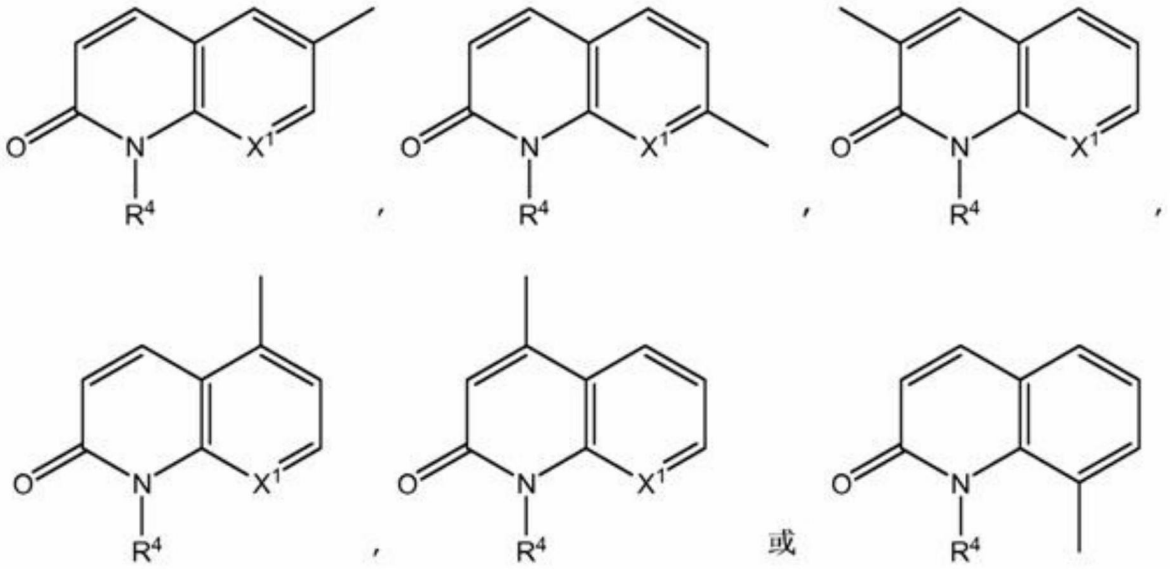
[0072] X是氢原子或氟原子,优选为氟原子。

[0073] R是氢原子或烷基,优选为氢原子。

[0074] R^1是(1)任选被1至3个卤素原子取代的环丙基或(2)任选被1至3个卤素原子取代的苯基,优选地,环丙基、2-氟环丙基或2,4-二氟苯基。

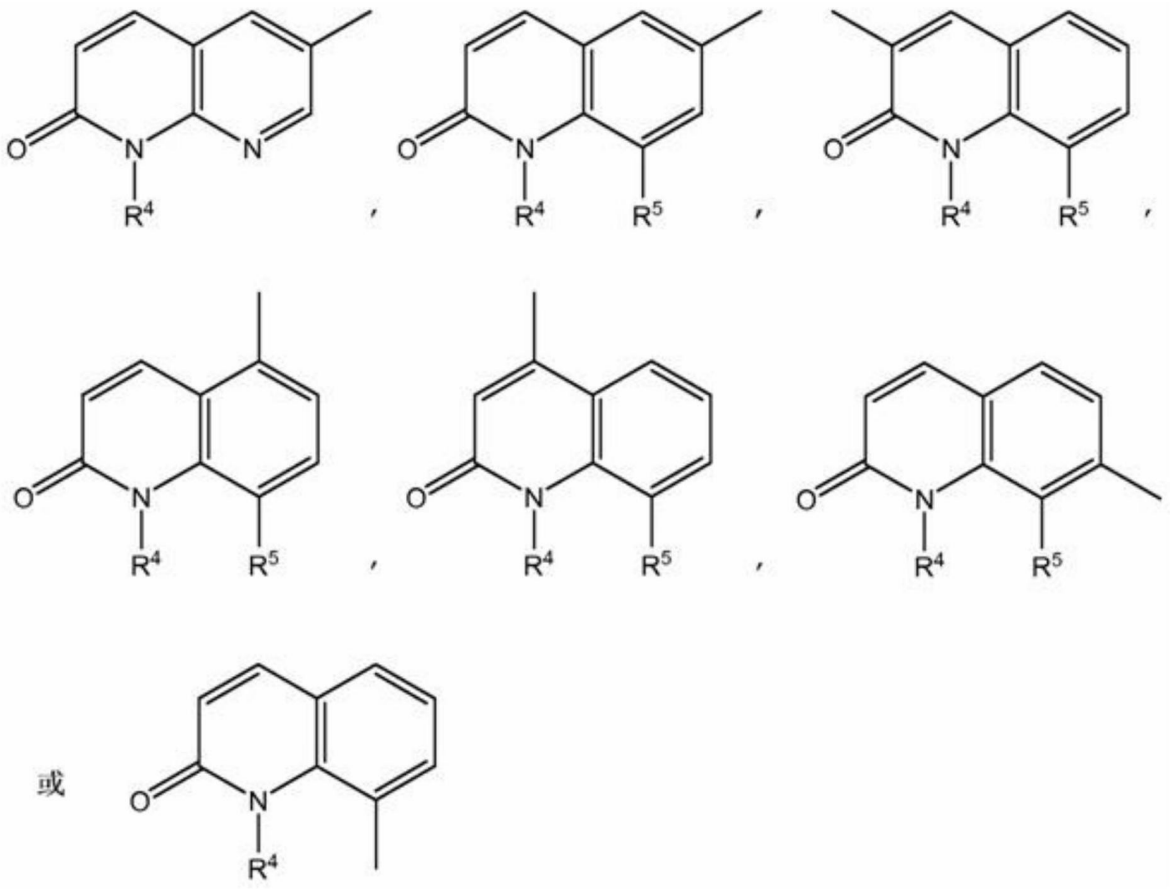
[0075] R^2是氢原子;任选被1或2个选自卤素原子和羟基的取代基取代的烷基;烷氧基;卤代烷氧基;卤素原子;氰基;环丙基;硝基;氨基;甲酰基;链烯基或炔基,优选为烷基、烷氧基、卤代烷氧基、氯原子或氰基,更优选为C_{1-6}烷基、C_{1-6}烷氧基、被1至3个卤素原子取代的C_{1-6}烷氧基、氯原子或氰基,更加优选为甲基、甲氧基或氯原子。

[0076] 式(A)或(B)的稠合杂环基团的实例包括下式的稠合杂环基团



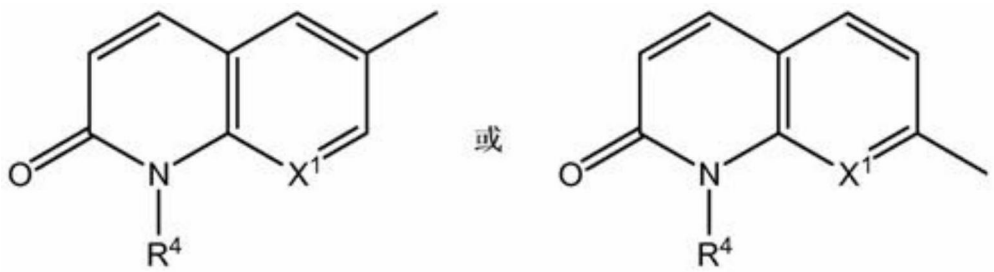
其中X^1和R^4定义如上，且所述的稠合杂环基团任选被1或2选自卤素原子、氰基、硝基、羟基和烷基的取代基取代。

[0077] 式(A)或(B)的稠合杂环基团优选的实例包括下式的稠合杂环基团



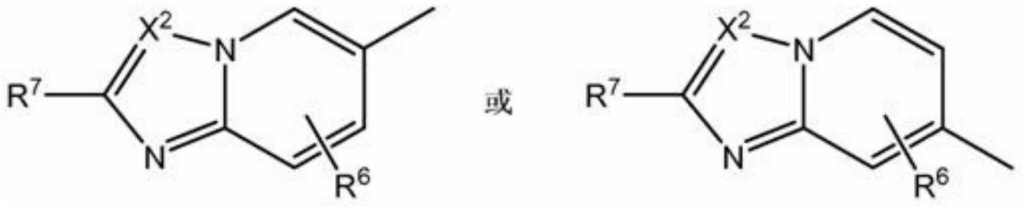
其中R^4和R^5定义如上，且所述的稠合杂环基团任选被1或2选自卤素原子、氰基、硝基、羟基和烷基的取代基取代。

[0078] 式(A)或(B)的稠合杂环基团优选的其它实例包括下式的稠合杂环基团



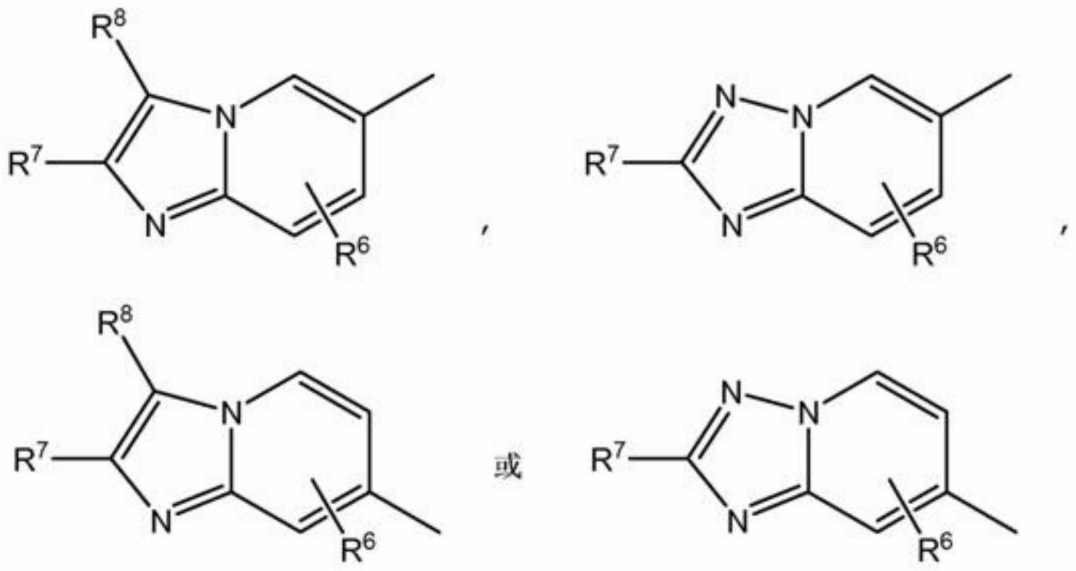
其中X^1和R^4定义如上，且所述的稠合杂环基团任选被1或2选自卤素原子、氰基、硝基、羟基和烷基的取代基取代。

[0079] 式(C)基团的实例包括下式的基团



其中X^2、R^6和R^7定义如上。

[0080] 式(C)基团优选的实例包括下式的基团



其中R^6、R^7和R^8定义如上。

[0081] 在上式中，R^6、R^7和R^8各自独立地为，

(a)氢原子，

(b)卤素原子，

(c)氰基，

(d)硝基，

(e)氨基，

(f)任选被1至3个选自卤素原子和氨基的取代基取代的烷基，

(g)链烯基，

(h)炔基，

(i)芳基，

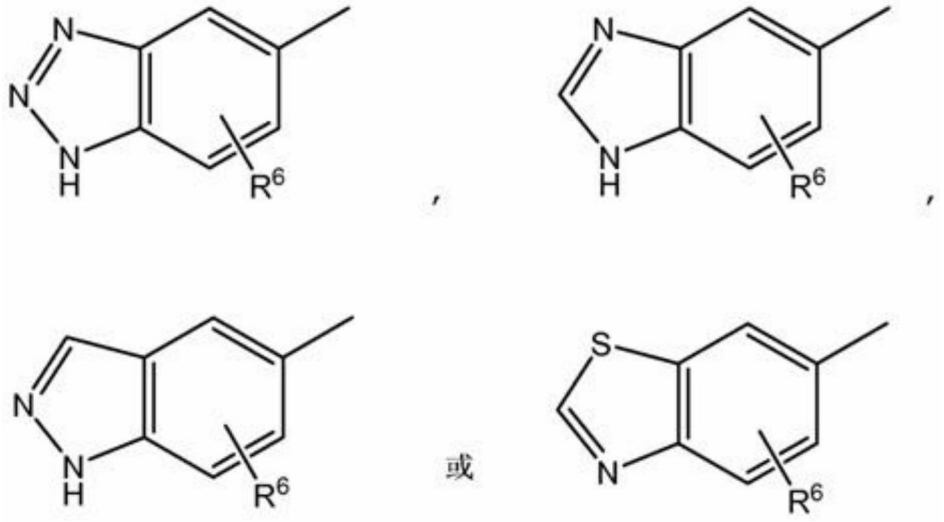
(j)甲酰基，

(k)羧基，

(1)氨基甲酰基，或

(m)任选被烷基取代的5-至10-元的芳香族杂环基(例如吡啶基、三唑基)。

[0082] 式(D)或(E)基团的实例包括下式的基团



其中R^6定义如上。R^6优选为氢原子、卤原子、硝基或氨基。

[0083] 优选地，R^3是任选地被1或2个选自下列的取代基取代的3-吡啶基

(a)卤素原子，

(b)氰基，

(c)硝基，

(d)羟基，

(e)氨基，

(f)烷基，其任选被1至3个选自卤素原子、烷基氨基、二烷基氨基和羟基的取代基取代，

(g)链烯基，

(h)芳基，

(i)环烷基，

(j)烷氧基，

(k)烷基氨基，

(1)二烷基氨基，

(m)任选被1至3个卤素原子取代的苯基氨基，

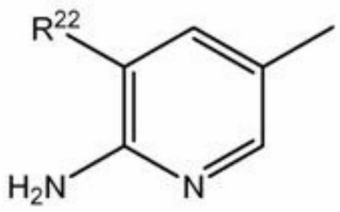
(n)任选被烷氧基羰基取代的环状氨基(例如1-哌嗪基、吗啉代)，

(o)甲酰基，

(p)氨基甲酰基，和

(q)任选被烷基取代的5-至10-元的芳香族杂环基(例如三唑基)。

[0084] 更优选地，R^3是是下式基团



其中R^{22}是

(a)卤素原子，

(b)氰基，

(c)硝基，

(d)烷基，其任选被1至3个选自卤素原子、烷基氨基、二烷基氨基和羟基的取代基取代，

(e)链烯基，

(f)芳基，

(g)环烷基，

(h)烷氧基，

(i)甲酰基，或

(j)氨基甲酰基。

[0085] 优选地，R^{22}是

(a)氰基，

(b)硝基，

(c)芳基，

(d)甲酰基，或

(e)氨基甲酰基。

[0086] 优选地，R^3是被1或2个选自氨基、烷基氨基和二烷基氨基的取代基取代的5-嘧啶基。

[0087] 优选地，R^3是2-吲哚基、3-吲哚基、5-吲哚基或6-吲哚基，各自任选被1或2个选自下列的取代基取代

(a)卤素原子，

(b)氰基，

(c)硝基，

(d)羟基，

(e)烷基，其任选被1至3个选自氨基、烷氧基羰基氨基、烷基氨基和二烷基氨基的取代基取代，

(f)烷氧基，

(g)甲酰基，

(h)羧基，和

(j)任选被1或2个选自下列的取代基取代的氨基

(i)烷氧基羰基，

(ii)任选被选自下列的取代基取代的烷基羰基

(A)任选被1至3个烷基取代的环烷基氧基，

(B)烷基氨基，

(C)二烷基氨基，

(D)任选被烷氧基羰基取代的环状氨基(例如吗啉代、1-哌嗪基)，和

(E)卤素原子，

(iii)任选被1至3个选自烷基和烷氧基的取代基取代的苯基羰基，

(iv)环烷基羰基，

(v)任选被烷基取代的5-至10-元的芳香族杂环基羰基(例如吡啶基羰基)，所述烷基任选被1至3个卤素原子取代，

(vi)苄基羰基，其任选被1至3个选自卤素原子和烷氧基的取代基取代，

(vii)任选被烷氧基取代的芳基磺酰基，

(viii)任选被1至3个选自烷基和氧代的取代基取代的环烷基烷基磺酰基(例如樟脑磺酰基)，

(ix)任选被1至3个烷基取代的5-至10-元的芳香族杂环基磺酰基(例如咪唑基磺酰基)，和

(x)-C(=N-CN)-SR^9，其中R^9是烷基。

[0088] 更优选地，R^3是2-吲哚基，其任选被1或2个选自下列的取代基取代

(a)卤素原子，

(b)氰基，

(c)硝基，

(d)羟基，

(e)烷基，其任选被1至3个选自氨基、烷氧基羰基氨基、烷基氨基和二烷基氨基的取代基取代，

(f)烷氧基，

(g)甲酰基，

(h)羧基，和

(j)任选被1或2个选自下列的取代基取代的氨基

(i)烷氧基羰基，

(ii)任选被选自下列的取代基取代的烷基羰基

(A)任选被1至3个烷基取代的环烷基氧基，

(B)烷基氨基，

(C)二烷基氨基，

(D)任选被烷氧基羰基取代的环状氨基(例如吗啉代、1-哌嗪基)，和

(E)卤素原子，

(iii)任选被1至3个选自烷基和烷氧基的取代基取代的苯基羰基，

(iv)环烷基羰基，

(v)任选被烷基取代的5-至10-元的芳香族杂环基羰基(例如吡啶基羰基)，所述烷基任选被1至3个卤素原子取代，

(vi)苄基羰基，其任选被1至3个选自卤素原子和烷氧基的取代基取代，

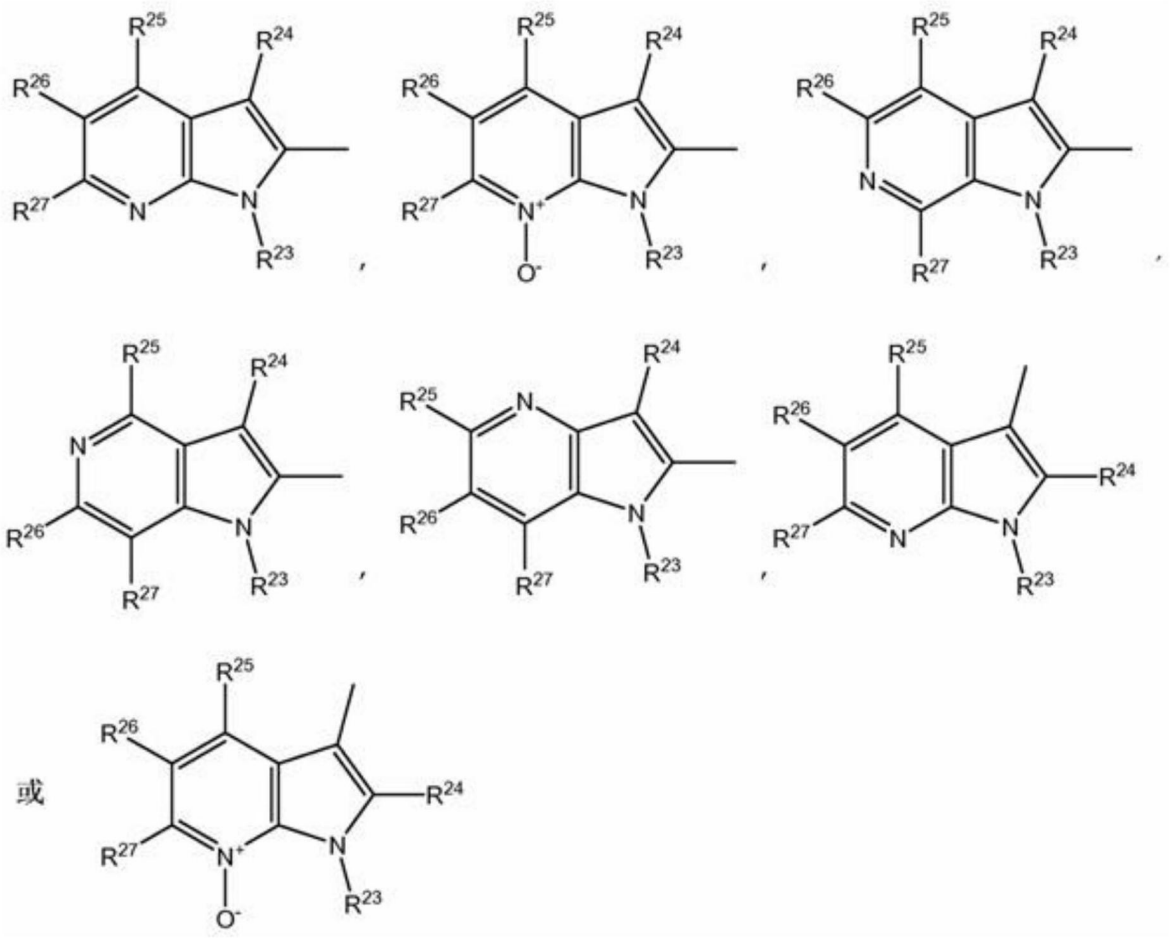
(vii)任选被烷氧基取代的芳基磺酰基，

(viii)任选被1至3个选自烷基和氧代的取代基取代的环烷基烷基磺酰基(例如樟脑磺酰基),

(ix)任选被1至3个烷基取代的5-至10-元的芳香族杂环基磺酰基(例如咪唑基磺酰基),和

(x)-C(=N-CN)-SR^9,其中R^9是烷基。

[0089] 式(F)或(G)基团的实例包括下式的基团



其中

R^{23}是氢原子或烷基,和

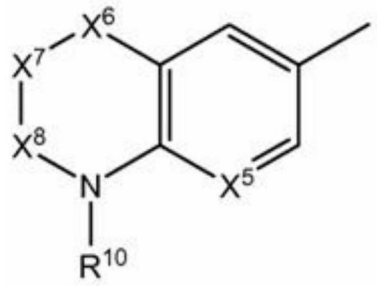
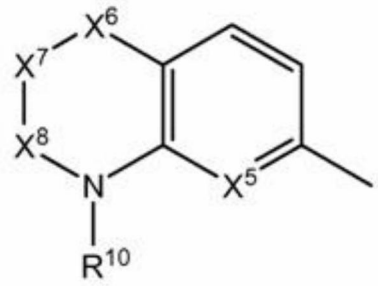
R^{24}、R^{25}、R^{26}和R^{27}各自独立地为,

(a)氢原子,

(b)氰基,或

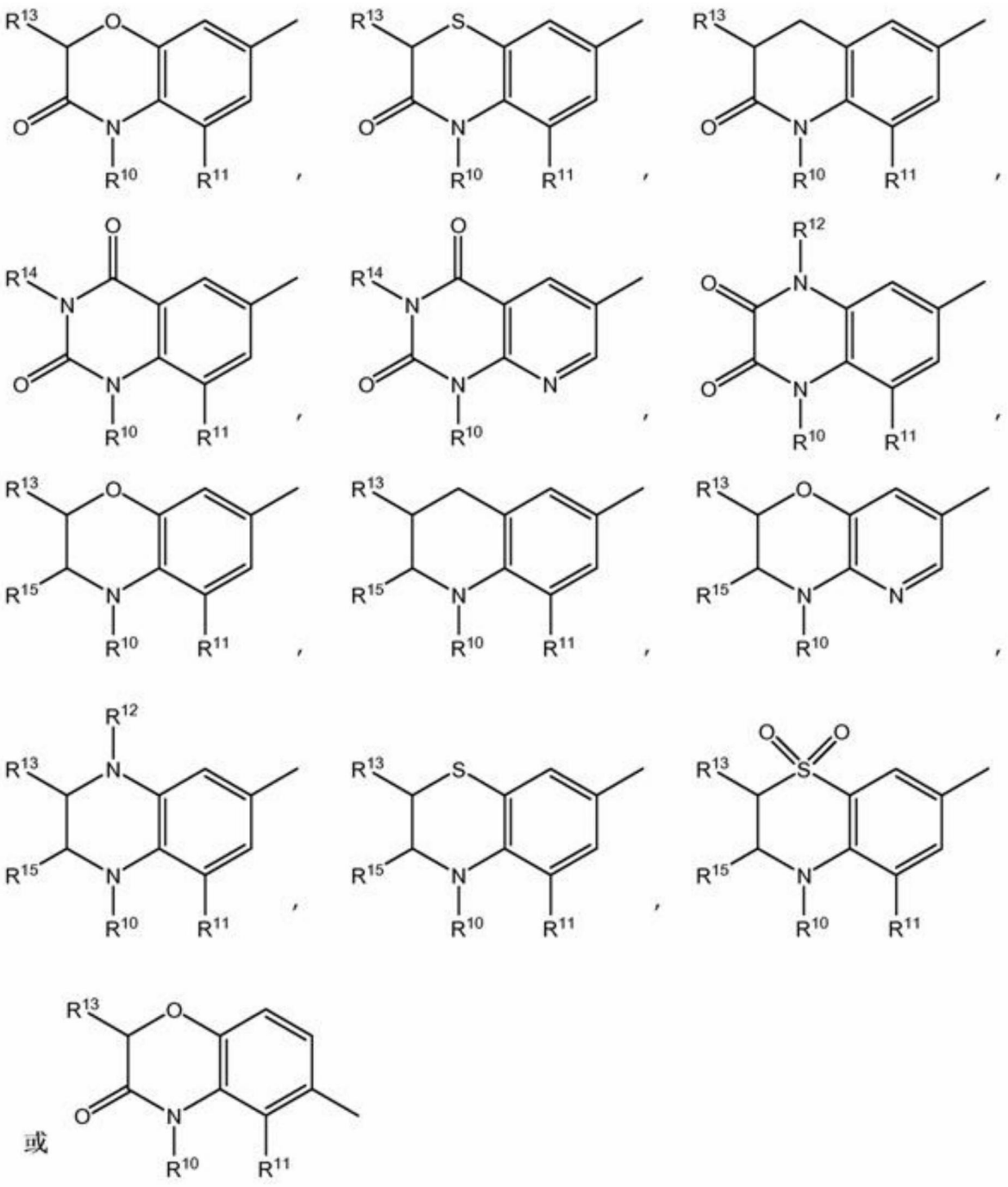
(c)硝基。

[0090] 式(K)基团的实例包括下式的基团


或


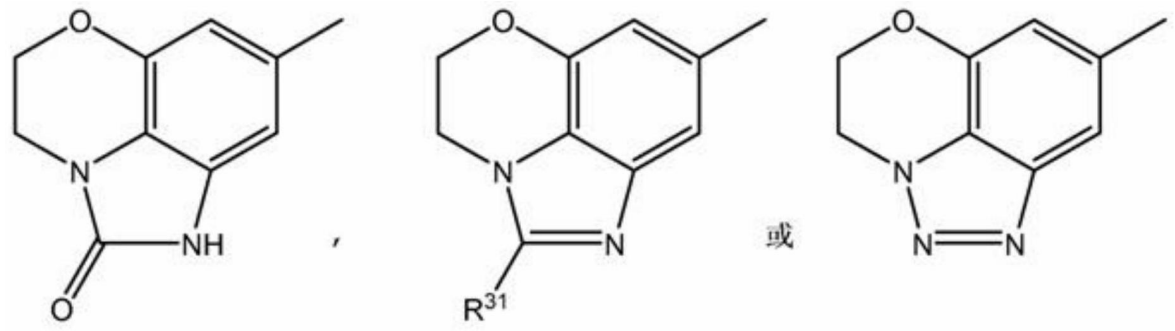
其中X^5、X^6、X^7、X^8和R^{10}定义如上。

[0091] 式(K)基团优选的实例包括下式的基团



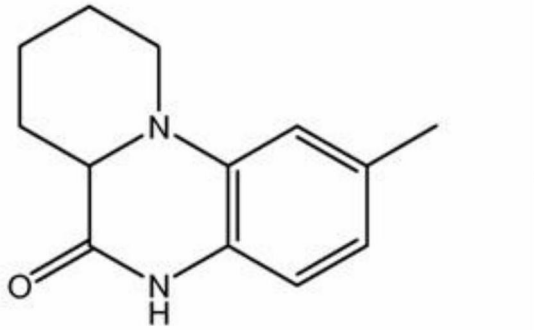
其中R^{10}、R^{11}、R^{12}、R^{13}、R^{14}和R^{15}定义如上。

[0092] 当R^{10}和R^{11}键合以形成任选被烷基或氧代取代的5-或6-元环时，式(K)基团优选的实例包括下式的基团



其中R^{31}是氢原子或烷基。

[0093] 当R^{12}和R^{13}键合以形成5-或6-元的环时，式(K)基团优选的实例包括下式的基团



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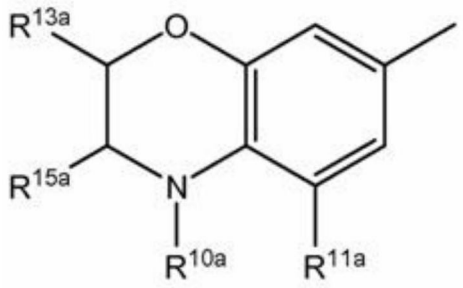
[0094] 式(K)基团更优选的实例包括下式的基团



其中R^{10a}是

(a)氢原子或

(b)烷基，和

R^{11a}、R^{13a}和R^{15a}各自独立地为，

(a)氢原子，

(b)卤素原子，

(c)氰基，

(d)硝基，

(e)氨基，

(f)烷基氨基，

(g)二烷基氨基，

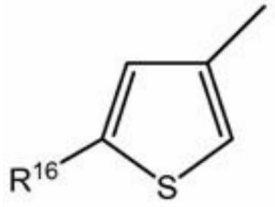
(h)任选被羟基取代的烷基，或

(i)链烯基，

R^{10a}和R^{11a}任选地键合以形成任选被烷基或氧代取代的5-或6-元的环，

条件是R^{10a}、R^{11a}、R^{13a}和R^{15a}不同时为氢原子。

[0095] 优选地，R^3是下式的基团



其中R^{16}是

(a)氢原子，

(b)烷基，其任选被1至3个选自氰基、烷基氨基和二烷基氨基的取代基取代，

(c)任选被羧基取代的链烯基，

(d)甲酰基，

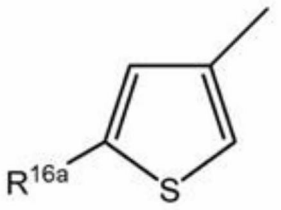
(e)羧基，

(f)氨基甲酰基，

(g)-C(R^{17})=N-OH，其中R^{17}是氢原子、氰基或羟基，或

(h)5-至10-元的芳香族杂环基(例如四唑基、吡咯基、噁唑基、苯并咪唑基、三唑基)，其任选被烷基、烷氧基羰基、羧基或苯基取代。

[0096] 更优选地，R^3是下式的基团



其中R^{16a}是

(a)烷基，其任选被1至3个选自氰基、烷基氨基和二烷基氨基的取代基取代，

(b)任选被羧基取代的链烯基，

(c)甲酰基，

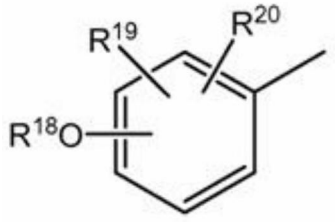
(d)羧基，

(e)氨基甲酰基，

(f)-C(R^{17})=N-OH，其中R^{17}是氢原子、氰基或羟基，或

(g)5-至10-元的芳香族杂环基(例如四唑基、吡咯基、噁唑基、苯并咪唑基、三唑基)，其任选被烷基、烷氧基羰基、羧基或苯基取代。

[0097] 优选地，R^3是下式的基团



其中

R^{18}是任选被1至3个选自卤素原子和苯基的取代基取代的烷基，和

R^{19}和R^{20}各自独立地为，

(a)氢原子，

(b)卤素原子，

(c)氰基，

(d)任选被1至3个选自下列的取代基取代的烷基

(i)卤素原子，

(ii)氰基，

(iii)羟基，

(iv)氨基，

(v)烷基氨基，

(vi)二烷基氨基，和

(vii)任选被烷基取代的环状氨基(例如，1-哌嗪基)，

(e)烷氧基，

(f)任选被1或2个选自下列的取代基取代的氨基

(i)任选被环状氨基(例如，吗啉代)取代的烷基羰基，

(ii)烷基磺酰基，和

(iii)氨基甲酰基，

(g)羧基，

(h)烷氧基羰基，

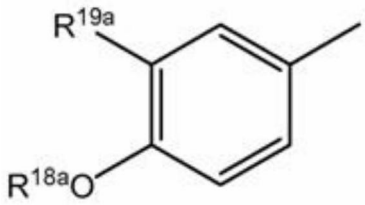
(i)任选被烷基取代的氨基甲酰基，所述烷基任选被氨基、烷基氨基、二烷基氨基或烷氧基羰基氨基取代，

(j)甲酰基，

(k)5-至10-元的芳香族杂环基(例如，噁唑基、苯并咪唑基)，或

(l)-CH=N-OR^{21}，其中R^{21}是氢原子或任选被烷基氨基或二烷基氨基取代的烷基。

[0098] 更优选地，R^3是下式的基团



其中

R^{18a}是烷基，和

R^{19a}是(a)卤素原子，

(b)氰基，

(c)任选被1至3个选自下列的取代基取代的烷基

(i)卤素原子，

(ii)氰基，

(iii)羟基，

(iv)氨基，

(v)烷基氨基，

(vi)二烷基氨基，和

(vii)任选被烷基取代的环状氨基(例如，1-哌嗪基)，

(d)烷氧基，

(e)任选被1或2个选自下列的取代基取代的氨基

(i)任选被环状氨基(例如，吗啉代)取代的烷基羰基，

(ii)烷基磺酰基，和

(iii)氨基甲酰基，

(f)羧基，

(g)烷氧基羰基，

(h)任选被烷基取代的氨基甲酰基，所述烷基任选被氨基、烷基氨基、二烷基氨基或烷氧基羰基氨基取代，

(i)甲酰基，

(j)5-至10-元的芳香族杂环基(例如，噁唑基、苯并咪唑基)，或

(k)-CH=N-OR^{21}，其中R^{21}是氢原子或任选被烷基氨基或二烷基氨基取代的烷基。

[0099] 化合物(I)优选的实例描述如下。

[0100] [化合物I-1]

式(I)的化合物，其中

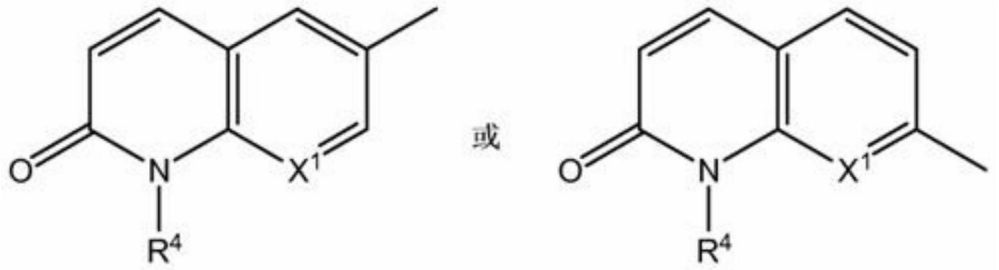
R是氢原子；

R^{1}是环丙基、2-氟环丙基或2,4-二氟苯基；

R^{2}是C_{1-6}烷基(例如，甲基)、C_{1-6}烷氧基(例如，甲氧基)或氯原子；或

R^{1}和R^{2}任选地键合以形成-O-CH_2-CH(CH_3)-，其中氧原子键合在喹诺酮环的苯基环上；和

R^{3}是下式的稠合的杂环基团



其中

X^{1}是C(R^{5})或N，

R^{4}是氢原子或C_{1-6}烷基，和

R^{5}是(a)氢原子，

(b)卤素原子，

(c)氰基，

(d)硝基，

(e)羟基，

(f)任选被1至3个卤素原子取代的C_{1-6}烷基，

(g)C_{2-6}炔基，

(h)C_{6-14}芳基，或

(i)任选被1至3个卤素原子取代的C_{1-6}烷氧基，

当X^1是$C(R^5)$时，R^4和R^5任选地键合以形成$-CH_2-O-(C=O)-$，其中羰基键合在喹诺酮环的苯基环上，

所述稠合的杂环基团任选被1或2个选自卤素原子、氰基、硝基、羟基和C_{1-6}烷基的取代基取代，

或其盐。

[0101] [化合物I-2]

式(I)的化合物，其中

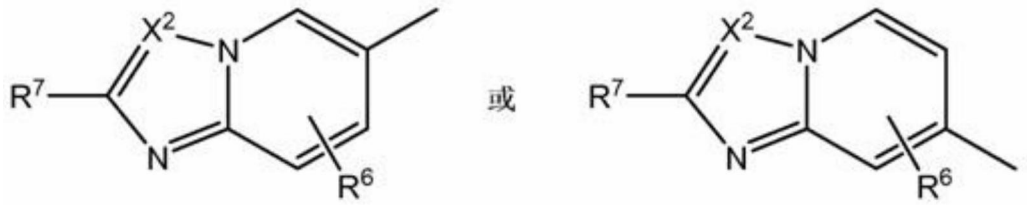
R是氢原子；

R^1是环丙基、2-氟环丙基或2,4-二氟苯基；

R^2是C_{1-6}烷基(例如，甲基)、C_{1-6}烷氧基(例如，甲氧基)或氯原子；或

R^1和R^2任选地键合以形成$-O-CH_2-CH(CH_3)-$，其中氧原子键合在喹诺酮环的苯基环上；和

R^3是下式的基团



其中

X^2是$C(R^8)$或N，和

R^6、R^7和R^8各自独立地为，

(a)氢原子，

(b)卤素原子，

(c)氰基，

(d)硝基，

(e)氨基，

(f)C_{1-6}烷基，其任选被1至3个选自卤素原子和氨基的取代基取代，

(g)C_{2-6}链烯基，

(h)C_{2-6}炔基，

(i)C_{6-14}芳基，

(j)甲酰基，

(k)羧基，

(l)氨基甲酰基，或

(m)任选被C_{1-6}烷基取代的5-至10-元的芳香族杂环基(例如，吡啶基、三唑基)，

或其盐。

[0102] [化合物I-3]

式(I)的化合物,其中

R是氢原子;

R^1是环丙基、2-氟环丙基或2,4-二氟苯基;

R^2是C_{1-6}烷基(例如,甲基)、C_{1-6}烷氧基(例如,甲氧基)或氯原子;和

R^3是下式的基团

其中

X^3和X^4是N,或

X^3是N和X^4是CH,或

X^3是CH和X^4是N,和

R^6是氢原子、卤素原子、硝基或氨基,

或其盐。

[0103] [化合物I-4]

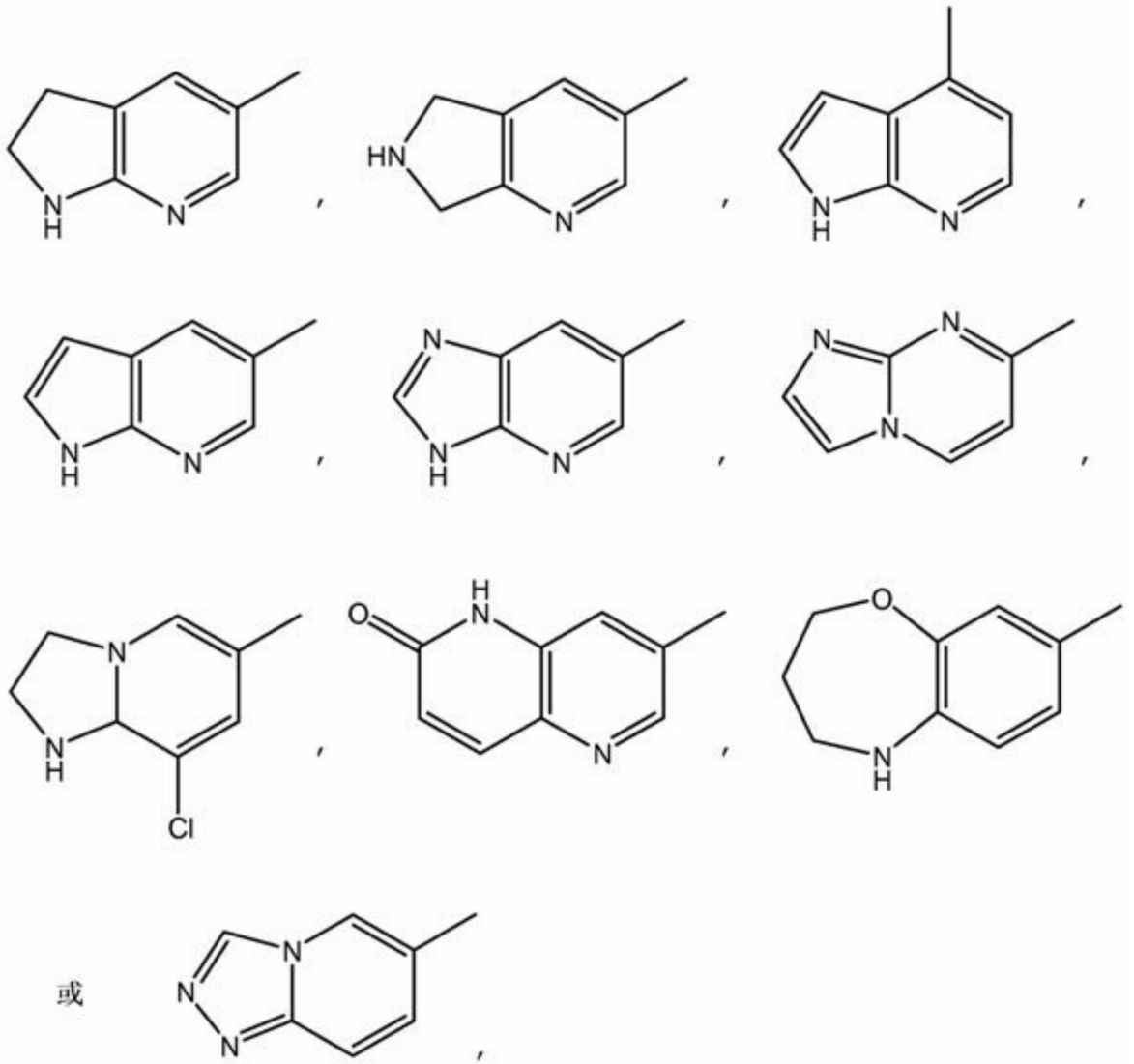
式(I)的化合物,其中

R是氢原子;

R^1是环丙基、2-氟环丙基或2,4-二氟苯基;

R^2是C_{1-6}烷基(例如,甲基)、C_{1-6}烷氧基(例如,甲氧基)或氯原子;和

R^3是下式的基团



或其盐。

[0104] [化合物I-5]

式(I)的化合物,其中

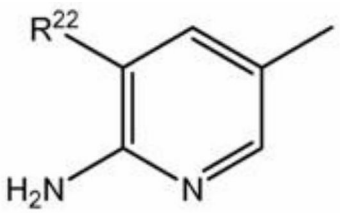
R是氢原子;

R^1是环丙基、2-氟环丙基或2,4-二氟苯基;

R^2是C_{1-6}烷基(例如,甲基)、C_{1-6}烷氧基(例如,甲氧基)或氯原子;或

R^1和R^2任选地键合以形成-O-CH_2-CH(CH_3)-,其中氧原子键合在喹诺酮环的苯基环上;和

R^3是下式的基团



其中R^{22}是

(a)卤素原子,

(b)氰基，

(c)硝基，

(d)C_{1-6}烷基，其任选被1至3个选自卤素原子、C_{1-6}烷基氨基、二(C_{1-6}烷基)氨基和羟基的取代基取代，

(e)C_{2-6}链烯基，

(f)C_{6-14}芳基，

(g)C_{3-8}环烷基，

(h)C_{1-6}烷氧基，

(i)甲酰基，或

(j)氨基甲酰基，

或其盐。

[0105] [化合物I-6]

式(I)的化合物，其中

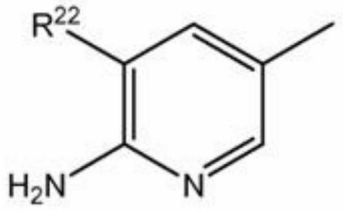
R是氢原子；

R^1是环丙基、2-氟环丙基或2,4-二氟苯基；

R^2是C_{1-6}烷基(例如，甲基)、C_{1-6}烷氧基(例如，甲氧基)或氯原子；或

R^1和R^2任选地键合以形成-O-CH_2-CH(CH_3)-，其中氧原子键合在喹诺酮环的苯基环上；和

R^3是下式的基团



其中R^{22}是

(a)氰基，

(b)硝基，

(c)C_{6-14}芳基，

(d)甲酰基，或

(e)氨基甲酰基，

或其盐。

[0106] [化合物I-7]

式(I)的化合物，其中

R是氢原子；

R^1是环丙基、2-氟环丙基或2,4-二氟苯基；

R^2是C_{1-6}烷基(例如，甲基)、C_{1-6}烷氧基(例如，甲氧基)或氯原子；和

R^3是5-嘧啶基，其被1或2个选自氨基、C_{1-6}烷基氨基和二(C_{1-6}烷基)氨基的取代基取代，

或其盐。

[0107] [化合物I-8]

式(I)的化合物,其中

R是氢原子;

R^1是环丙基、2-氟环丙基或2,4-二氟苯基;

R^2是C_{1-6}烷基(例如,甲基)、C_{1-6}烷氧基(例如,甲氧基)或氯原子;和

R^3是2-吲哚基,其任选被1或2个选自下列的取代基取代

(a)卤素原子,

(b)氰基,

(c)硝基,

(d)羟基,

(e)C_{1-6}烷基,其任选被1至3个选自氨基、C_{1-6}烷氧基-羰基氨基、C_{1-6}烷基氨基和二(C_{1-6}烷基)氨基的取代基取代,

(f)C_{1-6}烷氧基,

(g)甲酰基,

(h)羧基,和

(j)任选被1或2个选自下列的取代基取代的氨基

(i)C_{1-6}烷氧基-羰基,

(ii)任选被选自下列的取代基取代的C_{1-6}烷基-羰基

(A)任选被1至3个C_{1-6}烷基取代的C_{3-8}环烷基氧基,

(B)C_{1-6}烷基氨基,

(C)二(C_{1-6}烷基)氨基,

(D)任选被C_{1-6}烷氧基-羰基取代的环状氨基(例如吗啉代、1-哌嗪基),和

(E)卤素原子,

(iii)任选被1至3个选自C_{1-6}烷基和C_{1-6}烷氧基的取代基取代的苯基羰基,

(iv)C_{3-8}环烷基-羰基,

(v)任选被C_{1-6}烷基取代的5-至10-元的芳香族杂环基羰基(例如,吡啶基羰基),所述C_{1-6}烷基任选被1至3个卤素原子取代,

(vi)苄基羰基,其任选被1至3个选自卤素原子和C_{1-6}烷氧基的取代基取代,

(vii)任选被C_{1-6}烷氧基取代的C_{6-14}芳基磺酰基,

(viii)C_{3-8}环烷基-C_{1-6}烷基磺酰基,其任选被1至3个选自C_{1-6}烷基和氧代的取代基取代(例如,樟脑磺酰基),

(ix)任选被1至3个C_{1-6}烷基取代的5-至10-元的芳香族杂环基磺酰基(例如,咪唑基磺酰基),和

(x)-C(=N-CN)-SR^9,其中R^9是C_{1-6}烷基,

或其盐。

[0108] [化合物I-9]

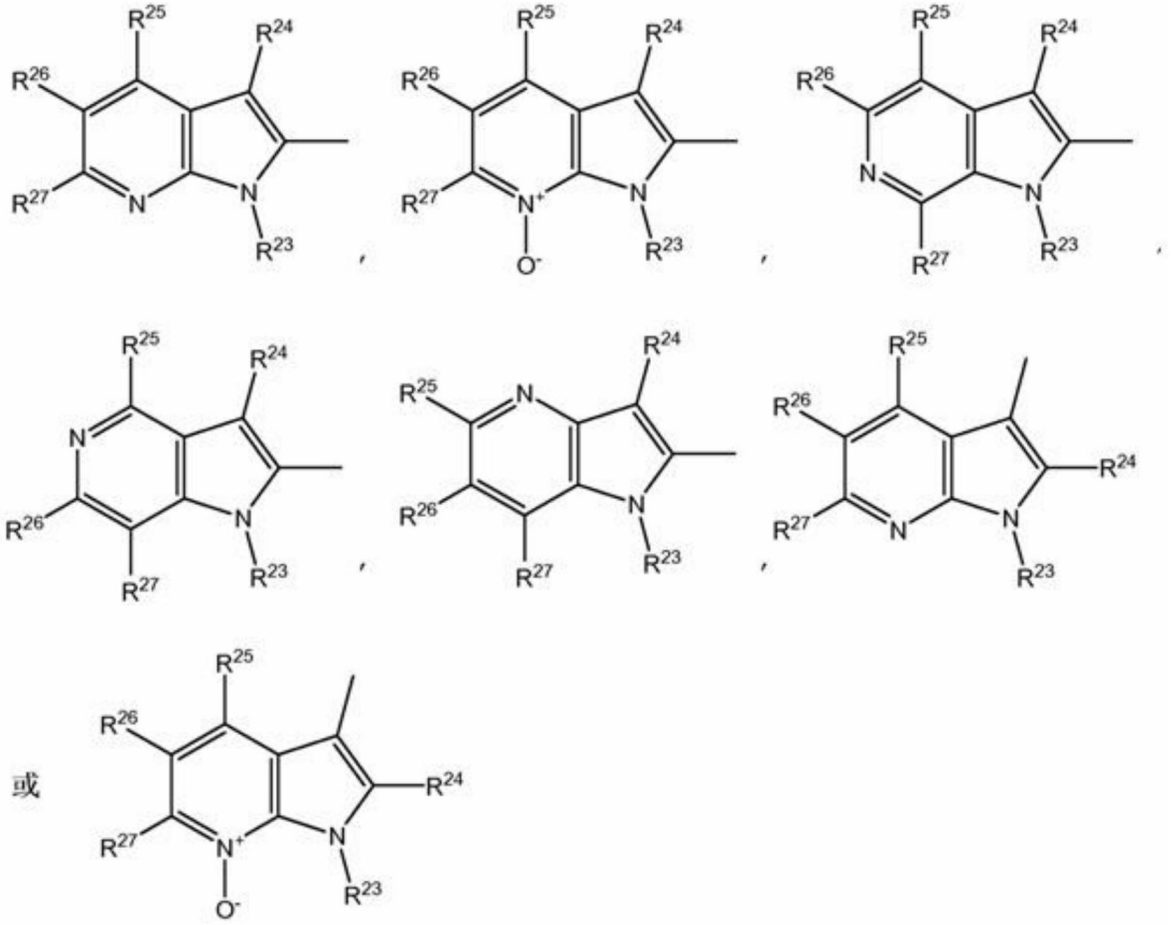
式(I)的化合物,其中

R是氢原子;

R^1是环丙基、2-氟环丙基或2,4-二氟苯基;

R^2是C_{1-6}烷基(例如,甲基)、C_{1-6}烷氧基(例如,甲氧基)或氯原子;和

R^3是下式的基团



其中

R^{23}是氢原子或C_{1-6}烷基，和

R^{24}、R^{25}、R^{26}和R^{27}各自独立地为，

(a)氢原子，

(b)氰基，或

(c)硝基，

或其盐。

[0109] [化合物I-10]

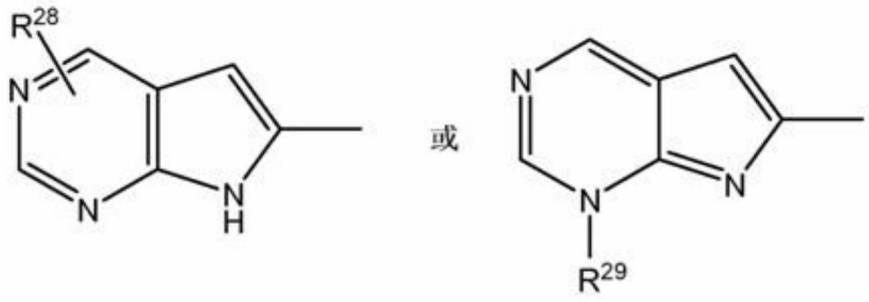
式(I)的化合物，其中

R是氢原子；

R^1是环丙基、2-氟环丙基或2,4-二氟苯基；

R^2是C_{1-6}烷基(例如，甲基)、C_{1-6}烷氧基(例如，甲氧基)或氯原子；和

R^3是下式的基团



其中

R^{28}是氢原子或羟基，和

R^{29}是氢原子或C_{1-6}烷基，

或其盐。

[0110] ［化合物I-11］

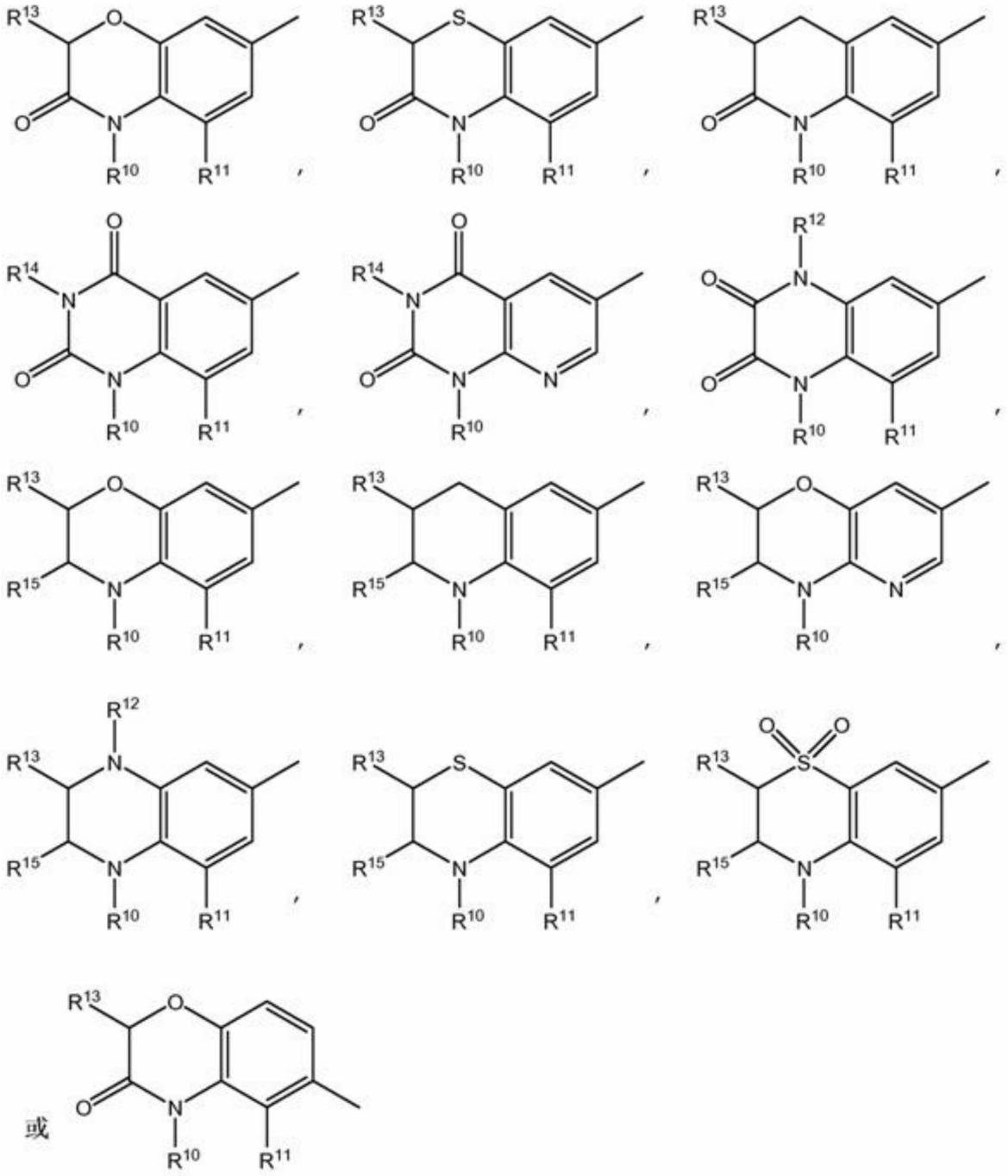
式(I)的化合物，其中

R是氢原子；

R^1是环丙基、2-氟环丙基或2,4-二氟苯基；

R^2是C_{1-6}烷基(例如，甲基)、C_{1-6}烷氧基(例如，甲氧基)或氯原子；和

R^3是下式的基团



其中

R^{10}、R^{12}和R^{14}各自独立地为，

(a)氢原子或

(b)C_{1-6}烷基，和

R^{11}、R^{13}和R^{15}各自独立地为，

(a)氢原子，

(b)卤素原子，

(c)氰基，

(d)硝基，

(e)氨基，

(f)C_{1-6}烷基氨基，

(g)二(C_{1-6}烷基)氨基，

(h)任选被羟基取代的C_{1-6}烷基，或

(i)C_{2-6}链烯基，或

R^{10}和R^{11}任选地键合以形成-(C＝O)-NH-、-C(R^{31})＝N-或-N＝N-，其中R^{31}是氢原子或C_{1-6}烷基，和氮原子键合在稠环的苯基环上，或

R^{12}和R^{13}任选地键合以形成-$(CH_2)_4$-，

或其盐。

[0111] [化合物I-12]

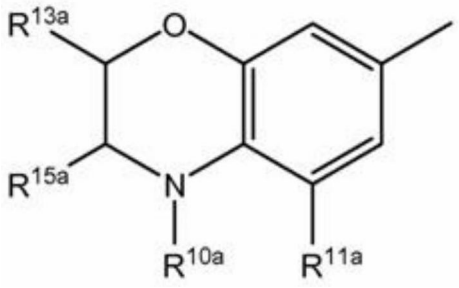
式(I)的化合物，其中

R是氢原子；

R^1是环丙基、2-氟环丙基或2,4-二氟苯基；

R^2是C_{1-6}烷基(例如，甲基)、C_{1-6}烷氧基(例如，甲氧基)或氯原子；和

R^3是下式的基团



其中R^{10a}是

(a)氢原子或

(b)C_{1-6}烷基，和

R^{11a}、R^{13a}和R^{15a}各自独立地为，

(a)氢原子，

(b)卤素原子，

(c)氰基，

(d)硝基，

(e)氨基，

(f)C_{1-6}烷基氨基，

(g)二(C_{1-6}烷基)氨基，

(h)任选被羟基取代的C_{1-6}烷基，或

(i)C_{2-6}链烯基，和

条件是R^{10a}、R^{11a}、R^{13a}和R^{15a}不同时为氢原子，

或其盐。

[0112] [化合物I-13]

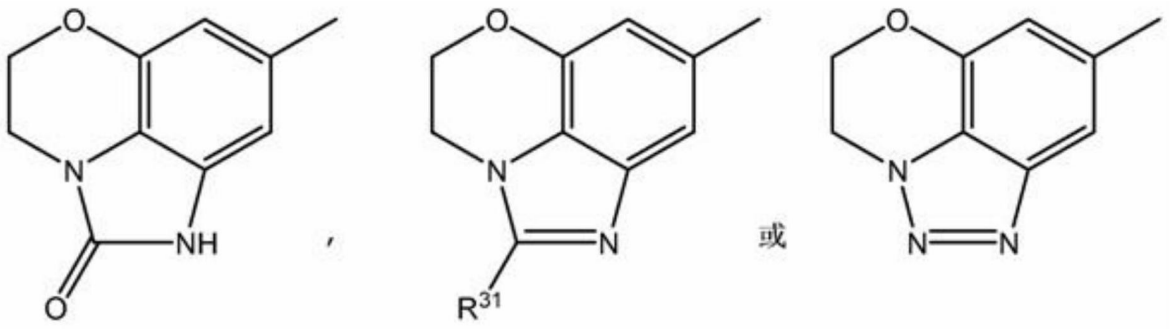
式(I)的化合物，其中

R是氢原子；

R^1是环丙基、2-氟环丙基或2,4-二氟苯基；

R^2是C_{1-6}烷基(例如,甲基)、C_{1-6}烷氧基(例如,甲氧基)或氯原子;和

R^3是下式的基团



其中R^{31}是氢原子或C_{1-6}烷基,

或其盐。

[0113] [化合物I-14]

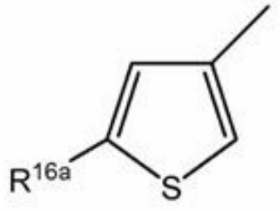
式(I)的化合物,其中

R是氢原子;

R^1是环丙基、2-氟环丙基或2,4-二氟苯基;

R^2是C_{1-6}烷基(例如,甲基)、C_{1-6}烷氧基(例如,甲氧基)或氯原子;和

R^3是下式的基团



其中R^{16a}是

(a)C_{1-6}烷基,其任选被1至3个选自氰基、C_{1-6}烷基氨基和二(C_{1-6}烷基)氨基的取代基取代,

(b)任选被羧基取代的C_{2-6}链烯基,

(c)甲酰基,

(d)羧基,

(e)氨基甲酰基,

(f)-C(R^{17})=N-OH,其中R^{17}是氢原子、氰基或羟基,或

(g)5-至10-元的芳香族杂环基(例如四唑基、吡咯基、噁唑基、苯并咪唑基、三唑基),其任选被C_{1-6}烷基、C_{1-6}烷氧基-羰基、羧基或苯基取代,

或其盐。

[0114] [化合物I-15]

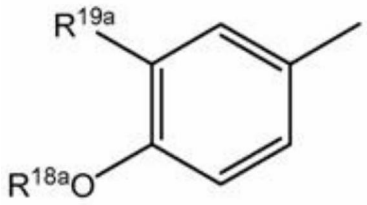
式(I)的化合物,其中

R是氢原子;

R^1是环丙基、2-氟环丙基或2,4-二氟苯基;

R^2是C_{1-6}烷基(例如,甲基)、C_{1-6}烷氧基(例如,甲氧基)或氯原子;和

R^3是下式的基团



其中

R^{18a}是C_{1-6}烷基,和

R^{19a}是(a)卤素原子,

(b)氰基,

(c)任选被1至3个选自下列的取代基取代的C_{1-6}烷基

(i)卤素原子,

(ii)氰基,

(iii)羟基,

(iv)氨基,

(v)C_{1-6}烷基氨基,

(vi)二(C_{1-6}烷基)氨基,和

(vii)任选被C_{1-6}烷基取代的环状氨基(例如,1-哌嗪基),

(d)C_{1-6}烷氧基,

(e)任选被1或2个选自下列的取代基取代的氨基

(i)任选被环状氨基(例如,吗啉代)取代的C_{1-6}烷基-羰基,

(ii)C_{1-6}烷基磺酰基,和

(iii)氨基甲酰基,

(f)羧基,

(g)C_{1-6}烷氧基-羰基,

(h)任选被C_{1-6}烷基取代的氨基甲酰基,所述C_{1-6}烷基任选被氨基、C_{1-6}烷基氨基、二(C_{1-6}烷基)氨基或C_{1-6}烷氧基-羰基氨基取代,

(i)甲酰基,

(j)5-至10-元的芳香族杂环基(例如,噁唑基、苯并咪唑基),或

(k)-CH=N-OR^{21},其中R^{21}是氢原子或任选被C_{1-6}烷基氨基或二(C_{1-6}烷基)氨基取代的C_{1-6}烷基,

或其盐。

[0115] [化合物I-16]

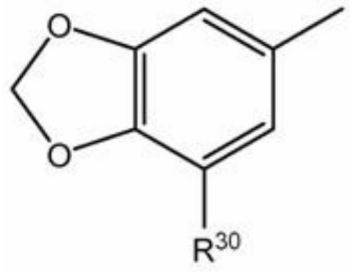
式(I)的化合物,其中

R是氢原子;

R^1是环丙基、2-氟环丙基或2,4-二氟苯基;

R^2是C_{1-6}烷基(例如,甲基)、C_{1-6}烷氧基(例如,甲氧基)或氯原子;和

R^3是下式的基团



其中

R^{30}是(a)氢原子，

(b)卤素原子，

(c)氰基，

(d)任选被1至3个选自卤素原子和羟基的取代基取代的C_{1-6}烷基，

(e)C_{2-6}链烯基，

(f)C_{2-6}炔基，

(g)C_{1-6}烷氧基，

(h)甲酰基，或

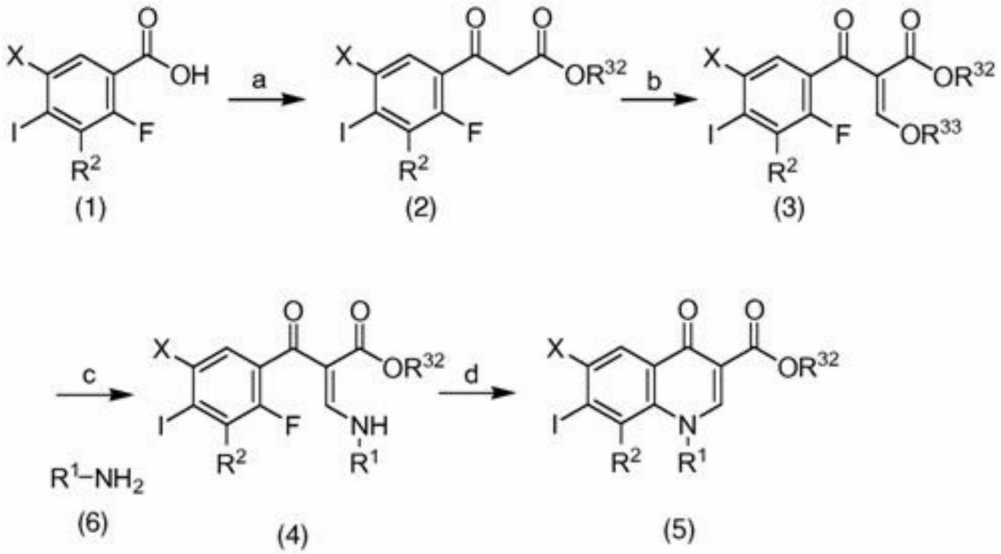
(i)-CH=N-OH，

或其盐。

[0116] 式(I)化合物的盐的实例包括药学上可接受的盐。式(I)化合物适宜的药学上可接受的盐是常规的无毒性的盐，包括，例如与碱或酸加成的盐，诸如与无机碱的盐，例如碱金属盐(例如钠盐、钾盐等)、碱土金属盐(例如钙盐、镁盐等)、铵盐；与有机碱的盐，例如有机胺盐(例如三甲胺盐、三乙胺盐、吡啶盐、甲基吡啶盐、乙醇胺盐、三乙醇胺盐、二环己基胺盐、N,N'-二苄基乙二胺盐等)；无机酸加成盐(例如盐酸盐、氢溴酸盐、硫酸盐、硫酸氢盐、磷酸盐等)；有机羧酸或磺酸加成盐(例如甲酸盐、乙酸盐、三氟乙酸盐、马来酸盐、酒石酸盐、柠檬酸盐、富马酸盐、甲磺酸盐、苯磺酸盐、甲苯磺酸盐等)；和与碱性或酸性氨基酸(例如精氨酸、天门冬氨酸、谷氨酸等)的盐。

[0117] 化合物(I)可以例如根据下面的反应方案的方法制备。

[0118] 反应方案I



其中X、R^1和R^2定义如上，R^{32}是烷基和R^{33}是烷基。

[0119] 步骤a

通过化合物(1)在有或无溶剂存在下与卤化剂反应，可以将化合物(1)转化为酰基卤。所述溶剂包括芳香烃类，如苯、甲苯和二甲苯；卤代烃，如二氯甲烷、氯仿和四氯化碳；醚，如二噁烷、四氢呋喃和二乙醚；N,N-二甲基甲酰胺(DMF)；和二甲基亚砜(DMSO)等。所述卤化剂可以是任何常规的可将羧基中的羟基转换成卤素原子的卤化剂，且包括例如亚硫酰氯、三氯氧化磷、三溴氧化磷、五氯化磷、和五溴化磷等。化合物(1)和卤化剂的量没有特别的限制，但是，在不使用溶剂的情况下，卤化剂通常以大过量使用，和在使用溶剂的情况下，卤化剂通常以每1摩尔化合物(1)使用至少1摩尔、优选2～4摩尔的量。反应温度和反应时期没有特别的限制，但是反应通常在室温至约100℃的温度下进行约30分钟至约6小时。

[0120] 将得到的酰基卤与丙二酸单烷基酯的镁盐反应，得到化合物(2)。丙二酸单烷基酯的镁盐可以在氯化镁和碱性化合物如三乙胺的存在下由丙二酸单烷基酯的钾盐如丙二酸乙酯钾在原位制得。该反应可以在适当的溶剂中进行。在反应中所用的溶剂，除非它们对反应产生任何不良的影响，可以是任何常规的溶剂，且包括例如，酯如乙酸乙酯；醚类如二乙醚、二噁烷、四氢呋喃、甘醇二甲醚和二甘醇二甲醚；醇如甲醇、乙醇和异丙醇；芳族烃类如苯、甲苯和二甲苯；脂族烃如正己烷、庚烷、环己烷和石油醚(ligroin)；胺如吡啶和N,N-二甲基苯胺；卤代烃如氯仿、二氯甲烷和四氯化碳；非质子极性溶剂如DMF、DMSO和六甲基磷酰三胺(HMPA)；以及这些溶剂的混合物。反应通常在温度为约0℃至约150℃、优选约0℃至约120℃下进行约0.5至约20小时。丙二酸单烷基酯的钾盐通常以每1摩尔化合物(1)使用至少1摩尔、优选1～2摩尔的量。氯化镁和碱性化合物通常以每1摩尔化合物(1)使用至少1摩尔、优选1～2摩尔的量。

[0121] 步骤b

通过化合物(2)与原甲酸三烷基酯如原甲酸三甲酯和原甲酸三乙酯在乙酸酐中反应，可以制得化合物(3)。该反应通常在温度为约0℃至约200℃、优选在约0℃至约150℃下进行约0.5至约20小时。原甲酸三烷基酯通常以每1摩尔化合物(2)使用至少1摩尔、优选1～10摩尔的量。

[0122] 步骤c

化合物(4)可以通过化合物(3)与化合物(6)起反应制得。

[0123] 化合物(3)与化合物(6)之间的反应可以在适当的溶剂中进行。在反应中所用的溶剂，除非它们对反应产生任何不良的影响，可以是任何常规的溶剂，且包括例如，醇如甲醇、乙醇和异丙醇；醚类如二乙醚、二噁烷、四氢呋喃、甘醇二甲醚和二甘醇二甲醚；芳族烃类如苯、甲苯和二甲苯；脂族烃如正己烷、庚烷、环己烷和石油醚；卤代烃如氯仿、二氯甲烷和四氯化碳；非质子极性溶剂如DMF、DMSO和HMPA；等。反应通常在温度为约0℃至约150℃、优选室温至约100℃下进行约0.1至约15小时。化合物(6)通常以每1摩尔化合物(3)使用至少1摩尔、优选1～2摩尔的量。

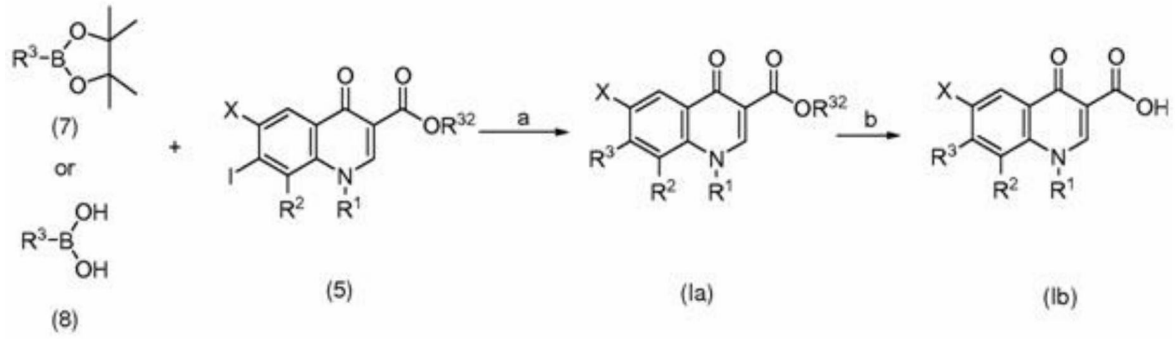
[0124] 步骤d

化合物(5)可通过化合物(4)的环化反应制得。

[0125] 化合物的(4)环化反应可以在碱性化合物存在下在适当的溶剂中进行。在反应中所用的溶剂，除非它们对反应产生任何不良的影响，可以是任何常规的溶剂，且包括例如，

醚类如二乙醚、二噁烷、四氢呋喃、甘醇二甲醚和二甘醇二甲醚;脂族烃如正己烷、庚烷和石油醚;卤代烃如氯仿、二氯甲烷和四氯化碳;非质子极性溶剂如DMF、DMSO和HMPA;等。在反应中所用的碱性化合物包括无机碱如金属钠、金属钾、氢化钠、氨基钠、氢氧化钠、氢氧化钾、碳酸钠和碳酸钾,金属醇化物如甲醇钠和乙醇钠,有机碱如1,8-二氮杂双环[5.4.0]十一碳-7-烯(DBU)、N-苄基三甲基氢氧化铵和四丁基氢氧化铵,等。反应通常在温度为约0℃至约200℃、优选室温至约150℃下进行约0.5至约15小时。碱性化合物通常以每1摩尔化合物(4)使用至少1摩尔、优选1～2摩尔的量。

[0126] 反应方案II



其中X、R^1、R^2、R^3和R^{32}定义如上。

[0127] 步骤a

通过在存在或缺失碱性化合物下,在钯催化剂的存在下,在惰性溶剂中或不使用任何溶剂,使化合物(5)和化合物(7)或化合物(8)起反应,可以制备化合物(Ia)。

[0128] 惰性溶剂的实例包括水;醚如二噁烷、四氢呋喃、二乙醚、1,2-二甲氧基乙烷、二乙二醇二甲基醚和乙二醇二甲基醚;芳香烃类如苯、甲苯和二甲苯;醇如甲醇、乙醇和异丙醇;酮如丙酮和甲基乙基甲酮;和非质子极性溶剂如DMF、DMSO、HMPA和乙腈。这些惰性溶剂可以单独使用,或两种或两种以上的组合使用。

[0129] 在反应中所用的钯催化剂没有特别的限定,但包括例如4价的钯催化剂,如六氯钯(IV)酸钠四水合物和六氯钯(IV)酸钾;二价钯催化剂,如氯化钯(II)、溴化钯(II)、醋酸钯(II)、乙酰丙酮酸钯(II)、双(苄腈)二氯化钯(II)、双(乙腈)二氯化钯(II)、双(三苯基膦)二氯化钯(II)、二氯四氨钯(II)(dichlorotetramine palladium(II))、(1,5-环辛二烯)二氯化钯(II)、三氟乙酸钯(II)、和1,1'-双(二苯基膦基)二茂铁二氯化钯(II)二氯甲烷复合物(Pd(dppf)Cl_2·CH_2Cl_2);零价的钯催化剂,如三(二亚苄基丙酮)二钯(0)、三(二亚苄基丙酮)二钯(0)氯仿加合物和四(三苯基膦)钯(0)等。这些钯催化剂可以单独使用或者两种或两种以上的组合使用。

[0130] 在该反应中,钯催化剂的量没有特别的限制,但以相对于1摩尔化合物(5)而言通常为0.000001至20摩尔的钯。优选地,钯催化剂的量以相对于1摩尔化合物(5)而言为0.0001至5摩尔的钯。

[0131] 该反应在合适的配体存在下有利地进行。钯催化剂配体的实例包括,例如,2,2'-双(二苯基膦基)-1,1'-联萘(BINAP)、三-邻-甲苯基膦、双(二苯基膦基)二茂铁、三苯基膦、三-叔丁基膦和4,5-双(二苯基膦基)-9,9-二甲基氧杂蒽(Xantphos)。这些配体单独或者两种或两种以上的组合使用。

[0132] 钯催化剂和配体的比例没有特别的限制。配体的量相对每1摩尔钯催化剂为约0.1至约100摩尔，优选每1摩尔钯催化剂为约0.5至约15摩尔。

[0133] 作为碱性化合物，可以使用公知的各种无机和有机碱。

[0134] 无机碱包括，例如，碱金属氢氧化物如氢氧化钠、氢氧化钾、氢氧化铯和氢氧化锂；碱金属碳酸盐如碳酸钠、碳酸钾、碳酸铯和碳酸锂；碱金属碳酸氢盐如碳酸氢锂、碳酸氢钠和碳酸氢钾；碱金属如钠和钾；磷酸盐如磷酸钠和磷酸钾；酰胺如氨基钠；和碱金属氢化物如氢化钠和氢化钾。

[0135] 有机碱包括，例如，低级醇碱金属盐如甲醇钠、乙醇钠、叔丁醇钠、甲醇钾、乙醇钾和叔丁醇钾，和胺如三乙胺、三丙胺、吡啶、喹啉、哌啶、咪唑、N-乙基二异丙胺、二甲基氨基吡啶、三甲胺、二甲基苯胺、N-甲基吗啉、1,5-二氮杂双环[4.3.0]壬-5-烯(DBN)、1,8-二氮杂双环[5.4.0]十一碳-7-烯(DBU)、1,4-二氮杂双环[2.2.2]辛烷(DABCO)等。

[0136] 这样的碱性化合物可以单独使用，或两种或两种以上的组合使用。更优选地，在反应中所用的碱性化合物包括碱金属碳酸盐如碳酸钠、碳酸钾、碳酸铯和碳酸锂。

[0137] 碱性化合物的量通常以每1摩尔化合物(5)使用0.5至10摩尔，且优选以每1摩尔化合物(5)使用0.5至6摩尔。

[0138] 化合物(7)或化合物(8)的量通常以每1摩尔化合物(5)使用至少1摩尔，且优选以每1摩尔化合物(5)使用约1至约5摩尔。

[0139] 该反应可以在标准压力下，在惰性气体气氛包括氮气、氩气等下，或在增加的压力下进行。

[0140] 反应通常在室温至约200℃、优选室温至约150℃进行，且通常在约1至约30小时内完成。通过使用微波反应器在约100℃至约200℃加热约5分钟至约1小时，也实现了反应。

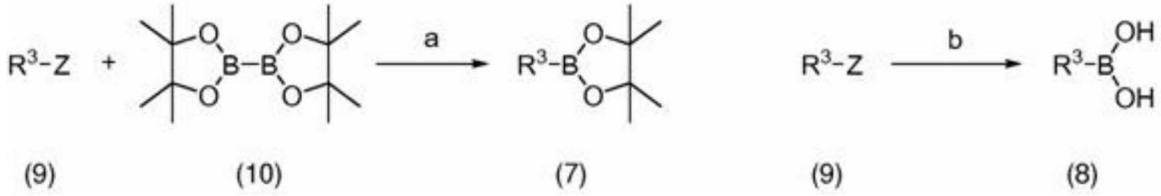
[0141] 步骤b

化合物(Ib)通过化合物(Ia)的水解可以制得。

[0142] 化合物(Ia)的水解可以在常规水解条件下，例如，在碱性化合物如氢氧化钠、氢氧化钾、氢氧化钡或碳酸钾；矿物酸如硫酸、盐酸或硝酸；或有机酸如乙酸或芳族磺酸存在下，在溶剂包括水，醇如甲醇、乙醇和异丙醇；酮如丙酮、甲基乙基甲酮；醚如二噁烷和乙二醇二乙醚；或它们的混合物中进行。该反应通常在温度为室温至约200℃、优选室温至约150℃进行约0.1至约30小时。

[0143] 反应方案III

硼酸酯和硼酸的制备



(9) (10) (7) (9) (8)

其中R^3定义如上，和Z是溴原子或碘原子。

[0144] 步骤a

通过在钯催化剂和碱性化合物存在下将化合物(9)与双(频哪醇合(pinacolato))二硼(10)在惰性溶剂中反应，可以制备化合物(7)。

[0145] 惰性溶剂和钯催化剂的实例与反应方案II步骤a中所述的那些相同。

[0146] 反应中所用的碱性化合物包括乙酸钾、三乙胺、N-甲基吗啉、碳酸钠、碳酸钾、碳酸铯、碳酸锂、磷酸钾和碳酸氢钠。

[0147] 在该反应中，钯催化剂的量没有特别的限制，但以相对于1摩尔化合物(9)而言通常为0.000001至20摩尔的钯。优选地，钯催化剂的量以相对于1摩尔化合物(9)而言为0.0001至5摩尔的钯。

[0148] 碱性化合物的量通常以每1摩尔化合物(9)使用0.5至10摩尔，且优选以每1摩尔化合物(9)使用0.5至6摩尔。

[0149] 双(频哪醇合)二硼(10)的量通常以每1摩尔化合物(9)使用至少1摩尔，且优选以每1摩尔化合物(9)使用约1至约5摩尔。

[0150] 该反应可以在标准压力下，在惰性气体气氛包括氮气、氩气等下，或在增加的压力下进行。

[0151] 反应通常在室温至约200℃、优选室温至约150℃进行，且通常在约1至约30小时内完成。

[0152] 步骤b

通过在正丁基锂或二异丙基氨基锂的存在下，将化合物(9)与硼酸三烷基酯如硼酸三甲酯、硼酸三乙酯、硼酸三(异丙基)酯和硼酸三(正丁基)酯在惰性溶剂中反应，可制得化合物(8)。

[0153] 惰性溶剂的实例与反应方案II步骤a中所述的那些相同。

[0154] 硼酸三烷基酯的量通常以每1摩尔化合物(9)使用至少1摩尔，且优选以每1摩尔化合物(9)使用约1至约5摩尔。

[0155] 正丁基锂或二异丙基氨基锂的量通常以每1摩尔化合物(9)使用至少1摩尔，且优选以每1摩尔化合物(9)使用约1至约5摩尔。

[0156] 该反应通常在约-70℃至约0℃的温度下进行约0.1至约15小时。

[0157] 本发明的化合物(I)通过用药学上可接受的酸或碱处理可以容易地转化成其盐。所述酸包括无机酸如盐酸、硫酸、磷酸、和氢溴酸，以及有机酸如草酸、马来酸、富马酸、苹果酸、酒石酸、柠檬酸、苯甲酸、乳酸、甲磺酸和丙酸。所述碱包括氢氧化钠、氢氧化钾、氢氧化钙、碳酸钠、和碳酸氢钾等。

[0158] 由此得到的化合物通过常规的方法，例如，溶剂提取、稀释法、重结晶、柱色谱法和制备薄层色谱法，可以容易地分离和纯化。

[0159] 化合物(I)对支原体、铜绿假单胞菌(Pseudomonas aeruginosa)、厌氧菌、耐受多种抗微生物剂的细胞(cells)、临床分离细菌、和革兰氏阴性和革兰氏阳性菌如难辨梭菌、粪肠球菌(Enterococcus faecalis)和酿脓葡萄球菌(Staphylococcus pyogenes)显示出优异的抗微生物活性，因此作为抗微生物剂用于治疗这些微生物引起的疾病。化合物(I)也显示出低毒性和更少的副作用，且特有好的吸收性和持续的活性。

[0160] 由于化合物(I)显示出抗难辨梭菌优异的抗微生物活性，它有用于预防或治疗肠道感染，包括抗生素相关性腹泻(AAD)如难辨梭菌-相关性腹泻(CDAD)。

[0161] 本发明化合物通常以常用的药物制剂的形式使用。与常规的药学上可接受的稀释剂或载体，如填充剂、增量剂(bulking agents)、粘合剂、润湿剂、崩解剂、表面活性剂和润滑剂混合，可以制备该药物制剂。所述药物制剂包括适于治疗所述疾病的多种制剂，例如片

剂、丸剂、粉剂、溶液剂、混悬剂、乳剂、颗粒剂、胶囊剂、栓剂、和如溶液和悬浮液的注射剂等。在制备片剂时，可以使用任何常规载体，例如，赋形剂如乳糖、精制糖(white sugar)、氯化钠、葡萄糖、尿素、淀粉、碳酸钙、高岭土、微晶纤维素和硅酸盐，粘合剂例如水、乙醇、丙醇、单糖浆、葡萄糖溶液、淀粉溶液、明胶溶液、羧甲基纤维素、虫胶、甲基纤维素、磷酸钾和聚乙烯吡咯烷酮，崩解剂如干淀粉、藻酸钠、琼脂粉、昆布糖粉(laminaran powder)、碳酸氢钠、碳酸钙、聚氧乙烯脱水山梨糖醇脂肪酸酯、月桂基硫酸钠、硬脂酸单甘油酯、淀粉和乳糖，崩解抑制剂如精制糖、硬脂、可可豆脂和氢化油，吸收促进剂如季铵盐和月桂基硫酸钠，润湿剂如甘油和淀粉，吸附剂如淀粉、乳糖、高岭土、膨润土和胶态硅酸盐，润滑剂如精制滑石、硬脂酸盐、硼酸粉和聚乙二醇等。片剂也可以用常规的包衣剂包衣，例如，可以是糖包衣片剂、明胶包衣片剂、肠溶包衣片剂、薄膜包衣片剂、或双或多层片剂的形式。在制备丸剂时，可以使用常规载体，其包括赋形剂如葡萄糖、乳糖、淀粉、可可豆脂、氢化的蔬菜油、高岭土和滑石，粘合剂如阿拉伯胶粉、黄蓍胶粉、明胶和乙醇，崩解剂如昆布多糖和琼脂等。在制备栓剂时，可以使用常规载体，例如，聚乙二醇、可可豆脂，高级醇、高级醇酯、明胶和半合成甘油酯。在制备注射剂时，所述化合物的溶液、乳剂或悬浮液是灭菌的，且优选被制成与体液等渗。通过将活性化合物与常规的稀释剂如水、乳酸水溶液、乙醇、丙二醇、乙氧基化异硬脂醇、聚氧化异硬脂醇或聚氧乙烯脱水山梨糖醇脂肪酸酯混合，制备这些溶液剂、乳剂和悬浮液。所述制剂也可掺入足够量的氯化钠、葡萄糖或甘油，以使它们与体液等渗。所述制剂也可掺入常规的增溶剂、缓冲剂、麻醉剂，和进一步掺入着色剂、防腐剂、香料、矫味剂、甜味剂和其它药物。使用作为稀释剂如白凡士林、石蜡、甘油、纤维素衍生物、聚乙二醇、硅酮、或膨润土等，可以制备糊剂、霜剂或凝胶形式的制剂。当活性成分的化合物在注射剂中沉淀时，酸例如甲磺酸、丙酸、盐酸、琥珀酸或乳酸可按需要添加到注射剂中，以保持注射稳定的溶液。

[0162] 制剂中可以包含任何量的化合物(I)，通常包含基于制剂的总重量的1～70％的量。

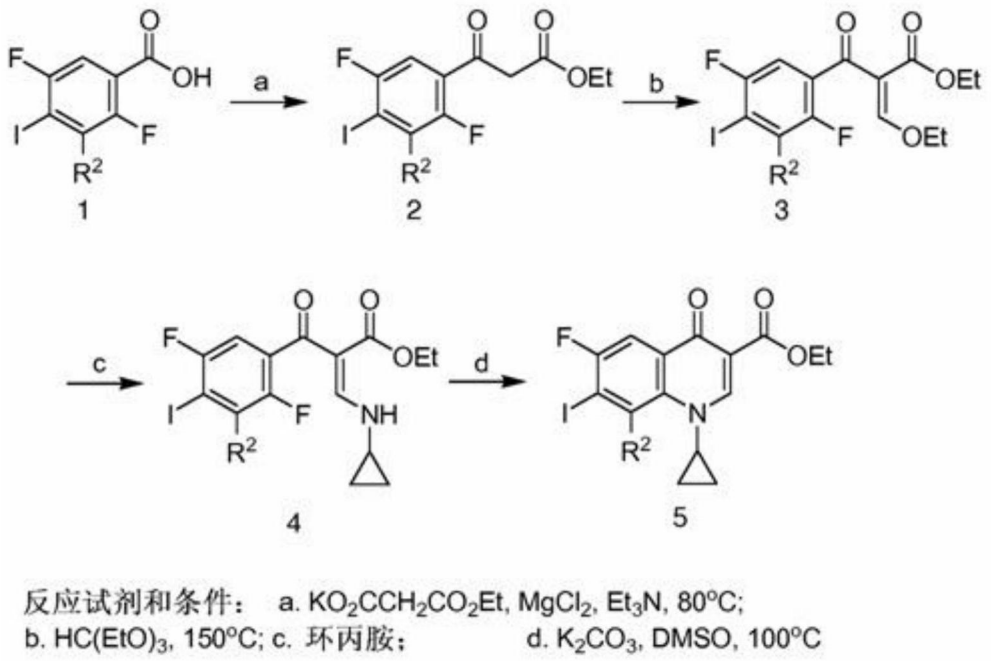
[0163] 本发明的药物制剂可以以任何方法施用。施用的合适方法可以根据制剂的形式、患者的年龄和性别、和疾病的严重程度等进行选择。例如，片剂、丸剂、溶液、悬浮液、乳剂、颗粒剂和胶囊剂是口服途径施用的。在注射情况下，以单一形式或连同辅助液体如葡萄糖或氨基酸溶液经静脉内施用。注射也可以经肌内、皮内、皮下、或腹膜内途径施用。栓剂在直肠内途径施用。

[0164] 本发明药物制剂的剂量可根据施用方法、患者的年龄和性别、和疾病的严重程度等而变化，对于每天每1kg患者体重，通常为在约0.1至约100mg，更优选为约0.1至约50mg的化合物(I)。制剂通常分成每天2～4次施用。

[0165] 本发明由下面的实施例、实验实施例和制备实施例举例说明。应当理解，本发明并不限于这些实施例、实验实施例或制备实施例，且可以在不脱离本发明的范围和精神下作出各种变化和修改。

实施例

[0166] 一般方案I.中间体的合成



反应试剂和条件： a. $KO_2CCH_2CO_2Et$, $MgCl_2$, Et_3N, 80°C;
b. $HC(EtO)_3$, 150°C; c. 环丙胺； d. K_2CO_3, DMSO, 100°C

在我们的工作中，应用了铃木偶联反应作为关键反应，以构建我们的最终产品。至于偶联反应，通过众所周知的以前广泛用于合成喹诺酮类的方法，可以制备相应的碘代-中间体(一般方案I)。

[0167] 实施例1：中间体5a(R^2＝Me)的合成

1.1.化合物2：将化合物1(2g,6.71mmol)和亚硫酰氯(9.8mL)的混合物回流3小时，然后浓缩，得到酰氯。向剩余物中加入无水EtOAc(10mL)，然后浓缩混合物。

[0168] 在50℃以下将丙二酸单乙酯钾(1.6g,9.40mmol)和$MgCl_2$(1.91g,20.13mmol)于无水EtOAc的混合物搅拌30分钟。在50℃以下向混合物中加入Et_3N(2.83mL,20.13mmol)。然后，将混合物回流1小时。在50-70℃，向混合物中逐滴加入所述酰氯的无水EtOAc(10mL)溶液，然后将混合物回流1.5小时。在冰冷却下，向反应混合物中加入水(30mL)和5N HCl(30mL)。将EtOAc溶液用水洗涤，干燥并浓缩，得到为黄色油的化合物2，其无需纯化用于下一步骤。

[0169] 1.2.化合物3：将化合物2(11g,29.88mmol)、原甲酸三乙酯(7.47mL,44.82mmol)和乙酸酐(6.77mL,71.72mmol)的混合物在150℃加热1小时，然后浓缩，得到化合物3，其无需纯化用于下一步骤。

[0170] 1.3.化合物4：向化合物3(上面获得的)中加入EtOH(50mL)和环丙胺(2.48mL,35.86mmol)。将混合物搅拌30分钟并浓缩，得到化合物4，其无需纯化用于下一步骤。

[0171] 1.4.中间体5a：将化合物4(上面获得的)溶于无水DMSO(100mL)。将K_2CO_3(16.52g,119.53mmol)加入到该溶液中。反应混合物在100℃搅拌1小时。当TLC(EtOAc/二丙醚＝1/1)指示反应完成后，将混合物冷却至室温，倒入水中，用EtOAc萃取。将有机层用盐水洗涤，干燥并浓缩，得到黄色固体，将其从EtOAc中重结晶。得到为白色固体的中间体5a，总产率75％。^1H NMR(400MHz,DMSO)δ8.60(s,1H),7.70(d,J＝7.8Hz,1H),4.29-4.14(m,3H),2.96(s,3H),1.28(t,J＝7.1Hz,3H),1.14(q,J＝7.0Hz,2H),0.87-0.76(m,2H)。

[0172] 下列化合物根据一般方案I得到合成。

[0173] 实施例2：中间体5b(R^2＝OMe)：^1H NMR(400MHz,DMSO)δ8.51(s,1H),7.69(d,J＝

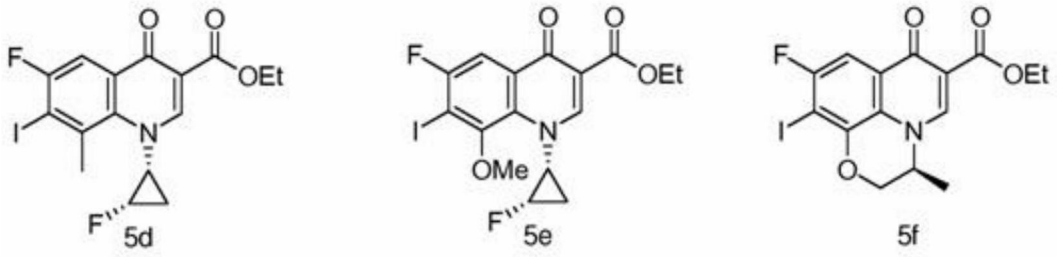
7.7Hz,1H),4.23(dd,J＝14.0,6.9Hz,2H),4.03(s,1H),3.80(s,3H),1.28(t,J＝7.0Hz,3H),1.09(d,J＝6.2Hz,2H),0.97(m,2H)。

[0174] 实施例3:中间体5c(R^2＝C1):^{1}HNMR(400MHz,DMSO)δ8.61(s,1H),7.81(d,J＝7.6Hz,1H),4.23(m,3H),1.28(t,J＝7.1Hz,3H),1.21-1.08(dd,J＝7.1,2.2Hz,2H),0.99－0.92(m,2H)。

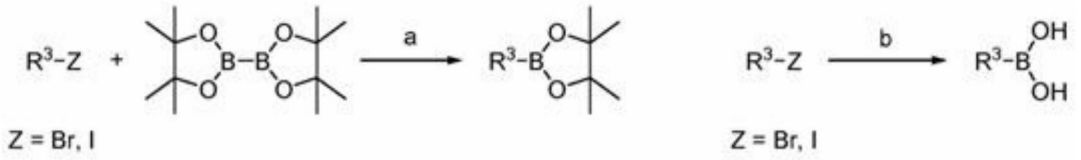
[0175] 实施例4:中间体5d:^{1}H NMR(400MHz,$CDCl_3$)δ8.59-8.51(d,J＝3.1Hz,1H),8.03-7.92(d,J＝7.5Hz,1H),4.98-4.73(dddd,J＝62.9,6.3,4.9,3.4Hz,1H),4.44-4.34(q,J＝7.1Hz,2H),3.91-3.83(dt,J＝8.6,5.4Hz,1H),2.95-2.88(s,3H),1.59-1.48(m,1H),1.45-1.38(t,J＝7.1Hz,3H),1.35-1.18(m,1H)。

[0176] 实施例5:中间体5e:^{1}H NMR(400MHz,$CDCl_3$)δ8.51-8.43(d,J＝2.0Hz,1H),7.94-7.86(d,J＝7.6Hz,1H),4.90-4.65(dddd,J＝62.7,6.0,5.1,3.3Hz,1H),4.37-4.28(q,J＝7.1Hz,2H),3.80-3.76(s,3H),3.75-3.69(dt,J＝8.7,5.5Hz,1H),1.61-1.47(m,2H),1.46-1.30(m,4H)。

[0177] 实施例6:中间体5f:^{1}H NMR(400MHz,DMSO)δ8.65(s,1H),7.48(d,J＝8.16Hz,1H),4.79(q,J＝6.65Hz,1H),4.62(dd,J＝1.82,11.36Hz,1H),4.44(dd,J＝2.20,11.36Hz,1H),4.23(qd,J＝2.95,7.09Hz,2H),1.40(d,J＝6.65Hz,3H),1.28(t,J＝7.09Hz,3H)。



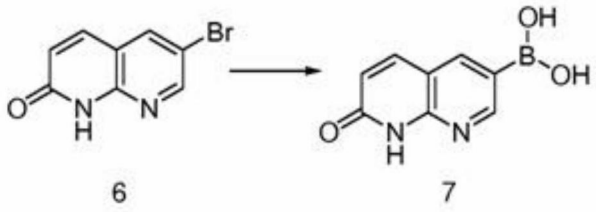
[0178] 一般方案II.硼酸酯和硼酸的制备



反应试剂和条件:a.Pd(dppf)Cl_2.CH_2Cl_2(5％mol),KOAc,二噁烷,80℃;b.nBuLi(或LDA),$B(OiPr)_3$,THF。

[0179] 一般方案II概述了所需的硼酸和硼酸酯的制备。他们通过一般方法容易制得。

[0180] 实施例7硼酸7的合成

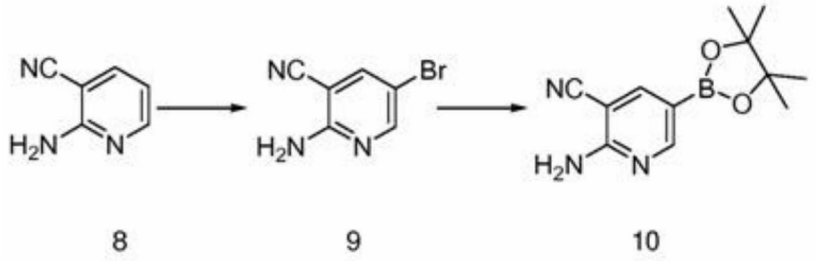


反应试剂和条件:a.1)NaH,THF,r.t.;2)nBuLi,$B(OiPr)_3$,-70℃～0℃。

[0181] 7.1硼酸7:在0℃向化合物6(10g,44.44mmol)于无水四氢呋喃(350mL)的溶液中,加入氢化钠(2g,66.66mmol,80％分散液)。该混合物在室温搅拌30分钟后,将混合物在干冰/丙酮浴中冷却到-60℃以下,在30分钟内加入正丁基锂(70mL,112mmol,1.6M已烷溶液)。

继续搅拌该混合物另一个30分钟，然后滴加入硼酸三异丙酯(40mL,177mmol)。将反应混合物搅拌10分钟，然后在冰浴中慢慢地升温至0℃。将HCl(5N)加入到该混合物中以调节pH＝3-4，并搅拌混合物20分钟。将NaOH水溶液加入到混合物中，以调节pH＝10。过滤后，分离有机层。将水层用乙酸乙酯/THF(4/1;2x 120mL)的混合物和EtOAc(100mL)萃取。水层用盐酸调节至pH＝5-6。通过过滤收集如此形成的沉淀物，干燥得到硼酸7(3.5g,41％)，为白色固体。

[0182] 实施例8硼酸酯8的合成

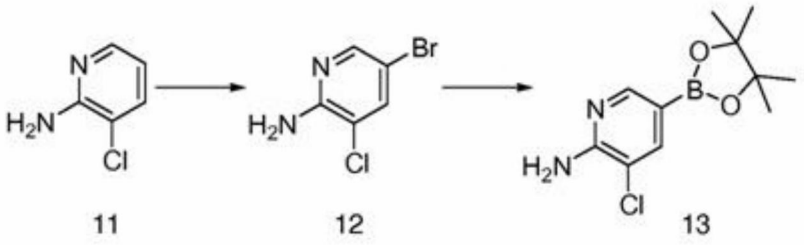


8 9 10

8.1化合物9：将2-氨基烟腈8(100g,0.839mol)溶于HOAc(800mL)。向该溶液中加入Na_2CO_3(88.97g,0.839mol)。然后，逐滴加入Br_2(46.4mL,0.923mol)。反应混合物在室温搅拌50分钟。向混合物中加入水(600mL)。将混合物冷却至约5℃。通过过滤收集如此形成的沉淀，干燥得到化合物9(207g,96％)。

[0183] 8.2硼酸酯10：将化合物9(50g,0.224mol)、双(频哪醇合)二硼(85.6g,0.337mol)、KOAc(44.1g,0.449mol)和Pd(dppf)Cl_2.CH_2Cl_2(2.77g,3.4mmol)装入烧瓶中。加入二噁烷(400mL)。该反应混合物在氩气氛下100℃搅拌2小时。当LC-MS表明反应完成后，将混合物冷却至室温。该混合物通过硅藻土过滤，浓缩，用乙酸乙酯和己烷的3/1比例的混合物(1000mL)稀释，通过硅胶(300-400目)过滤，浓缩，结晶，干燥得到硼酸酯10(32g,66％)，为白色固体。

[0184] 实施例9硼酸酯13的合成

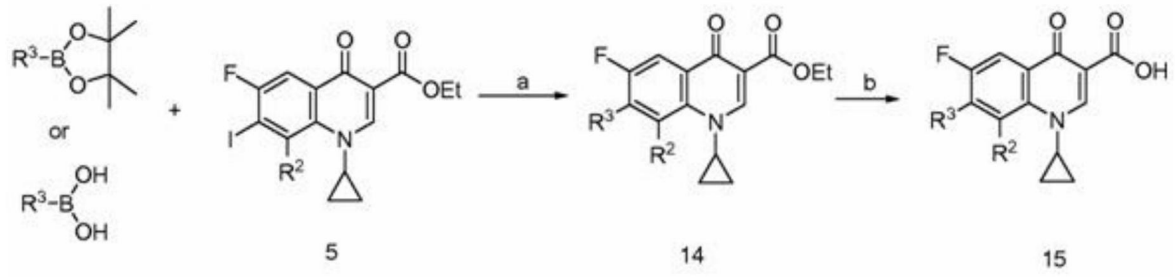


11 12 13

9.1化合物12：将3-氯吡啶-2-胺(100g,0.778mol)溶于乙酸(1200mL)。向该溶液中加入Na_2CO_3(82.4g,0.778mol)。然后，滴加入Br_2(39.1mL,0.856mmol)。加完后，将反应混合物在室温搅拌30分钟。向混合物中加入水(800mL)。将混合物冷却至约5℃。将所得到的固体通过过滤收集并干燥，得到化合物12(147g,91％)，为白色固体。

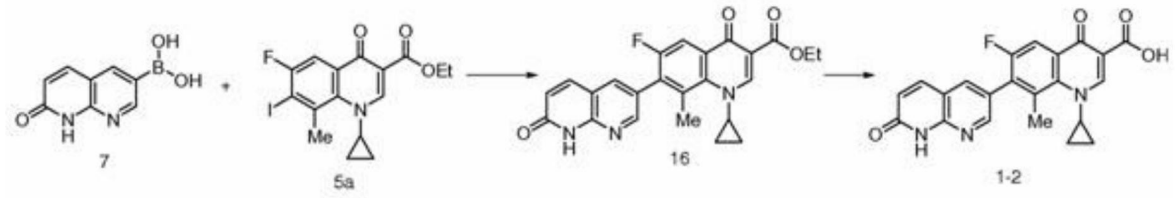
[0185] 9.2硼酸酯13：将化合物12(4g,17.2mmol)、双(频哪醇合)二硼(4.79g,18.8mmol)、KOAc(3.37g,34.2mmol)和Pd(dppf)Cl_2·CH_2Cl_2(0.210g,0.25mmol)装入烧瓶中。加入二噁烷(80mL)。该混合物在氩气氛下85℃搅拌2小时。当LC-MS表明反应完成后，将混合物冷却至室温。该混合物通过硅藻土过滤和浓缩。剩余物用乙酸乙酯和己烷(3/1,100mL)稀释，通过硅胶(300-400目)过滤，浓缩，通过正己烷结晶，得到硼酸酯13(3.4g,78％)，为白色固体。

[0186] 一般方案III



反应试剂和条件:a.Pd(dppf)Cl_2.CH_2Cl_2(5%mol),K_2CO_3,二噁烷,80℃;b.NaOH,EtOH。

[0187] 实施例10化合物1-2的合成

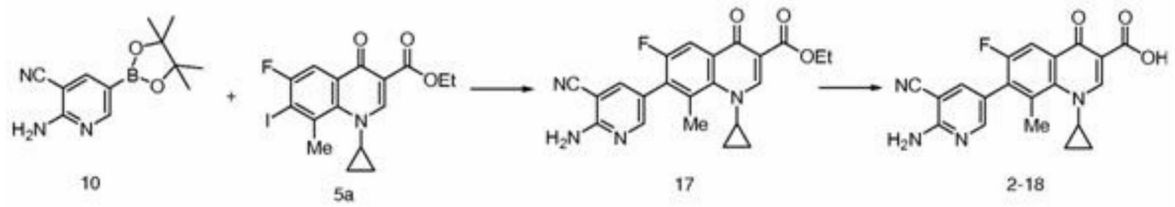


10.1化合物16:将中间体5a(30g,65mmol)、硼酸7(17g,71.6mmol)和K_2CO_3(27,195mmol)装入烧瓶中。加入二噁烷(600mL)和水(60mL)。溶液用N_2脱氧15分钟。向混合物中加入Pd(dppf)Cl_2.CH_2Cl_2(2.8g,3.24mmol)。反应混合物在85℃搅拌过夜。当反应完成后,将反应混合物冷却至室温。将沉淀物滤出,溶于水中,过滤,用EtOH研磨,过滤并干燥,得到化合物16(16g,57%),为灰白色固体。至于使用,所得化合物是足够纯的。

[0188] 浓缩有机滤液。向剩余物中加入水、二氯甲烷和EtOAc。将这样形成的沉淀物通过过滤收集,并溶于HC1(5N)。在过滤除去钯剩余物后,将滤液用NaOH水溶液碱化(pH=7-8)。通过过滤收集沉淀物,干燥得到化合物16(3g,11%),为灰白色固体。

[0189] 10.2化合物1-2:将化合物16(33g,76.1mmol)悬浮于EtOH(300mL)。向悬浮液中加入NaOH水溶液(4N,100mL),并将该混合物在60℃搅拌2小时。在减压下蒸发200mLEtOH。向剩余物中加入HC1(5N)以调节pH=4。将所得沉淀物滤出,用EtOH研磨,过滤并干燥,得到化合物1-2(30g,97%),为灰白色固体。熔点:>300℃。^{1}H NMR(400MHz,DMSO)δ14.64(s,1H),12.39(s,1H),8.92(s,1H),8.58(s,1H),8.28(s,1H),8.01(m,2H),6.67(d,J=9.4Hz,1H),4.42(s,1H),2.68(s,3H),1.27(d,J=6.4Hz,2H),1.12-1.03(m,2H)。^{13}C NMR(101MHz,DMSO)δ176.92,165.25,162.85,158.16,155.72,152.71,150.92,149.62,139.29,138.79,137.62,133.70,133.52,131.80,127.47,127.38,123.75,123.42,113.89,108.05,107.81,107.29,41.29,20.64,20.62,10.62。HPLC-MS m/z 406(MH^+)。分析.$C_{22}H_{16}FN_3O_4$的计算值:C,65.18,H,3.98,N,10.37。实测值:C,63.50,H,4.00,N,9.91。

[0190] 实施例11化合物2-18的合成

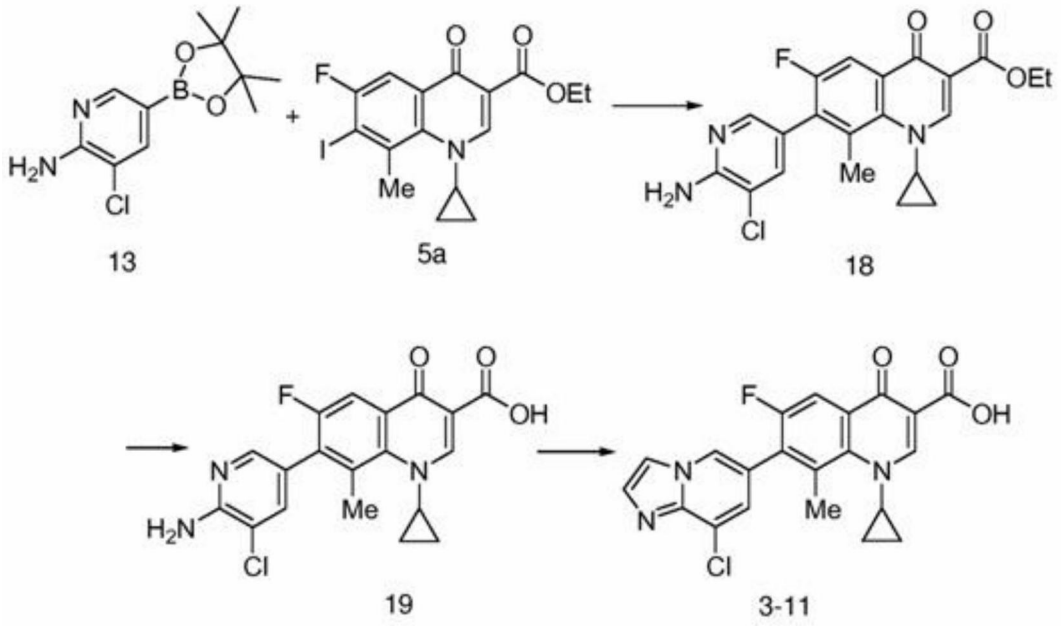


11.1化合物17:将硼酸酯10(14g,56.1mmol)、中间体5a(20g,46.7mmol)、Cs_2CO_3(15.22g,46.7mmol)和Pd(dppf)Cl_2.CH_2Cl_2(0.98g,1.2mmol)装入烧瓶中。加入二噁烷(500mL)和水(5mL)。该混合物在氩气氛下110℃搅拌过夜。混合物冷却至室温。将混合物过

滤，用二噁烷和乙酸乙酯洗涤固体。将固体溶于热CH_2C1_2(1200mL)，并通过硅藻土过滤该溶液。该操作被重复两次。将有机层合并，浓缩。向剩余物中加入乙酸乙酯(200mL)。固体通过过滤收集，用乙酸乙酯(60mL)洗涤，干燥得到化合物17(17.6g,90％)，为白色固体。

[0191] 11.2化合物2-18：将化合物17(43g,0.101mol)溶于THF和EtOH(1/1,500mL)。向该溶液中加入NaOH(60mL,4N)。混合物在室温搅拌2小时。加入HC1(63mL,4N)以酸化混合物(pH＝3-4)。固体通过过滤收集，用EtOH(100mL)洗涤，干燥得到化合物2-18(35.7g,99％)，为白色固体。熔点>300℃。^{1}H NMR(400MHz,DMSO)δ14.65(s,1H),8.89(s,1H),8.32-8.23(m,1H),8.08(d,J＝2.09Hz,1H),7.94(d,J＝8.87Hz,1H),7.28(s,2H),4.40(tt,J＝3.74,7.17Hz,1H),2.67(s,3H),1.31-1.19(m,2H),1.10-0.99(m,2H)。^{13}C NMR(101MHz,DMSO)δ176.95,176.92,165.32,159.60,158.29,155.86,154.07,152.67,143.59,139.32,133.39,133.22,131.73,127.13,127.05,116.93,116.52,107.96,107.71,107.27,89.15,41.32,20.64,20.62,10.65。HPLC-MS m/z 379(MH^+)。分析.$C_{20}H_{15}FN_4O_3$的计算值：C,63.49,H,4.00,N,14.81。实测值：C,62.04,H,4.20,N,13.97。

[0192] 实施例12化合物3-11的合成



12.1化合物18：将硼酸酯13(20g,75.4mmol)、中间体5a(24.1g,58.03mmol)，Cs_2CO_3(26.5g,81.2mmol)和Pd(dppf)$C1_2$.CH_2C1_2(1.42g,1.7mmol)装入烧瓶中。加入二噁烷(400mL)和水(4mL)。该混合物在氩气氛下100℃搅拌过夜。混合物冷却至室温。将混合物过滤，用二噁烷和乙酸乙酯洗涤固体。将固体溶于热CH_2C1_2(1200mL)，并通过硅藻土过滤该溶液。该操作被重复两次。将有机层合并，浓缩。向剩余物中加入乙酸乙酯(200mL)。固体通过过滤收集，用乙酸乙酯(60mL)洗涤，干燥得到化合物18(21g,85％)，为白色固体。

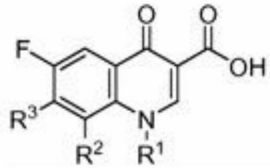
[0193] 12.2化合物19：将化合物18(39g,91.91mmol)溶于THF和EtOH(1/1,600mL)。向该混合物中加入NaOH(4N,60mL)。混合物在室温搅拌2小时。加入HC1(4N,62mL)以酸化溶液(pH＝3-4)。固体通过过滤收集，用EtOH(100mL)洗涤，干燥得到化合物19(34g,98％)，为白色固体。

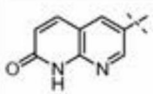
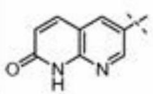
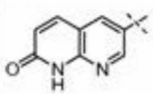
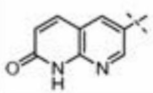
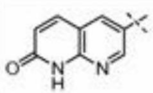
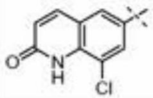
[0194] 12.3化合物3-11：将氯乙醛(40％水溶液,80mL)加入到化合物19(34g,91.9mmol)

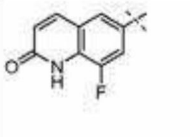
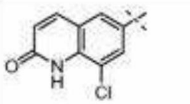
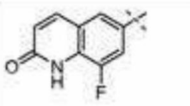
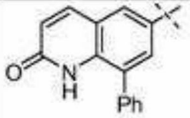
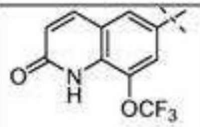
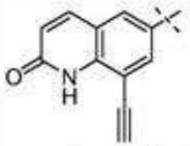
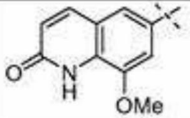
的EtOH(600mL)溶液中。将混合物回流3小时。当LC-MS表明反应完成后，将混合物冷却至5℃，过滤。将固体干燥得到化合物3-11(21g)。母液用NaOH水溶液碱化(pH＝7-8)。将沉淀物通过过滤收集，用EtOH洗涤并干燥，得到化合物3-11(11.5g)，为白色固体。总共得到了32.5g化合物3-11，产率93％，熔点：307-311℃。^{1}HNMR(400MHz,DMSO)δ14.53(s,1H),8.98-8.84(m,2H),8.28(d,J＝1.16Hz,1H),7.98(d,J＝8.83Hz,1H),7.90(d,J＝0.89Hz,1H),7.77(s,1H),4.43(tt,J＝3.70,7.10Hz,1H),3.50-3.36(m,1H),2.72(s,3H),1.26(d,J＝6.80Hz,2H),1.07(d,J＝18.24Hz,2H)。^{13}C NMR(101MHz,DMSO)δ176.91,176.88,165.23,158.22,155.77,152.84,139.98,139.17,139.16,132.44,132.15,131.98,131.54,127.86,127.78,127.38,120.72,118.97,116.37,108.15,107.91,107.37,41.38,20.54,20.52,10.72。HPLC-MS：m/z 412(MH^+)。分析.$C_{21}H_{15}ClF_3O_3$的计算值：C,61.25,H,3.67,N,10.20。实测值：C,58.59,H,3.86,N,9.76。

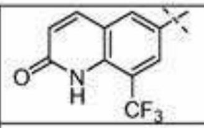
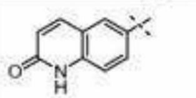
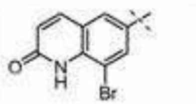
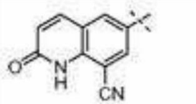
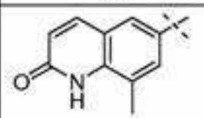
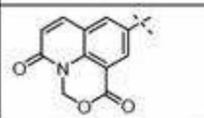
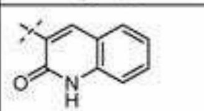
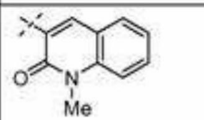
[0195] 在下述表中列出的化合物根据一般方案III得到合成。

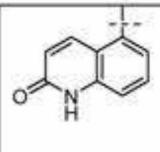
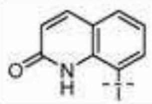
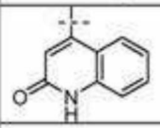
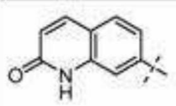
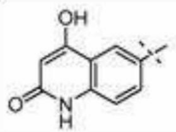
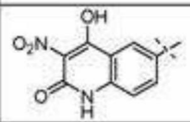
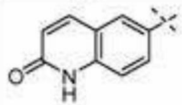
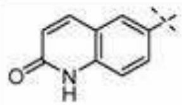
表1

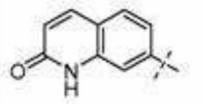
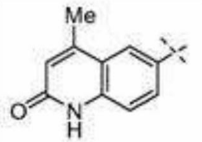
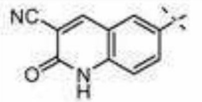
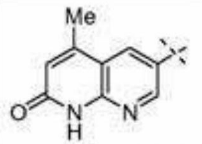
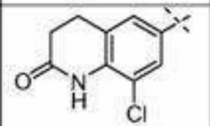
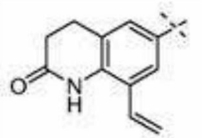


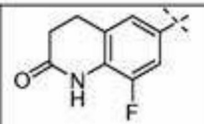
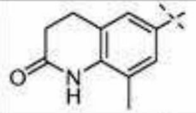
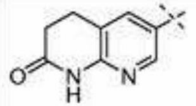
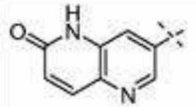
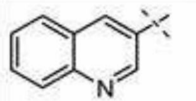
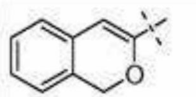
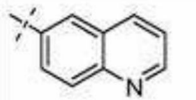
化合物编号	R^3 =	R^2 =	R^1 =	NMR	MS (MH^+)	HPLC
1-1		OMe	环丙基	^{1}H NMR (400 MHz, DMSO) δ 14.63 (s, 1H), 12.41 (s, 1H), 8.82 (s, 1H), 8.69 (s, 1H), 8.38 (s, 1H), 8.05 (d, *J* = 9.6 Hz, 1H), 7.99 (d, *J* = 9.1 Hz, 1H), 6.66 (dd, *J* = 9.5, 1.6 Hz, 1H), 4.24 (s, 1H), 3.42 (s, 3H), 1.19 (d, *J* = 7.2 Hz, 4H).	422	98%
1-2		Me	环丙基	^{1}H NMR (400 MHz, DMSO) δ 14.64 (s, 1H), 12.39 (s, 1H), 8.92 (s, 1H), 8.58 (s, 1H), 8.28 (s, 1H), 8.01 (m, 2H), 6.67 (d, *J* = 9.4 Hz, 1H), 4.42 (s, 1H), 2.68 (s, 3H), 1.27 (d, *J* = 6.4 Hz, 2H), 1.12 – 1.03 (m, 2H).	406	98%
1-3		OMe		^{1}H NMR (400 MHz, DMSO) δ 14.49 (s, 1H), 12.41 (s, 1H), 8.85 (d, *J* = 1.3 Hz, 1H), 8.67 (s, 1H), 8.36 (s, 1H), 8.05 (d, *J* = 9.6 Hz, 1H), 8.00 (d, *J* = 9.1 Hz, 1H), 6.77 – 6.54 (m, 1H), 5.24 – 4.97 (m, 1H), 4.29 – 4.10 (m, 1H), 3.44 (s, 3H), 1.89 – 1.59 (m, 2H).	440	98%
1-4		Me		^{1}H NMR (400 MHz, DMSO) δ 14.50 (s, 1H), 12.39 (s, 1H), 8.90 (d, *J* = 3.0 Hz, 1H), 8.58 (s, 1H), 8.27 (s, 1H), 8.02 (m, 2H), 6.74 – 6.61 (m, 1H), 5.17 (dd, *J* = 64.3, 3.1 Hz, 1H), 4.39 (m, 1H), 2.60 (s, 3H), 1.84 – 1.50 (m, 2H).	424	98%
1-5		Cl	环丙基	^{1}H NMR (400 MHz, DMSO) δ 14.22 (s, 1H), 12.42 (s, 1H), 8.94 (s, 1H), 8.61 (d, *J* = 2.0 Hz, 1H), 8.31 (d, *J* = 2.0 Hz, 1H), 8.20 (d, *J* = 8.5 Hz, 1H), 8.03 (d, *J* = 9.6 Hz, 1H), 6.67 (d, *J* = 9.5 Hz, 1H), 4.51 – 4.34 (m, 1H), 1.29 – 1.19 (m, 2H), 1.17 – 1.05 (m, 2H).	426	98%
1-7		Me	环丙基	^{1}H NMR (400 MHz, DMSO) δ 14.65 (s, 1H), 11.27 (s, 1H), 8.91 (s, 1H), 8.04 (d, *J* = 9.5 Hz, 1H), 7.98 (d, *J* = 8.8 Hz, 1H), 7.78 (s, 2H), 6.69 (d, *J* = 9.5 Hz, 1H), 4.49 – 4.30 (m, 1H), 2.65 (s, 3H), 1.25 (d, *J* = 6.7 Hz, 2H), 1.08 (s, 2H).	439	98%

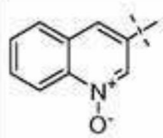
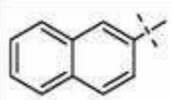
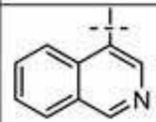
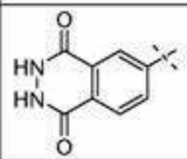
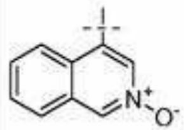
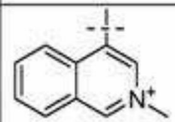
1-8		Me	环丙基	^{1}H NMR (400 MHz, DMSO) δ 14.66 (s, 1H), 11.99 (s, 1H), 8.91 (s, 1H), 8.03 (d, *J* = 9.1 Hz, 1H), 7.98 (d, *J* = 8.8 Hz, 1H), 7.60 (s, 1H), 7.57 (d, *J* = 11.5 Hz, 1H), 6.66 (d, *J* = 9.6 Hz, 1H), 4.51 – 4.29 (m, 1H), 1.25 (d, *J* = 6.3 Hz, 2H), 1.15 – 0.94 (m, 2H).	423	98%
1-9		OMe	环丙基	^{1}H NMR (400 MHz, DMSO) δ 14.64 (s, 1H), 11.30 (s, 1H), 8.82 (s, 1H), 8.15 – 8.03 (m, 1H), 8.00 – 7.93 (d, *J* = 9.1 Hz, 1H), 7.93 – 7.80 (d, *J* = 12.9 Hz, 2H), 6.79 – 6.51 (d, *J* = 9.4 Hz, 1H), 4.28 – 4.15 (m, 1H), 3.51 – 3.38 (s, 3H), 1.31 – 1.09 (m, 4H).	455	93%
1-10		OMe	环丙基	^{1}H NMR (400 MHz, DMSO) δ 14.69 – 14.59 (s, 1H), 12.08 – 11.94 (s, 1H), 8.90 – 8.74 (s, 1H), 8.13 – 8.01 (d, *J* = 1.8 Hz, 1H), 7.99 – 7.91 (d, *J* = 9.1 Hz, 1H), 7.77 – 7.71 (s, 1H), 7.68 – 7.59 (d, *J* = 11.6 Hz, 1H), 6.71 – 6.62 (d, *J* = 9.6 Hz, 1H), 4.30 – 4.17 (ddd, *J* = 11.2, 7.5, 4.7 Hz, 1H), 3.47 – 3.39 (s, 3H), 1.22 – 1.11 (m, 4H).	439	95%
1-11		Me	环丙基	^{1}H NMR (400 MHz, DMSO) δ 14.68 (s, 1H), 9.92 (s, 1H), 8.91 (s, 1H), 8.09 (d, *J* = 9.6 Hz, 1H), 7.99 (d, *J* = 8.8 Hz, 1H), 7.81 (s, 1H), 7.62 – 7.53 (m, 4H), 7.52 – 7.47 (m, 1H), 7.46 (s, 1H), 6.65 (d, *J* = 9.5 Hz, 1H), 4.65 – 4.23 (m, 1H), 2.70 (s, 3H), 1.24 (d, *J* = 7.0 Hz, 2H), 1.07 (s, 2H).	481	98%
1-12		Me	环丙基	^{1}H NMR (400 MHz, DMSO) δ 14.68 (s, 1H), 12.23 (s, 1H), 8.92 (s, 1H), 8.10 (d, *J* = 9.5 Hz, 1H), 8.00 (d, *J* = 8.7 Hz, 1H), 7.87 (s, 1H), 7.70 (s, 1H), 6.70 (d, *J* = 9.3 Hz, 1H), 4.43 (s, 1H), 2.64 (s, 3H), 1.23 (s, 2H), 1.07 (d, *J* = 12.5 Hz, 2H).	489	98%
1-13		Me	环丙基	^{1}H NMR (400 MHz, DMSO) δ 14.66 (s, 1H), 10.55 (s, 1H), 8.91 (s, 1H), 8.04 (d, *J* = 9.5 Hz, 1H), 7.99 (d, *J* = 8.7 Hz, 1H), 7.84 (s, 1H), 7.74 (s, 1H), 6.68 (d, *J* = 9.4 Hz, 1H), 4.75 (s, 1H), 4.40 (m, 1H), 2.64 (s, 3H), 1.25 (d, *J* = 6.9 Hz, 2H), 1.08 (s, 2H).	429	90%
1-14		Me	环丙基	^{1}H NMR (400 MHz, DMSO) δ 14.70 (s, 1H), 11.06 (s, 1H), 8.91 (s, 1H), 8.05 – 7.87 (m, 2H), 7.31 (s, 1H), 7.16 (s, 1H), 6.60 (d, *J* = 9.5 Hz, 1H), 4.40 (dd, *J* = 7.0, 3.4 Hz, 1H), 3.94 (s, 3H), 2.65 (s, 3H), 1.25 (d, *J* = 7.1 Hz, 2H), 1.08 (s, 2H).	435	90%

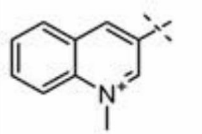
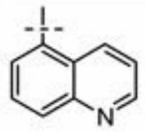
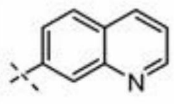
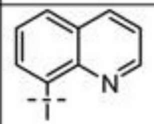
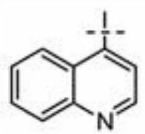
1-15		Me	环丙基	[1]H NMR (400 MHz, DMSO) δ 14.65 (s, 1H), 10.97 (s, 1H), 8.92 (s, 1H), 8.28 – 8.06 (m, 2H), 8.01 (d, *J* = 8.8 Hz, 1H), 7.95 (s, 1H), 6.74 (d, *J* = 8.5 Hz, 1H), 4.49 – 4.33 (m, 1H), 2.64 (s, 3H), 1.25 (d, *J* = 6.8 Hz, 2H), 1.10 (s, 2H).	473	90%
1-16		Me	环丙基	[1]H NMR (400 MHz, DMSO) δ 14.72 (s, 1H), 11.95 (s, 1H), 8.91 (s, 1H), 7.99 (d, *J* = 7.9 Hz, 2H), 7.76 (s, 1H), 7.54 (d, *J* = 8.4 Hz, 1H), 7.47 (d, *J* = 8.4 Hz, 1H), 6.59 (d, *J* = 9.5 Hz, 1H), 4.40 (s, 1H), 2.63 (s, 3H), 1.25 (d, *J* = 6.1 Hz, 2H), 1.07 (s, 2H).	405	98%
1-17		Me	环丙基	[1]H NMR (400 MHz, DMSO) δ 14.66 (s, 1H), 10.76 (s, 1H), 8.92 (s, 1H), 8.03 (d, *J* = 9.7 Hz, 1H), 7.99 (d, *J* = 8.8 Hz, 1H), 7.93 (s, 1H), 7.83 (s, 1H), 6.68 (d, *J* = 9.4 Hz, 1H), 2.65 (s, 3H), 1.25 (m, 2H), 1.07 (m, 2H).	482; 484	96%
1-18		Me	环丙基	[1]H NMR (400 MHz, DMSO) δ 14.63 (s, 1H), 11.86 (s, 1H), 8.92 (s, 1H), 8.16 (m, 3H), 8.00 (d, *J* = 8.7 Hz, 1H), 6.80 (s, 1H), 4.42 (s, 1H), 2.65 (s, 3H), 1.26 (m, 2H), 1.09 (m, 2H).	430	96%
1-19		Me	环丙基	[1]H NMR (400 MHz, DMSO) δ 14.69 (s, 1H), 11.10 (s, 1H), 8.90 (s, 1H), 7.97 (t, *J* = 9.04 Hz, 2H), 7.58 (s, 1H), 7.39 (s, 1H), 6.59 (d, *J* = 9.48 Hz, 1H), 4.39 (dt, *J* = 3.29, 6.75 Hz, 1H), 3.36 (s, 3H), 2.63 (s, 3H), 1.25 (d, *J* = 6.45 Hz, 2H), 1.06 (s, 2H).	419	96%
1-20		Me	环丙基	[1]H NMR (400 MHz, DMSO) δ 14.64 (s, 1H), 8.93 (s, 1H), 8.21 (s, 1H), 8.18 (s, 1H), 8.15 (d, *J* = 9.7 Hz, 1H), 8.02 (d, *J* = 8.9 Hz, 1H), 6.81 (d, *J* = 9.7 Hz, 1H), 6.24 (s, 2H), 4.41 (m, 2H), 2.65 (s, 4H), 1.25 (m, 2H), 1.10 (m, 2H).	461	90%
1-21		Me	环丙基	[1]H NMR (400 MHz, DMSO) δ 14.75 (s, 1H), 12.18 (s, 1H), 8.91 (s, 1H), 8.14 (s, 1H), 7.96 (d, *J* = 8.8 Hz, 1H), 7.78 (d, *J* = 7.7 Hz, 1H), 7.60 (d, *J* = 7.8 Hz, 1H), 7.41 (d, *J* = 7.9 Hz, 1H), 7.28 (d, *J* = 7.4 Hz, 1H), 4.43 (s, 1H), 2.71 (s, 3H), 1.24 (s, 2H), 1.05 (s, 2H).	405	98%
1-22		Me	环丙基	[1]H NMR (400 MHz, DMSO) δ 14.75 (s, 1H), 8.91 (s, 1H), 8.16 (s, 1H), 7.96 (d, *J* = 8.2 Hz, 1H), 7.90 (s, 1H), 7.85 (d, *J* = 7.3 Hz, 1H), 7.66 (d, *J* = 8.5 Hz, 1H), 7.38 (d, *J* = 6.7 Hz, 1H), 4.42 (s, 1H), 3.74 (s, 3H), 2.69 (s, 3H), 1.23 (s, 2H), 1.05 (s, 2H).	419	95%

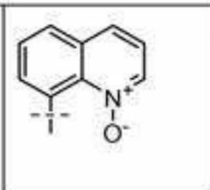
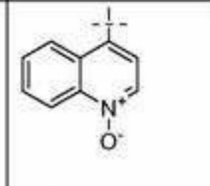
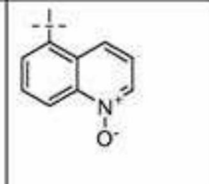
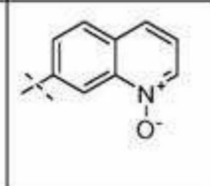
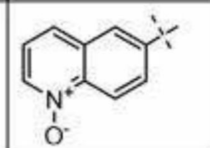
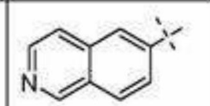
1-23		Me	环丙基	[1]H NMR (400 MHz, DMSO) δ 14.72 (s, 1H), 12.04 (s, 1H), 8.93 (s, 1H), 8.04 (d, J = 8.2 Hz, 1H), 7.68 (t, J = 7.5 Hz, 1H), 7.48 (d, J = 8.1 Hz, 1H), 7.35 (d, J = 9.7 Hz, 1H), 7.17 (d, J = 7.1 Hz, 1H), 6.49 (d, J = 9.7 Hz, 1H), 4.39 (s, 1H), 2.50 (s, 3H), 1.16 (m, 4H).	405	96%
1-24		Me	环丙基	[1]H NMR (400 MHz, DMSO) δ 14.82 (s, 1H), 10.88 (s, 1H), 8.95 (s, 1H), 8.20 – 7.94 (m, 2H), 7.86 (d, J = 30.6 Hz, 1H), 7.44 (d, J = 7.5 Hz, 1H), 7.36 (s, 1H), 6.57 (s, 1H), 4.41 (s, 1H), 2.67 (s, 3H), 1.47 – 0.92 (m, 4H).	405	90%
1-25		Me	环丙基	[1]H NMR (400 MHz, DMSO) δ 14.66 (s, 1H), 12.12 (s, 1H), 8.94 (s, 1H), 8.06 (d, J = 8.5 Hz, 1H), 7.58 (s, 1H), 7.45 (d, J = 7.0 Hz, 1H), 7.13 (s, 1H), 7.02 (d, J = 8.0 Hz, 1H), 6.65 (s, 1H), 4.40 (m, 1H), 2.62 (s, 3H), 1.28 – 1.04 (m, 4H).	405	90%
1-26		Me	环丙基	[1]H NMR (400 MHz, DMSO) δ 14.70 (s, 1H), 11.88 (s, 1H), 8.92 (s, 1H), 8.01 (d, J = 8.8 Hz, 2H), 7.86 (d, J = 7.8 Hz, 1H), 7.29 (s, 1H), 7.22 (d, J = 7.6 Hz, 1H), 6.60 (d, J = 9.6 Hz, 1H), 4.40 (s, 1H), 2.62 (s, 3H), 1.24 (d, J = 5.6 Hz, 2H), 1.07 (s, 2H).	405	94%
1-27		Me	环丙基	[1]H NMR (400 MHz, DMSO) δ 14.80 (s, 1H), 11.57 (s, 1H), 11.48 (s, 1H), 8.97 (s, 1H), 8.04 (d, J = 8.5 Hz, 1H), 7.82 (s, 1H), 7.60 (d, J = 8.1 Hz, 1H), 7.49 (d, J = 8.2 Hz, 1H), 5.86 (s, 1H), 4.45 (s, 1H), 2.68 (s, 3H), 1.30 (d, J = 5.7 Hz, 2H), 1.13 (s, 2H).	421	98%
1-28		Me	环丙基	[1]H NMR (400 MHz, DMSO) δ 14.75 (s, 1H), 10.73 (s, 1H), 8.90 (s, 1H), 7.97 (d, J = 8.4 Hz, 1H), 7.89 (s, 1H), 7.43 (s, 1H), 7.28 (d, J = 7.6 Hz, 1H), 4.40 (s, 1H), 2.62 (s, 3H), 1.24 (s, 2H), 1.06 (s, 2H).	466	96%
1-29		OMe	环丙基	[1]H NMR (400 MHz, DMSO) δ 14.69 (s, 1H), 11.96 (s, 1H), 8.81 (s, 1H), 8.01 (d, J = 9.6 Hz, 1H), 7.95 (d, J = 9.1 Hz, 1H), 7.87 (s, 1H), 7.68 (d, J = 8.6 Hz, 1H), 7.49 (d, J = 8.6 Hz, 1H), 6.57 (dd, J = 9.5, 1.7 Hz, 1H), 4.32 – 4.10 (m, 1H), 3.38 (s, 3H), 1.18 (m, 4H).	421	98%
1-30		Cl	环丙基	[1]H NMR (400 MHz, DMSO) δ 14.41 (s, 1H), 11.96 (s, 1H), 8.91 (s, 1H), 8.20 (d, J = 8.8 Hz, 1H), 7.95 (d, J = 9.1 Hz, 1H), 7.80 (s, 1H), 7.68 (d, J = 8.6 Hz, 1H), 7.49 (d, J = 8.6 Hz, 1H), 6.62 (dd, J = 9.5, 1.7 Hz, 1H), 4.32 – 4.10 (m, 1H), 1.30 (m, 2H), 1.18 (m, 2H).	425	96%

1-31		OMe	环丙基	^{1}H NMR (400 MHz, DMSO) δ 14.67 (s, 1H), 11.89 (s, 1H), 8.82 (s, 1H), 8.17 – 7.90 (m, 2H), 7.85 (d, *J* = 8.0 Hz, 1H), 7.48 (s, 1H), 7.35 (d, *J* = 7.9 Hz, 1H), 6.60 (d, *J* = 11.2 Hz, 1H), 4.28 – 4.14 (m, 1H), 3.41 (s, 4H), 1.18 (m, 4H).	421	90%
1-32		Me	环丙基	^{1}H NMR (400 MHz, DMSO) δ 14.69 (s, 1H), 11.78 (s, 1H), 8.91 (s, 1H), 7.98 (d, *J* = 8.77 Hz, 1H), 7.72 (s, 1H), 7.54 (s, 1H), 7.50 – 7.44 (m, 1H), 6.48 (s, 1H), 2.63 (s, 3H), 2.44 (s, 3H), 1.28 – 1.21 (m, 2H), 1.12 – 1.02 (m, 2H).	419	96%
1-33		Me	环丙基	^{1}H NMR (400 MHz, DMSO) δ 14.62 (s, 1H), 13.15 (s, 1H), 8.92 (s, 1H), 8.87 (s, 1H), 8.77 (d, *J* = 1.74 Hz, 1H), 8.38 (d, *J* = 1.97 Hz, 1H), 8.02 (d, *J* = 8.86 Hz, 1H), 4.42 (tt, *J* = 3.74, 7.15 Hz, 1H), 2.66 (s, 3H), 1.25 (q, *J* = 6.85 Hz, 2H), 1.08 (s, 2H).	431	96%
1-34		Me	环丙基	^{1}H NMR (400 MHz, DMSO) δ 9.11 (s, 1H), 8.92 (s, 1H), 8.31 (d, *J* = 8.86 Hz, 1H), 8.16 (d, *J* = 8.54 Hz, 1H), 8.03 (d, *J* = 8.91 Hz, 1H), 6.51 (s, 1H), 4.44 (tt, *J* = 3.64, 7.02 Hz, 2H), 2.69 (s, 3H), 2.51 (s, 3H), 1.24 (d, *J* = 6.83 Hz, 2H), 1.10 (s, 2H).	420	95%
1-35		OMe	环丙基	^{1}H NMR (400 MHz, DMSO) δ 14.75 – 14.55 (m, 1H), 9.83 – 9.67 (d, *J* = 3.2 Hz, 1H), 8.89 – 8.73 (s, 1H), 7.96 – 7.86 (d, *J* = 9.1 Hz, 1H), 7.58 – 7.47 (s, 1H), 7.42 – 7.34 (s, 1H), 4.30 – 4.14 (tt, *J* = 7.3, 4.5 Hz, 1H), 3.52 – 3.39 (s, 3H), 3.11 – 2.95 (t, *J* = 7.5 Hz, 2H), 2.62 – 2.56 (dd, *J* = 8.5, 6.3 Hz, 2H), 1.21 – 1.12 (m, 4H).	457	99%
1-36		OMe	环丙基	^{1}H NMR (400 MHz, $CDCl_3$) δ 14.52 – 14.39 (s, 1H), 8.87 – 8.82 (s, 1H), 8.01 – 7.92 (m, 1H), 7.75 – 7.69 (s, 1H), 7.39 – 7.34 (t, *J* = 1.7 Hz, 1H), 7.21 – 7.18 (s, 1H), 6.79 – 6.69 (dd, *J* = 17.3, 11.0 Hz, 1H), 5.70 – 5.62 (d, *J* = 17.3 Hz, 1H), 5.54 – 5.44 (d, *J* = 11.0 Hz, 1H), 4.09 – 3.99 (d, *J* = 3.7 Hz, 1H), 3.45 – 3.36 (s, 3H), 3.03 – 2.95 (dd, *J* = 8.5, 6.5 Hz, 2H), 2.68 – 2.59 (dd, *J* = 8.7, 6.5 Hz, 2H), 1.26 – 1.21 (dd, *J* = 5.2, 1.8 Hz, 2H), 1.11 – 1.03 (dt, *J* = 4.0, 1.9 Hz, 2H).	449	85%

1-37		OMe	环丙基	[1]H NMR (400 MHz, DMSO) δ 14.73 – 14.60 (s, 1H), 10.38 – 10.26 (s, 1H), 8.84 – 8.76 (s, 1H), 7.96 – 7.88 (d, *J* = 9.1 Hz, 1H), 7.36 – 7.28 (d, *J* = 11.2 Hz, 1H), 7.25 – 7.19 (s, 1H), 4.29 – 4.18 (ddd, *J* = 11.3, 7.3, 4.4 Hz, 1H), 3.47 – 3.43 (s, 3H), 3.07 – 2.99 (t, *J* = 7.4 Hz, 2H), 2.60 – 2.53 (dd, *J* = 8.5, 6.5 Hz, 2H), 1.21 – 1.08 (d, *J* = 5.3 Hz, 4H).	441	85%
1-38		OMe	环丙基	[1]H NMR (400 MHz, DMSO) δ 14.70 (s, 1H), 9.62 (s, 1H), 8.79 (s, 1H), 7.89 (d, *J* = 9.2 Hz, 1H), 7.20 (d, *J* = 8.5 Hz, 2H), 4.39 – 4.16 (m, 1H), 3.42 (s, 3H), 3.03 – 2.88 (m, 2H), 2.54 (m, 5H), 1.16 (m, 4H).	436	99%
1-39		OMe	环丙基	[1]H NMR (400 MHz, DMSO) δ 15.13 – 14.27 (m, 1H), 10.76 – 10.64 (s, 5H), 8.98 – 8.88 (s, 1H), 8.19 – 8.14 (d, *J* = 2.2 Hz, 1H), 8.00 – 7.94 (d, *J* = 8.7 Hz, 1H), 7.75 – 7.70 (d, *J* = 2.1 Hz, 1H), 4.49 – 4.32 (tt, *J* = 7.3, 3.8 Hz, 1H), 3.03 – 2.95 (m, 2H), 2.69 – 2.64 (s, 3H), 2.62 – 2.56 (t, *J* = 7.5 Hz, 2H), 1.28 – 1.22 (m, 2H), 1.09 – 1.03 (m, 2H).	408	90%
1-40		Me	环丙基	[1]H NMR (400 MHz, DMSO) δ 14.60 (s, 1H), 12.01 (s, 1H), 8.92 (s, 1H), 8.53 (s, 1H), 8.08 – 7.98 (m, 2H), 7.72 (s, 1H), 6.85 (d, *J* = 9.75 Hz, 1H), 4.41 (s, 1H), 3.34 (s, 1H), 2.65 (s, 3H), 2.54 (s, 3H), 1.24 (d, *J* = 6.54 Hz, 2H), 1.09 (s, 2H).	406	96%
1-41		Me	环丙基	[1]H NMR (400 MHz, DMSO) δ 14.85 – 14.51 (s, 1H), 9.00 – 8.91 (m, 2H), 8.60 – 8.53 (s, 1H), 8.18 – 8.09 (t, *J* = 8.4 Hz, 2H), 8.09 – 8.02 (m, 1H), 7.95 – 7.84 (s, 1H), 7.79 – 7.68 (s, 1H), 4.51 – 4.31 (s, 1H), 2.79 – 2.61 (s, 3H), 1.36 – 1.20 (d, *J* = 6.9 Hz, 2H), 1.16 – 1.04 (s, 2H).	389	100%
1-42		Me	环丙基	[1]H NMR (400 MHz, DMSO) δ 15.01 – 14.88 (d, *J* = 2.6 Hz, 1H), 8.95 – 8.82 (d, *J* = 2.5 Hz, 1H), 8.05 – 7.94 (d, *J* = 6.7 Hz, 1H), 7.89 – 7.77 (d, *J* = 9.4 Hz, 1H), 7.62 – 7.40 (m, 3H), 6.33 – 6.21 (s, 1H), 5.59 – 5.49 (s, 2H), 4.48 – 4.35 (s, 1H), 2.86 – 2.76 (s, 3H), 1.30 – 1.15 (d, *J* = 7.0 Hz, 2H), 1.00 – 0.88 (s, 2H).	392	100%
1-43		Me	环丙基	[1]H NMR (400 MHz, MeOD) δ 9.05 – 8.91 (s, 1H), 8.87 – 8.77 (s, 1H), 8.43 – 8.36 (s, 1H), 8.14 – 8.06 (d, *J* = 7.3 Hz, 1H), 8.02 – 7.88 (d, *J* = 21.7 Hz, 2H), 7.74 – 7.62 (d, *J* = 8.7 Hz, 1H), 7.59 – 7.51 (s, 1H), 4.35 – 4.15 (s, 1H), 2.73 – 2.53 (m, 3H), 1.05 – 0.93 (s, 2H), 0.85 – 0.71 (d, *J* = 8.0 Hz, 2H).	389	97%

1-44		Me	环丙基	^{1}H NMR (400 MHz, DMSO) δ 14.72 – 14.59 (s, 1H), 9.01 – 8.91 (s, 1H), 8.88 – 8.80 (s, 1H), 8.66 – 8.56 (d, *J* = 8.6 Hz, 1H), 8.25 – 8.16 (d, *J* = 8.0 Hz, 1H), 8.14 – 8.09 (s, 1H), 8.08 – 8.01 (d, *J* = 8.6 Hz, 1H), 7.95 – 7.89 (d, *J* = 8.7 Hz, 1H), 7.88 – 7.79 (d, *J* = 7.7 Hz, 1H), 4.51 – 4.35 (s, 1H), 2.75 – 2.67 (s, 3H), 1.30 – 1.19 (d, *J* = 6.8 Hz, 2H), 1.16 – 1.07 (s, 2H).	405	97.5%
1-45		Me	环丙基	^{1}H NMR (400 MHz, DMSO) δ 14.85 – 14.58 (s, 1H), 9.00 – 8.88 (s, 1H), 8.19 – 8.07 (d, *J* = 8.3 Hz, 1H), 8.07 – 7.94 (m, 4H), 7.68 – 7.58 (d, *J* = 6.0 Hz, 2H), 7.57 – 7.48 (d, *J* = 8.2 Hz, 1H), 4.49 – 4.33 (s, 1H), 2.72 – 2.59 (s, 3H), 1.33 – 1.19 (d, *J* = 7.4 Hz, 2H), 1.16 – 1.00 (s, 2H).	388	98%
1-46		Me	环丙基	^{1}H NMR (400 MHz, DMSO) δ 9.69 – 9.59 (s, 1H), 9.01 – 8.92 (d, *J* = 2.5 Hz, 1H), 8.69 – 8.58 (d, *J* = 2.4 Hz, 1H), 8.47 – 8.34 (d, *J* = 7.6 Hz, 1H), 8.14 – 8.04 (d, *J* = 8.1 Hz, 1H), 7.95 – 7.80 (t, *J* = 8.7 Hz, 2H), 7.57 – 7.46 (d, *J* = 7.9 Hz, 1H), 4.48 – 4.34 (s, 1H), 2.52 – 2.50 (s, 3H), 1.29 – 1.01 (m, 4H).	389	98%
1-47		Me	环丙基	^{1}H NMR (400 MHz, DMSO) δ 14.96 – 14.46 (s, 1H), 12.04 – 11.50 (s, 1H), 8.98 – 8.89 (s, 1H), 8.34 – 8.17 (d, *J* = 12.3 Hz, 1H), 8.17 – 8.01 (m, 2H), 7.97 – 7.90 (d, *J* = 8.1 Hz, 1H), 4.48 – 4.36 (dd, *J* = 7.3, 4.1 Hz, 1H), 2.66 – 2.56 (s, 3H), 1.31 – 1.17 (d, *J* = 7.1 Hz, 2H), 1.15 – 1.03 (s, 2H).	422	99%
1-48		Me	环丙基	^{1}H NMR (400 MHz, DMSO) δ 9.19 – 9.11 (s, 1H), 8.98 – 8.92 (s, 1H), 8.45 – 8.39 (s, 1H), 8.13 – 8.00 (dd, *J* = 16.7, 8.4 Hz, 2H), 7.80 – 7.69 (t, *J* = 7.7 Hz, 1H), 7.66 – 7.55 (t, *J* = 7.7 Hz, 1H), 7.38 – 7.29 (d, *J* = 8.3 Hz, 1H), 4.47 – 4.34 (s, 1H), 2.65 – 2.54 (s, 3H), 1.28 – 1.07 (m, 4H).	405	98%
1-49		Me	环丙基	^{1}H NMR (400 MHz, DMSO) δ 14.69 – 14.45 (s, 1H), 10.31 – 10.19 (s, 1H), 9.06 – 8.94 (d, *J* = 3.6 Hz, 2H), 8.73 – 8.62 (d, *J* = 8.2 Hz, 1H), 8.61 – 8.43 (m, 2H), 8.32 – 8.21 (t, *J* = 7.5 Hz, 1H), 8.21 – 8.11 (m, 2H), 7.83 – 7.71 (d, *J* = 8.3 Hz, 1H), 4.67 – 4.52 (s, 3H), 4.50 – 4.39 (d, *J* = 7.6 Hz, 1H), 2.52 – 2.50 (m, 3H), 1.32 – 1.03 (m, 4H).	404	100%

1-50		Me	环丙基	[1]H NMR (400 MHz, DMSO) δ 14.72 – 14.45 (s, 1H), 9.88 – 9.78 (s, 1H), 9.58 – 9.48 (s, 1H), 9.02 – 8.92 (s, 1H), 8.70 – 8.60 (d, *J* = 9.0 Hz, 1H), 8.59 – 8.51 (d, *J* = 8.2 Hz, 1H), 8.46 – 8.36 (t, *J* = 7.9 Hz, 1H), 8.24 – 8.06 (t, *J* = 9.7 Hz, 2H), 4.78 – 4.67 (s, 2H), 4.53 – 4.40 (s, 1H), 2.82 – 2.71 (s, 3H), 1.37 – 1.18 (d, *J* = 6.4 Hz, 2H), 1.16 – 1.07 (m, 2H).	404	98%
1-51		Me	环丙基	[1]H NMR (400 MHz, DMSO) δ 9.10 – 9.01 (d, *J* = 4.0 Hz, 1H), 8.98 – 8.91 (d, *J* = 2.6 Hz, 1H), 8.30 – 8.19 (d, *J* = 8.4 Hz, 1H), 8.14 – 8.07 (s, 1H), 8.05 – 7.97 (t, *J* = 7.7 Hz, 1H), 7.96 – 7.89 (d, *J* = 8.4 Hz, 1H), 7.78 – 7.68 (d, *J* = 6.8 Hz, 1H), 7.65 – 7.57 (m, 1H), 4.45 – 4.33 (s, 1H), 2.48 – 2.40 (d, *J* = 2.8 Hz, 3H), 1.28 – 1.03 (m, 4H).	389	93.6%
1-52		Me	环丙基	[1]H NMR (400 MHz, DMSO) δ 14.78 – 14.66 (s, 1H), 9.06 – 8.97 (s, 1H), 8.96 – 8.88 (s, 1H), 8.54 – 8.46 (d, *J* = 8.1 Hz, 1H), 8.26 – 8.14 (d, *J* = 8.3 Hz, 1H), 8.14 – 8.06 (s, 1H), 8.06 – 7.98 (d, *J* = 8.6 Hz, 1H), 7.74 – 7.58 (d, *J* = 8.3 Hz, 2H), 4.51 – 4.29 (s, 1H), 2.73 – 2.60 (s, 3H), 1.29 – 1.18 (d, *J* = 7.0 Hz, 2H), 1.15 – 1.07 (s, 2H).	389	100%
1-53		Me	环丙基	[1]H NMR (400 MHz, DMSO) δ 8.96 – 8.88 (d, *J* = 2.4 Hz, 1H), 8.85 – 8.78 (s, 1H), 8.57 – 8.47 (d, *J* = 8.2 Hz, 1H), 8.25 – 8.13 (d, *J* = 8.3 Hz, 1H), 8.03 – 7.95 (d, *J* = 8.3 Hz, 1H), 7.86 – 7.77 (m, 2H), 7.69 – 7.54 (d, *J* = 8.7 Hz, 1H), 4.44 – 4.31 (s, 1H), 2.48 – 2.42 (s, 3H), 1.29 – 1.16 (d, *J* = 7.6 Hz, 2H), 1.15 – 1.02 (s, 2H).	389	98%
1-54		Me	环丙基	[1]H NMR (400 MHz, DMSO) δ 9.17 – 9.09 (s, 1H), 9.01 – 8.91 (d, *J* = 2.7 Hz, 1H), 8.26 – 8.17 (d, *J* = 8.5 Hz, 1H), 8.15 – 8.06 (d, *J* = 8.5 Hz, 1H), 7.94 – 7.84 (s, 1H), 2.48 – 2.42 (m, 2H), 7.72 – 7.59 (d, *J* = 9.2 Hz, 2H), 7.56 – 7.45 (d, *J* = 8.3 Hz, 1H), 4.45 – 4.35 (s, 1H), 2.52 – 2.45 (s, 3H), 1.29 – 1.03 (dd, *J* = 16.6, 7.5 Hz, 4H).	389	98%

1-55		Me	环丙基	^{1}H NMR (400 MHz, DMSO) δ 15.08 – 14.78 (s, 1H), 8.95 – 8.83 (s, 2H), 8.48 – 8.37 (d, *J* = 6.0 Hz, 1H), 8.33 – 8.19 (d, *J* = 8.2 Hz, 1H), 8.14 – 8.02 (d, *J* = 8.5 Hz, 1H), 7.94 – 7.76 (m, 2H), 7.68 – 7.59 (d, *J* = 7.1 Hz, 1H), 7.58 – 7.49 (t, *J* = 7.2 Hz, 1H), 4.47 – 4.34 (s, 1H), 2.73 – 2.56 (s, 3H), 1.31 – 0.99 (m, 4H).	405	95%
1-56		Me	环丙基	^{1}H NMR (400 MHz, DMSO) δ 9.00 – 8.91 (s, 1H), 8.85 – 8.75 (d, *J* = 6.1 Hz, 1H), 8.73 – 8.64 (d, *J* = 8.6 Hz, 1H), 8.13 – 8.05 (d, *J* = 8.4 Hz, 1H), 7.97 – 7.86 (d, *J* = 8.1 Hz, 1H), 7.80 – 7.71 (s, 1H), 7.65 – 7.58 (d, *J* = 5.8 Hz, 1H), 7.57 – 7.48 (d, *J* = 8.4 Hz, 1H), 4.46 – 4.35 (s, 1H), 2.57 – 2.52 (s, 3H), 1.28 – 1.04 (m, 4H).	405	96%
1-57		Me	环丙基	^{1}H NMR (400 MHz, DMSO) δ 14.95 – 14.35 (m, 1H), 9.01 – 8.90 (t, *J* = 2.0 Hz, 1H), 8.80 – 8.63 (m, 2H), 8.13 – 8.06 (m, 1H), 8.04 – 7.95 (t, *J* = 7.8 Hz, 1H), 7.84 – 7.75 (d, *J* = 6.5 Hz, 1H), 7.52 – 7.41 (ddd, *J* = 10.0, 5.1, 2.5 Hz, 1H), 7.38 – 7.29 (d, *J* = 8.4 Hz, 1H), 4.46 – 4.32 (d, *J* = 6.9 Hz, 1H), 2.49 – 2.44 (s, 3H), 1.29 – 0.99 (m, 4H).	405	93.3%
1-58		Me	环丙基	^{1}H NMR (400 MHz, DMSO) δ 8.98 – 8.89 (s, 1H), 8.73 – 8.64 (d, *J* = 6.6 Hz, 1H), 8.58 – 8.52 (s, 1H), 8.35 – 8.26 (d, *J* = 8.2 Hz, 1H), 8.12 – 7.99 (t, *J* = 10.7 Hz, 2H), 7.83 – 7.75 (d, *J* = 8.3 Hz, 1H), 7.65 – 7.53 (s, 1H), 4.46 – 4.36 (s, 1H), 2.65 – 2.59 (s, 3H), 1.29 – 1.19 (d, *J* = 7.8 Hz, 2H), 1.14 – 1.07 (s, 2H).	405	96.2%
1-59		Me	环丙基	^{1}H NMR (400 MHz, DMSO) δ 8.96 – 8.87 (s, 1H), 8.75 – 8.64 (d, *J* = 7.2 Hz, 2H), 8.28 – 8.19 (s, 1H), 8.10 – 7.99 (d, *J* = 8.5 Hz, 2H), 7.90 – 7.80 (d, *J* = 9.0 Hz, 1H), 7.63 – 7.52 (s, 1H), 4.48 – 4.34 (s, 1H), 2.65 – 2.57 (s, 3H), 1.30 – 1.18 (d, *J* = 7.1 Hz, 2H), 1.14 – 1.02 (s, 2H).	405	99%
1-60		Me	环丙基	^{1}H NMR (400 MHz, DMSO) δ 9.77 – 9.61 (s, 1H), 9.00 – 8.90 (d, *J* = 3.1 Hz, 1H), 8.75 – 8.62 (d, *J* = 5.8 Hz, 1H), 8.57 – 8.42 (d, *J* = 8.2 Hz, 1H), 8.31 – 8.21 (s, 1H), 8.22 – 8.13 (d, *J* = 5.3 Hz, 1H), 8.11 – 8.01 (d, *J* = 8.7 Hz, 1H), 7.94 – 7.81 (d, *J* = 8.4 Hz, 1H), 4.49 – 4.34 (s, 1H), 2.68 – 2.59 (s, 3H), 1.34 – 1.18 (d, *J* = 7.6 Hz, 2H), 1.15 – 1.00 (s, 2H).	389	93.6%

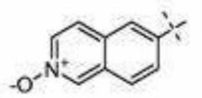
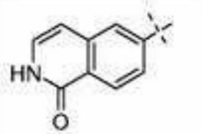
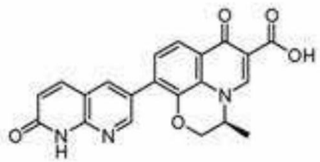
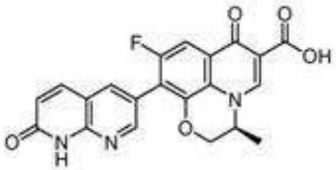
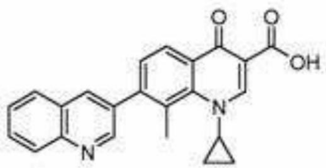
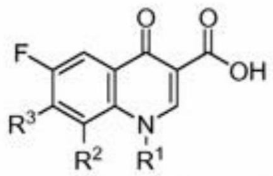
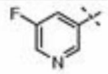
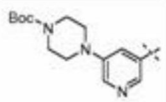
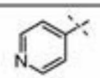
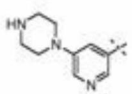
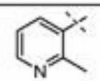
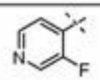
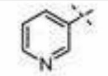
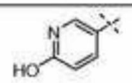
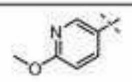
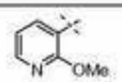
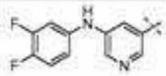
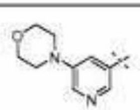
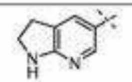
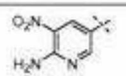
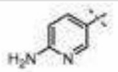
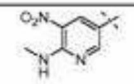
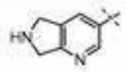
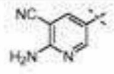
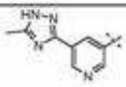
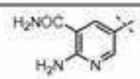
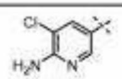
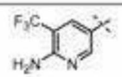
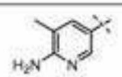
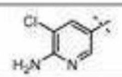
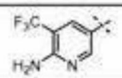
1-61		Me	环丙基	^{1}H NMR (400 MHz, DMSO) δ 9.19 – 9.10 (s, 1H), 9.03 – 8.95 (s, 1H), 8.37 – 8.27 (d, *J* = 6.9 Hz, 1H), 8.18 – 8.05 (m, 4H), 7.81 – 7.73 (d, *J* = 8.4 Hz, 1H), 4.52 – 4.42 (t, *J* = 5.2 Hz, 1H), 2.74 – 2.65 (s, 3H), 1.36 – 1.27 (d, *J* = 7.1 Hz, 2H), 1.19 – 1.10 (s, 2H).	405	1005
1-62		Me	环丙基	^{1}H NMR (400 MHz, DMSO) δ 14.82 – 14.70 (s, 1H), 11.54 – 11.41 (s, 1H), 9.03 – 8.93 (s, 1H), 8.44 – 8.33 (d, *J* = 8.2 Hz, 1H), 8.14 – 8.01 (d, *J* = 8.0 Hz, 1H), 7.84 – 7.75 (s, 1H), 7.58 – 7.51 (d, *J* = 7.6 Hz, 1H), 7.39 – 7.26 (s, 1H), 6.76 – 6.64 (d, *J* = 6.6 Hz, 1H), 4.52 – 4.40 (s, 1H), 2.70 – 2.61 (s, 3H), 1.37 – 1.22 (d, *J* = 6.8 Hz, 2H), 1.19 – 1.04 (s, 2H).	405	100%
1-63				^{1}H NMR (400 MHz, DMSO) δ 15.18 (s, 1H), 12.31 (s, 1H), 9.09 (s, 1H), 8.82 (d, *J* = 2.0 Hz, 1H), 8.45 (d, *J* = 1.7 Hz, 1H), 8.03 (t, *J* = 9.3 Hz, 2H), 7.76 (d, *J* = 8.4 Hz, 1H), 6.63 (d, *J* = 9.4 Hz, 1H), 5.00 (d, *J* = 6.7 Hz, 1H), 4.58 (d, *J* = 10.8 Hz, 1H), 4.45 (d, *J* = 10.0 Hz, 1H), 2.54 (s, 1H), 1.52 (d, *J* = 6.7 Hz, 3H).	390	98%
1-64				^{1}H NMR (400 MHz, DMSO) δ 14.96 (s, 1H), 12.35 (s, 1H), 9.10 (s, 1H), 8.68 (s, 1H), 8.34 (s, 1H), 8.01 (d, *J* = 9.53 Hz, 1H), 7.79 (d, *J* = 9.70 Hz, 1H), 6.64 (d, *J* = 9.45 Hz, 1H), 5.01 (d, *J* = 6.68 Hz, 1H), 4.60 – 4.54 (m, 1H), 4.46 (d, *J* = 9.78 Hz, 1H), 1.49 (d, *J* = 6.71 Hz, 3H).	408	96%
1-65				^{1}H NMR (400 MHz, DMSO) δ 9.27 (s, 1H), 8.95 (s, 1H), 8.87 (d, *J* = 15.4 Hz, 1H), 8.41 – 8.22 (m, 3H), 8.01 (t, *J* = 7.3 Hz, 1H), 7.85 (t, *J* = 7.3 Hz, 1H), 7.73 (d, *J* = 8.2 Hz, 1H), 4.45 (m, 1H), 2.77 (s, 3H), 1.31 (d, *J* = 6.2 Hz, 2H), 1.11 (s, 2H).	371	97%

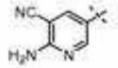
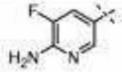
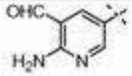
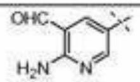
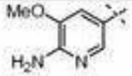
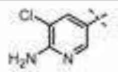
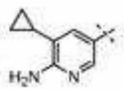
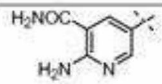
表2

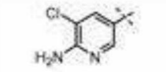
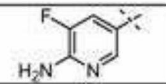
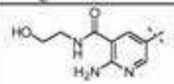
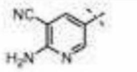
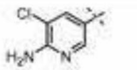
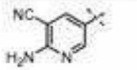
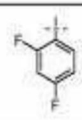
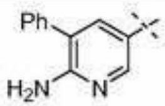
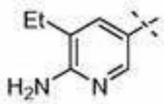


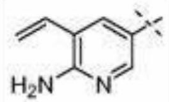
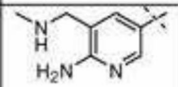
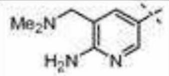
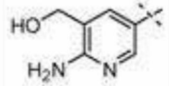
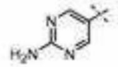
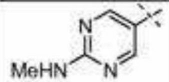
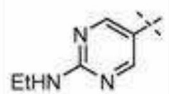
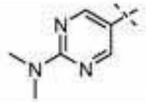
化合物编号	R³ =	R² =	R¹ =	NMR	MS (MH⁺)	HPLC
2-1		Me	环丙基	^{1}H NMR (400 MHz, DMSO) δ 8.28 (s, 1H), 7.98 (s, 1H), 7.80 (s, 1H), 7.33 (d, *J* = 8.90 Hz, 1H), 7.16 (d, *J* = 9.30 Hz, 1H), 3.66 (d, *J* = 3.58 Hz, 1H), 1.96 (s, 3H), 0.58 (d, *J* = 5.78 Hz, 2H), 0.37 (d, *J* = 1.61 Hz, 2H).	357	94%
2-2		Me	环丙基	^{1}H NMR (400 MHz, DMSO) δ 8.93 (s, 1H), 8.48 (d, *J* = 2.77 Hz, 1H), 8.13 (s, 1H), 8.01 (d, *J* = 8.72 Hz, 1H), 7.61 (s, 1H), 4.50 – 4.30 (m, 1H), 3.49 (d, *J* = 5.30 Hz, 5H), 3.36 – 3.29 (m, 5H), 2.66 (d, *J* = 15.95 Hz, 3H), 1.43 (s, 9H), 1.28 – 1.21 (m, 2H), 1.08 (s, 2H).	523	98%
2-3		Me	环丙基	^{1}H NMR (400 MHz, DMSO) δ 8.92 (s, 1H), 8.79 (d, *J* = 5.61 Hz, 2H), 8.01 (d, *J* = 8.93 Hz, 1H), 7.50 (d, *J* = 5.50 Hz, 2H), 4.40 (s, 1H), 2.61 (s, 3H), 1.24 (d, *J* = 5.97 Hz, 2H), 1.07 (s, 2H).	339	98%
2-4		Me	环丙基	^{1}H NMR (400 MHz, DMSO) δ 9.00 (s, 2H), 8.92 (s, 1H), 8.49 (d, *J* = 2.73 Hz, 1H), 8.12 (s, 1H), 7.98 (t, *J* = 11.57 Hz, 1H), 7.56 (s, 1H), 4.44 – 4.34 (m, 1H), 3.64 (s, 5H), 3.26 (s, 4H), 2.62 (s, 3H), 1.23 (d, *J* = 6.27 Hz, 2H), 1.07 (s, 2H).	423	95%
2-5		Me	环丙基	^{1}H NMR (400 MHz, DMSO) δ 8.93 (s, 1H), 8.71 (t, *J* = 26.47 Hz, 1H), 8.04 (d, *J* = 8.68 Hz, 2H), 7.61 (d, *J* = 45.28 Hz, 1H), 4.44 – 4.38 (m, 1H), 2.55 (s, 2H), 2.34 (d, *J* = 9.33 Hz, 3H), 1.23 (s, 2H), 1.06 (dd, *J* = 4.45, 8.57 Hz, 2H).	353	95%
2-6		Me	环丙基	^{1}H NMR (400 MHz, DMSO) δ 14.55 (s, 1H), 8.92 (s, 1H), 8.83 (t, *J* = 8.69 Hz, 1H), 8.65 (dt, *J* = 8.70, 17.42 Hz, 1H), 8.05 (d, *J* = 8.87 Hz, 1H), 7.73 – 7.52 (m, 1H), 4.41 (tt, *J* = 3.77, 7.16 Hz, 1H), 2.64 (s, 3H), 1.31 – 1.16 (m, 2H), 1.10 – 0.97 (m, 2H).	357	98%

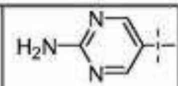
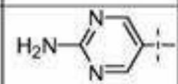
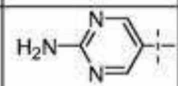
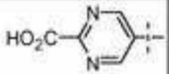
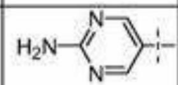
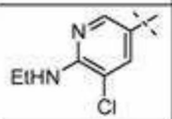
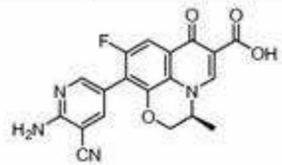
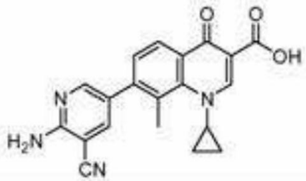
2-7		Me	环丙基	[1]H NMR (400 MHz, DMSO) δ 8.93 (s, 1H), 8.85 – 8.61 (m, 2H), 8.03 (d, *J* = 6.60 Hz, 1H), 7.96 (s, 2H), 7.69 (dd, *J* = 5.19, 7.64 Hz, 1H), 4.41 (ddd, *J* = 3.87, 7.26, 10.97 Hz, 2H), 2.75 – 2.72 (m, 5H), 1.33 – 1.20 (m, 3H), 1.13 – 1.03 (m, 2H).	339	98%
2-8		Me	环丙基	[1]H NMR (400 MHz, MeOD) δ 8.79 (s, 1H), 7.92 – 7.71 (m, 2H), 7.55 (t, *J* = 17.62 Hz, 1H), 6.84 (t, *J* = 36.31 Hz, 1H), 4.16 – 4.04 (m, 1H), 3.02 (s, 5H), 1.09 – 1.01 (m, 2H), 0.81 (q, *J* = 7.23 Hz, 2H).	355	98%
2-9		Me	环丙基	[1]H NMR (400 MHz, MeOD) δ 8.06 (t, *J* = 38.62 Hz, 2H), 7.68 (dd, *J* = 8.35, 33.76 Hz, 2H), 7.47 (d, *J* = 8.87 Hz, 1H), 7.13 – 6.77 (m, 2H), 4.33 (s, 1H), 3.97 (d, *J* = 7.85 Hz, 3H), 2.20 – 1.90 (m, 2H), 1.35 – 1.22 (m, 1H), 1.05 (s, 1H).	369	98%
2-10		Me	环丙基	[1]H NMR (400 MHz, MeOD) δ 9.06 (s, 1H), 8.33 (s, 1H), 8.01 (d, *J* = 9.18 Hz, 1H), 7.67 (t, *J* = 24.14 Hz, 2H), 7.17 (s, 1H), 4.37 (s, 1H), 3.94 (s, 3H), 2.66 (s, 3H), 1.32 (d, *J* = 6.60 Hz, 2H), 1.07 (s, 2H).	369	98%
2-11		Me	环丙基	[1]H NMR (400 MHz, MeOD) δ 9.05 (s, 1H), 8.29 (s, 2H), 8.09 (d, *J* = 7.83 Hz, 1H), 7.94 (d, *J* = 23.80 Hz, 2H), 7.39 – 7.20 (m, 2H), 7.09 (s, 1H), 4.36 (s, 1H), 2.77 (s, 3H), 1.30 (s, 2H), 1.09 (s, 2H).	466	98%
2-12		Me	环丙基	[1]H NMR (400 MHz, MeOD) δ 9.02 (s, 1H), 8.40 (d, *J* = 92.33 Hz, 2H), 8.16 – 8.03 (m, 2H), 7.98 – 7.80 (m, 1H), 7.75 – 7.50 (m, 2H), 4.34 (s, 1H), 3.82 (d, *J* = 24.28 Hz, 4H), 3.45 (s, 4H), 2.70 (d, *J* = 23.16 Hz, 3H), 1.27 (dd, *J* = 11.61, 24.61 Hz, 3H), 1.09 (s, 2H).	424	98%
2-13		Me	环丙基	[1]H NMR (400 MHz, DMSO) δ 14.68 (s, 1H), 8.91 (s, 1H), 8.69 (s, 1H), 7.97 (d, *J* = 8.46 Hz, 1H), 7.79 (s, 1H), 7.63 (s, 1H), 4.40 (s, 1H), 3.82 (d, *J* = 6.95 Hz, 2H), 3.21 (s, 2H), 2.63 (d, *J* = 43.98 Hz, 3H), 1.22 (d, *J* = 5.36 Hz, 2H), 1.05 (s, 2H).	380	97%
2-14		Me	环丙基	[1]H NMR (400 MHz, DMSO) δ 14.69 (s, 2H), 8.91 (s, 1H), 8.49 (s, 2H), 8.24 (s, 2H), 7.98 (d, *J* = 8.62 Hz, 1H), 4.41 (s, 1H), 2.65 (d, *J* = 31.48 Hz, 3H), 1.24 (d, *J* = 6.48 Hz, 2H), 1.07 (s, 2H).	399	99%
2-15		Me	环丙基	[1]H NMR (400 MHz, DMSO) δ 14.67 (s, 1H), 8.91 (s, 1H), 8.13 (d, *J* = 25.11 Hz, 1H), 8.07 (s, 1H), 7.95 (dd, *J* = 8.95, 25.35 Hz, 2H), 7.06 (d, *J* = 8.71 Hz, 1H), 4.41 (s, 1H), 2.65 (d, *J* = 25.72 Hz, 3H), 1.22 (d, *J* = 5.45 Hz, 2H), 1.05 (s, 2H).	354	99%

2-16		Me	环丙基	[1]H NMR (400 MHz, DMSO) δ 8.91 (s, 1H), 8.74 (s, 1H), 8.54 (t, J = 24.30 Hz, 2H), 7.99 (d, J = 8.68 Hz, 1H), 4.41 (s, 1H), 3.10 (d, J = 17.91 Hz, 3H), 2.70 (s, 3H), 1.25 (d, J = 5.66 Hz, 2H), 1.07 (s, 2H).	413	99%
2-17		Me	环丙基	[1]H NMR (400 MHz, DMSO) δ 14.63 (s, 1H), 9.79 (s, 2H), 8.92 (s, 1H), 8.61 (s, 1H), 8.01 (d, J = 13.11 Hz, 2H), 4.67 (d, J = 32.94 Hz, 4H), 4.40 (s, 1H), 2.62 (s, 3H), 1.23 (s, 3H), 1.07 (s, 2H).	380	97%
2-18		Me	环丙基	[1]H NMR (400 MHz, DMSO) δ 14.65 (s, 1H), 8.89 (s, 1H), 8.27 (s, 1H), 8.07 (t, J = 6.62 Hz, 1H), 7.94 (d, J = 8.87 Hz, 1H), 7.28 (s, 2H), 4.40 (tt, J = 3.75, 7.16 Hz, 1H), 3.31 (s, 1H), 2.67 (s, 3H), 1.31 – 1.19 (m, 2H), 1.10 – 1.00 (m, 2H).	379	99%
2-19		Me	环丙基	[1]H NMR (400 MHz, DMSO) δ 9.28 (s, 1H), 8.93 (s, 1H), 8.70 (s, 1H), 8.36 (s, 1H), 8.03 (d, J = 8.65 Hz, 1H), 4.41 (s, 2H), 2.65 (s, 3H), 2.44 (s, 3H), 1.25 (d, J = 6.79 Hz, 2H), 1.10 (s, 2H).	420	97%
2-20		Me	环丙基	[1]H NMR (400 MHz, DMSO) δ 8.91 (s, 1H), 8.19 (d, J = 11.25 Hz, 3H), 7.99 (d, J = 8.83 Hz, 1H), 7.62 (s, 1H), 4.41 (s, 2H), 2.69 (s, 3H), 1.25 (d, J = 5.80 Hz, 2H), 1.05 (s, 2H).	397	99%
2-21		Me	环丙基	[1]H NMR (400 MHz, DMSO) δ 14.72 (s, 1H), 8.89 (s, 1H), 8.11 – 7.87 (m, 2H), 7.74 (s, 1H), 6.71 (s, 2H), 4.39 (s, 1H), 2.63 (d, J = 29.40 Hz, 3H), 1.20 (t, J = 25.86 Hz, 2H), 0.99 (d, J = 41.43 Hz, 2H).	388	98%
2-22		Me	环丙基	[1]H NMR (400 MHz, DMSO) δ 14.71 (s, 1H), 8.90 (s, 1H), 8.26 (s, 1H), 7.95 (d, J = 8.81 Hz, 1H), 7.86 (s, 1H), 6.89 (s, 2H), 4.39 (s, 1H), 2.66 (s, 3H), 1.24 (d, J = 5.61 Hz, 2H), 1.06 (s, 2H).	422	98%
2-23		Me	环丙基	[1]H NMR (400 MHz, DMSO) δ 14.71 (s, 1H), 8.98 (s, 1H), 8.13 – 8.02 (m, 2H), 7.92 (d, J = 14.79 Hz, 3H), 4.47 (s, 1H), 2.71 (d, J = 23.60 Hz, 3H), 2.31 (s, 3H), 1.29 (d, J = 5.54 Hz, 2H), 1.15 (d, J = 22.69 Hz, 2H).	368	99%
2-24		OMe	环丙基	[1]H NMR (400 MHz, DMSO) δ 14.67 (s, 1H), 8.79 (s, 1H), 8.11 (s, 1H), 7.90 (s, 1H), 7.82 (s, 1H), 6.73 (s, 2H), 4.22 (s, 1H), 3.46 (s, 3H), 3.31 (s, 2H), 1.16 (s, 4H).	404	98%
2-25		OMe	环丙基	[1]H NMR (400 MHz, DMSO) δ 14.66 (s, 1H), 8.80 (s, 1H), 8.39 (s, 1H), 8.13 – 7.81 (m, 2H), 6.91 (s, 2H), 4.23 (s, 1H), 3.31 (s, 3H), 1.17 (d, J = 6.99 Hz, 3H).	438	99%

2-26		OMe	环丙基	[1]H NMR (400 MHz, DMSO) δ 14.74 (d, J = 61.68 Hz, 1H), 8.76 (d, J = 28.90 Hz, 1H), 8.39 (s, 1H), 7.97 (s, 1H), 7.92 (d, J = 9.13 Hz, 1H), 4.23 (s, 1H), 3.46 (s, 3H), 1.17 (d, J = 7.13 Hz, 4H).	395	98%
2-27		Me	环丙基	[1]H NMR (400 MHz, DMSO), 8.89 (s, 1H), 7.95 – 7.93 (m, 2H), 7.83 (s, 1H), 7.60 – 6.57 (d, 1H), 4.39 (s, 1H), 2.63 (d, J = 29.40 Hz, 3H), 1.20 (t, J = 25.86 Hz, 2H), 0.99 (d, J = 41.43 Hz, 2H).	372	98%
2-28		OMe	环丙基	[1]H NMR (400 MHz, DMSO) δ 9.95 (s, 1H), 8.94 – 8.66 (m, 1H), 8.49 – 8.39 (m, 1H), 8.26 (d, J = 1.30 Hz, 1H), 7.91 (dd, J = 19.79, 31.75 Hz, 2H), 4.27 – 4.17 (m, 1H), 3.50 – 3.42 (m, 3H), 1.17 (dt, J = 7.59, 17.65 Hz, 3H).	398	98%
2-29		Me	环丙基	[1]H NMR (400 MHz, DMSO) δ 9.95 (s, 1H), 8.92 (d, J = 13.25 Hz, 1H), 8.32 (d, J = 1.05 Hz, 1H), 8.17 (d, J = 1.69 Hz, 1H), 8.00 (t, J = 18.18 Hz, 1H), 7.83 (d, J = 33.09 Hz, 1H), 4.40 (dt, J = 3.59, 10.71 Hz, 1H), 2.68 (d, J = 12.78 Hz, 3H), 1.25 (q, J = 6.89 Hz, 2H), 1.14 – 0.93 (m, 2H).	382	98%
2-30		Me	环丙基	[1]H NMR (400 MHz, DMSO) δ 14.64 (s, 2H), 8.90 (s, 1H), 7.97 (d, J = 8.81 Hz, 1H), 7.64 (d, J = 1.21 Hz, 1H), 7.34 (s, 1H), 4.40 (td, J = 3.75, 7.19 Hz, 1H), 3.90 (s, 3H), 2.78 – 2.61 (m, 3H), 1.23 (q, J = 7.19 Hz, 2H), 1.16 – 0.97 (m, 2H).	384	95%
2-31		Me		[1]H NMR (400 MHz, DMSO) δ 14.64 (s, 2H), 8.90 (s, 1H), 7.97 (d, J = 8.81 Hz, 1H), 7.64 (d, J = 1.21 Hz, 1H), 7.34 (s, 1H), 4.40 (td, J = 3.75, 7.19 Hz, 1H), 3.90 (s, 3H), 2.78 – 2.61 (m, 3H), 1.23 (q, J = 7.19 Hz, 2H), 1.16 – 0.97 (m, 2H).	406	99%
2-32		Me	环丙基	[1]H NMR (400 MHz, DMSO) δ 14.62 (s, 1H), 8.90 (s, 1H), 7.99 (d, J = 1.60 Hz, 1H), 7.95 (t, J = 10.20 Hz, 1H), 7.70 – 7.53 (m, 1H), 4.39 (td, J = 3.61, 7.03 Hz, 1H), 2.62 (d, J = 19.25 Hz, 3H), 1.84 (ddd, J = 5.42, 8.33, 13.56 Hz, 1H), 1.21 (t, J = 6.56 Hz, 1H), 1.05 (d, J = 8.64 Hz, 1H), 1.03 – 0.96 (m, 2H), 0.78 – 0.65 (m, 2H).	394	98%
2-33		Me		[1]H NMR (400 MHz, DMSO) δ 8.88 (d, J = 3.01 Hz, 1H), 8.18 (s, 1H), 8.13 (s, 1H), 8.09 (s, 1H), 7.99 (d, J = 8.77 Hz, 1H), 7.54 (s, 1H), 5.29 – 5.01 (m, 1H), 4.50 – 4.31 (m, 1H), 2.71 – 2.57 (m, 2H), 1.76 (ddd, J = 9.04, 15.14, 17.62 Hz, 1H), 1.53 (d, J = 26.94 Hz, 1H).	415	98%

2-34		Cl	环丙基	[1]H NMR (400 MHz, DMSO) δ 8.92 (s, 1H), 8.11 (d, *J* = 8.56 Hz, 1H), 8.02 (d, *J* = 0.96 Hz, 1H), 7.81 (d, *J* = 1.67 Hz, 1H), 4.44 – 4.39 (m, 2H), 1.32 – 1.17 (m, 2H), 1.17 – 1.04 (m, 2H).	408	94%
2-35		OMe	环丙基	[1]H NMR (400 MHz, DMSO) δ 8.80 (s, 1H), 7.99 (s, 1H), 7.92 (d, *J* = 9.3 Hz, 1H), 7.69 (d, *J* = 12.0 Hz, 1H), 4.29 – 4.14 (m, 1H), 3.47 (s, 3H), 1.24 – 1.04 (m, 4H).	387	99%
2-36		Me	环丙基	[1]H NMR (400 MHz, DMSO) δ 14.67 (s, 1H), 8.92 (s, 1H), 8.37 (s, 1H), 8.30 (d, *J* = 2.3 Hz, 1H), 8.11 – 7.88 (m, 3H), 7.51 (s, 1H), 4.55 – 4.30 (m, 3H), 3.20 (m, 2H), 2.68 (s, 3H), 1.25 (d, *J* = 6.4 Hz, 2H), 1.08 (d, *J* = 7.0 Hz, 2H).	441	98%
2-37		OMe		[1]H NMR (400 MHz, DMSO) δ 14.52 (s, 1H), 8.82 (d, *J* = 1.51 Hz, 1H), 8.38 (s, 1H), 8.11 (s, 1H), 7.94 (d, *J* = 9.20 Hz, 1H), 7.36 (s, 2H), 5.10 (ddd, *J* = 5.42, 8.45, 64.07 Hz, 1H), 4.24 – 4.12 (m, 1H), 1.86 – 1.55 (m, 2H).	413	98%
2-38		OMe		[1]H NMR (400 MHz, DMSO) δ 14.55 (s, 1H), 8.82 (d, *J* = 1.46 Hz, 1H), 8.15 (d, *J* = 36.97 Hz, 1H), 7.92 (d, *J* = 9.24 Hz, 1H), 7.80 (s, 1H), 6.75 (s, 2H), 5.10 (ddd, *J* = 5.43, 8.45, 64.08 Hz, 1H), 4.29 – 4.12 (m, 1H), 1.93 – 1.53 (m, 2H).	422	98%
2-39		Me		[1]H NMR (400 MHz, DMSO) δ 14.39 (s, 1H), 8.80 (s, 1H), 8.16 – 8.08 (m, 2H), 7.98 – 7.86 (m, 2H), 7.69 – 7.59 (m, 1H), 7.37 (dd, *J* = 5.20, 11.82 Hz, 1H), 7.26 (s, 2H), 1.67 (s, 3H).	451	99%
2-40		Me	环丙基	[1]H NMR (400 MHz, $CDCl_3$) δ 14.60 – 14.29 (s, 1H), 8.96 – 8.89 (s, 1H), 8.05 – 7.96 (m, 2H), 7.48 – 7.40 (m, 4H), 7.40 – 7.33 (dt, *J* = 8.5, 2.8 Hz, 1H), 7.33 – 7.29 (s, 1H), 4.88 – 4.75 (s, 2H), 4.17 – 3.98 (s, 1H), 2.73 – 2.62 (s, 3H), 1.28 – 1.20 (m, 2H), 1.02 – 0.93 (s, 2H).	430	99%
2-41		Me	环丙基	[1]H NMR (400 MHz, DMSO) δ 14.83 – 14.68 (s, 1H), 8.99 – 8.81 (s, 1H), 7.96 – 7.89 (d, *J* = 8.9 Hz, 1H), 7.88 – 7.81 (s, 1H), 7.36 – 7.20 (s, 1H), 6.19 – 6.08 (s, 2H), 4.47 – 4.31 (s, 1H), 2.75 – 2.60 (s, 3H), 1.36 – 1.10 (m, 6H), 1.10 – 0.94 (t, *J* = 3.1 Hz, 2H).	382	93%

2-42		Me	环丙基	^{1}H NMR (400 MHz, DMSO) δ 14.83 – 14.67 (s, 3H), 8.97 – 8.85 (s, 3H), 8.00 – 7.85 (m, 6H), 7.72 – 7.60 (t, J = 1.7 Hz, 3H), 6.97 – 6.81 (dd, J = 17.3, 11.0 Hz, 3H), 6.45 – 6.27 (s, 6H), 5.85 – 5.70 (m, 4H), 5.44 – 5.26 (dd, J = 11.0, 1.2 Hz, 3H), 4.47 – 4.33 (s, 1H), 2.76 – 2.60 (s, 9H), 1.30 – 1.18 (m, 6H), 1.12 – 0.98 (m, 5H), 1.32 – 1.20 (m, 7H).	380	99%
2-43		Me	环丙基	^{1}H NMR (400 MHz, DMSO) δ 8.95 – 8.90 (s, 1H), 8.36 – 8.31 (m, 1H), 8.13 – 8.07 (d, J = 2.0 Hz, 1H), 8.02 – 7.97 (d, J = 8.8 Hz, 1H), 4.49 – 4.36 (m, 3H), 2.90 – 2.79 (s, 5H), 2.76 – 2.67 (s, 3H), 1.33 – 1.20 (q, J = 6.9 Hz, 2H), 1.10 – 0.98 (m, 2H).	397	98%
2-44		Me	环丙基	^{1}H NMR (400 MHz, DMSO) δ 8.93 – 8.91 (s, 1H), 8.24 – 8.20 (m, 1H), 8.01 – 7.96 (d, J = 8.8 Hz, 1H), 7.93 – 7.87 (t, J = 2.8 Hz, 1H), 4.49 – 4.38 (tt, J = 7.2, 3.9 Hz, 1H), 4.24 – 4.14 (t, J = 5.5 Hz, 2H), 2.85 – 2.77 (s, 6H), 1.29 – 1.20 (m, 2H), 1.09 – 0.98 (m, 2H).	411	97%
2-45		Me	环丙基	^{1}H NMR (400 MHz, DMSO) δ 8.94 – 8.89 (s, 1H), 8.15 – 8.09 (d, J = 2.1 Hz, 1H), 8.02 – 7.96 (d, J = 8.9 Hz, 1H), 7.92 – 7.88 (s, 1H), 4.46 – 4.37 (m, 1H), 4.57 – 4.46 (s, 2H), 2.71 – 2.65 (s, 3H), 1.25 – 1.18 (d, J = 6.7 Hz, 2H), 1.10 – 0.98 (m, 2H).	384	90%
2-46		Me	环丙基	^{1}H NMR (400 MHz, DMSO) δ 14.71 (s, 1H), 8.89 (s, 1H), 8.35 (s, 2H), 7.94 (d, J = 8.67 Hz, 1H), 7.09 (s, 2H), 4.39 (s, 1H), 2.70 (s, 3H), 1.24 (d, J = 5.31 Hz, 2H), 1.03 (s, 2H).	354	99%
2-47		Me	环丙基	^{1}H NMR (400 MHz, DMSO) δ 14.72 (s, 1H), 8.89 (s, 1H), 8.41 (s, 2H), 7.95 (d, J = 8.41 Hz, 1H), 7.60 (d, J = 28.12 Hz, 1H), 4.40 (s, 1H), 2.88 (s, 3H), 2.70 (s, 3H), 1.25 (d, J = 5.56 Hz, 2H), 1.03 (s, 2H).	369	99%
2-48		Me	环丙基	^{1}H NMR (400 MHz, DMSO) δ 14.73 (s, 1H), 8.89 (s, 1H), 8.39 (s, 2H), 7.95 (d, J = 8.73 Hz, 1H), 7.64 (s, 1H), 4.39 (s, 1H), 2.70 (s, 3H), 2.53 (d, J = 9.32 Hz, 3H), 1.24 (d, J = 6.11 Hz, 2H), 1.17 (t, J = 6.98 Hz, 2H), 1.03 (s, 2H).	383	97%
2-49		Me	环丙基	^{1}H NMR (400 MHz, DMSO) δ 14.72 (s, 2H), 8.90 (s, 1H), 8.48 (s, 2H), 7.96 (d, J = 8.59 Hz, 1H), 4.39 (s, 1H), 3.24 (d, J = 22.01 Hz, 6H), 2.70 (s, 3H), 1.25 (d, J = 6.03 Hz, 2H), 1.04 (d, J = 7.73 Hz, 2H).	383	98%

2-50		Cl	环丙基	^{1}H NMR (400 MHz, DMSO) δ 8.92 (s, 1H), 8.35 (s, 2H), 8.13 (d, *J* = 8.6 Hz, 1H), 7.15 (s, 2H), 4.41 (m, 3.8 Hz, 1H), 1.37 – 1.17 (m, 2H), 1.18 – 1.02 (m, 2H).	375	99%
2-51		Me		^{1}H NMR (400 MHz, DMSO) δ 8.87 (d, *J* = 3.2 Hz, 1H), 8.35 (d, *J* = 1.0 Hz, 2H), 7.97 (d, *J* = 8.9 Hz, 1H), 7.08 (s, 2H), 5.33 – 4.97 (m, 2H), 4.37 (m, 1H), 2.65 (s, 3H), 1.89 – 1.41 (m, 2H).	373	99%
2-52		MeO		^{1}H NMR (400 MHz, DMSO) δ 14.54 (s, 1H), 8.82 (d, *J* = 1.2 Hz, 1H), 8.44 (s, 2H), 7.93 (d, *J* = 9.2 Hz, 1H), 7.10 (s, 2H), 5.09 (m, 1H), 4.37 – 3.96 (m, 1H), 3.50 (s, 3H), 1.98 – 1.52 (m, 2H).	389	98%
2-53		Me	环丙基	^{1}H NMR (400 MHz, DMSO) δ 14.65 (s, 1H), 8.91 (d, *J* = 4.9 Hz, 1H), 8.76 (s, 2H), 8.15 – 7.85 (m, 1H), 4.63 – 4.29 (m, 1H), 2.50 (s, 3H), 1.29 – 1.15 (m, 2H), 1.06 (d, *J* = 7.0 Hz, 2H).	384	99%
2-54		MeO	环丙基	^{1}H NMR (400 MHz, DMSO) δ 8.86 (s, 1H), 8.52 (s, 2H), 8.00 (d, *J* = 9.2 Hz, 1H), 7.18 (s, 2H), 4.29 (m, 1H), 3.55 (s, 3H), 1.27 – 1.11 (m, 4H).	371	99%
2-55		Me	环丙基	^{1}H NMR (400 MHz, DMSO) δ 14.67 (s, 1H), 8.79 (s, 1H), 8.19 (s, 1H), 7.90 (d, *J* = 9.3 Hz, 1H), 7.81 (s, 1H), 6.91 (t, *J* = 5.6 Hz, 1H), 4.29 – 4.11 (m, 1H), 3.53 – 3.41 (m, 5H), 1.26 – 1.06 (m, 7H).	432	98%
2-56				^{1}H NMR (400 MHz, DMSO) δ 9.06 (s, 1H), 8.38 (s, 1H), 8.13 (d, *J* = 1.75 Hz, 1H), 7.72 (d, *J* = 9.80 Hz, 1H), 7.29 (s, 2H), 5.06 – 4.90 (m, 1H), 4.58 (d, *J* = 10.62 Hz, 1H), 4.44 (d, *J* = 9.71 Hz, 1H), 1.48 (d, *J* = 6.75 Hz, 3H).	381	95%
2-57				^{1}H NMR (400 MHz, DMSO) δ 14.95 (s, 1H), 8.91 (s, 1H), 8.37 – 8.33 (d, *J* = 2.5 Hz, 1H), 8.24 – 8.19 (d, *J* = 8.3 Hz, 1H), 8.14 – 8.10 (d, *J* = 2.5 Hz, 1H), 7.58 – 7.51 (d, *J* = 8.3 Hz, 1H), 7.22 (s, 2H), 4.42 – 4.36 (tt, *J* = 7.1, 3.7 Hz, 1H), 2.71 (s, 3H), 1.30 – 1.25 (m, 2H), 1.05 – 0.94 (m, 2H).	361	95%

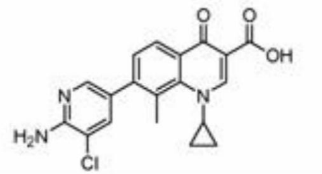
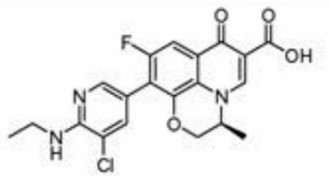
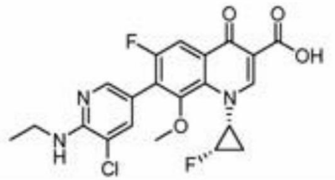
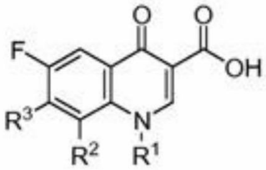
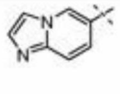
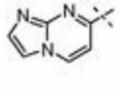
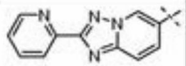
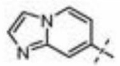
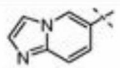
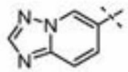
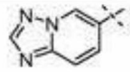
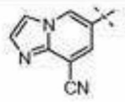
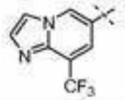
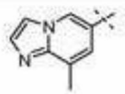
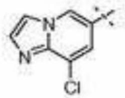
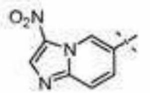
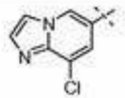
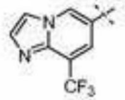
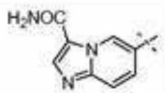
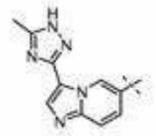
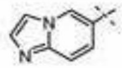
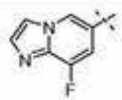
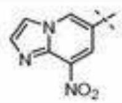
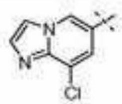
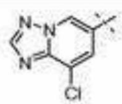
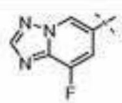
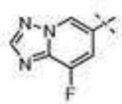
2-58		^{1}H NMR (400 MHz, DMSO) δ 14.95 (s, 1H), 8.89 (s, 1H), 8.32 (d, *J* = 3.5 Hz, 1H), 8.21 (d, *J* = 8.2 Hz, 1H), 8.06 (s, 1H), 7.79 (s, 1H), 7.53 (d, *J* = 8.2 Hz, 1H), 6.61 (s, 2H), 4.39 (s, 1H), 2.72 (s, 3H), 1.27 (d, *J* = 6.1 Hz, 2H), 1.03 (s, 2H).	370	99%
2-59		^{1}H NMR (400 MHz, DMSO) δ 15.00 (s, 1H), 9.06 (s, 1H), 8.17 (s, 1H), 7.80 (s, 1H), 7.72 (d, *J* = 9.8 Hz, 1H), 6.86 (t, *J* = 5.7 Hz, 1H), 4.98 (d, *J* = 6.7 Hz, 1H), 4.57 (d, *J* = 10.2 Hz, 1H), 4.48 – 4.32 (m, 1H), 3.55 – 3.37 (m, 2H), 1.48 (d, *J* = 6.8 Hz, 2H), 1.17 (t, *J* = 7.1 Hz, 2H).	418	98%
2-60		^{1}H NMR (400 MHz, DMSO) δ 14.55 (s, 1H), 8.82 (d, *J* = 1.6 Hz, 1H), 8.18 (s, 1H), 7.92 (d, *J* = 9.3 Hz, 1H), 7.80 (s, 1H), 6.92 (t, *J* = 5.7 Hz, 1H), 5.10 (ddd, *J* = 64.1, 8.4, 5.4 Hz, 1H), 4.32 – 4.06 (m, 1H), 3.58 – 3.37 (m, 5H), 1.93 – 1.51 (m, 2H), 1.19 (t, *J* = 7.1 Hz, 3H).	450	98%

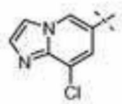
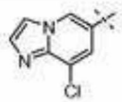
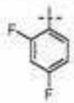
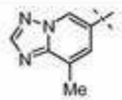
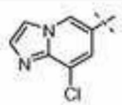
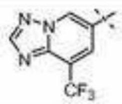
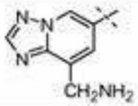
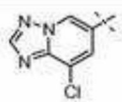
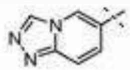
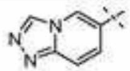
表3

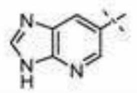
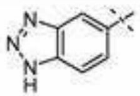
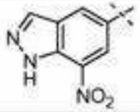
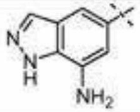
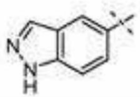
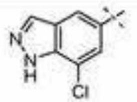
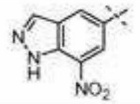
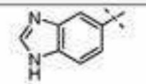
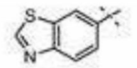


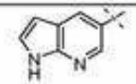
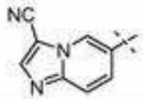
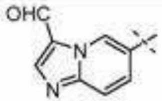
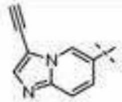
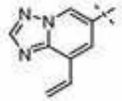
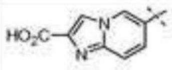
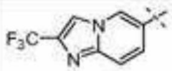
化合物编号	R^3 =	R^2 =	R^1 =	NMR	MS (MH$^+$)	HPLC
3-1		Me	环丙基	^{1}H NMR (400 MHz, DMSO) δ 14.59 (s, 1H), 9.08 (s, 1H), 8.94 (s, 1H), 8.33 (d, J = 1.3 Hz, 1H), 8.16 (d, J = 1.7 Hz, 1H), 8.06 (t, J = 8.5 Hz, 2H), 7.85 (d, J = 9.4 Hz, 1H), 4.49 – 4.38 (m, 1H), 2.70 (s, 3H), 1.25 (d, J = 6.6 Hz, 2H), 1.09 (s, 2H).	378	98%
3-2		Me	环丙基	^{1}H NMR (400 MHz, DMSO) δ 14.63 (s, 1H), 9.38 (s, 1H), 8.91 (d, J = 25.3 Hz, 1H), 8.79 (s, 1H), 8.13 (s, 1H), 8.06 (d, J = 8.8 Hz, 1H), 8.01 (s, 1H), 4.44 (s, 1H), 2.75 (s, 3H), 1.25 (s, 2H), 1.09 (s, 2H).	379	95%
3-3		Me	环丙基	^{1}H NMR (400 MHz, DMSO) δ 14.70 (s, 1H), 9.41 (s, 1H), 9.00 (s, 1H), 8.80 (s, 1H), 8.36 (s, 1H), 8.17 (s, 1H), 8.07 (s, 2H), 7.86 (s, 1H), 7.61 (s, 1H), 4.49 (s, 1H), 2.79 (s, 3H), 1.31 (s, 3H), 1.17 (s, 2H).	456	98%
3-4		Me	环丙基	^{1}H NMR (400 MHz, DMSO) δ 14.57 (d, J = 5.1 Hz, 1H), 9.05 (d, J = 6.5 Hz, 1H), 8.94 (s, 1H), 8.44 (s, 1H), 8.23 (s, 1H), 8.11 (s, 1H), 8.05 (d, J = 8.8 Hz, 1H), 7.54 (d, J = 6.4 Hz, 1H), 4.43 (s, 1H), 2.68 (s, 3H), 1.24 (d, J = 5.0 Hz, 2H), 1.11 (s, 2H).	378	97%
3-5		OMe	环丙基	^{1}H NMR (400 MHz, DMSO) δ 14.64 (s, 1H), 9.13 (d, J = 6.3 Hz, 1H), 8.90 (s, 1H), 8.53 (s, 1H), 8.31 (d, J = 11.7 Hz, 2H), 8.09 (d, J = 9.1 Hz, 1H), 7.72 (d, J = 5.8 Hz, 1H), 4.30 (s, 1H), 3.57 (s, 3H), 1.25 (s, 4H).	394	95%
3-6		Me	环丙基	^{1}H NMR (400 MHz, DMSO) δ 9.30 (s, 1H), 8.93 (s, 1H), 8.64 (s, 1H), 8.04 (t, J = 9.2 Hz, 2H), 7.75 (d, J = 9.2 Hz, 1H), 4.42 (s, 1H), 2.69 (s, 3H), 1.24 (s, 2H), 1.09 (s, 2H).	379	97%

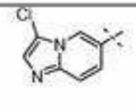
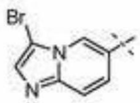
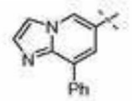
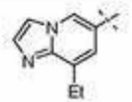
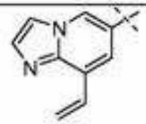
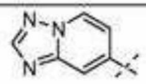
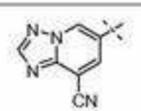
3-7		OMe	环丙基	[1]H NMR (400 MHz, DMSO) δ 14.61 (s, 1H), 9.33 (s, 1H), 8.83 (s, 1H), 8.64 (s, 1H), 8.06 (d, *J* = 9.2 Hz, 1H), 8.01 (d, *J* = 9.1 Hz, 1H), 7.86 (d, *J* = 9.3 Hz, 1H), 4.24 (s, 1H), 3.48 (s, 3H), 1.19 (d, *J* = 5.2 Hz, 4H).	395	98%
3-8		Me	环丙基	[1]H NMR (400 MHz, DMSO) δ 14.60 (s, 1H), 9.11 (s, 1H), 8.93 (s, 1H), 8.22 (d, *J* = 1.2 Hz, 1H), 8.17 (s, 1H), 8.03 (d, *J* = 8.9 Hz, 1H), 7.84 (d, *J* = 1.1 Hz, 1H), 4.43 (tt, *J* = 7.1, 3.7 Hz, 1H), 2.70 (s, 3H), 1.26 (d, *J* = 6.8 Hz, 2H), 1.09 (s, 2H).	379	98%
3-9		Me	环丙基	[1]H NMR (400 MHz, DMSO) δ 14.60 (s, 1H), 9.07 (s, 1H), 8.93 (s, 1H), 8.22 (s, 1H), 8.02 (d, *J* = 8.9 Hz, 1H), 7.81 (s, 1H), 7.80 (s, 1H), 4.49 – 4.37 (m, 1H), 2.70 (d, *J* = 21.5 Hz, 3H), 1.27 (t, *J* = 9.8 Hz, 2H), 1.14 – 1.05 (m, 2H).	446	97%
3-10		Me	环丙基	[1]H NMR (400 MHz, DMSO) δ 14.62 (s, 1H), 8.94 (s, 2H), 8.35 (s, 1H), 8.23 (s, 1H), 8.05 (d, *J* = 8.7 Hz, 1H), 7.75 (s, 1H), 4.43 (s, 1H), 2.69 (s, 3H), 2.66 (s, 3H), 1.24 (s, 2H), 1.08 (s, 2H).	392	98%
3-11		Me	环丙基	[1]H NMR (400 MHz, DMSO) δ 14.61 (s, 1H), 8.92 (s, 1H), 8.79 (d, *J* = 1.2 Hz, 1H), 8.16 (d, *J* = 1.1 Hz, 1H), 8.01 (d, *J* = 8.8 Hz, 1H), 7.76 (d, *J* = 1.1 Hz, 1H), 7.58 (s, 1H), 4.42 (tt, *J* = 7.2, 3.8 Hz, 1H), 2.70 (d, *J* = 20.2 Hz, 3H), 1.26 (d, *J* = 6.9 Hz, 2H), 1.15 – 1.03 (m, 2H).	412	99%
3-12		Me	环丙基	[1]H NMR (400 MHz, DMSO) δ 9.40 (s, 1H), 8.94 (s, 1H), 8.88 (s, 1H), 8.18 (d, *J* = 9.3 Hz, 1H), 8.05 (d, *J* = 8.8 Hz, 1H), 7.89 (d, *J* = 9.3 Hz, 1H), 4.43 (s, 1H), 2.69 (s, 3H), 1.24 (d, *J* = 6.1 Hz, 2H), 1.12 (s, 2H).	423	96%
3-13		OMe	环丙基	[1]H NMR (400 MHz, DMSO) δ 14.60 (s, 1H), 8.90 (s, 1H), 8.83 (s, 1H), 8.22 (d, *J* = 1.0 Hz, 1H), 7.98 (d, *J* = 9.2 Hz, 1H), 7.75 (d, *J* = 1.0 Hz, 1H), 7.66 (s, 1H), 4.29 – 4.18 (m, 1H), 3.51 (d, *J* = 13.2 Hz, 3H), 1.25 – 1.14 (m, 4H).	428	100%
3-14		OMe	环丙基	[1]H NMR (400 MHz, DMSO) δ 14.59 (s, 1H), 9.19 (s, 1H), 8.83 (s, 1H), 8.28 (s, 1H), 8.01 (d, *J* = 9.2 Hz, 1H), 7.92 (s, 1H), 7.81 (s, 1H), 4.25 (dt, *J* = 11.0, 5.7 Hz, 1H), 3.50 (d, *J* = 12.8 Hz, 3H), 1.19 (m, 4H).	462	98%
3-15		Me	环丙基	[1]H NMR (400 MHz, DMSO) δ 9.61 (s, 1H), 8.93 (s, 1H), 8.51 (s, 1H), 8.13 (s, 1H), 8.04 (d, *J* = 8.8 Hz, 1H), 7.97 (d, *J* = 9.2 Hz, 1H), 7.62 (d, *J* = 9.2 Hz, 1H), 7.55 (s, 1H), 4.42 (s, 1H), 2.69 (s, 3H), 1.24 (s, 2H), 1.10 (s, 2H).	421	98%

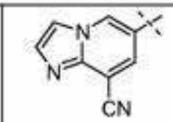
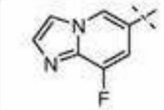
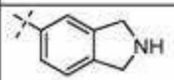
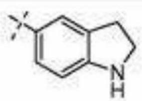
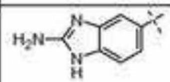
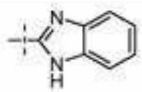
3-16		Me	环丙基	^{1}H NMR (400 MHz, DMSO) δ 14.87 – 13.95 (m, 2H), 9.60 (s, 1H), 8.94 (s, 1H), 8.44 (s, 1H), 8.05 (t, *J* = 9.5 Hz, 2H), 7.71 (d, *J* = 9.4 Hz, 1H), 4.46 – 4.39 (m, 1H), 2.71 (m, 3H), 2.46 (s, 3H), 1.25 (d, *J* = 6.3 Hz, 2H), 1.11 (s, 2H).	459	98%
3-17		Cl	环丙基	^{1}H NMR (400 MHz, DMSO) δ 14.44 – 13.91 (m, 1H), 9.16 (s, 1H), 8.95 (s, 1H), 8.37 (s, 1H), 8.23 (d, *J* = 8.6 Hz, 1H), 8.08 (s, 1H), 7.81 (s, 1H), 4.43 (m, 1H), 1.23 (m, 2H), 1.16 (s, 2H).	398	98%
3-18		Me	环丙基	^{1}H NMR (400 MHz, DMSO) δ 14.62 (s, 1H), 8.92 (s, 1H), 8.68 (s, 1H), 8.19 (d, *J* = 2.9 Hz, 1H), 8.01 (d, *J* = 8.8 Hz, 1H), 7.73 (d, *J* = 1.0 Hz, 1H), 7.32 (d, *J* = 11.7 Hz, 1H), 4.42 (m, 1H), 2.72 (s, 3H), 1.25 (d, 2H), 1.12 – 1.04 (m, 2H).	396	98%
3-19		Me	环丙基	^{1}H NMR (400 MHz, DMSO) δ 9.29 (s, 1H), 8.94 (s, 1H), 8.54 (s, 1H), 8.36 (s, 1H), 8.05 (d, *J* = 8.9 Hz, 1H), 8.00 (s, 1H), 4.49 – 4.38 (m, 1H), 2.74 (s, 3H), 1.25 (d, *J* = 6.9 Hz, 2H), 1.11 (s, 2H).	423	98%
3-20		Cl	环丙基	^{1}H NMR (400 MHz, DMSO) δ 8.95 (s, 1H), 8.88 (t, *J* = 4.2 Hz, 1H), 8.22 (t, *J* = 2.4 Hz, 1H), 8.20 (d, *J* = 8.5 Hz, 1H), 7.82 (s, 1H), 7.68 (s, 1H), 4.48 – 4.36 (m, 1H), 1.26 – 1.19 (m, 2H), 1.14 (m, 2H).	432	98%
3-21		Me	环丙基	^{1}H NMR (400 MHz, DMSO) δ 14.60 (s, 1H), 9.32 (d, *J* = 1.2 Hz, 1H), 8.93 (s, 1H), 8.71 (s, 1H), 8.06 (s, 1H), 8.02 (d, *J* = 8.8 Hz, 1H), 4.43 (tt, *J* = 7.0, 3.6 Hz, 1H), 2.70 (d, *J* = 17.8 Hz, 3H), 1.30 – 1.20 (m, 2H), 1.15 – 1.05 (m, 2H).	413	98%
3-22		Me	环丙基	^{1}H NMR (400 MHz, DMSO) δ 14.57 (s, 1H), 9.22 (s, 1H), 8.93 (s, 1H), 8.71 (s, 1H), 8.02 (d, *J* = 8.8 Hz, 1H), 7.85 (d, *J* = 10.8 Hz, 1H), 4.47 – 4.37 (m, 1H), 2.72 (s, 3H), 1.29 – 1.22 (m, 2H), 1.10 (s, 2H).	397	99%
3-23		OMe	环丙基	^{1}H NMR (400 MHz, DMSO) δ 14.57 (s, 1H), 9.26 (s, 1H), 8.84 (s, 1H), 8.72 (s, 1H), 8.01 (d, *J* = 9.1 Hz, 1H), 7.92 (d, *J* = 10.9 Hz, 1H), 4.28 – 4.18 (m, 1H), 3.51 (s, 3H), 1.20 (d, *J* = 5.5 Hz, 4H).	413	95%

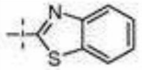
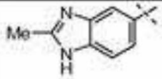
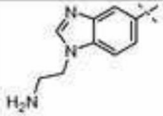
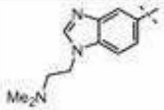
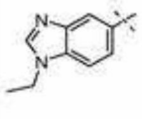
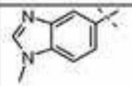
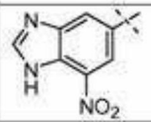
3-24		OMe		[1]H NMR (400 MHz, DMSO) δ 14.47 (s, 1H), 8.89 (t, J = 1.3 Hz, 1H), 8.86 (d, J = 1.8 Hz, 1H), 8.23 (d, J = 1.3 Hz, 1H), 8.00 (d, J = 9.1 Hz, 1H), 7.75 (d, J = 1.2 Hz, 1H), 7.63 (t, J = 1.3 Hz, 1H), 5.31 – 4.93 (dtd, J = 64.0, 5.5, 3.3 Hz, 1H), 4.26 – 4.12 (dt, J = 8.9, 5.4 Hz, 1H), 3.54 (s, 3H), 1.93 – 1.49 (m, 2H).	446	98%
3-25		Me		[1]H NMR (400 MHz, $CDCl_3$) δ 14.07 (s, 1H), 8.55 (s, 1H), 8.14 (d, J = 8.4 Hz, 1H), 8.00 (d, J = 17.0 Hz, 1H), 7.66 (dd, J = 11.6, 4.8 Hz, 2H), 7.49 (d, J = 4.4 Hz, 1H), 7.13 – 7.03 (m, 2H), 7.01 (d, J = 0.8 Hz, 1H), 5.22 (s, 1H), 1.72 (s, 3H).	484	98%
3-26		Me	环丙基	[1]H NMR (400 MHz, DMSO) δ 14.64 (s, 1H), 9.09 (s, 1H), 8.93 (s, 1H), 8.58 (s, 1H), 8.02 (d, J = 8.8 Hz, 1H), 7.54 (s, 1H), 4.46 – 4.36 (m, 1H), 2.70 (s, 3H), 2.64 (s, 3H), 1.25 (d, J = 6.2 Hz, 2H), 1.09 (s, 2H).	393	98%
3-27		Me		[1]H NMR (400 MHz, DMSO) δ 14.48 (s, 1H), 8.90 (d, J = 3.0 Hz, 1H), 8.78 (s, 1H), 8.16 (s, 1H), 8.03 (d, J = 8.8 Hz, 1H), 7.75 (s, 1H), 7.57 (s, 1H), 5.16 (d, J = 64.5 Hz, 1H), 4.44 – 4.33 (m, 1H), 2.65 (s, 3H), 1.83 – 1.68 (m, 1H), 1.62 (m, 1H).	430	98%
3-28		Me	环丙基	[1]H NMR (400 MHz, DMSO) δ 14.59 (s, 1H), 9.63 (s, 1H), 8.94 (s, 1H), 8.81 (s, 1H), 8.30 (s, 1H), 8.04 (d, J = 8.9 Hz, 1H), 4.50 – 4.37 (m, 1H), 2.73 (s, 3H), 1.24 (t, J = 9.6 Hz, 2H), 1.12 (s, 2H).	447	98%
3-29		Me	环丙基	[1]H NMR (400 MHz, DMSO) δ 9.33 (s, 1H), 8.94 (s, 1H), 8.74 (s, 1H), 8.63 (s, 2H), 8.05 (d, J = 8.8 Hz, 1H), 7.84 (s, 1H), 4.51 (s, 2H), 4.46 – 4.36 (m, 1H), 2.71 (s, 3H), 1.26 (d, J = 6.8 Hz, 2H), 1.09 (s, 2H).	408	95%
3-30		OMe	环丙基	[1]H NMR (400 MHz, DMSO) δ 14.58 (s, 1H), 9.37 (s, 1H), 8.84 (s, 1H), 8.72 (s, 1H), 8.13 (s, 1H), 8.00 (d, J = 9.0 Hz, 1H), 4.29 – 4.18 (m, 1H), 3.51 (s, 3H), 1.20 (d, J = 5.4 Hz, 4H).	429	96%
3-31		Me	环丙基	[1]H NMR (400 MHz, DMSO) δ 9.43 (s, 1H), 8.99 (s, 1H), 8.89 (s, 1H), 8.14 – 8.01 (m, 2H), 7.54 (d, J = 9.8 Hz, 1H), 4.49 (s, 2H), 2.77 (s, 3H), 1.30 (s, 2H), 1.14 (s, 2H).	379	88%
3-32		OMe	环丙基	[1]H NMR (400 MHz, DMSO) δ 9.42 (s, 1H), 8.92 (s, 1H), 8.83 (s, 1H), 8.00 (s, 2H), 7.57 (d, J = 9.3 Hz, 1H), 4.23 (s, 1H), 3.51 (s, 3H), 1.18 (s, 4H).	395	95%

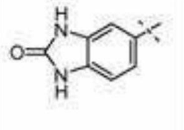
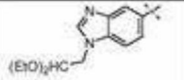
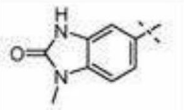
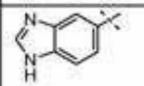
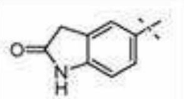
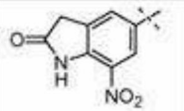
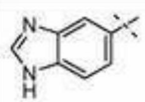
3-33		Me	环丙基	^{1}H NMR (400 MHz, DMSO) δ 8.98 (s, 1H), 8.74 (s, 1H), 8.48 (s, 1H), 8.23 (s, 1H), 8.04 (d, *J* = 8.9 Hz, 1H), 4.39 (s, 2H), 2.64 (s, 3H), 1.29 (s, 2H), 1.07 (s, 2H).	379	99%
3-34		Me	环丙基	^{1}H NMR (400 MHz, DMSO) δ 15.02 – 14.73 (m, 1H), 9.01 (s, 1H), 8.10 (s, 3H), 7.54 (s, 1H), 4.51 (s, 1H), 1.33 (s, 2H), 1.18 (s, 2H).	379	95%
3-35		Me	环丙基	^{1}H NMR (400 MHz, DMSO) δ 14.68 (s, 1H), 14.19 (s, 1H), 8.93 (s, 1H), 8.53 (s, 1H), 8.44 (s, 1H), 8.40 (s, 1H), 8.01 (d, *J* = 8.5 Hz, 1H), 4.42 (s, 1H), 2.64 (s, 3H), 1.22 (m, 2H), 1.12 (m, 2H).	423	98%
3-36		Me	环丙基	^{1}H NMR (400 MHz, DMSO) δ 12.87 (s, 1H), 8.97 (s, 1H), 8.10 (s, 1H), 8.01 (d, *J* = 8.7 Hz, 1H), 7.02 (s, 1H), 6.48 (s, 1H), 4.46 (s, 1H), 2.70 (s, 2H), 1.30 (s, 2H), 1.12 (s, 2H).	393	98%
3-37		Me	环丙基	^{1}H NMR (400 MHz, DMSO) δ 14.83 (s, 1H), 13.45 (b, 1H), 8.98 (s, 1H), 8.26 (s, 1H), 8.04 (d, *J* = 8.6 Hz, 1H), 7.90 (s, 1H), 7.78 (d, *J* = 8.5 Hz, 1H), 7.42 (d, *J* = 8.4 Hz, 1H), 4.46 (s, 1H), 2.68 (s, 3H), 1.31 (d, *J* = 5.7 Hz, 2H), 1.14 (s, 2H).	378	92%
3-38		Me	环丙基	^{1}H NMR (400 MHz, DMSO) δ 14.69 (s, 1H), 13.83 (s, 1H), 8.91 (s, 1H), 8.31 (s, 1H), 7.98 (d, *J* = 8.8 Hz, 1H), 7.83 (s, 1H), 7.53 (s, 1H), 4.46 – 4.34 (m, 1H), 2.63 (s, 3H), 1.25 (d, *J* = 6.9 Hz, 2H), 1.09 (s, 2H).	412	98%
3-39		OMe	环丙基	^{1}H NMR (400 MHz, DMSO) δ 14.74 (s, 1H), 14.27 (s, 1H), 8.90 (s, 1H), 8.62 (d, *J* = 10.6 Hz, 3H), 8.07 (d, *J* = 9.1 Hz, 1H), 4.31 (s, 1H), 3.44 (s, 3H), 1.26 (s, 4H).	439	95%
3-40		Me	环丙基	^{1}H NMR (400 MHz, DMSO) δ 14.77 (s, 1H), 13.23 (s, 1H), 8.91 (s, 1H), 8.49 (s, 1H), 7.98 (d, *J* = 8.3 Hz, 1H), 7.79 (d, *J* = 8.0 Hz, 1H), 7.67 (s, 1H), 7.25 (d, *J* = 7.9 Hz, 1H), 4.40 (s, 1H), 2.61 (s, 2H), 1.25 (s, 2H), 1.09 (s, 2H).	378	98%
3-41		Me	环丙基	^{1}H NMR (400 MHz, DMSO) δ 14.72 (s, 1H), 9.52 (s, 1H), 8.92 (s, 1H), 8.30 (s, 1H), 8.27 (d, *J* = 8.4 Hz, 1H), 8.01 (d, *J* = 8.8 Hz, 1H), 7.58 (d, *J* = 8.1 Hz, 1H), 4.40 (s, 1H), 2.62 (s, 3H), 1.25 (d, *J* = 5.9 Hz, 2H), 1.08 (s, 2H).	395	95%

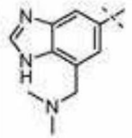
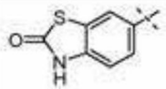
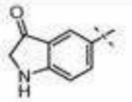
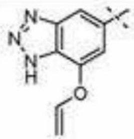
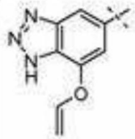
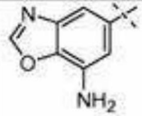
3-42		Me	环丙基	^{1}H NMR (400 MHz, DMSO) δ 14.77 (s, 1H), 11.96 (s, 1H), 8.92 (s, 1H), 8.24 (s, 1H), 8.06 (s, 1H), 7.99 (d, *J* = 8.7 Hz, 1H), 7.61 (s, 1H), 6.57 (s, 1H), 4.41 (s, 1H), 2.64 (s, 3H), 1.26 (d, *J* = 6.1 Hz, 2H), 1.09 (s, 2H).	378	98%
3-43		Me	环丙基	^{1}H NMR (400 MHz, DMSO) δ 14.76 – 14.48 (s, 1H), 8.97 – 8.90 (d, *J* = 2.7 Hz, 2H), 8.63 – 8.55 (s, 1H), 8.07 – 7.97 (t, *J* = 9.2 Hz, 2H), 7.69 – 7.58 (m, 1H), 4.48 – 4.39 (s, 2H), 2.73 – 2.65 (s, 3H), 1.27 – 1.20 (m, 2H), 1.14 – 1.06 (s, 2H).	403	95%
3-44		Me	环丙基	^{1}H NMR (400 MHz, DMSO) δ 10.02 – 9.98 (s, 1H), 9.48 – 9.43 (s, 1H), 8.95 – 8.90 (s, 1H), 8.67 – 8.62 (s, 1H), 8.12 – 8.07 (d, *J* = 9.2 Hz, 1H), 8.07 – 8.01 (d, *J* = 8.9 Hz, 1H), 7.82 – 7.75 (dd, *J* = 9.4, 1.7 Hz, 1H), 4.48 – 4.36 (s, 1H), 2.72 – 2.67 (s, 3H), 1.25 – 1.21 (t, *J* = 3.8 Hz, 2H), 1.14 – 1.06 (m, 2H).	406	90%
3-45		Me	环丙基	^{1}H NMR (400 MHz, DMSO) δ 9.93 (s, 1H), 8.83 (s, 1H), 8.40 (s, 1H), 8.09 – 8.05 (dd, *J* = 9.2, 1.0 Hz, 1H), 8.05 – 8.00 (d, *J* = 8.7 Hz, 1H), 7.81 – 7.72 (dd, *J* = 9.3, 1.7 Hz, 1H), 5.35 – 5.16 (s, 1H), 4.53 – 4.33 (m, 1H), 2.75 – 2.64 (s, 3H), 1.28 – 1.20 (d, *J* = 6.2 Hz, 2H), 1.15 – 1.03 (d, *J* = 3.8 Hz, 2H).	402	98%
3-46		Me	环丙基	^{1}H NMR (400 MHz, DMSO) δ 14.70 – 14.56 (s, 1H), 9.23 – 9.15 (m, 1H), 8.99 – 8.89 (s, 1H), 8.72 – 8.65 (s, 1H), 8.08 – 7.99 (d, *J* = 8.8 Hz, 1H), 7.84 – 7.77 (s, 1H), 7.16 – 7.04 (m, 1H), 6.93 – 6.82 (m, 1H), 5.82 – 5.69 (dd, *J* = 11.2, 1.6 Hz, 1H), 4.49 – 4.36 (t, *J* = 3.5 Hz, 1H), 2.75 – 2.68 (s, 3H), 1.33 – 1.19 (t, *J* = 6.5 Hz, 2H), 1.16 – 1.03 (s, 2H).	405	97%
3-47		Me	环丙基	^{1}H NMR (400 MHz, DMSO) δ 14.76 – 14.48 (s, 1H), 8.96 – 8.91 (s, 4H), 8.86 – 8.79 (s, 4H), 8.64 – 8.56 (d, *J* = 2.3 Hz, 4H), 8.06 – 7.99 (d, *J* = 8.8 Hz, 4H), 7.86 – 7.79 (d, *J* = 9.4 Hz, 4H), 7.52 – 7.43 (s, 3H), 4.48 – 4.37 (s, 1H), 2.74 – 2.67 (s, 12H), 1.29 – 1.20 (d, *J* = 6.8 Hz, 9H), 1.11 – 1.01 (t, *J* = 3.0 Hz, 6H).	422	96%
3-48		Me	环丙基	^{1}H NMR (400 MHz, DMSO) δ 14.76 – 14.48 (s, 1H), 8.95 – 8.89 (s, 1H), 8.84 – 8.78 (s, 1H), 8.63 – 8.58 (s, 1H), 8.05 – 8.00 (d, *J* = 8.8 Hz, 1H), 7.90 – 7.84 (d, *J* = 9.4 Hz, 1H), 7.53 – 7.45 (d, *J* = 9.3 Hz, 1H), 4.47 – 4.40 (s, 1H), 2.73 – 2.68 (s, 3H), 1.27 – 1.21 (d, *J* = 6.6 Hz, 2H), 1.12 – 1.02 (s, 2H).	446	90%

3-49		Me	环丙基	[1]H NMR (400 MHz, DMSO) δ 8.93 (s, 1H), 8.66 (s, 1H), 8.06 – 7.99 (d, *J* = 8.7 Hz, 1H), 7.99 – 7.95 (s, 1H), 7.94 – 7.88 (d, *J* = 9.3 Hz, 1H), 7.55 – 7.47 (dd, *J* = 9.3, 1.6 Hz, 1H), 4.52 – 4.32 (m, 1H), 2.77 – 2.61 (s, 3H), 1.33 – 1.17 (d, *J* = 6.6 Hz, 2H), 1.19 – 1.05 (t, *J* = 3.3 Hz, 2H).	412	98%
3-50		Me	环丙基	[1]H NMR (400 MHz, DMSO) δ 8.93 (s, 1H), 8.60 (s, 1H), 8.06 – 8.00 (d, *J* = 8.7 Hz, 1H), 8.00 – 7.96 (s, 1H), 7.92 – 7.86 (d, *J* = 9.3 Hz, 1H), 7.56 – 7.48 (d, *J* = 9.4 Hz, 1H), 4.55 – 4.26 (m, 1H), 2.81 – 2.60 (s, 3H), 1.37 – 1.21 (d, *J* = 6.5 Hz, 2H), 1.15 – 1.05 (m, 2H).	456, 458	97%
3-51		Me	环丙基	[1]H NMR (400 MHz, DMSO) δ 14.71 – 14.62 (s, 1H), 8.96 – 8.88 (s, 1H), 8.83 – 8.75 (s, 1H), 8.25 – 8.16 (d, *J* = 7.5 Hz, 2H), 8.15 – 8.07 (s, 1H), 8.07 – 7.97 (d, *J* = 8.8 Hz, 1H), 7.77 – 7.71 (s, 1H), 7.57 – 7.42 (m, 4H), 4.50 – 4.33 (s, 1H), 2.82 – 2.71 (s, 3H), 1.31 – 1.22 (d, *J* = 6.7 Hz, 2H), 1.15 – 1.04 (s, 2H).	454	99%
3-52		Me	环丙基	[1]H NMR (400 MHz, DMSO) δ 14.71 – 14.60 (s, 1H), 8.95 – 8.88 (s, 1H), 8.73 – 8.65 (s, 1H), 8.10 – 7.96 (m, 2H), 7.74 – 7.68 (s, 1H), 7.40 – 7.32 (s, 1H), 7.11 – 7.02 (m, 1H), 6.96 – 6.83 (m, 1H), 5.70 – 5.60 (dd, *J* = 11.2, 2.0 Hz, 1H), 4.47 – 4.38 (t, *J* = 3.5 Hz, 1H), 2.78 – 2.69 (s, 3H), 1.31 – 1.20 (d, *J* = 6.9 Hz, 2H), 1.14 – 1.01 (s, 2H).	405	93%
3-53		Me	环丙基	[1]H NMR (400 MHz, DMSO) δ 14.71 – 14.60 (s, 1H), 8.95 – 8.88 (s, 1H), 8.73 – 8.65 (s, 1H), 8.10 – 7.96 (m, 2H), 7.74 – 7.68 (s, 1H), 7.40 – 7.32 (s, 1H), 7.11 – 7.02 (m, 1H), 6.96 – 6.83 (m, 1H), 5.70 – 5.60 (dd, *J* = 11.2, 2.0 Hz, 1H), 4.47 – 4.38 (t, *J* = 3.5 Hz, 1H), 2.78 – 2.69 (s, 3H), 1.31 – 1.20 (d, *J* = 6.9 Hz, 2H), 1.14 – 1.01 (s, 2H).	403	95%
3-54		Me	环丙基	[1]H NMR (400 MHz, DMSO) δ 14.76 – 14.39 (s, 1H), 9.20 – 9.07 (d, *J* = 7.0 Hz, 1H), 8.95 – 8.90 (s, 1H), 8.67 – 8.60 (s, 1H), 8.08 – 8.00 (m, 2H), 7.32 – 7.24 (m, 1H), 4.47 – 4.36 (s, 1H), 2.75 – 2.61 (s, 3H), 1.30 – 1.19 (m, 2H), 1.15 – 1.03 (q, *J* = 3.8, 3.1 Hz, 2H).	379	98%
3-55		Me	环丙基	[1]H NMR (400 MHz, DMSO) δ 14.76 – 14.36 (s, 1H), 9.68 – 9.65 (d, *J* = 1.5 Hz, 1H), 8.95 – 8.92 (s, 1H), 8.84 – 8.81 (s, 1H), 8.63 – 8.59 (d, *J* = 1.5 Hz, 1H), 8.06 – 8.01 (d, *J* = 8.8 Hz, 1H), 4.46 – 4.39 (s, 1H), 2.76 – 2.69 (s, 3H), 1.30 – 1.20 (m, 2H), 1.14 – 1.05 (s, 2H).	404	98%

3-56		OMe		[1]H NMR (400 MHz, DMSO) δ 14.73 – 14.06 (s, 1H), 9.21 – 9.18 (m, 1H), 8.87 – 8.83 (d, *J* = 1.86 Hz, 1H), 8.32 – 8.27 (d, *J* = 1.33 Hz, 1H), 8.20 – 8.16 (s, 1H), 8.04 – 7.97 (d, *J* = 9.06 Hz, 1H), 7.87 – 7.80 (d, *J* = 1.20 Hz, 1H), 5.31 – 4.87 (m, 1H), 4.32 – 4.12 (m, 1H), 3.67 – 3.47 (s, 3H), 1.95 – 1.56 (m, 2H).	437	98%
3-57		OMe	环丙基	[1]H NMR (400 MHz, DMSO) δ 14.61 (s, 1H), 8.83 (s, 1H), 8.77 (s, 1H), 8.23 (d, *J* = 2.1 Hz, 1H), 7.99 (d, *J* = 9.2 Hz, 1H), 7.73 (d, *J* = 1.0 Hz, 1H), 7.40 (d, *J* = 11.8 Hz, 1H), 4.46 – 4.08 (m, 1H), 3.51 (d, *J* = 10.5 Hz, 3H), 1.19 (d, *J* = 6.9 Hz, 4H).	412	90%
3-58		Me	环丙基	[1]H NMR (400 MHz, DMSO) δ 14.83 – 14.57 (s, 1H), 9.82 – 9.48 (s, 2H), 9.01 – 8.84 (d, *J* = 2.6 Hz, 1H), 8.05 – 7.90 (dd, *J* = 8.5, 2.7 Hz, 1H), 7.65 – 7.57 (d, *J* = 7.5 Hz, 1H), 7.51 – 7.46 (s, 1H), 7.45 – 7.36 (d, *J* = 7.7 Hz, 1H), 4.72 – 4.50 (s, 4H), 4.47 – 4.28 (d, *J* = 6.8 Hz, 1H), 2.64 – 2.53 (d, *J* = 2.7 Hz, 3H), 1.31 – 1.14 (d, *J* = 6.1 Hz, 2H), 1.14 – 0.96 (s, 2H).	379	95%
3-59		Me	环丙基	[1]H NMR (400 MHz, DMSO) δ 8.95 – 8.83 (d, *J* = 2.4 Hz, 1H), 7.98 – 7.86 (d, *J* = 8.8 Hz, 1H), 7.25 – 7.15 (s, 1H), 7.14 – 7.01 (d, *J* = 7.9 Hz, 1H), 6.97 – 6.81 (d, *J* = 7.9 Hz, 1H), 3.65 – 3.50 (m, 2H), 4.45 – 4.29 (dp, *J* = 9.2, 4.7, 3.9 Hz, 1H), 3.16 – 2.99 (t, *J* = 8.4 Hz, 2H), 2.65 – 2.56 (s, 3H), 1.28 – 1.16 (d, *J* = 6.6 Hz, 3H), 1.12 – 0.97 (m, 2H).	379	99%
3-60		Me	环丙基	[1]H NMR (400 MHz, DMSO) δ 15.01 – 14.39 (m, 1H), 12.95 – 12.53 (s, 2H), 9.03 – 8.82 (t, *J* = 1.9 Hz, 1H), 8.73 – 8.47 (s, 2H), 8.10 – 7.90 (d, *J* = 8.4 Hz, 1H), 7.62 – 7.44 (m, 1H), 4.51 – 4.23 (m, 1H), 7.44 – 7.31 (s, 1H), 7.31 – 7.11 (d, *J* = 8.6 Hz, 1H), 2.65 – 2.55 (s, 3H), 1.30 – 1.16 (m, 2H), 1.16 – 0.96 (s, 2H).	393	90%
3-61		Me	环丙基	[1]H NMR (400 MHz, MeOD) δ 9.17 – 9.06 (d, *J* = 2.8 Hz, 1H), 8.30 – 8.15 (m, 1H), 7.94 – 7.80 (m, 2H), 7.65 – 7.49 (dt, *J* = 7.5, 3.3 Hz, 2H), 4.47 – 4.32 (d, *J* = 6.9 Hz, 1H), 2.96 – 2.81 (d, *J* = 2.8 Hz, 3H), 1.43 – 1.27 (dd, *J* = 10.8, 4.5 Hz, 2H), 1.21 – 1.05 (s, 2H).	378	100%

3-62		Me	环丙基	^{1}H NMR (400 MHz, DMSO) δ 14.63 – 14.42 (s, 1H), 8.99 – 8.89 (s, 1H), 8.33 – 8.25 (d, *J* = 7.8 Hz, 1H), 8.25 – 8.18 (d, *J* = 8.0 Hz, 1H), 8.14 – 8.05 (d, *J* = 8.7 Hz, 1H), 7.71 – 7.56 (dt, *J* = 22.8, 7.4 Hz, 2H), 4.51 – 4.31 (s, 1H), 2.85 – 2.70 (s, 3H), 1.30 – 1.20 (d, *J* = 7.0 Hz, 2H), 1.13 – 0.97 (s, 2H).	395	100%
3-63		Me	环丙基	^{1}H NMR (400 MHz, DMSO) δ 15.01 – 14.28 (s, 2H), 9.04 – 8.82 (t, *J* = 2.3 Hz, 1H), 8.05 – 7.98 (d, *J* = 8.3 Hz, 1H), 7.98 – 7.92 (dd, *J* = 10.5, 2.5 Hz, 1H), 7.90 – 7.83 (s, 1H), 7.56 – 7.47 (d, *J* = 8.2 Hz, 1H), 4.46 – 4.34 (t, *J* = 6.3 Hz, 1H), 2.87 – 2.78 (t, *J* = 2.1 Hz, 3H), 2.64 – 2.55 (s, 3H), 1.29 – 1.16 (m, 2H), 1.16 – 1.03 (s, 2H).	392	100%
3-64		Me	环丙基	^{1}H NMR (400 MHz, DMSO) δ 15.01 – 14.28 (s, 2H), 9.04 – 8.82 (t, *J* = 2.3 Hz, 1H), 8.05 – 7.98 (d, *J* = 8.3 Hz, 1H), 7.98 – 7.92 (dd, *J* = 10.5, 2.5 Hz, 1H), 7.90 – 7.83 (s, 1H), 7.56 – 7.47 (d, *J* = 8.2 Hz, 1H), 4.46 – 4.34 (t, *J* = 6.3 Hz, 1H), 2.87 – 2.78 (t, *J* = 2.1 Hz, 3H), 2.64 – 2.55 (m, 6H), 1.29 – 1.16 (m, 2H), 1.16 – 1.03 (s, 2H).	421	100%
3-65		Me	环丙基	^{1}H NMR (400 MHz, DMSO) δ 15.05 – 14.35 (m, 1H), 10.46 – 9.91 (m, 1H), 9.02 – 8.80 (s, 1H), 8.80 – 8.47 (d, *J* = 15.2 Hz, 1H), 8.12 – 7.64 (m, 3H), 7.44 – 7.25 (dd, *J* = 23.7, 8.0 Hz, 1H), 4.84 – 4.63 (d, *J* = 8.8 Hz, 2H), 4.49 – 4.32 (s, 1H), 3.01 – 2.77 (d, *J* = 17.9 Hz, 6H), 1.37 – 1.13 (d, *J* = 6.9 Hz, 2H), 1.17 – 0.86 (s, 2H).	449	96%
3-66		Me	环丙基	^{1}H NMR (400 MHz, DMSO) δ 14.97 – 14.24 (s, 2H), 9.14 – 8.97 (m, 2H), 8.98 – 8.88 (s, 2H), 8.07 – 7.89 (dd, *J* = 24.1, 8.9 Hz, 6H), 7.86 – 7.79 (s, 1H), 7.52 – 7.37 (t, *J* = 9.6 Hz, 3H), 4.57 – 4.31 (t, *J* = 6.8 Hz, 5H), 2.66 – 2.55 (s, 7H), 1.60 – 1.40 (m, 7H), 1.30 – 1.16 (m, 2H), 1.16 – 0.98 (s, 2H).	406	97%
3-67		Me	环丙基	^{1}H NMR (400 MHz, DMSO) δ 14.97 – 14.24 (s, 2H), 9.14 – 8.97 (m, 2H), 8.98 – 8.88 (s, 2H), 8.07 – 7.89 (dd, *J* = 24.1, 8.9 Hz, 6H), 7.86 – 7.79 (s, 1H), 7.52 – 7.37 (t, *J* = 9.6 Hz, 3H), 4.57 – 4.31 (t, *J* = 6.8 Hz, 5H), 2.66 – 2.55 (s, 3H), 1.60 – 1.40 (m, 7H), 1.30 – 1.16 (m, 2H), 1.16 – 0.98 (s, 2H).	392	100%
3-68		Me	环丙基	^{1}H NMR (400 MHz, DMSO) δ 8.95 – 8.91 (s, 1H), 8.65 – 8.59 (s, 1H), 8.31 – 8.25 (s, 1H), 8.23 – 8.17 (s, 1H), 8.05 – 7.98 (m, 1H), 4.48 – 4.35 (s, 1H), 2.68 – 2.61 (s, 3H), 1.30 – 1.22 (s, 2H), 1.16 – 1.06 (s, 2H).	423	97%

3-69		Me	环丙基	[1]H NMR (400 MHz, DMSO) δ 14.96 – 14.48 (m, 1H), 10.94 – 10.65 (d, *J* = 25.6 Hz, 2H), 9.01 – 8.77 (m, 1H), 8.05 – 7.81 (d, *J* = 8.6 Hz, 1H), 7.18 – 7.00 (d, *J* = 7.8 Hz, 1H), 7.00 – 6.78 (m, 2H), 4.47 – 4.25 (td, *J* = 6.9, 3.6 Hz, 1H), 2.67 – 2.54 (s, 3H), 1.27 – 1.10 (d, *J* = 6.3 Hz, 2H), 1.14 – 0.88 (s, 2H).	394	94%
3-70		Me	环丙基	[1]H NMR (400 MHz, DMSO) δ 15.02 – 14.18 (s, 1H), 9.00 – 8.67 (m, 2H), 8.12 – 7.68 (m, 3H), 7.49 – 7.25 (dd, *J* = 16.6, 8.2 Hz, 1H), 5.04 – 4.75 (m, 1H), 4.62 – 4.23 (m, 9H), 3.77 – 3.55 (m, 2H), 3.57 – 3.23 (d, *J* = 7.0 Hz, 1H), 2.70 – 2.53 (s, 3H), 1.37 – 1.15 (t, *J* = 8.0 Hz, 2H), 1.15 – 0.84 (td, *J* = 16.0, 7.8 Hz, 9H).	494	90%
3-71		Me	环丙基	[1]H NMR (400 MHz, DMSO) δ 14.45 – 14.13 (s, 1H), 11.09 – 10.85 (s, 1H), 8.73 – 8.58 (d, *J* = 2.7 Hz, 1H), 7.85 – 7.61 (m, 2H), 7.31 – 7.15 (m, 1H), 7.07 – 6.83 (m, 2H), 4.27 – 4.07 (s, 1H), 3.82 – 3.71 (d, *J* = 2.5 Hz, 3H), 1.27 – 1.08 (m, 2H), 1.08 – 0.86 (s, 2H).	408	93%
3-72		OMe	环丙基	[1]H NMR (400 MHz, DMSO) δ 15.07 – 14.72 (s, 1H), 9.21 – 8.97 (s, 1H), 8.95 – 8.73 (m, 1H), 8.41 – 8.14 (m, 1H), 8.12 – 7.95 (s, 1H), 3.40 – 3.18 (m, 4H), 7.95 – 7.79 (d, *J* = 8.6 Hz, 1H), 7.79 – 7.60 (dd, *J* = 8.5, 3.9 Hz, 2H), 4.34 – 4.10 (d, *J* = 6.3 Hz, 1H), 1.30 – 1.02 (s, 4H).	376	95%
3-73		Me	环丙基	[1]H NMR (400 MHz, DMSO) δ 14.85 – 14.61 (s, 1H), 10.68 – 10.51 (s, 1H), 9.04 – 8.78 (m, 1H), 8.01 – 7.81 (m, 1H), 7.36 – 7.11 (m, 2H), 7.11 – 6.87 (dd, *J* = 7.8, 2.7 Hz, 1H), 4.47 – 4.29 (s, 1H), 3.72 – 3.47 (s, 2H), 1.27 – 1.08 (m, 2H), 1.08 – 0.86 (s, 2H).	393	97%
3-74		Me	环丙基	[1]H NMR (400 MHz, DMSO) δ 14.85 – 14.61 (s, 1H), 10.68 – 10.51 (s, 1H), 9.04 – 8.78 (m, 1H), 8.01 – 7.81 (m, 1H), 7.36 – 7.11 (m, 2H), 7.11 – 6.87 (dd, *J* = 7.8, 2.7 Hz, 1H), 4.47 – 4.29 (s, 1H), 3.72 – 3.47 (s, 2H), 2.66 – 2.57 (d, *J* = 2.7 Hz, 3H), 2.55 – 2.45 (d, *J* = 3.4 Hz, 4H).	424	97%
3-75		OMe	环丙基	[1]H NMR (400 MHz, DMSO) δ 14.80 – 14.62 (m, 1H), 8.38 – 8.18 (m, 1H). 8.03 – 7.83 (m, 1H), 8.96 – 8.82 (m, 1H), 7.77 – 7.59 (m, 1H), 7.37 – 7.22 (m, 1H), 4.48 – 4.29 (m, 1H), 3.24 – 3.08 (m, 2H), 3.94 – 3.70 (m, 2H), 1.32 – 1.12 (m, 2H), 1.12 – 0.86 (m, 2H).	394	100%

3-76		Me	环丙基	^{1}H NMR (400 MHz, DMSO) δ 15.11 – 14.26 (d, *J* = 53.0 Hz, 1H), 10.22 – 9.45 (m, 1H), 9.01 – 8.84 (m, 1H), 8.77 – 8.58 (s, 1H), 8.09 – 7.92 (d, *J* = 8.5 Hz, 1H), 7.88 – 7.68 (s, 1H), 7.51 – 7.33 (s, 1H), 4.84 – 4.58 (s, 2H), 4.53 – 4.25 (s, 1H), 2.96 – 2.72 (s, 6H), 2.72 – 2.56 (s, 3H), 1.34 – 1.17 (d, *J* = 6.5 Hz, 2H), 1.17 – 0.93 (d, *J* = 10.1 Hz, 2H).	435	94%
3-77		Me	环丙基	^{1}H NMR (400 MHz, DMSO) δ 14.87 – 14.59 (s, 1H), 12.20 – 12.00 (s, 1H), 9.01 – 8.79 (s, 1H), 8.09 – 7.83 (d, *J* = 8.6 Hz, 1H), 7.74 – 7.59 (s, 1H), 7.39 – 7.20 (m, 2H), 4.48 – 4.31 (s, 1H), 2.72 – 2.56 (s, 3H), 1.36 – 1.12 (d, *J* = 6.9 Hz, 2H), 1.12 – 0.79 (s, 2H).	411	98%
3-78		Me	环丙基	^{1}H NMR (400 MHz, DMSO) δ 14.85 – 14.61 (s, 1H), 10.68 – 10.51 (s, 1H), 9.04 – 8.78 (m, 1H), 8.01 – 7.81 (m, 1H), 7.36 – 7.11 (m, 2H), 7.11 – 6.87 (dd, *J* = 7.8, 2.7 Hz, 1H), 4.47 – 4.29 (s, 1H), 3.72 – 3.47 (s, 2H), 1.27 – 1.08 (m, 2H), 1.08 – 0.86 (s, 2H).	393	95%
3-79		Me	环丙基	^{1}H NMR (400 MHz, DMSO) δ 14.82 – 14.60 (s, 1H), 11.50 – 11.28 (s, 1H), 8.99 – 8.81 (s, 1H), 8.09 – 7.90 (m, 2H), 7.66 – 7.53 (d, *J* = 1.1 Hz, 1H), 6.91 – 6.78 (s, 1H), 6.17 – 5.99 (d, *J* = 15.7 Hz, 1H), 5.38 – 5.23 (d, *J* = 9.0 Hz, 1H), 4.48 – 4.31 (dd, *J* = 8.4, 4.4 Hz, 1H), 3.61 – 3.41 (s, 1H), 2.71 – 2.56 (s, 3H), 1.32 – 1.16 (s, 2H), 1.14 – 0.97 (s, 2H).	421	97%
3-80		MeO	环丙基	^{1}H NMR (400 MHz, DMSO) δ 14.82 – 14.60 (s, 1H), 11.50 – 11.28 (s, 1H), 8.99 – 8.81 (s, 1H), 8.09 – 7.90 (m, 2H), 7.66 – 7.53 (d, *J* = 1.1 Hz, 1H), 6.91 – 6.78 (s, 1H), 6.17 – 5.99 (d, *J* = 15.7 Hz, 1H), 5.38 – 5.23 (d, *J* = 9.0 Hz, 1H), 4.48 – 4.31 (dd, *J* = 8.4, 4.4 Hz, 1H), 3.61 – 3.41 (s, 1H), 2.71 – 2.56 (s, 3H), 1.14 – 0.97 (s, 4H).	437	90%
3-81		Me	环丙基	^{1}H NMR (400 MHz, DMSO) δ 14.85 – 14.61 (s, 1H), 10.95 – 10.69 (s, 1H), 9.06 – 8.79 (s, 2H), 8.05 – 7.90 (d, *J* = 8.7 Hz, 1H), 7.28 – 7.09 (s, 1H), 6.85 – 6.63 (s, 1H), 4.46 – 4.29 (tt, *J* = 7.4, 4.0 Hz, 1H), 2.72 – 2.54 (s, 3H), 1.32 – 1.14 (d, *J* = 5.8 Hz, 2H), 1.14 – 0.97 (d, *J* = 3.8 Hz, 2H).	394	94%

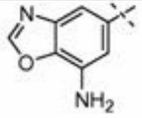
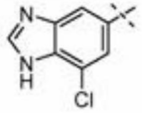
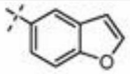
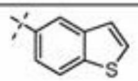
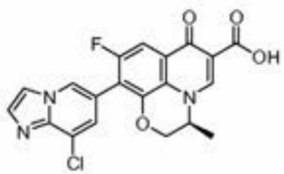
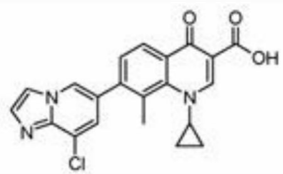
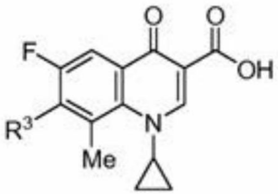
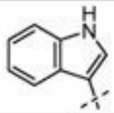
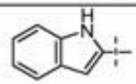
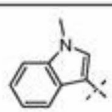
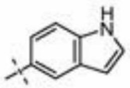
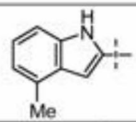
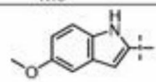
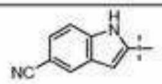
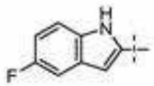
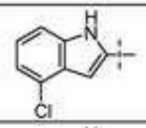
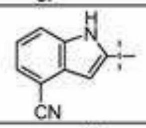
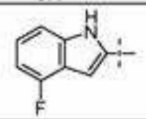
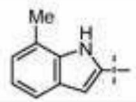
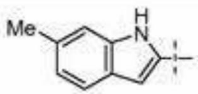
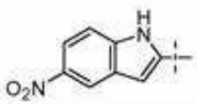
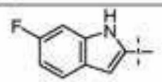
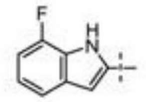
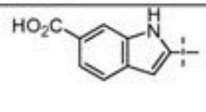
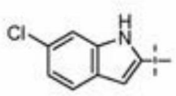
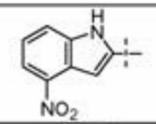
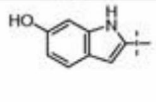
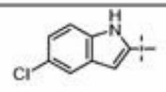
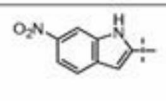
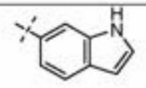
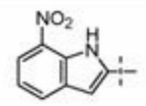
3-82		OMe	环丙基	^{1}H NMR (400 MHz, DMSO) δ 14.89 – 14.50 (s, 2H), 11.09 – 10.63 (s, 1H), 9.21 – 8.97 (s, 1H), 8.97 – 8.73 (s, 1H), 8.07 – 7.85 (m, 1H), 3.48 – 3.31 (m, 5H), 7.42 – 7.26 (m, 1H), 7.04 – 6.87 (m, 1H), 4.31 – 4.13 (p, *J* = 5.6 Hz, 1H), 2.72 – 2.54 (s, 3H), 1.27 – 1.01 (d, *J* = 5.6 Hz, 4H).	410	98%
3-83		OMe	环丙基	^{1}H NMR (400 MHz, DMSO) δ 15.05 – 14.39 (s, 1H), 13.02 – 12.32 (s, 1H), 8.97 – 8.77 (s, 1H), 8.47 – 8.20 (s, 1H), 7.85 – 7.39 (m, 2H), 7.33 – 6.98 (d, *J* = 8.0 Hz, 1H), 4.47 – 4.23 (s, 1H), 2.74 – 2.52 (s, 3H), 1.34 – 1.13 (m, 2H), 1.13 – 0.71 (s, 2H).	428	100%
3-84		Me	环丙基	^{1}H NMR (400 MHz, DMSO) δ 14.75 (d, *J* = 8.7 Hz, 1H), 8.91 (s, 1H), 8.13 (s, 1H), 7.99 (t, *J* = 11.1 Hz, 1H), 7.78 (t, *J* = 13.2 Hz, 1H), 7.72 (s, 1H), 7.33 (d, *J* = 8.5 Hz, 1H), 7.07 (s, 1H), 4.40 (m, 1H), 2.61 (s, 3H), 1.24 (d, *J* = 5.7 Hz, 2H), 1.08 (s, 2H).	378	98%
3-85		Me	环丙基	^{1}H NMR (400 MHz, DMSO) δ 14.70 (s, 1H), 8.90 (s, 1H), 8.21 (d, *J* = 8.0 Hz, 1H), 7.98 (d, *J* = 8.1 Hz, 1H), 7.94 (s, 1H), 7.90 (s, 1H), 7.56 (s, 1H), 7.38 (d, *J* = 7.9 Hz, 1H), 4.38 (s, 1H), 2.65 (s, 3H), 1.17 (m, 2H), 1.06 (m, 2H).	394	98%
3-86				^{1}H NMR (400 MHz, DMSO) δ 15.38 – 14.22 (s, 1H), 9.14 – 9.08 (s, 1H), 9.00 – 8.94 (s, 1H), 8.32 – 8.24 (s, 1H), 7.93 – 7.90 (s, 1H), 7.90 – 7.86 (s, 1H), 7.83 – 7.76 (d, *J* = 9.72 Hz, 1H), 5.07 – 4.96 (d, *J* = 6.74 Hz, 1H), 4.65 – 4.56 (d, *J* = 11.26 Hz, 1H), 4.53 – 4.43 (d, *J* = 9.86 Hz, 1H), 1.54 – 1.46 (d, *J* = 6.76 Hz, 3H).	414	99%
3-87				^{1}H NMR (400 MHz, DMSO) δ 14.87 (s, 1H), 8.93 (s, 1H), 8.77 (s, 1H), 8.27 (d, *J* = 8.2 Hz, 1H), 8.15 (s, 1H), 7.73 (d, *J* = 0.9 Hz, 1H), 7.63 (m, 2H), 4.46 – 4.36 (m, 1H), 2.76 (s, 3H), 1.29 (d, *J* = 6.5 Hz, 2H), 1.08 (t, *J* = 7.4 Hz, 2H).	394	99%

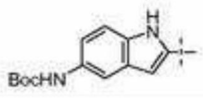
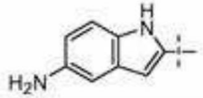
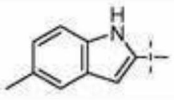
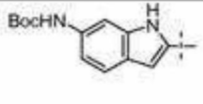
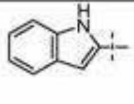
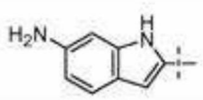
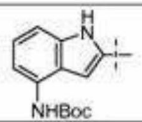
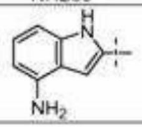
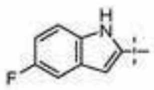
表 4

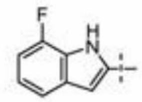
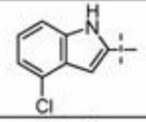
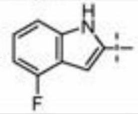
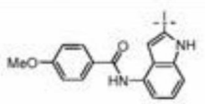
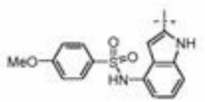
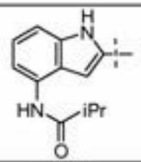
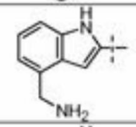
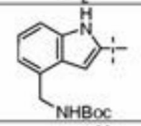
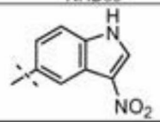


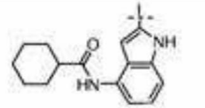
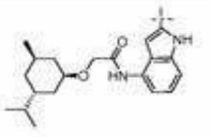
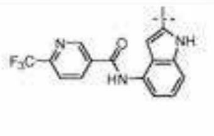
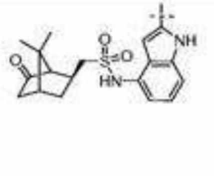
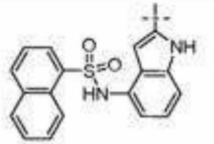
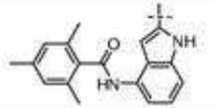
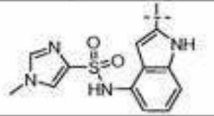
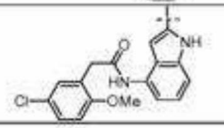
化合物编号	R^3 =	NMR	MS (MH$^+$)	HPLC
4-1		^{1}H NMR (400 MHz, DMSO) δ 14.49 (s, 1H), 11.38 (s, 1H), 8.70 (s, 1H), 7.78 (d, *J* = 9.1 Hz, 1H), 7.42 (d, *J* = 7.9 Hz, 1H), 7.26 (d, *J* = 8.1 Hz, 1H), 7.00 – 6.92 (m, 1H), 6.86 (t, *J* = 7.5 Hz, 1H), 6.51 (s, 1H), 4.24 – 4.16 (m, 1H), 2.56 (s, 3H), 1.03 (dd, *J* = 12.0, 4.6 Hz, 2H), 0.86 (d, *J* = 7.4 Hz, 2H).	377	95%
4-2		^{1}H NMR (400 MHz, DMSO) δ 14.70 (s, 1H), 11.59 (s, 1H), 8.92 (s, 1H), 8.00 (d, *J* = 9.1 Hz, 1H), 7.64 (d, *J* = 7.5 Hz, 1H), 7.48 (d, *J* = 8.0 Hz, 1H), 7.19 (t, *J* = 7.5 Hz, 1H), 7.08 (t, *J* = 7.3 Hz, 1H), 6.73 (s, 1H), 4.42 (s, 1H), 2.78 (s, 3H), 1.27 (d, *J* = 6.1 Hz, 2H), 1.07 (s, 2H).	377	100%
4-3		^{1}H NMR (400 MHz, DMSO) δ 14.66 (s, 1H), 8.93 (s, 1H), 8.05 (d, *J* = 8.6 Hz, 1H), 7.65 (d, *J* = 7.7 Hz, 1H), 7.57 (d, *J* = 8.0 Hz, 1H), 7.30 – 7.24 (m, 1H), 7.14 (t, *J* = 7.3 Hz, 1H), 6.68 (s, 1H), 4.41 (s, 1H), 3.58 (s, 3H), 2.65 (s, 3H), 1.24 (s, 4H).	391	98%
4-4		^{1}H NMR (400 MHz, DMSO) δ 14.82 (s, 1H), 11.36 (s, 1H), 8.90 (s, 1H), 7.95 (d, *J* = 7.8 Hz, 1H), 7.57 (s, 3H), 7.46 (s, 1H), 7.07 (d, *J* = 8.5 Hz, 1H), 6.53 (s, 1H), 4.39 (s, 1H), 2.62 (s, 3H), 1.24 (s, 2H), 1.09 (d, *J* = 18.8 Hz, 2H).	377	87%
4-5		^{1}H NMR (400 MHz, DMSO) δ 14.71 (s, 1H), 11.55 (s, 1H), 8.92 (s, 1H), 8.00 (d, *J* = 9.0 Hz, 1H), 7.30 (d, *J* = 8.4 Hz, 1H), 7.09 (t, *J* = 7.4 Hz, 1H), 6.87 (d, *J* = 6.9 Hz, 1H), 6.75 (s, 1H), 4.42 (s, 1H), 2.79 (s, 3H), 2.09 (s, 3H), 1.28 (d, *J* = 6.0 Hz, 2H), 1.07 (s, 2H).	391	90%
4-6		^{1}H NMR (400 MHz, DMSO) δ 14.71 (s, 1H), 11.43 (s, 1H), 8.91 (s, 1H), 7.99 (d, *J* = 8.7 Hz, 1H), 7.37 (d, *J* = 8.6 Hz, 1H), 7.13 (s, 1H), 6.84 (d, *J* = 8.7 Hz, 1H), 6.63 (s, 1H), 4.41 (s, 1H), 3.78 (s, 4H), 2.77 (s, 3H), 1.26 (d, *J* = 5.7 Hz, 2H), 1.07 (s, 2H).	407	92.3%

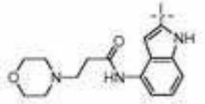
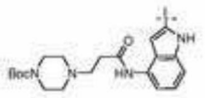
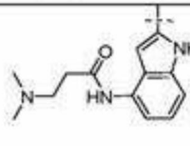
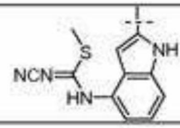
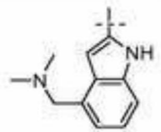
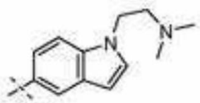
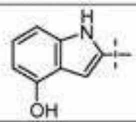
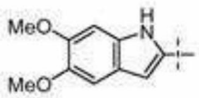
4-9		^{1}H NMR (400 MHz, DMSO) δ 14.65 (s, 1H), 12.23 (d, J = 30.1 Hz, 1H), 8.93 (s, 1H), 8.20 (d, J = 11.8 Hz, 1H), 7.65 (s, 1H), 7.53 (s, 2H), 6.87 (d, J = 26.1 Hz, 1H), 4.38 (d, J = 31.7 Hz, 1H), 2.74 (d, J = 19.6 Hz, 3H), 1.24 (d, J = 8.9 Hz, 2H), 1.07 (s, 2H).	402	92.8%
4-10		^{1}H NMR (400 MHz, DMSO) δ 14.67 (s, 1H), 11.70 (s, 1H), 8.92 (s, 1H), 8.00 (d, J = 8.9 Hz, 1H), 7.52 – 7.44 (m, 1H), 7.41 (d, J = 9.8 Hz, 1H), 7.04 (t, J = 9.3 Hz, 1H), 6.72 (s, 1H), 4.42 (s, 1H), 2.77 (s, 3H), 1.26 (d, J = 6.4 Hz, 2H), 1.07 (s, 2H).	395	89.7%
4-11		^{1}H NMR (400 MHz, DMSO) δ 14.68 (s, 1H), 11.98 (s, 1H), 8.93 (s, 1H), 8.02 (d, J = 9.1 Hz, 1H), 7.47 (d, J = 7.3 Hz, 1H), 7.19 (q, J = 7.8 Hz, 2H), 6.76 (s, 1H), 4.42 (s, 1H), 2.78 (s, 3H), 1.27 (d, J = 6.2 Hz, 2H), 1.08 (s, 2H).	411	97%
4-12		^{1}H NMR (400 MHz, DMSO) δ 14.64 (s, 1H), 12.30 (s, 1H), 8.93 (s, 1H), 8.04 (d, J = 8.3 Hz, 1H), 7.86 (d, J = 6.8 Hz, 1H), 7.64 (s, 1H), 7.36 (s, 1H), 6.91 (s, 1H), 4.43 (s, 1H), 2.78 (s, 3H), 1.28 (s, 2H), 1.09 (s, 2H).	402	99%
4-13		^{1}H NMR (400 MHz, DMSO) δ 14.66 (s, 1H), 11.93 (s, 1H), 8.92 (s, 1H), 8.01 (d, J = 9.1 Hz, 1H), 7.33 (d, J = 8.3 Hz, 1H), 7.17 (d, J = 6.5 Hz, 1H), 6.87 (t, J = 8.9 Hz, 1H), 6.80 (s, 1H), 4.42 (s, 1H), 2.78 (s, 3H), 1.27 (d, J = 6.4 Hz, 2H), 1.07 (s, 2H).	395	87%
4-14		^{1}H NMR (400 MHz, DMSO) δ 14.70 (s, 1H), 11.43 (s, 1H), 8.92 (s, 1H), 8.00 (d, J = 8.8 Hz, 1H), 7.46 (s, 1H), 6.98 (s, 2H), 6.67 (s, 1H), 4.42 (s, 1H), 2.77 (s, 3H), 1.26 (d, J = 6.3 Hz, 2H), 1.09 (s, 2H).	391	92.7%
4-15		^{1}H NMR (400 MHz, DMSO) δ 11.07 (s, 1H), 9.02 (s, 1H), 8.04 (s, 1H), 7.55 (s, 2H), 7.29 (s, 1H), 6.96 (s, 1H), 6.67 (s, 1H), 2.85 (s, 3H), 2.47 (s, 3H), 1.34 (s, 2H), 1.09 (s, 2H).	391	99%
4-16		^{1}H NMR (400 MHz, DMSO) δ 14.64 (s, 1H), 12.41 (s, 1H), 8.93 (s, 1H), 8.69 (s, 1H), 8.07 (d, J = 13.8 Hz, 2H), 7.67 (s, 1H), 7.05 (s, 1H), 4.42 (s, 1H), 2.78 (s, 3H), 1.26 (s, 2H), 1.08 (s, 2H).	422	100%
4-17		^{1}H NMR (400 MHz, DMSO) δ 14.70 (s, 1H), 11.70 (s, 1H), 8.92 (s, 1H), 8.00 (d, J = 9.0 Hz, 1H), 7.65 (s, 1H), 7.24 (d, J = 10.1 Hz, 1H), 6.96 (t, J = 9.1 Hz, 1H), 6.76 (s, 1H), 4.42 (s, 1H), 2.77 (s, 3H), 1.26 (d, J = 5.7 Hz, 2H), 1.07 (s, 2H).	395	88%

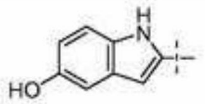
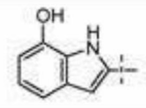
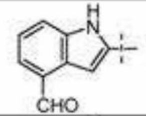
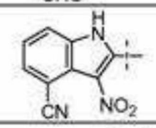
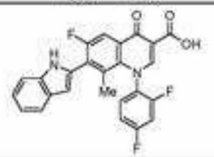
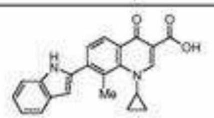
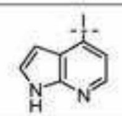
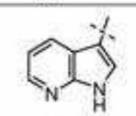
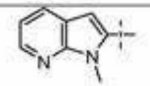
4-18		^{1}H NMR (400 MHz, DMSO) δ 14.68 (s, 1H), 12.08 (s, 1H), 8.92 (s, 1H), 8.01 (d, *J* = 8.9 Hz, 1H), 7.47 (d, *J* = 6.4 Hz, 1H), 7.04 (d, *J* = 9.3 Hz, 2H), 6.79 (s, 1H), 4.42 (s, 1H), 2.76 (s, 3H), 1.26 (d, *J* = 6.2 Hz, 2H), 1.08 (s, 2H).	395	89.1%
4-19		^{1}H NMR (400 MHz, DMSO) δ 14.65 (s, 1H), 12.66 (s, 1H), 11.98 (s, 1H), 8.93 (s, 1H), 8.12 (s, 1H), 8.03 (d, *J* = 8.8 Hz, 1H), 7.70 (q, *J* = 8.2 Hz, 2H), 6.83 (s, 1H), 4.43 (s, 1H), 2.78 (s, 3H), 1.27 (d, *J* = 6.2 Hz, 2H), 1.08 (s, 2H).	421	100%
4-20		^{1}H NMR (400 MHz, DMSO) δ 14.68 (s, 1H), 11.78 (s, 1H), 8.92 (s, 1H), 8.01 (d, *J* = 9.0 Hz, 1H), 7.66 (d, *J* = 8.6 Hz, 1H), 7.51 (s, 1H), 7.10 (d, *J* = 8.4 Hz, 1H), 6.77 (s, 1H), 4.42 (s, 1H), 2.77 (s, 3H), 1.26 (d, *J* = 6.1 Hz, 2H), 1.07 (s, 2H).	411	90%
4-21		^{1}H NMR (400 MHz, DMSO) δ 14.49 (s, 1H), 12.71 (s, 1H), 8.92 (s, 1H), 8.15 (s, 1H), 8.04 (d, *J* = 9.4 Hz, 2H), 7.43 (s, 1H), 7.29 (s, 1H), 4.42 (s, 1H), 2.79 (s, 3H), 1.27 (s, 2H), 1.08 (s, 2H).	422	97%
4-22		^{1}H NMR (400 MHz, MeOD) δ 8.96 (s, 1H), 7.93 (d, *J* = 9.1 Hz, 1H), 7.55 (d, *J* = 12.6 Hz, 2H), 7.47 (s, 1H), 7.34 (d, *J* = 8.1 Hz, 1H), 6.77 (s, 1H), 6.57 (d, *J* = 7.9 Hz, 1H), 6.51 (s, 1H), 4.29 (s, 1H), 2.78 (s, 3H), 1.38 – 1.24 (m, 2H), 1.20 (s, 2H).	393	90%
4-23		^{1}H NMR (400 MHz, DMSO) δ 14.68 (s, 1H), 11.82 (s, 1H), 8.92 (s, 1H), 8.01 (d, *J* = 8.5 Hz, 1H), 7.70 (s, 1H), 7.50 (d, *J* = 8.3 Hz, 1H), 7.19 (d, *J* = 9.4 Hz, 1H), 6.73 (s, 1H), 4.42 (s, 1H), 2.76 (s, 3H), 1.26 (d, *J* = 6.1 Hz, 2H), 1.07 (s, 2H).	411	90%
4-24		^{1}H NMR (400 MHz, DMSO) δ 14.63 (s, 1H), 11.61 (s, 1H), 8.95 (d, *J* = 9.5 Hz, 1H), 8.41 (s, 1H), 7.99 (s, 1H), 7.67 (d, *J* = 9.1 Hz, 1H), 6.52 (s, 1H), 4.43 (s, 1H), 2.78 (s, 3H), 1.25 (s, 2H), 1.08 (s, 2H).	422	90%
4-25		^{1}H NMR (400 MHz, DMSO) δ 14.82 (s, 1H), 11.31 (s, 1H), 8.91 (s, 1H), 7.97 (d, *J* = 8.4 Hz, 1H), 7.71 (d, *J* = 7.8 Hz, 1H), 7.48 (s, 1H), 7.41 (s, 1H), 6.99 (d, *J* = 7.9 Hz, 1H), 6.53 (s, 1H), 4.40 (s, 1H), 2.63 (s, 3H), 1.24 (s, 2H), 1.08 (s, 2H).	377	100%
4-26		^{1}H NMR (400 MHz, DMSO) δ 14.70 (s, 1H), 12.37 (s, 1H), 8.93 (s, 1H), 8.19 (t, *J* = 9.0 Hz, 2H), 8.01 (d, *J* = 8.0 Hz, 1H), 7.34 (s, 1H), 7.00 (s, 1H), 4.43 (s, 1H), 2.75 (s, 3H), 1.24 (s, 2H), 1.11 (s, 2H).	422	99%

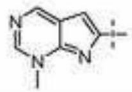
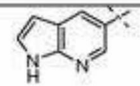
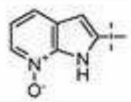
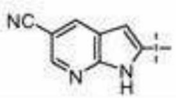
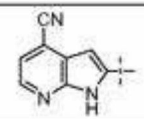
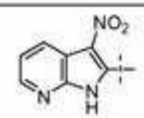
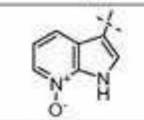
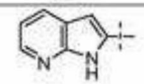
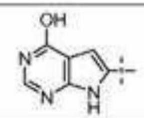
4-27		[1]H NMR (400 MHz, DMSO) δ 14.73 (s, 1H), 11.45 (s, 1H), 9.17 (s, 1H), 8.92 (s, 1H), 7.99 (d, J = 8.6 Hz, 1H), 7.77 (s, 1H), 7.35 (d, J = 8.5 Hz, 1H), 7.24 (s, 1H), 6.64 (s, 1H), 4.42 (s, 1H), 2.77 (s, 2H), 1.46 (d, J = 29.9 Hz, 9H), 1.25 (s, 2H), 1.06 (s, 2H).	492	100%
4-28		[1]H NMR (400 MHz, DMSO) δ 14.67 (s, 1H), 11.94 (s, 1H), 9.97 (s, 2H), 8.93 (s, 1H), 8.02 (d, J = 8.7 Hz, 1H), 7.65 (s, 1H), 7.60 (d, J = 8.6 Hz, 1H), 7.19 – 7.13 (m, 1H), 6.84 (s, 1H), 4.42 (s, 2H), 2.76 (s, 3H), 1.14 – 1.00 (m, 4H).	392	94%
4-29		[1]H NMR (400 MHz, DMSO) δ 14.67 (s, 1H), 11.94 (s, 1H), 9.97 (s, 2H), 8.93 (s, 1H), 8.02 (d, J = 8.7 Hz, 1H), 7.65 (s, 1H), 7.60 (d, J = 8.6 Hz, 1H), 7.19 – 7.13 (m, 1H), 6.84 (s, 1H), 4.42 (s, 2H), 2.76 (s, 3H), 1.14 – 1.00 (m, 4H).	391	100%
4-30		[1]H NMR (400 MHz, DMSO) δ 14.73 (s, 1H), 11.38 (s, 1H), 9.33 (s, 1H), 8.91 (s, 1H), 7.98 (d, J = 9.1 Hz, 1H), 7.81 (s, 1H), 7.48 (d, J = 8.3 Hz, 1H), 7.09 (d, J = 8.7 Hz, 1H), 6.64 (s, 1H), 4.42 (s, 1H), 2.78 (s, 3H), 1.51 (s, 10H), 1.25 (d, J = 8.9 Hz, 2H), 1.08 (dd, J = 14.0, 6.3 Hz, 2H).	492	97%
4-31		[1]H NMR (400 MHz, DMSO) δ 14.31 (s, 1H), 11.68 (s, 1H), 8.94 (s, 1H), 8.17 (d, J = 8.7 Hz, 1H), 7.66 (d, J = 7.8 Hz, 1H), 7.49 (d, J = 8.1 Hz, 1H), 7.21 (t, J = 7.5 Hz, 1H), 7.08 (t, J = 7.4 Hz, 1H), 6.80 (s, 1H), 4.44 (s, 1H), 1.25 (d, J = 6.4 Hz, 2H), 1.12 (s, 2H).	397	100%
4-32		[1]H NMR (400 MHz, DMSO) δ 14.72 (s, 1H), 11.74 (s, 1H), 9.35 (s, 2H), 8.92 (s, 1H), 8.00 (d, J = 9.0 Hz, 1H), 7.66 (d, J = 8.5 Hz, 1H), 7.34 (s, 1H), 6.94 (d, J = 8.3 Hz, 1H), 6.76 (s, 1H), 4.42 (s, 1H), 2.78 (s, 3H), 1.27 (d, J = 5.6 Hz, 3H), 1.06 (s, 2H).	392	97%
4-33		[1]H NMR (400 MHz, DMSO) δ 14.73 (s, 1H), 11.56 (s, 1H), 9.17 (s, 1H), 8.93 (s, 1H), 8.00 (d, J = 7.7 Hz, 1H), 7.46 (s, 2H), 7.12 (d, J = 20.9 Hz, 2H), 5.18 – 4.56 (m, 1H), 4.44 (s, 1H), 2.80 (s, 3H), 1.24 (s, 2H), 1.07 (s, 2H).	492	91%
4-34		[1]H NMR (400 MHz, DMSO) δ 14.70 (s, 1H), 11.77 (s, 1H), 8.93 (s, 1H), 8.01 (d, J = 8.4 Hz, 1H), 7.23 – 7.03 (m, 2H), 6.88(s, 1H), 6.76 (d, J = 6.4 Hz, 1H), 4.43 (m, 1H), 2.77(s, 3H), 1.24 (d, J = 6.6 Hz, 2H), 1.12 (s, 2H).	392	99%
4-35		[1]H NMR (400 MHz, DMSO) δ 14.28 (s, 1H), 11.79 (s, 1H), 8.94 (s, 1H), 8.17 (d, J = 8.8 Hz, 1H), 7.56 – 7.38 (m, 2H), 7.06 (t, J = 8.8 Hz, 1H), 6.79 (s, 1H), 4.44 (s, 1H), 1.24 (d, J = 6.6 Hz, 2H), 1.12 (s, 2H).	415	91%

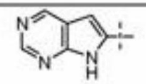
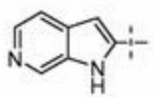
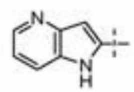
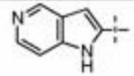
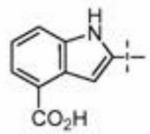
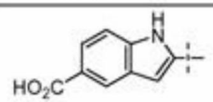
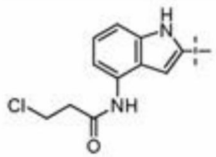
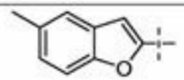
4-36		^{1}H NMR (400 MHz, DMSO) δ 14.28 (s, 1H), 12.16 (s, 1H), 8.95 (s, 1H), 8.18 (d, *J* = 8.0 Hz, 1H), 7.49 (d, *J* = 4.2 Hz, 1H), 7.05 (d, *J* = 8.5 Hz, 2H), 6.85 (s, 1H), 4.43 (s, 1H), 1.24 (s, 2H), 1.13 (s, 2H).	415	95%
4-37		^{1}H NMR (400 MHz, DMSO) δ 14.26 (s, 1H), 12.07 (s, 1H), 8.95 (s, 1H), 8.19 (d, *J* = 8.5 Hz, 1H), 7.49 (d, *J* = 7.6 Hz, 1H), 7.29 – 7.07 (m, 2H), 6.81 (s, 1H), 4.44 (s, 1H), 1.25 (s, 2H), 1.13 (s, 2H).	431	95%
4-38		^{1}H NMR (400 MHz, DMSO) δ 14.28 (s, 1H), 12.04 (s, 1H), 8.95 (s, 1H), 8.19 (d, *J* = 8.7 Hz, 1H), 7.34 (d, *J* = 8.0 Hz, 1H), 7.20 (s, 1H), 6.93 – 6.81 (m, 2H), 4.44 (s, 1H), 1.24 (s, 2H), 1.13 (s, 2H).	415	87%
4-39		^{1}H NMR (400 MHz, DMSO) δ 14.71 (s, 1H), 11.66 (s, 1H), 10.06 (s, 1H), 8.92 (s, 1H), 8.02 (s, 3H), 7.46 (s, 1H), 7.31 (s, 1H), 7.19 (s, 1H), 7.06 (s, 1H), 6.90 (s, 1H), 4.42 (s, 1H), 3.85 (s, 3H), 2.79 (s, 3H), 1.26 (s, 2H), 1.07 (s, 2H).	526	95.6%
4-40		^{1}H NMR (400 MHz, DMSO) δ 14.71 (s, 1H), 11.62 (s, 1H), 10.05 (s, 1H), 8.93 (s, 1H), 7.99 (d, *J* = 9.2 Hz, 1H), 7.70 (d, *J* = 7.5 Hz, 2H), 7.28 – 6.87 (m, 6H), 4.42 (s, 1H), 3.75 (s, 3H), 2.68 (s, 3H), 1.25 (d, *J* = 9.3 Hz, 2H), 1.05 (d, *J* = 18.8 Hz, 2H).	562	96%
4-41		^{1}H NMR (400 MHz, DMSO) δ 14.73 (s, 1H), 11.66 (s, 1H), 9.62 (s, 1H), 8.93 (s, 1H), 8.02 (d, *J* = 8.7 Hz, 1H), 7.72 (s, 1H), 7.21 (s, 1H), 7.12 (s, 1H), 7.04 (s, 1H), 4.44 (s, 1H), 3.05 (s, 1H), 2.82 (d, *J* = 25.3 Hz, 3H), 1.12 (d, *J* = 24.4 Hz, 10H).	462	87%
4-42		^{1}H NMR (400 MHz, DMSO) δ 11.87 (s, 1H), 9.18 (s, 1H), 8.08 – 7.63 (m, 2H), 7.48 (s, 2H), 7.20 (s, 2H), 6.95 (s, 2H), 4.54 (s, 1H), 4.24 (s, 2H), 2.81 (s, 3H), 1.29 (s, 2H), 1.06 (s, 2H).	406	97%
4-43		^{1}H NMR (400 MHz, DMSO) δ 14.78 (s, 1H), 11.70 (s, 1H), 8.98 (s, 1H), 8.06 (d, *J* = 9.0 Hz, 1H), 7.49 (s, 1H), 7.43 (d, *J* = 7.4 Hz, 1H), 7.20 (s, 1H), 7.00 (d, *J* = 6.8 Hz, 1H), 6.91 (s, 1H), 4.49 (s, 3H), 2.84 (s, 3H), 1.46 (s, 9H), 1.30 (s, 2H), 1.13 (s, 2H).	506	98%
4-44		^{1}H NMR (400 MHz, DMSO) δ 14.76 (s, 1H), 12.92 (s, 1H), 8.92 (s, 1H), 8.79 (s, 1H), 8.07 (s, 1H), 7.99 (d, *J* = 8.6 Hz, 1H), 7.77 (d, *J* = 8.3 Hz, 1H), 7.37 (d, *J* = 8.0 Hz, 1H), 4.40 (s, 1H), 2.62 (s, 3H), 1.25 (d, *J* = 5.7 Hz, 2H), 1.10 (s, 2H).	422	100%

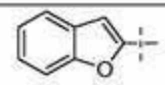
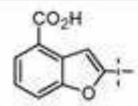
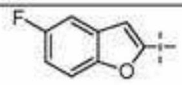
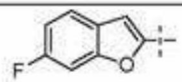
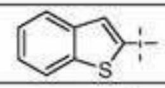
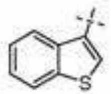
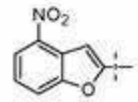
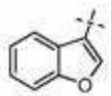
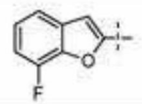
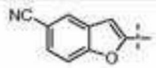
4-45		[1]H NMR (400 MHz, DMSO) δ 11.65 (s, 1H), 9.57 (s, 1H), 8.82 (s, 1H), 7.93 (d, J = 8.3 Hz, 1H), 7.71 (d, J = 5.5 Hz, 1H), 7.19 (s, 1H), 7.09 (s, 1H), 7.00 (s, 1H), 4.32 (s, 1H), 2.72 (d, J = 18.9 Hz, 3H), 1.89 – 1.77 (m, 5H), 1.65 (s, 1H), 1.45 (d, J = 10.5 Hz, 2H), 1.35 – 1.16 (m, 6H), 0.97 (s, 2H).	502	89%
4-46		[1]H NMR (400 MHz, DMSO) δ 14.69 (s, 1H), 11.94 (s, 1H), 9.39 (s, 1H), 8.92 (s, 1H), 8.00 (d, J = 7.8 Hz, 1H), 7.72 (s, 1H), 7.28 (s, 1H), 7.15 (s, 1H), 6.81 (s, 1H), 4.43 (s, 1H), 4.27 – 4.13 (m, 2H), 2.79 (s, 3H), 2.33 (s, 1H), 2.17 (s, 1H), 1.59 (d, J = 14.2 Hz, 2H), 1.26 (s, 5H), 1.07 (s, 2H), 0.85 (dd, J = 54.3, 14.6 Hz, 14H).	588	86.3%
4-47		[1]H NMR (400 MHz, DMSO) δ 14.73 (s, 1H), 11.74 (s, 1H), 10.60 (s, 1H), 9.30 (s, 1H), 8.92 (s, 1H), 8.61 (d, J = 7.6 Hz, 1H), 8.11 (d, J = 7.9 Hz, 1H), 8.01 (d, J = 8.8 Hz, 1H), 7.59 (d, J = 6.7 Hz, 1H), 7.37 (d, J = 7.8 Hz, 1H), 7.24 (d, J = 8.0 Hz, 1H), 6.97 (s, 1H), 4.43 (s, 1H), 2.79 (s, 3H), 1.25 (s, 2H), 1.07 (s, 2H).	565	96%
4-48		[1]H NMR (400 MHz, DMSO) δ 14.70 (s, 1H), 11.74 (s, 1H), 9.76 (s, 1H), 8.93 (s, 1H), 8.01 (d, J = 8.7 Hz, 1H), 7.29 (d, J = 6.6 Hz, 1H), 7.23 – 7.01 (m, 3H), 4.43 (s, 1H), 3.49 (d, J = 14.6 Hz, 1H), 3.06 (d, J = 14.8 Hz, 1H), 2.37 (dd, J = 27.4, 15.5 Hz, 2H), 2.04 (s, 1H), 1.91 (d, J = 17.7 Hz, 2H), 1.51 (d, J = 11.3 Hz, 1H), 1.41 (d, J = 10.3 Hz, 1H), 1.25 (s, 2H), 1.09 (d, J = 11.8 Hz, 3H), 0.98 (s, 2H), 0.77 (d, J = 22.2 Hz, 3H).	606	88%
4-49		[1]H NMR (400 MHz, DMSO) δ 14.69 (s, 1H), 11.58 (s, 1H), 10.29 (s, 1H), 8.91 (s, 1H), 8.40 (s, 1H), 8.05 (dd, J = 15.6, 8.6 Hz, 2H), 7.97 (s, 2H), 7.83 (d, J = 8.2 Hz, 1H), 7.72 – 7.56 (m, 2H), 7.18 (d, J = 8.0 Hz, 1H), 7.04 (t, J = 8.0 Hz, 1H), 6.98 (d, J = 7.5 Hz, 1H), 6.81 (s, 1H), 4.35 (s, 1H), 2.54 (s, 3H), 1.23 (s, 2H), 1.04 (s, 2H).	582	100%
4-50		[1]H NMR (400 MHz, DMSO) δ 14.72 (s, 1H), 11.68 (s, 1H), 10.26 (s, 1H), 8.92 (s, 1H), 8.00 (s, 1H), 7.74 (s, 1H), 7.29 (s, 1H), 7.19 (s, 1H), 7.03 (s, 1H), 6.93 (s, 2H), 4.43 (s, 1H), 2.79 (s, 3H), 2.31 (s, 6H), 2.10 (s, 3H), 1.24 (s, 2H), 1.07 (s, 2H).	538	90%
4-51		[1]H NMR (400 MHz, DMSO) δ 14.73 (s, 1H), 11.62 (s, 1H), 10.08 (s, 1H), 8.93 (s, 1H), 8.00 (d, J = 7.6 Hz, 1H), 7.76 (d, J = 8.6 Hz, 2H), 7.18 (d, J = 7.7 Hz, 2H), 7.02 (d, J = 18.7 Hz, 2H), 4.44 (s, 1H), 3.63 (s, 3H), 2.76 (s, 3H), 1.24 (s, 2H), 1.08 (s, 2H).	536	99%
4-52		[1]H NMR (400 MHz, DMSO) δ 14.72 (s, 1H), 11.68 (s, 1H), 9.29 (s, 1H), 8.93 (s, 1H), 8.81 (s, 1H), 8.31 (s, 1H), 8.03 (d, J = 8.9 Hz, 1H), 7.15 (s, 2H), 7.02 (dd, J = 24.0, 8.3 Hz, 2H), 6.94 (s, 1H), 4.44 (s, 1H), 3.91 (s, 3H), 2.80 (s, 3H), 1.25 (d, J = 15.5 Hz, 2H), 1.08 (s, 2H).	575	96%

4-53		^{1}H NMR (400 MHz, DMSO) δ 14.71 (s, 1H), 11.72 (s, 1H), 10.04 (s, 1H), 8.94 (s, 1H), 8.02 (d, *J* = 10.3 Hz, 1H), 7.71 (d, *J* = 7.0 Hz, 1H), 7.24 (s, 1H), 7.15 (d, *J* = 7.3 Hz, 1H), 7.04 (s, 1H), 4.44 (s, 1H), 3.98 (s, 2H), 3.76 (s, 2H), 3.43 (s, 2H), 3.07 (d, *J* = 24.3 Hz, 4H), 2.78 (s, 3H), 2.69 (d, *J* = 10.9 Hz, 1H), 1.26 (s, 2H), 1.08 (s, 2H).	533	99%
4-54		^{1}H NMR (400 MHz, DMSO) δ 14.71 (s, 1H), 11.72 (s, 1H), 10.03 (s, 1H), 8.94 (s, 1H), 8.02 (d, *J* = 8.9 Hz, 1H), 7.70 (s, 1H), 7.24 (s, 1H), 7.14 (s, 1H), 7.03 (s, 1H), 5.33 (s, 1H), 4.43 (s, 1H), 4.03 (s, 2H), 3.03 (s, 4H), 2.78 (s, 3H), 2.00 (d, *J* = 7.6 Hz, 2H), 1.24 (s, 9H), 1.08 (s, 2H), 0.85 (s, 2H).	632	96%
4-55		^{1}H NMR (400 MHz, DMSO) δ 14.71 (s, 1H), 11.72 (s, 1H), 10.04 (s, 1H), 9.57 (s, 1H), 8.94 (s, 1H), 8.02 (d, *J* = 8.9 Hz, 1H), 7.71 (d, *J* = 7.8 Hz, 1H), 7.26 (d, *J* = 7.6 Hz, 1H), 7.15 (d, *J* = 9.1 Hz, 1H), 7.03 (d, *J* = 9.6 Hz, 1H), 4.44 (s, 1H), 2.99 (s, 1H), 2.82 (s, 3H), 2.78 (s, 2H), 2.54 (s, 2H), 1.26 (s, 2H), 1.08 (s, 2H).	491	91%
4-56		^{1}H NMR (400 MHz, DMSO) δ 14.71 (s, 1H), 11.87 (s, 1H), 10.45 (s, 1H), 8.93 (s, 1H), 8.02 (d, *J* = 8.8 Hz, 1H), 7.47 (d, *J* = 7.2 Hz, 1H), 7.23 (s, 1H), 7.07 (d, *J* = 7.9 Hz, 1H), 6.68 (s, 1H), 4.42 (s, 1H), 2.78 (s, 3H), 2.68 (s, 3H), 1.26 (s, 2H), 1.08 (s, 2H).	490	96%
4-57		^{1}H NMR (400 MHz, DMSO) δ 14.78 (s, 1H), 11.75 (s, 1H), 9.64 (s, 1H), 8.92 (s, 1H), 7.99 (d, *J* = 8.7 Hz, 1H), 7.83 (s, 1H), 7.70 (s, 1H), 7.63 (d, *J* = 7.8 Hz, 1H), 7.18 (d, *J* = 8.6 Hz, 1H), 4.48 (s, 2H), 4.40 (s, 1H), 2.72 (d, *J* = 27.2 Hz, 7H), 2.62 (s, 3H), 1.25 (s, 2H), 1.08 (s, 2H).	M-$(Me)_2N$ 389	100%
4-58		^{1}H NMR (400 MHz, DMSO) δ 14.79 (s, 1H), 9.84 (s, 1H), 8.92 (s, 1H), 7.97 (d, *J* = 8.2 Hz, 1H), 7.77 (d, *J* = 8.7 Hz, 1H), 7.62 (s, 1H), 7.56 (s, 1H), 7.20 (d, *J* = 8.0 Hz, 1H), 6.63 (s, 1H), 4.64 (s, 2H), 4.39 (s, 1H), 3.57 (s, 2H), 2.88 (s, 6H), 2.65 (d, *J* = 22.8 Hz, 3H), 1.24 (s, 2H), 1.08 (s, 2H).	448	100%
4-59		^{1}H NMR (400 MHz, DMSO) δ 14.76 (s, 1H), 11.62 (s, 1H), 9.68 (s, 1H), 8.92 (s, 1H), 7.99 (s, 1H), 6.95 (s, 2H), 6.77 (s, 1H), 6.46 (s, 1H), 4.43 (s, 1H), 2.80 (s, 3H), 1.27 (s, 2H), 1.07 (s, 4H).	393	99%
4-60		^{1}H NMR (400 MHz, DMSO) δ 14.77 (s, 1H), 11.29 (s, 1H), 8.91 (s, 1H), 7.97 (d, *J* = 9.0 Hz, 1H), 7.13 (s, 1H), 6.97 (s, 1H), 6.61 (s, 1H), 4.42 (s, 1H), 3.80 (d, *J* = 13.7 Hz, 7H), 2.78 (s, 3H), 1.26 (s, 2H), 1.06 (s, 2H).	437	99%

4-61		[1]H NMR (400 MHz, DMSO) δ 14.74 (s, 1H), 11.29 (s, 1H), 8.91 (s, 1H), 8.81 (s, 1H), 7.98 (d, *J* = 9.1 Hz, 1H), 7.27 (d, *J* = 8.8 Hz, 1H), 6.93 (s, 1H), 6.71 (d, *J* = 8.4 Hz, 1H), 6.53 (s, 1H), 4.41 (s, 2H), 2.77 (s, 3H), 1.25 (s, 2H), 1.06 (s, 2H).	393	98%
4-62		[1]H NMR (400 MHz, DMSO) δ 14.75 (s, 1H), 11.50 (s, 1H), 9.79 (s, 1H), 8.91 (s, 1H), 7.97 (d, *J* = 8.7 Hz, 1H), 7.07 (d, *J* = 6.7 Hz, 1H), 6.86 (s, 1H), 6.60 (s, 2H), 4.41 (s, 1H), 2.76 (s, 3H), 1.23 (s, 2H), 1.08 (s, 2H).	393	100%
4-63		[1]H NMR (400 MHz, DMSO) δ 12.18 (s, 1H), 10.24 (s, 1H), 8.93 (s, 1H), 8.04 (d, *J* = 8.8 Hz, 1H), 7.87 (d, *J* = 8.8 Hz, 2H), 7.78 (d, *J* = 7.0 Hz, 1H), 7.46 (d, *J* = 7.3 Hz, 2H), 7.35 (s, 1H), 4.43 (s, 1H), 2.77 (s, 3H), 1.27 (s, 2H), 1.09 (s, 2H).	405	85%
4-64		[1]H NMR (400 MHz, DMSO) δ 14.55 (s, 1H), 13.88 (s, 1H), 8.94 (s, 1H), 8.10 (d, *J* = 8.4 Hz, 1H), 8.01 (dd, *J* = 14.5, 7.6 Hz, 2H), 7.62 (s, 1H), 4.44 (s, 1H), 2.71 (s, 3H), 1.24 (s, 2H), 1.08 (s, 2H).	447	89%
4-65		[1]H NMR (400 MHz, DMSO) δ 14.44 (s, 1H), 11.53 (s, 1H), 8.84 (s, 1H), 8.16 (d, *J* = 9.1 Hz, 1H), 7.95 (d, *J* = 7.2 Hz, 1H), 7.69 (d, *J* = 9.7 Hz, 1H), 7.58 (t, *J* = 10.6 Hz, 1H), 7.42 (d, *J* = 7.4 Hz, 2H), 7.16 (t, *J* = 7.5 Hz, 1H), 7.04 (t, *J* = 7.4 Hz, 1H), 6.62 (s, 1H), 5.77 (s, 1H), 1.77 (d, *J* = 17.9 Hz, 3H).	449	94.06 %
4-66		[1]H NMR (400 MHz, DMSO) δ 14.79 (s, 1H), 11.42 (s, 1H), 8.70 (s, 1H), 8.04 (d, *J* = 8.2 Hz, 1H), 7.57 (d, *J* = 8.2 Hz, 1H), 7.42 (d, *J* = 8.0 Hz, 1H), 7.25 (s, 1H), 6.96 (d, *J* = 8.1 Hz, 1H), 6.86 (d, *J* = 7.7 Hz, 1H), 6.61 (s, 1H), 4.23 (s, 1H), 2.70 (s, 3H), 1.06 (s, 2H), 0.81 (s, 2H).	359	91.2%
4-67		[1]H NMR (400 MHz, DMSO) δ 11.76 (s, 1H), 8.71 (s, 1H), 8.16 (d, *J* = 4.8 Hz, 1H), 7.81 (d, *J* = 8.8 Hz, 1H), 7.36 (s, 1H), 5.94 (dd, *J* = 3.4, 1.8 Hz, 1H), 5.10 (s, 1H), 4.22 – 4.08 (m, 1H), 2.33 (s, 3H), 1.09 – 0.88 (m, 4H).	378	97%
4-68		[1]H NMR (400 MHz, DMSO) δ 12.33 (s, 1H), 8.92 (s, 1H), 8.35 (d, *J* = 4.4 Hz, 1H), 7.99 (d, *J* = 8.8 Hz, 1H), 7.87 (s, 1H), 7.77 (d, *J* = 7.8 Hz, 1H), 7.21 (dd, *J* = 7.7, 4.0 Hz, 1H), 4.47 – 4.34 (m, 2H), 2.69 (s, 3H), 1.28 (d, *J* = 6.6 Hz, 2H), 1.10 (s, 2H).	378	98%
4-69		[1]H NMR (400 MHz, DMSO) δ 8.94 (s, 1H), 8.39 (t, *J* = 3.1 Hz, 1H), 8.08 (t, *J* = 9.0 Hz, 2H), 7.22 (dd, *J* = 8.1, 4.1 Hz, 1H), 6.74 (d, *J* = 2.9 Hz, 1H), 4.48 – 4.36 (m, 1H), 2.67 (s, 3H), 1.26 (d, *J* = 7.0 Hz, 4H), 1.09 (s, 4H).	392	98%

4-70		[1]H NMR (400 MHz, DMSO) δ 8.94 (s, 1H), 8.39 (t, *J* = 3.1 Hz, 1H), 8.07 (t, *J* = 9.0 Hz, 1H), 7.21 (dt, *J* = 7.7, 3.7 Hz, 1H), 6.74 (d, *J* = 2.9 Hz, 1H), 4.50 – 4.32 (m, 1H), 2.67 (s, 3H), 1.33 – 1.19 (d, *J* = 7.0 Hz, 2H), 1.09 (s, 2H).	392	96%
4-71		[1]H NMR (400 MHz, DMSO) δ 14.73 (s, 1H), 11.96 (s, 1H), 8.92(s, 1H), 8.24 (s, 1H), 8.06 (s, 1H), 8.00 (d, *J* = 8.7 Hz, 1H), 7.61 (t, *J* = 2.8 Hz, 1H), 6.57 (s, 1H), 4.59 – 4.15 (dm, 1H), 2.64 (s, 3H), 1.26 (d, *J* = 6.8 Hz, 2H), 1.09 (m, 2H).	378	98%
4-72		[1]H NMR (400 MHz, DMSO) δ 14.67 (s, 1H), 13.15 (s, 1H), 8.93 (s, 1H), 8.27 (d, *J* = 6.1 Hz, 1H), 8.01 (d, *J* = 8.8 Hz, 1H), 7.78 (d, *J* = 7.9 Hz, 1H), 7.19 (t, *J* = 7.1 Hz, 1H), 6.88 (s, 1H), 4.49 – 4.33 (m, 1H), 2.77 (s, 3H), 1.39 – 1.21 (d, *J* = 7.0 Hz, 2H), 1.15 – 1.01 (m, 2H).	394	98%
4-73		[1]H NMR (400 MHz, DMSO) δ 14.63 (s, 1H), 12.94 (s, 1H), 8.93 (s, 1H), 8.72 (s, 1H), 8.65 (s, 1H), 8.04 (d, *J* = 8.7 Hz, 1H), 6.93 (s, 1H), 4.53 – 4.29 (m, 1H), 2.77 (s, 3H), 1.32 – 1.19 (m, 3H), 1.17 – 0.95 (m, 2H).	403	92%
4-74		[1]H NMR (400 MHz, DMSO) δ 14.65 (s, 1H), 13.00 (s, 1H), 8.94 (s, 1H), 8.53 (s, 7H), 8.04 (d, *J* = 8 Hz,1H), 7.69 (dd, *J* = 4.4, 2.4 Hz, 1H), 7.01 (s, 6H), 4.58 – 4.31 (m, 1H), 2.78 (s, 3H), 1.27 (d, *J* = 6.6 Hz, 15H), 1.18 – 1.01 (m, 16H).	403	92%
4-75		[1]H NMR (400 MHz, DMSO) δ 14.57(s, 1H), 13.95 (s, 1H), 8.94 (s, 1H), 8.58 (s, 2H), 8.09 (d, *J* = 8.7 Hz, 1H), 7.60 – 7.51 (m, 1H), 4.53 – 4.33 (m, 1H), 2.73 (s, 3H), 1.35 – 1.17 (m, 2H), 1.15 – 1.01 (m, 2H).	423	86%
4-76		[1]H NMR (400 MHz, DMSO) δ 13.25 (s, 1H), 8.99 (s, 1H), 8.36 (d, *J* = 5.9 Hz, 1H), 8.07 (d, *J* = 8.7 Hz, 1H), 7.95 (s, 1H), 7.52 (d, *J* = 8.0 Hz, 1H), 7.28 (t, *J* = 6.8 Hz, 1H), 4.54 – 4.44 (m, 1H), 2.76 (s, 3H), 1.34 (d, *J* = 6.8 Hz, 2H), 1.26 – 1.06 (m, 2H).	394	98%
4-77		[1]H NMR (400 MHz, DMSO) δ 12.56 (s, 1H), 8.93 (s, 1H), 8.38 (t, *J* = 3.6 Hz, 1H), 8.20 (d, *J* = 7.4 Hz, 1H), 8.02 (d, *J* = 9.1 Hz, 1H), 7.26 (dd, *J* = 8.0, 4.1 Hz, 1H), 6.83 (s, 1H), 4.57 – 4.33 (m, 1H), 2.78 (s, 3H), 1.35 – 1.19 (d, *J* = 6.9 Hz, 2H), 1.15 – 1.01 (s, 2H).	378	98%
4-78		[1]H NMR (400 MHz, DMSO) δ 14.65 (s, 1H), 12.47 (s, 1H), 11.98 (s, 1H), 8.91(s, 1H), 7.95 (m, 2H), 6.76 (s, 1H), 4.51 – 4.36 (m, 1H), 2.78 (s, 3H), 1.26 (d, *J* = 6.9 Hz, 2H), 1.17 – 1.01 (m, 2H).	395	95%

4-79		[1]H NMR (400 MHz, DMSO) δ 14.57 (s, 1H), 13.19 (d, *J* = 8.5 Hz, 1H), 9.29 (d, *J* = 2.9 Hz, 1H), 9.02 (d, *J* = 2.4 Hz, 1H), 8.94 (s, 1H), 8.05 (d, *J* = 8.8 Hz, 1H), 7.06 (s, 1H), 4.49 – 4.35 (m, 1H), 2.77 (s, 3H), 1.26 (d, *J* = 7.2 Hz, 2H), 1.13 – 0.99 (s, 2H).	379	98%
4-80		[1]H NMR (400 MHz, DMSO) δ 15.167 (s, 1H), 14.59 (s, 1H), 13.80 (s, 1H), 9.32 (s, 1H), 8.96 (d, *J* = 2.3 Hz, 1H), 8.40 (d, *J* = 6.1 Hz, 1H), 8.25 (d, *J* = 6.0 Hz, 1H), 8.10 (d, *J* = 8.4 Hz, 1H), 7.27 (s, 1H), 4.51 – 4.39 (m, 1H), 2.76 (m, 3H), 1.29 – 1.17 (d, *J* = 7.0 Hz, 2H), 1.17 – 0.97 (m, 2H).	378	85%
4-81		[1]H NMR (400 MHz, DMSO) δ 14.56 (s, 1H), 13.05 (s, 1H), 8.95 (s, 1H), 8.68 (s, 1H), 8.08 (d, *J* = 9.1 Hz, 1H), 7.62 (s, 1H), 7.12 (s, 1H), 4.51 – 4.36 (m, 1H), 2.76 (s, 3H), 1.33 – 1.19 (d, *J* = 7.1 Hz, 2H), 1.13 – 1.05 (s, 2H).	378	85%
4-82		[1]H NMR (400 MHz, DMSO) δ 14.88 (s, 1H), 14.57 (s, 1H), 13.46 (s, 1H), 9.41 (s, 1H), 8.96 (s, 1H), 8.52 (d, *J* = 6.5 Hz, 1H), 8.21 – 7.93 (m, 2H), 7.38 (s, 1H), 4.53 – 4.29 (m, 1H), 2.77 (s, 3H), 1.35 – 1.17 (d, *J* = 6.7 Hz, 2H), 1.19 – 1.03 (s, 2H).	378	98%
4-83			421	90%
4-84			421	98%
4-85			482	93%
4-86		[1]H NMR (400 MHz, DMSO) δ 14.60 (s, 1H), 10.06 (s, 1H), 8.81 (s, 1H), 7.88 (d, *J* = 8.5 Hz, 1H), 7.21 (s, 1H), 7.05 (d, *J* = 8.1 Hz, 1H), 6.80 (d, *J* = 8.1 Hz, 1H), 4.36 (m, 1H), 3.08 (s, 2H), 1.06 (m, 4H).	392	95%

4-87		^{1}H NMR (400 MHz, DMSO) δ 14.57 (s, 1H), 8.91 (s, 1H), 8.03 (d, *J* = 9.3 Hz, 1H), 7.80 (d, *J* = 7.7 Hz, 1H), 7.73 (d, *J* = 8.3 Hz, 1H), 7.56 – 7.22 (m, 3H), 4.57 – 4.32 (m, 1H), 2.84 (s, 3H), 1.27 (m, 2H), 1.06 (m, 2H).	378	98%
4-88		^{1}H NMR (400 MHz, DMSO) δ 14.50 (s, 1H), 13.22 (s, 1H), 8.84 (s, 1H), 8.10 – 7.80 (m, 2H), 7.74 – 7.58 (s, 1H), 7.49 (s, 1H), 4.38 (m, 1H), 2.78 (s, 3H), 1.30 – 1.12 (m, 2H), 1.00 (m, 2H).	422	98%
4-89		^{1}H NMR (400 MHz, DMSO) δ 14.56 (s, 1H), 8.93 (s, 1H), 8.02 (d, *J* = 9.2 Hz, 1H), 7.76 (dd, *J* = 8.8, 3.5 Hz, 1H), 7.61 (d, *J* = 8.6 Hz, 1H), 7.41 (s, 1H), 7.28 (t, *J* = 9.3 Hz, 1H), 4.43 (m, 1H), 2.82 (s, 3H), 1.26 (d, *J* = 6.4 Hz, 3H), 1.05 (s, 2H).	396	98%
4-90		^{1}H NMR (400 MHz, DMSO) δ 8.88 (s, 1H), 7.95 (d, *J* = 8.9 Hz, 1H), 7.76 (s, 1H), 7.61 (d, *J* = 8.9 Hz, 1H), 7.36 (s, 1H), 7.20 (t, *J* = 9.0 Hz, 1H), 4.35 (m, 1H), 2.76 (s, 3H), 1.30 – 1.09 (m, 3H), 0.96 (s, 2H).	396	98%
4-91		^{1}H NMR (400 MHz, DMSO) δ 14.57 (s, 1H), 8.86 (s, 1H), 7.96 (m, 3H), 7.59 (s, 1H), 7.41 (d, *J* = 5.1 Hz, 2H), 4.35 (m, 1H), 2.72 (s, 3H), 1.17 (m, 2H), 1.00 (m, 2H).	394	96%
4-92		^{1}H NMR (400 MHz, DMSO) δ 14.65 (s, 1H), 8.86 (s, 1H), 8.08 (d, *J* = 7.6 Hz, 1H), 7.97 (m, 2H), 7.36 (m, 3H), 4.32 (m, 1H), 2.57 (s, 3H), 1.03 (m, 4H).	394	98%
4-93		^{1}H NMR (400 MHz, DMSO) δ 14.51 (s, 1H), 8.92 (ss, 1H), 8.32 (d, *J* = 8.1 Hz, 1H), 8.28 (d, *J* = 8.0 Hz, 1H), 8.05 (t, *J* = 13.1 Hz, 1H), 7.90 (s, 1H), 7.70 (t, *J* = 8.2 Hz, 1H), 4.45 (m, 1H), 2.86 (s, 3H), 1.26 (t, *J* = 11.6 Hz, 2H), 1.10 (d, *J* = 21.6 Hz, 2H).	423	98%
4-94		^{1}H NMR (400 MHz, DMSO) δ 14.46 (s, 1H), 8.69 (s, 1H), 8.14 (s, 1H), 7.75 (d, *J* = 9.2 Hz, 1H), 7.52 (dd, *J* = 8.8, 3.5 Hz, 1H), 7.20-7.11 (m, 3H), 4.43 (s, 1H), 2.64 (s, 3H), 1.26 (d, *J* = 6.4 Hz, 3H), 1.05 (s, 2H).	378	98%
4-95		^{1}H NMR (400 MHz, DMSO) δ 14.55 (s, 1H), 8.94 (s, 1H), 8.05 (d, *J* = 9.3 Hz, 1H), 7.64 (d, *J* = 2.9 Hz, 1H), 7.54 (s, 1H), 7.36 (d, *J* = 6.6 Hz, 2H), 4.44 (m, 1H), 2.85 (s, 3H), 1.34 – 1.19 (m, 2H), 1.06 (s, 2H).	396	96%
4-96		^{1}H NMR (400 MHz, DMSO) δ 8.91 (s, 1H), 8.38 (s, 1H), 8.04 (d, *J* = 9.2 Hz, 1H), 7.96 (d, *J* = 8.4 Hz, 1H), 7.88 (d, *J* = 8.5 Hz, 1H), 7.55 (s, 1H), 4.44 (m, 1H), 2.83 (s, 3H), 1.35 – 1.18 (m, 2H), 1.06 (m, 2H).	403	98%

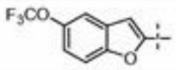
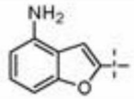
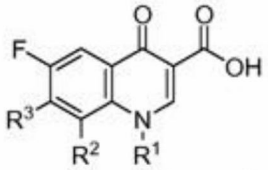
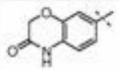
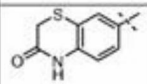
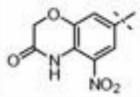
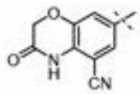
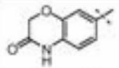
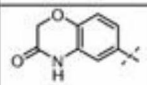
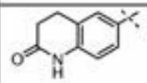
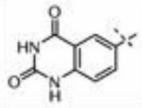
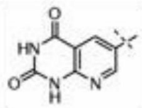
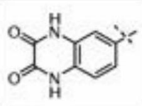
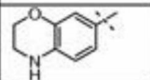
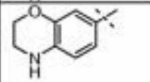
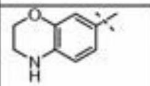
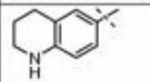
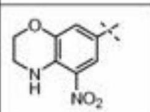
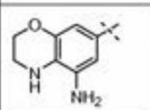
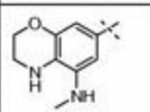
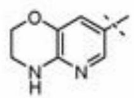
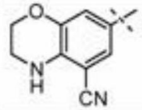
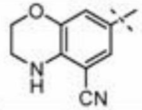
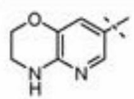
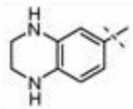
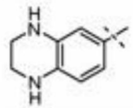
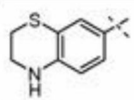
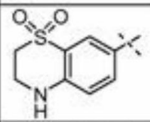
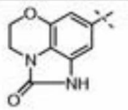
4-97		[1]H NMR (400 MHz, DMSO) δ 14.56 (s, 1H), 8.94 (s, 1H), 8.04 (d, *J* = 9.1 Hz, 1H), 7.95 – 7.77 (m, 2H), 7.53 – 7.33 (m, 2H), 4.45 (m, 1H), 2.83 (s, 3H), 1.27 (d, *J* = 6.3 Hz, 2H), 1.05 (s, 2H).	462	98%
4-98		[1]H NMR (400 MHz, DMSO) δ 14.61 (s, 1H), 8.86 (s, 1H), 7.95 (d, *J* = 9.0 Hz, 1H), 7.43 (s, 1H), 7.03 (t, *J* = 8.1 Hz, 1H), 6.77 (d, *J* = 7.4 Hz, 1H), 6.39 (d, *J* = 7.1 Hz, 1H), 4.38 (m, 1H), 2.77 (s, 3H), 1.19 (m, 2H), 0.98 (m, 1H).	393	96%

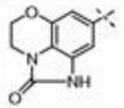
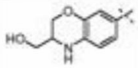
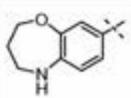
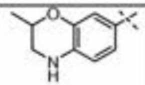
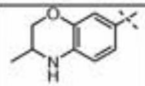
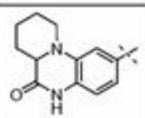
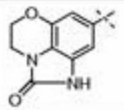
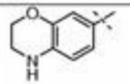
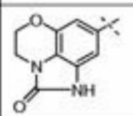
表 5

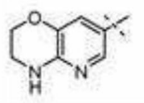
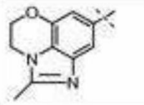
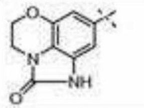
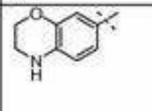
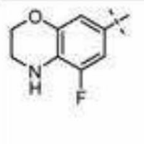
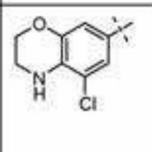
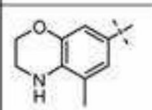
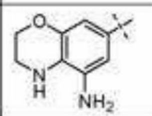


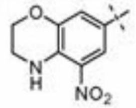
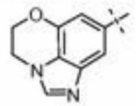
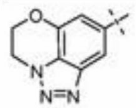
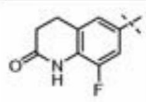
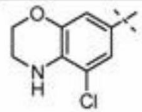
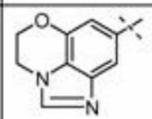
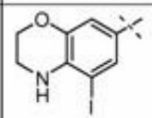
化合物编号	R^3 =	R^2 =	R^1 =	NMR	MS (MH^+)	HPLC
5-1		Me	环丙基	^{1}H NMR (400 MHz, DMSO) δ 14.72 (s, 1H), 10.91 (s, 1H), 8.89 (s, 1H), 7.94 (d, *J* = 8.60 Hz, 1H), 7.13 – 6.90 (m, 3H), 4.67 (s, 2H), 4.38 (s, 1H), 2.62 (s, 3H), 1.23 (d, *J* = 5.80 Hz, 2H), 1.04 (s, 2H).	409	97%
5-2		Me	环丙基	^{1}H NMR (400 MHz, DMSO) δ 14.71 (s, 1H), 10.78 (s, 1H), 8.90 (s, 1H), 7.95 (d, *J* = 8.72 Hz, 1H), 7.41 (s, 1H), 7.22 (d, *J* = 8.03 Hz, 1H), 7.13 (d, *J* = 8.17 Hz, 1H), 4.38 (s, 1H), 3.57 (s, 2H), 2.62 (s, 3H), 1.24 (d, *J* = 6.14 Hz, 2H), 1.05 (s, 2H).	425	98%
5-3		Me	环丙基	^{1}H NMR (400 MHz, DMSO) δ 14.70 (s, 1H), 10.64 (s, 1H), 8.98 (s, 1H), 8.05 (d, *J* = 8.72 Hz, 1H), 7.90 (s, 1H), 7.62 (s, 1H), 4.92 (s, 2H), 4.46 (s, 1H), 2.71 (s, 3H), 1.30 (s, 3H), 1.15 (s, 2H).	454	97%
5-4		Me	环丙基	^{1}H NMR (400 MHz, DMSO) δ 14.66 (s, 1H), 11.39 (s, 1H), 8.90 (s, 1H), 7.96 (d, *J* = 8.72 Hz, 1H), 7.57 (s, 1H), 7.43 (s, 1H), 4.75 (s, 2H), 4.39 (s, 1H), 2.62 (s, 3H), 1.23 (d, *J* = 5.26 Hz, 2H), 1.06 (s, 2H).	434	98%
5-5		OMe	环丙基	^{1}H NMR (400 MHz, DMSO) δ 14.72 (s, 1H), 10.94 (s, 1H), 8.80 (s, 1H), 7.90 (s, 1H), 7.11 (d, *J* = 26.18 Hz, 2H), 4.67 (s, 2H), 1.15 (s, 4H).	425	98%
5-6		Me	环丙基	^{1}H NMR (400 MHz, DMSO) δ 14.75 (s, 1H), 10.87 (s, 1H), 8.90 (s, 1H), 7.96 (d, *J* = 8.58 Hz, 1H), 7.14 (d, *J* = 8.35 Hz, 1H), 6.97 (d, *J* = 8.15 Hz, 1H), 6.89 (s, 1H), 4.69 (s, 2H), 4.39 (s, 1H), 2.62 (s, 3H), 1.23 (s, 2H), 1.04 (s, 2H).	409	98%
5-9		Me	环丙基	^{1}H NMR (400 MHz, DMSO) δ 14.74 (s, 1H), 10.28 (s, 1H), 8.90 (s, 1H), 7.94 (d, *J* = 8.20 Hz, 1H), 7.23 (s, 1H), 7.17 (s, 1H), 7.03 (s, 1H), 4.38 (s, 2H), 2.97 (s, 2H), 2.63 (s, 2H), 1.23 (s, 2H), 1.04 (s, 2H).	407	85%

5-10		Me	环丙基	^{1}H NMR (400 MHz, DMSO) δ 14.71 (s, 1H), 11.47 (s, 1H), 11.39 (s, 1H), 8.91 (s, 1H), 7.98 (d, *J* = 8.50 Hz, 1H), 7.89 (s, 1H), 7.70 (d, *J* = 8.10 Hz, 1H), 7.35 (d, *J* = 8.11 Hz, 1H), 4.40 (s, 1H), 3.49 (d, *J* = 87.04 Hz, 2H), 2.62 (s, 3H), 1.23 (s, 2H), 1.08 (s, 3H).	422	98%
5-11		Me	环丙基	^{1}H NMR (400 MHz, DMSO) δ 14.67 (s, 1H), 11.96 (s, 1H), 11.63 (s, 1H), 8.92 (s, 1H), 8.69 (s, 1H), 8.34 (s, 1H), 8.00 (d, *J* = 8.65 Hz, 1H), 4.41 (s, 1H), 2.61 (d, *J* = 29.62 Hz, 3H), 1.24 (d, *J* = 5.11 Hz, 2H), 1.09 (s, 2H).	423	99%
5-12		Me	环丙基	^{1}H NMR (400 MHz, DMSO) δ 14.73 (s, 1H), 12.44 – 11.74 (m, 2H), 8.91 (s, 1H), 7.98 (d, *J* = 8.01 Hz, 1H), 7.53 – 7.03 (m, 3H), 4.39 (s, 1H), 2.61 (s, 3H), 1.20 (d, *J* = 26.27 Hz, 3H), 1.05 (s, 2H).	422	96%
5-13		Me	环丙基	^{1}H NMR (400 MHz, DMSO) δ 14.83 (s, 1H), 8.88 (s, 1H), 7.90 (s, 2H), 6.70 (s, 3H), 4.27 (d, *J* = 77.51 Hz, 4H), 2.60 (d, *J* = 25.07 Hz, 3H), 1.23 (s, 2H), 1.02 (s, 2H).	395	98%
5-14		OMe	环丙基	^{1}H NMR (400 MHz, DMSO) δ 14.78 (s, 1H), 8.76 (s, 1H), 7.83 (d, *J* = 9.18 Hz, 1H), 6.92 – 6.81 (m, 2H), 6.70 (d, *J* = 7.26 Hz, 1H), 6.19 (d, *J* = 22.26 Hz, 1H), 4.16 (s, 4H), 3.39 (s, 3H), 2.50 (s, 7H).	411	96%
5-15		8-N	环丙基	^{1}H NMR (400 MHz, DMSO) δ 14.55 (s, 1H), 8.61 (s, 1H), 8.19 (d, *J* = 11.38 Hz, 1H), 7.55 (d, *J* = 8.31 Hz, 1H), 7.47 (s, 1H), 6.68 (s, 1H), 6.54 (d, *J* = 8.26 Hz, 1H), 4.00 (s, 2H), 3.73 (s, 1H), 1.15 – 0.91 (m, 5H).	382	94%
5-16		Me	环丙基	^{1}H NMR (400 MHz, DMSO) δ 14.90 (s, 1H), 8.94 (s, 1H), 7.94 (d, *J* = 9.06 Hz, 1H), 6.95 (d, *J* = 8.81 Hz, 2H), 6.63 (d, *J* = 7.73 Hz, 1H), 6.14 (s, 1H), 4.43 (s, 1H), 3.31 (s, 2H), 2.79 (s, 2H), 2.70 (s, 3H), 1.90 (s, 2H), 1.30 (s, 2H), 1.08 (s, 2H).	393	94%
5-17		Me	环丙基	^{1}H NMR (400 MHz, DMSO) δ 14.71 (s, 1H), 8.89 (s, 1H), 8.60 (s, 1H), 7.94 (d, *J* = 8.81 Hz, 1H), 7.67 (s, 1H), 7.10 (s, 1H), 4.38 (s, 1H), 4.27 (s, 2H), 3.63 (s, 2H), 2.66 (s, 3H), 1.24 (d, *J* = 5.67 Hz, 2H), 1.07 (s, 2H).	440	97%
5-18		Me	环丙基	^{1}H NMR (400 MHz, DMSO) δ 10.19 (s, 1H), 8.89 (s, 1H), 7.91 (d, *J* = 8.74 Hz, 1H), 6.33 (s, 1H), 6.24 (s, 1H), 4.57 (s, 2H), 4.38 (s, 2H), 2.64 (s, 3H), 1.23 (d, *J* = 5.42 Hz, 3H), 1.03 (s, 2H).	424	97%
5-19		Me	环丙基	^{1}H NMR (400 MHz, DMSO) δ 8.88 (s, 1H), 7.91 (s, 1H), 6.29 (s, 1H), 6.18 (s, 1H), 4.37 (s, 2H), 4.18 (s, 3H), 3.10 (s, 2H), 2.65 (d, *J* = 16.81 Hz, 6H), 1.23 (s, 3H), 1.03 (s, 2H).	424	97%

5-20		Me	环丙基	^{1}H NMR (400 MHz, DMSO) δ 8.97 (s, 1H), 8.01 (d, *J* = 9.26 Hz, 1H), 7.85 – 7.65 (m, 2H), 7.64 – 7.40 (m, 1H), 7.36 (s, 1H), 4.46 (s, 1H), 4.32 (s, 3H), 3.63 (s, 3H), 2.74 (s, 3H), 1.30 (d, *J* = 5.75 Hz, 2H), 1.11 (s, 2H).	396	98%
5-21		Me	环丙基	^{1}H NMR (400 MHz, DMSO) δ 14.72 (s, 1H), 8.85 (d, *J* = 23.76 Hz, 1H), 7.87 (t, *J* = 19.93 Hz, 1H), 7.17 (s, 1H), 6.99 (d, *J* = 9.29 Hz, 2H), 4.37 (s, 1H), 4.20 (s, 2H), 3.59 (s, 1H), 3.44 (s, 2H), 2.63 (s, 3H), 1.24 (s, 2H), 1.07 (d, *J* = 23.80 Hz, 2H).	420	95%
5-22		OMe	环丙基	^{1}H NMR (400 MHz, DMSO) δ 14.67 (s, 1H), 8.78 (s, 1H), 7.87 (d, *J* = 9.24 Hz, 1H), 7.26 (d, *J* = 10.63 Hz, 1H), 7.11 (s, 1H), 7.04 (s, 1H), 4.20 (s, 3H), 2.00 (dd, *J* = 7.56, 15.22 Hz, 1H), 1.21 (d, *J* = 14.05 Hz, 4H).	436	98%
5-24		OMe	环丙基	^{1}H NMR (400 MHz, DMSO) δ 8.77 (s, 1H), 7.87 (d, *J* = 9.25 Hz, 1H), 7.75 (s, 1H), 7.20 (s, 1H), 7.14 (s, 1H), 4.17 (s, 3H), 3.47 (s, 3H), 1.32 – 1.05 (m, 8H).	412	96%
5-25		Me	环丙基	^{1}H NMR (400 MHz, DMSO) δ 14.82 (s, 1H), 10.92 (s, 1H), 10.86 (s, 1H), 8.96 (s, 1H), 7.98 (t, *J* = 12.31 Hz, 1H), 7.15 (d, *J* = 7.60 Hz, 1H), 7.00 (d, *J* = 8.89 Hz, 2H), 4.44 (s, 1H), 2.67 (s, 3H), 1.28 (s, 2H), 1.12 (s, 2H).	394	98%
5-26		OMe	环丙基	^{1}H NMR (400 MHz, DMSO) δ 14.63 (s, 1H), 10.94 (s, 1H), 10.87 (s, 1H), 8.86 (s, 1H), 7.97 (d, *J* = 8.82 Hz, 1H), 7.17 (d, *J* = 7.41 Hz, 3H), 4.29 (s, 1H), 1.23 (s, 4H).	410	98%
5-27		Me	环丙基	^{1}H NMR (400 MHz, DMSO) δ 8.95 (s, 1H), 7.96 (d, *J* = 8.75 Hz, 1H), 6.96 (d, *J* = 10.17 Hz, 1H), 6.92 (d, *J* = 8.04 Hz, 1H), 6.72 (d, *J* = 7.83 Hz, 1H), 4.44 (s, 1H), 3.63 (s, 2H), 3.09 (s, 2H), 2.70 (s, 3H), 1.30 (d, *J* = 5.29 Hz, 2H), 1.10 (s, 2H).	411	98%
5-28		Me	环丙基	^{1}H NMR (400 MHz, DMSO) δ 14.74 (s, 1H), 8.89 (s, 1H), 7.94 (d, *J* = 8.48 Hz, 1H), 7.53 (s, 1H), 7.44 (s, 1H), 7.33 (d, *J* = 8.57 Hz, 1H), 6.94 (d, *J* = 8.45 Hz, 1H), 4.39 (s, 1H), 3.80 (s, 2H), 3.48 (s, 2H), 2.64 (s, 3H), 1.23 (s, 2H), 1.06 (s, 2H).	443	98%
5-29		Me	环丙基	^{1}H NMR (400 MHz, DMSO) δ 14.67 (s, 1H), 10.84 (s, 1H), 8.83 (s, 1H), 7.86 (d, *J* = 8.65 Hz, 1H), 6.52 (s, 2H), 4.38 (s, 2H), 4.31 (s, 1H), 3.89 (s, 2H), 2.54 (s, 3H), 1.16 (s, 2H), 1.00 (s, 2H).	436	98%

5-30		OMe	环丙基	^{1}H NMR (400 MHz, DMSO) δ 14.71 (s, 1H), 10.91 (s, 1H), 8.79 (s, 1H), 7.88 (d, *J* = 9.15 Hz, 1H), 6.75 (d, *J* = 14.51 Hz, 2H), 4.45 (t, *J* = 4.51 Hz, 2H), 4.27 – 4.16 (m, 1H), 3.96 (t, *J* = 4.53 Hz, 2H), 1.17 (d, *J* = 7.20 Hz, 4H).	452	99%
5-31		Me	环丙基	^{1}H NMR (400 MHz, DMSO) δ 8.94 (s, 1H), 7.95 (d, *J* = 8.62 Hz, 1H), 6.79 (dd, *J* = 7.23, 14.68 Hz, 3H), 4.43 (s, 1H), 4.23 (d, *J* = 10.57 Hz, 1H), 4.06 (d, *J* = 10.42 Hz, 1H), 3.60 – 3.41 (m, 3H), 2.70 (s, 3H), 1.30 (d, *J* = 5.98 Hz, 2H), 1.09 (s, 2H).	425	99%
5-32		Me	环丙基	^{1}H NMR (400 MHz, DMSO) δ 8.95 (s, 1H), 7.98 (d, *J* = 8.04 Hz, 1H), 7.09 (s, 1H), 6.96 (s, 2H), 4.44 (s, 1H), 4.15 (s, 2H), 3.29 (s, 3H), 2.69 (s, 3H), 2.02 (s, 2H), 1.30 (s, 2H), 1.10 (s, 2H).	409	99%
5-33		Me	环丙基	^{1}H NMR (400 MHz, DMSO) δ 8.76 (s, 1H), 7.77 (d, *J* = 8.81 Hz, 1H), 6.59 (s, 3H), 4.25 (s, 1H), 4.04 (s, 2H), 3.27 (d, *J* = 11.94 Hz, 1H), 2.96 – 2.79 (m, 1H), 2.52 (s, 3H), 1.18 (t, *J* = 8.54 Hz, 3H), 1.12 (d, *J* = 5.48 Hz, 2H), 0.91 (s, 2H).	409	98%
5-34		Me	环丙基	^{1}H NMR (400 MHz, DMSO) δ 8.71 (s, 1H), 7.72 (d, *J* = 8.62 Hz, 1H), 6.54 (s, 3H), 4.20 (s, 2H), 4.03 (d, *J* = 10.38 Hz, 2H), 3.52 (t, *J* = 8.97 Hz, 1H), 3.31 (s, 1H), 2.46 (s, 3H), 1.07 (d, *J* = 5.70 Hz, 2H), 0.96 (d, *J* = 4.88 Hz, 3H), 0.86 (s, 2H).	409	98%
5-35		Me	环丙基	^{1}H NMR (400 MHz, DMSO) δ 10.57 (s, 1H), 8.89 (s, 1H), 7.93 (d, *J* = 8.73 Hz, 1H), 7.48 (d, *J* = 52.24 Hz, 1H), 6.96 (d, *J* = 7.83 Hz, 1H), 6.80 (s, 1H), 6.74 (d, *J* = 7.83 Hz, 1H), 4.38 (s, 1H), 3.76 (d, *J* = 12.76 Hz, 1H), 2.63 (s, 3H), 2.07 (s, 1H), 1.85 (s, 1H), 1.66 (s, 1H), 1.58 – 1.37 (m, 3H), 1.23 (d, *J* = 6.52 Hz, 2H), 1.06 (s, 2H).	462	98%
5-36		Cl	环丙基	^{1}H NMR (400 MHz, DMSO) δ 10.92 (s, 1H), 10.70 (s, 1H), 8.92 (s, 1H), 8.09 (d, *J* = 8.43 Hz, 1H), 7.82 (s, 1H), 7.04 (d, *J* = 22.18 Hz, 1H), 6.64 (d, *J* = 10.90 Hz, 2H), 4.52 – 4.28 (m, 3H), 4.01 – 3.82 (m, 2H), 1.20 (t, *J* = 10.03 Hz, 2H), 1.12 (d, *J* = 3.28 Hz, 2H).	456	97%
5-37		8-Me		^{1}H NMR (400 MHz, DMSO) δ 8.85 (d, *J* = 3.12 Hz, 1H), 7.90 (d, *J* = 8.88 Hz, 1H), 6.71 (d, *J* = 5.48 Hz, 3H), 5.23 (d, *J* = 3.10 Hz, 1H), 5.07 (d, *J* = 2.78 Hz, 1H), 4.42 – 4.27 (m, 1H), 4.22 – 4.12 (m, 2H), 2.55 (s, 3H), 1.74 (ddd, *J* = 8.97, 14.93, 17.91 Hz, 1H), 1.62 – 1.45 (m, 1H).	413	98%
5-38		8-Me		^{1}H NMR (400 MHz, DMSO) δ 14.44 (d, *J* = 137.56 Hz, 2H), 10.82 (d, *J* = 68.59 Hz, 1H), 8.85 (t, *J* = 9.38 Hz, 1H), 7.93 (t, *J* = 10.51 Hz, 1H), 6.56 (t, *J* = 40.40 Hz, 2H), 4.44 (d, *J* = 4.54 Hz, 3H), 4.39 – 4.29 (m, 1H), 4.04 – 3.90 (m, 3H), 2.54 (s, 3H), 1.64 (m, 2H).	454	98%

5-39		Cl	环丙基	^{1}H NMR (400 MHz, DMSO) δ 8.92 (s, 1H), 8.10 (d, *J* = 8.56 Hz, 1H), 7.69 (s, 1H), 7.18 (s, 1H), 4.41 (s, 2H), 4.23 – 4.19 (m, 3H), 3.51 (s, 2H), 1.22 (d, *J* = 6.34 Hz, 2H), 1.11 (s, 2H).	416	98%
5-40		Me	环丙基	^{1}H NMR (400 MHz, DMSO) δ 14.67 (s, 1H), 8.91 (s, 1H), 7.97 (d, *J* = 8.68 Hz, 1H), 7.35 (s, 1H), 6.99 (s, 1H), 4.68 (d, *J* = 4.53 Hz, 2H), 4.58 (d, *J* = 4.64 Hz, 2H), 4.40 (dd, *J* = 3.32, 6.77 Hz, 1H), 2.61 (s, 3H), 1.24 (d, *J* = 6.14 Hz, 2H), 1.10 (s, 2H).	434	98%
5-41		8-OMe		^{1}H NMR (400 MHz, DMSO) δ 14.59 (s, 1H), 10.91 (s, 1H), 8.82 (s, 1H), 7.89 (d, *J* = 9.04 Hz, 1H), 6.74 (d, *J* = 14.28 Hz, 2H), 5.08 (d, *J* = 64.31 Hz, 1H), 4.45 (s, 2H), 4.19 (s, 1H), 3.96 (s, 2H), 1.80 (d, *J* = 26.47 Hz, 1H), 1.65 (dd, *J* = 7.14, 16.55 Hz, 1H).	470	98%
5-42		8-OMe		^{1}H NMR (400 MHz, DMSO) δ 8.80 (s, 1H), 7.86 (d, *J* = 9.34 Hz, 1H), 6.87 (d, *J* = 8.16 Hz, 1H), 6.84 (s, 1H), 6.70 (d, *J* = 8.14 Hz, 1H), 5.18 – 4.96 (m, 1H), 4.17 (s, 3H), 3.36 (s, 2H), 1.84 – 1.58 (m, 2H).	429	98%
5-43		Me	环丙基	^{1}H NMR (400 MHz, DMSO) δ 14.75 – 14.70 (s, 1H), 8.80 – 8.76 (s, 1H), 7.89 – 7.83 (d, *J* = 9.4 Hz, 1H), 6.92 – 6.86 (d, *J* = 11.4 Hz, 1H), 6.77 – 6.73 (s, 1H), 6.16 – 6.10 (s, 1H), 4.27 – 4.15 (s, 3H), 3.47 – 3.41 (s, 3H), 3.40 – 3.34 (q, *J* = 3.6 Hz, 2H), 1.20 – 1.09 (dd, *J* = 14.4, 5.5 Hz, 4H).	429	90%
5-44		Me	环丙基	^{1}H NMR (400 MHz, DMSO) δ 14.77 – 14.65 (s, 1H), 8.80 – 8.76 (s, 1H), 7.89 – 7.83 (d, *J* = 9.3 Hz, 1H), 7.09 – 7.03 (t, *J* = 1.6 Hz, 1H), 6.90 – 6.84 (t, *J* = 1.6 Hz, 1H), 6.19 – 6.10 (s, 1H), 4.26 – 4.15 (m, 3H), 3.48 – 3.39 (s, 5H), 1.20 – 1.09 (ddd, *J* = 10.6, 5.5, 3.0 Hz, 4H).	445	100%
5-45		Me	环丙基	^{1}H NMR (400 MHz, DMSO) δ 8.80 – 8.74 (s, 1H), 7.88 – 7.80 (d, *J* = 9.3 Hz, 1H), 6.81 – 6.71 (dd, *J* = 17.1, 2.1 Hz, 2H), 4.28 – 4.18 (tt, *J* = 7.2, 4.3 Hz, 1H), 4.18 – 4.12 (t, *J* = 4.2 Hz, 2H), 3.44 – 3.35 (m, 5H), 2.16 – 2.10 (s, 3H), 1.20 – 1.08 (m, 4H).	425	100%
5-46		Me	环丙基	^{1}H NMR (400 MHz, DMSO) δ 8.79 – 8.75 (s, 1H), 7.87 – 7.81 (d, *J* = 9.3 Hz, 1H), 6.55 – 6.49 (s, 1H), 6.43 – 6.39 (s, 1H), 4.27 – 4.18 (s, 1H), 4.16 – 4.10 (t, *J* = 4.3 Hz, 2H), 3.33-3.5 (s, 2H), 2.57 – 2.52 (s, 3H), 1.20 – 1.09 (m, 4H).	426	96%

5-47		Me	环丙基	^{1}H NMR (400 MHz, DMSO) δ 14.83 – 14.56 (s, 1H), 8.81 – 8.77 (s, 1H), 8.66 – 8.59 (m, 1H), 7.95 – 7.89 (d, *J* = 9.3 Hz, 1H), 7.89 – 7.84 (t, *J* = 1.7 Hz, 1H), 7.24 – 7.19 (s, 1H), 4.30 – 4.18 (m, 3H), 3.67 – 3.60 (q, *J* = 3.8 Hz, 2H), 3.52 – 3.44 (s, 3H), 1.20 – 1.12 (td, *J* = 6.5, 5.8, 2.7 Hz, 4H).	456	100%
5-48		Me	环丙基	^{1}H NMR (400 MHz, DMSO) δ15.22 – 14.17 (m, 1H), 8.97 – 8.90 (s, 1H), 8.84 – 8.80 (s, 1H), 7.97 – 7.90 (d, *J* = 9.0 Hz, 1H), 7.51 – 7.47 (s, 1H), 7.07 – 7.02 (s, 1H), 4.69 – 4.57 (s, 4H), 4.28 – 4.18 (p, *J* = 5.7 Hz, 1H), 3.42 – 3.35 (s, 3H), 1.21 – 1.12 (d, *J* = 5.6 Hz, 4H).	436	100%
5-49		Me	环丙基	^{1}H NMR (400 MHz, DMSO) δ 14.70 – 14.66 (s, 1H), 8.84 – 8.80 (s, 1H), 7.97 – 7.92 (d, *J* = 9.0 Hz, 1H), 7.78 – 7.74 (s, 1H), 7.08 – 7.04 (s, 1H), 5.00 – 4.94 (t, *J* = 4.9 Hz, 2H), 4.82 – 4.74 (t, *J* = 4.8 Hz, 2H), 4.27 – 4.18 (p, *J* = 5.7 Hz, 1H), 3.43 – 3.38 (s, 3H), 1.21 – 1.13 (d, *J* = 5.6 Hz, 4H).	437	85%
5-50		OMe	环丙基	^{1}H NMR (400 MHz, DMSO) δ 14.72 (s, 1H), 8.94 (s, 1H), 7.87 (d, *J* = 9.4 Hz, 1H), 6.89 (d, *J* = 11.4 Hz, 1H), 6.75 (s, 1H), 6.13 (s, 1H), 4.21 (m, 3H), 3.40 (s, 3H), 1.31 – 0.94 (m, 4H).	429	90%
5-51		Me	环丙基	^{1}H NMR (400 MHz, DMSO) δ 14.72 (s, 1H), 8.88 (s, 1H), 7.91 (d, *J* = 8.8 Hz, 1H), 6.91 (s, 1H), 6.72 (s, 1H), 6.07 (s, 1H), 4.48 – 4.30 (m, 1H), 4.20 (m, 2H), 3.43 (m, 2H), 2.70 – 2.56 (m, 3H), 1.24 (d, *J* = 4.0 Hz, 2H), 1.04 (s, 2H).	429	98%
5-52		Me	环丙基	^{1}H NMR (400 MHz, DMSO) δ 14.5 (b, 1H), 8.91 (s, 1H), 8.86 (s, 1H), 7.97 (d, *J* = 8.8 Hz, 1H), 7.34 (s, 1H), 6.90 (s, 1H), 4.63 (s, 4H), 4.39 (mz, 1H), 2.61 (s, 3H), 1.24 (d, *J* = 4.6 Hz, 2H), 1.09 (s, 2H).	420	98%
5-53		Me	环丙基	^{1}H NMR (400 MHz, DMSO) δ 14.73 (s, 1H), 8.88 (s, 1H), 7.90 (d, *J* = 8.8 Hz, 1H), 7.22 (s, 1H), 6.76 (s, 1H), 4.44 – 4.28 (m, 1H), 4.15 (m, 2H), 3.43 (m, 2H), 2.65 (s, 3H), 1.24 (s, 2H), 1.04 (s, 2H).	521	97%

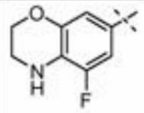
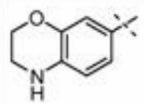
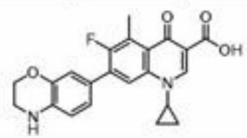
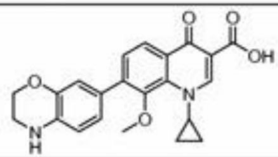
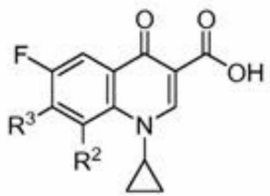
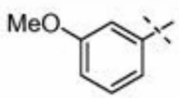
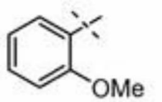
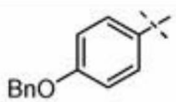
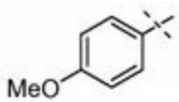
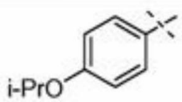
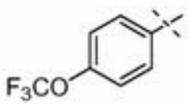
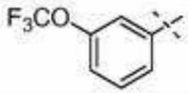
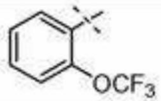
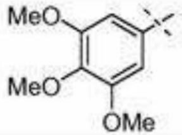
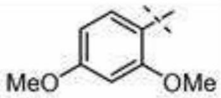
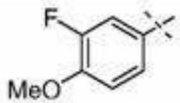
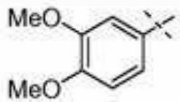
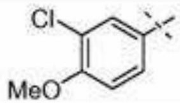
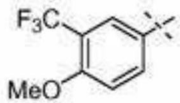
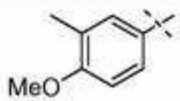
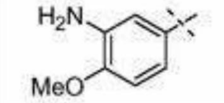
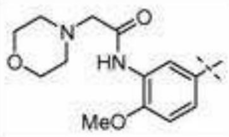
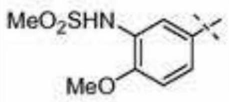
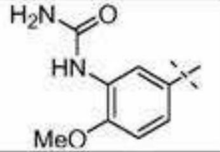
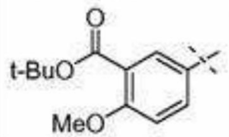
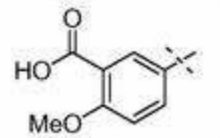
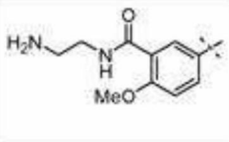
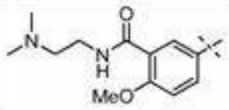
5-54		Me	环丙基	[1]H NMR (400 MHz, DMSO) δ 14.73 (s, 1H), 8.89 (s, 1H), 7.91 (d, *J* = 7.8 Hz, 1H), 6.75 (d, *J* = 11.3 Hz, 1H), 6.59 (s, 1H), 4.37 (m, 1H), 4.22 (s, 2H), 3.39 (s, 2H), 2.65 (s, 3H), 1.22 (m, 2H), 1.00 (m, 2H).	413	97%
5-55		Cl	环丙基	[1]H NMR (400 MHz, DMSO) δ 8.90 (s, 1H), 8.05 (d, *J* = 8.6 Hz, 1H), 6.91 – 6.49 (m, 3H), 4.46 – 4.36 (m, 1H), 4.16 (m, 2H), 3.49 (m, 2H), 2.67 (s, 3H), 1.19 (t, *J* = 15.1 Hz, 2H), 1.09 (s, 2H).	415	98%
5-56				[1]H NMR (400 MHz, DMSO) δ 8.77 (s, 1H), 8.15 (d, *J* = 7.00 Hz, 1H), 7.24 – 7.02 (m, 2H), 6.78 (d, *J* = 8.23 Hz, 1H), 4.28 – 4.13 (m, 2H), 4.05 – 3.86 (m, 1H), 3.49 – 3.34 (m, 2H), 2.90 (d, *J* = 2.66 Hz, 3H), 1.44 – 1.32 (m, 2H), 1.28 – 1.17 (m, 2H).	395	98%
5-57				[1]H NMR (400 MHz, DMSO) δ 15.13 (s, 1H), 8.84 (s, 1H), 8.16 (d, *J* = 8.2 Hz, 1H), 7.71 (s, 1H), 7.20 – 7.06 (m, 2H), 6.73 (t, *J* = 16.6 Hz, 1H), 4.30 (m, 1H), 4.22 – 4.17 (m, 2H), 3.68 (s, 2H), 3.44 (s, 3H), 1.43 – 0.95 (m, 4H).	393	98%

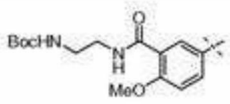
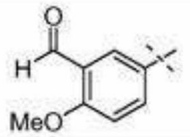
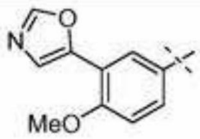
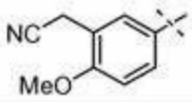
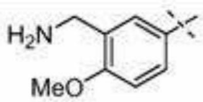
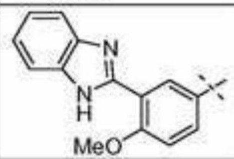
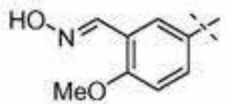
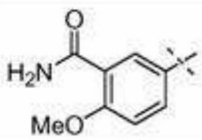
表 6

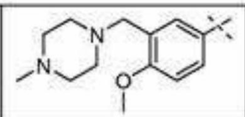
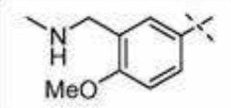
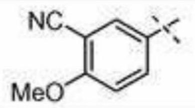
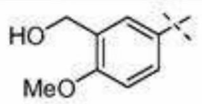
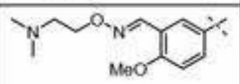
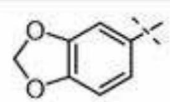
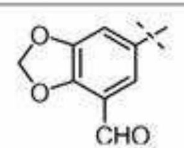
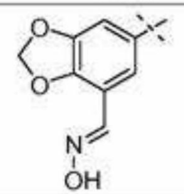


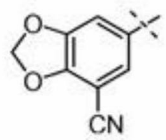
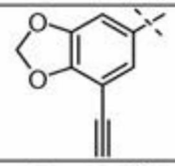
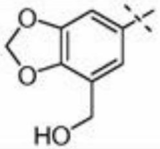
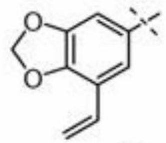
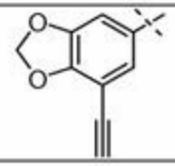
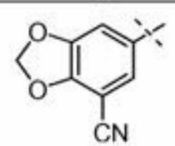
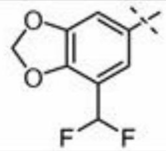
化合物编号	R^3 =	R^2 =	NMR	MS (MH^+)	HPLC
6-1		Me	^{1}H NMR (400 MHz, MeOD) δ 7.92 (s, 1H), 7.35 (m, 2H), 6.96 (s, 1H), 6.80 (m, 2H), 4.30 – 4.19 (m, 1H), 3.75 (s, 3H), 2.59 (s, 3H), 0.96 (m, 2H), 0.79 (m, 2H).	368	98%
6-2		Me	^{1}H NMR (400 MHz, DMSO) δ 14.75 (s, 1H), 8.89 (s, 1H), 7.92 (d, *J* = 8.6 Hz, 1H), 7.50 (t, *J* = 7.7 Hz, 1H), 7.24 (dd, *J* = 15.3, 7.9 Hz, 2H), 7.14 (d, *J* = 7.4 Hz, 1H), 4.38 (m, 1H), 3.76 (s, 3H), 2.55 (s, 3H), 1.41 – 1.15 (m, 2H), 1.12 – 0.96 (m, 2H).	482	90%
6-3		Me	^{1}H NMR (400 MHz, DMSO) δ 14.80 (s, 1H), 8.95 (s, 1H), 8.00 (d, *J* = 8.8 Hz, 1H), 7.57 (d, *J* = 7.2 Hz, 2H), 7.49 (t, *J* = 7.3 Hz, 2H), 7.45 – 7.36 (m, 3H), 7.26 (d, *J* = 8.6 Hz, 2H), 5.25 (s, 2H), 4.54 – 4.32 (m, 1H), 2.67 (s, 3H), 1.30 (d, *J* = 6.2 Hz, 2H), 1.11 (s, 2H).	444	99%
6-4		Me	^{1}H NMR (400 MHz, DMSO) δ 14.76 (s, 1H), 8.90 (s, 1H), 7.94 (d, *J* = 8.5 Hz, 1H), 7.35 (d, *J* = 8.0 Hz, 2H), 7.12 (d, *J* = 8.2 Hz, 2H), 4.38 (s, 1H), 3.84 (s, 3H), 2.61 (s, 3H), 1.23 (d, *J* = 6.2 Hz, 2H), 1.05 (s, 2H).	368	96%
6-5		Me	^{1}H NMR (400 MHz, DMSO) δ 14.63 (s, 1H), 8.88 (s, 1H), 7.92 (d, *J* = 8.9 Hz, 1H), 7.31 (d, *J* = 8.4 Hz, 2H), 7.08 (d, *J* = 8.7 Hz, 2H), 4.71 (dt, *J* = 12.0, 6.0 Hz, 1H), 4.38 (m, 1H), 2.58 (d, *J* = 26.0 Hz, 3H), 1.32 (d, *J* = 6.0 Hz, 6H), 1.23 (q, *J* = 6.9 Hz, 2H), 1.02 (s, 2H).	396	99%
6-6		Me	^{1}H NMR (400 MHz, DMSO) δ 14.68 (s, 1H), 8.91 (s, 1H), 7.98 (d, *J* = 8.8 Hz, 1H), 7.58 (s, 4H), 4.52 – 4.24 (m, 1H), 2.60 (s, 3H), 1.23 (q, *J* = 7.0 Hz, 2H), 1.15 – 1.01 (m, 2H).	422	99%

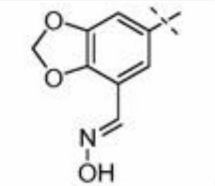
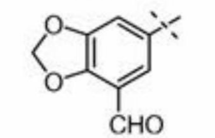
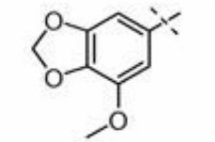
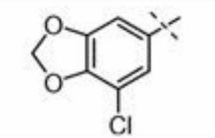
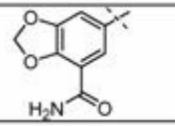
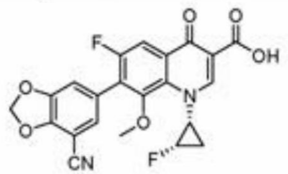
6-7		Me	^{1}H NMR (400 MHz, DMSO) δ 14.66 (s, 1H), 8.91 (s, 1H), 7.99 (d, *J* = 8.8 Hz, 1H), 7.72 (t, *J* = 7.9 Hz, 1H), 7.54 (d, *J* = 8.3 Hz, 1H), 7.52 – 7.44 (m, 2H), 4.52 – 4.20 (m, 1H), 2.60 (s, 3H), 1.23 (d, *J* = 6.8 Hz, 2H), 1.08 (s, 2H).	422	99%
6-8		Me	^{1}H NMR (400 MHz, DMSO) δ 14.48 (s, 1H), 8.76 (s, 1H), 7.86 (d, *J* = 8.7 Hz, 1H), 7.60 – 7.52 (m, 1H), 7.45 (ddd, *J* = 10.9, 9.8, 4.6 Hz, 3H), 4.25 (dt, *J* = 10.7, 3.6 Hz, 1H), 2.43 (s, 3H), 1.06 (dq, *J* = 9.4, 7.1 Hz, 2H), 0.99 – 0.71 (m, 3H).	422	99%
6-9		Me	^{1}H NMR (400 MHz, DMSO) δ 14.64 (s, 1H), 8.83 (s, 1H), 7.87 (d, *J* = 8.7 Hz, 1H), 6.61 (s, 2H), 4.33 (m, 1H), 3.74 (s, 6H), 3.68 (s, 3H), 2.57 (s, 3H), 1.18 (d, *J* = 6.4 Hz, 2H), 1.01 (s, 2H).	428	95%
6-10		Me	^{1}H NMR (400 MHz, DMSO) δ 14.80 (s, 1H), 8.88 (s, 1H), 7.90 (d, *J* = 8.6 Hz, 1H), 7.17 (d, *J* = 8.3 Hz, 1H), 6.76 (d, *J* = 2.2 Hz, 1H), 6.70 (dd, *J* = 8.4, 2.3 Hz, 1H), 4.47 – 4.28 (m, 1H), 3.85 (s, 3H), 3.75 (s, 3H), 2.55 (s, 3H), 1.21 (dd, *J* = 6.7, 4.5 Hz, 2H), 1.02 (dd, *J* = 10.3, 4.5 Hz, 2H).	398	96%
6-11		Me	^{1}H NMR (400 MHz, DMSO) δ 14.70 (s, 1H), 8.80 (s, 1H), 7.86 (d, *J* = 8.1 Hz, 1H), 7.32 (m, 2H), 7.16 (d, *J* = 7.2 Hz, 1H), 4.25 (s, 1H), 3.92 (s, 3H), 2.57 (s, 3H), 1.41 – 1.10 (m, 2H), 0.89 (m, 2H).	386	96%
6-12		Me	^{1}H NMR (400 MHz, DMSO) δ 14.74 (s, 1H), 8.90 (s, 1H), 7.93 (d, *J* = 8.8 Hz, 1H), 7.13 (d, *J* = 8.3 Hz, 1H), 6.97 (s, 1H), 6.93 (dd, *J* = 8.2, 1.7 Hz, 1H), 4.39 (tt, *J* = 7.1, 3.8 Hz, 1H), 3.84 (s, 3H), 3.79 (s, 3H), 2.63 (s, 3H), 1.24 (d, *J* = 6.8 Hz, 2H), 1.07 (s, 2H).	398	99%
6-13		Me	^{1}H NMR (400 MHz, DMSO) δ 14.70 (s, 1H), 8.90 (s, 1H), 7.94 (d, *J* = 8.7 Hz, 1H), 7.54 (s, 1H), 7.35 (dd, *J* = 18.3, 8.3 Hz, 2H), 4.39 (m, 1H), 3.95 (s, 3H), 2.62 (s, 3H), 1.23 (d, *J* = 5.8 Hz, 2H), 1.06 (s, 2H).	402	99%
6-14		Me	^{1}H NMR (400 MHz, DMSO) δ 14.69 (s, 1H), 8.91 (s, 1H), 7.97 (d, *J* = 8.6 Hz, 1H), 7.72 (d, *J* = 8.6 Hz, 1H), 7.67 (s, 1H), 7.47 (d, *J* = 8.6 Hz, 1H), 4.40 (m, 1H), 3.99 (s, 3H), 2.61 (s, 3H), 1.24 (d, *J* = 5.6 Hz, 2H), 1.08 (s, 2H).	436	99%
6-15		Me	^{1}H NMR (400 MHz, DMSO) δ 14.76 (s, 1H), 8.89 (s, 1H), 7.93 (d, *J* = 8.5 Hz, 1H), 7.20 (d, *J* = 12.7 Hz, 2H), 7.11 (d, *J* = 8.0 Hz, 1H), 4.38 (m, 1H), 3.87 (s, 3H), 2.64 (s, 3H), 2.23 (s, 3H), 1.23 (m, 2H), 1.07 (m, 2H).	382	99%

6-16		Me	^{1}H NMR (400 MHz, DMSO) δ 14.78 (s, 1H), 8.88 (s, 1H), 7.91 (d, *J* = 8.6 Hz, 1H), 6.95 (d, *J* = 7.4 Hz, 1H), 6.62 (s, 1H), 6.52 (d, *J* = 6.8 Hz, 1H), 4.94 (s, 2H), 4.39 (s, 1H), 3.84 (s, 3H), 2.63 (s, 3H), 1.23 (s, 2H), 1.03 (s, 2H).	383	95%
6-17		Me	^{1}H NMR (400 MHz, DMSO) δ 14.66 (s, 1H), 10.16 (s, 1H), 8.91 (s, 1H), 7.96 (d, *J* = 8.9 Hz, 2H), 7.26 (dd, *J* = 28.6, 8.1 Hz, 2H), 4.39 (m, 1H), 4.24 (m, 2H), 3.86 (m, 4H), 3.33 (m, 4H), 2.63 (s, 3H), 1.22 (d, *J* = 6.1 Hz, 2H), 1.05 (s, 2H).	510	90%
6-18		Me	^{1}H NMR (400 MHz, DMSO) δ 14.73 (s, 1H), 9.12 (s, 1H), 8.90 (s, 1H), 7.95 (d, *J* = 9.0 Hz, 1H), 7.29 (s, 1H), 7.26 (s, 2H), 4.39 (m, 1H), 3.92 (s, 3H), 3.01 (s, 3H), 2.62 (s, 3H), 1.35 – 1.15 (m, 2H), 1.06 (m, 2H).	461	98%
6-19		Me	^{1}H NMR (400 MHz, DMSO) δ 14.76 (s, 1H), 8.89 (s, 1H), 8.14 (d, *J* = 14.8 Hz, 2H), 7.94 (d, *J* = 8.9 Hz, 1H), 7.14 (d, *J* = 8.3 Hz, 1H), 6.90 (d, *J* = 7.9 Hz, 1H), 6.28 (s, 2H), 4.39 (s, 1H), 3.93 (s, 3H), 2.65 (s, 3H), 1.19 (m, 2H), 1.04 (m, 2H).	426	98%
6-20		Me	^{1}H NMR (400 MHz, DMSO) δ 14.73 (s, 1H), 8.91 (s, 1H), 7.97 (d, *J* = 8.7 Hz, 1H), 7.56 (d, *J* = 6.9 Hz, 2H), 7.31 (d, *J* = 8.5 Hz, 1H), 4.39 (m, 1H), 3.91 (s, 3H), 2.62 (s, 3H), 1.52 (s, 9H), 1.24 (m, 2H), 1.07 (m, 2H).	468	98%
6-21		Me	^{1}H NMR (400 MHz, DMSO) δ 14.80 (s, 1H), 12.93(s, 1H), 8.97 (s, 1H), 8.02 (d, *J* = 8.8 Hz, 1H), 7.70 (s, 1H), 7.62 (d, *J* = 8.8 Hz, 1H), 7.38 (d, *J* = 0.8 Hz, 1H), 4.39 (m, 1H), 3.67 (s, 3H), 2.62 (s, 3H), 1.52 (s, 9H), 1.30 (m, 2H), 1.13 (m, 2H).	412	98%
6-22		Me	^{1}H NMR (400 MHz, DMSO) δ 14.72 (s, 1H), 8.92 (s, 1H), 8.52 (s, 1H), 7.97 (d, *J* = 8.3 Hz, 1H), 7.81 (s, 3H), 7.57 (d, *J* = 7.9 Hz, 1H), 7.36 (d, *J* = 8.4 Hz, 1H), 4.39 (s, 1H), 3.96 (d, *J* = 24.7 Hz, 3H), 3.54 (s, 2H), 2.99 (s, 2H), 2.69 – 2.54 (m, 3H), 1.23 (d, *J* = 5.3 Hz, 2H), 1.07 (s, 2H).	454	95%
6-24		Me	^{1}H NMR (400 MHz, DMSO) δ 14.72 (s, 1H), 9.40 (s, 1H), 8.92 (s, 1H), 8.60 (s, 1H), 7.99 (s, 1H), 7.81 (s, 1H), 7.57 (s, 1H), 7.38 (s, 1H), 4.40 (s, 1H), 4.00 (s, 3H), 3.66 (s, 2H), 3.28 (s, 2H), 2.85 (s, 6H), 2.61 (s, 3H), 1.24 (s, 2H), 1.07 (s, 2H).	482	99%

6-25		Me	[1]H NMR (400 MHz, DMSO) δ 14.73 (s, 1H), 8.91 (s, 1H), 8.37 (s, 1H), 7.96 (d, *J* = 8.3 Hz, 1H), 7.75 (s, 1H), 7.53 (d, *J* = 8.2 Hz, 1H), 7.33 (d, *J* = 8.4 Hz, 1H), 6.95 (s, 1H), 4.40 (s, 1H), 3.98 (s, 3H), 3.33 (d, *J* = 5.1 Hz, 2H), 3.13 (d, *J* = 5.4 Hz, 2H), 2.61 (s, 3H), 1.36 (s, 9H), 1.24 (d, *J* = 4.4 Hz, 2H), 1.07 (s, 2H).	554	95%
6-26		Me	[1]H NMR (400 MHz, DMSO) δ 14.72 (s, 1H), 10.43 (s, 1H), 8.91 (s, 1H), 7.97 (d, *J* = 8.7 Hz, 1H), 7.74 (d, *J* = 8.8 Hz, 1H), 7.70 (s, 1H), 7.45 (d, *J* = 8.6 Hz, 1H), 4.39 (m, 1H), 4.02 (s, 3H), 2.61 (s, 3H), 1.23 (m, 2H), 1.07 (m, 2H).	396	98%
6-27		Me	[1]H NMR (400 MHz, DMSO) δ 14.65 (s, 1H), 8.91 (s, 1H), 8.47 (s, 1H), 7.97 (d, *J* = 8.7 Hz, 1H), 7.71 (s, 1H), 7.66 (s, 1H), 7.44 (d, *J* = 8.7 Hz, 1H), 7.38 (d, *J* = 8.6 Hz, 1H), 4.40 (m, 1H), 4.05 (s, 3H), 2.65 (s, 3H), 1.25 (d, *J* = 6.7 Hz, 2H), 1.08 (s, 2H).	435	90%
6-28		Me	[1]H NMR (400 MHz, DMSO) δ 14.71 (s, 1H), 8.90 (s, 1H), 7.96 (d, *J* = 8.4 Hz, 1H), 7.40 (d, *J* = 11.8 Hz, 2H), 7.26 (d, *J* = 8.0 Hz, 1H), 4.39 (s, 1H), 3.94 (s, 5H), 2.62 (s, 3H), 1.23 (s, 2H), 1.06 (s, 2H).	407	95%
6-29		Me	[1]H NMR (400 MHz, DMSO) δ 14.68 (s, 1H), 10.43 (s, 1H), 8.91 (s, 1H), 7.97 (d, *J* = 8.8 Hz, 1H), 7.86 – 7.62 (m, 2H), 7.44 (d, *J* = 8.5 Hz, 1H), 4.39 (s, 1H), 4.02 (s, 2H), 2.64 (s, 3H), 1.23 (s, 2H), 1.07 (s, 2H).	396	95%
6-30		Me	[1]H NMR (400 MHz, DMSO) δ 14.66 (s, 2H), 8.93 (s, 1H), 8.33 (s, 1H), 8.02 (d, *J* = 8.6 Hz, 1H), 7.80 (s, 2H), 7.71 (d, *J* = 8.5 Hz, 1H), 7.56 (d, *J* = 8.4 Hz, 1H), 7.46 (s, 2H), 4.42 (s, 1H), 4.17 (s, 3H), 2.66 (s, 3H), 1.35 – 1.15 (m, 2H), 1.09 (s, 2H).	484	85%
6-31		Me	[1]H NMR (400 MHz, DMSO) δ 14.74 (s, 1H), 11.37 (s, 1H), 8.90 (s, 1H), 8.35 (s, 1H), 7.96 (d, *J* = 8.1 Hz, 1H), 7.64 (s, 1H), 7.43 (d, *J* = 8.1 Hz, 1H), 7.27 (d, *J* = 8.5 Hz, 1H), 4.39 (s, 1H), 3.92 (s, 3H), 2.63 (s, 3H), 1.23 (d, *J* = 5.2 Hz, 2H), 1.06 (s, 2H).	411	95%
6-32		Me	[1]H NMR (400 MHz, DMSO) δ 14.75 (s, 1H), 8.91 (s, 1H), 7.97 (d, *J* = 8.7 Hz, 1H), 7.78 (s, 2H), 7.70 (s, 1H), 7.54 (d, *J* = 8.2 Hz, 1H), 7.33 (d, *J* = 8.4 Hz, 1H), 4.40 (s, 1H), 3.98 (s, 3H), 2.61 (s, 3H), 1.23 (s, 2H), 1.07 (s, 2H).	411	94%

6-33		Me	^{1}H NMR (400 MHz, DMSO) δ 14.73 (s, 1H), 8.92 (s, 1H), 7.96 (d, *J* = 8.6 Hz, 1H), 7.37 (s, 2H), 7.23 (d, *J* = 7.3 Hz, 1H), 4.39 (m, 1H), 3.89 (s, 3H), 3.74 (m, 4H), 3.07 (s, 4H), 2.76 (s, 3H), 2.62 (s, 3H), 1.24 (s, 2H), 1.06 (s, 2H).	480	96%
6-34		Me	^{1}H NMR (400 MHz, DMSO) δ 14.73 (s, 1H), 8.92 (s, 1H), 8.87 (s, 1H), 7.97 (d, *J* = 8.1 Hz, 1H), 7.48 (s, 2H), 7.29 (d, *J* = 8.7 Hz, 1H), 4.40 (m, 1H), 4.18 (s, 2H), 3.94 (s, 3H), 2.63 (s, 3H), 2.55 (s, 3H), 1.24 (s, 2H), 1.05 (s, 2H).	411	86%
6-35		Me	^{1}H NMR (400 MHz, DMSO) δ 14.69 (s, 1H), 8.91 (s, 1H), 7.97 (d, *J* = 8.6 Hz, 1H), 7.91 (s, 1H), 7.75 (d, *J* = 8.1 Hz, 1H), 7.44 (d, *J* = 8.1 Hz, 1H), 4.39 (s, 1H), 4.02 (s, 3H), 2.61 (s, 3H), 1.23 (s, 2H), 1.07 (s, 2H).	393	95%
6-36		Me	^{1}H NMR (400 MHz, DMSO) δ 14.78 (s, 1H), 8.90 (s, 1H), 7.95 (d, *J* = 8.7 Hz, 1H), 7.37 (s, 1H), 7.26 (d, *J* = 8.0 Hz, 1H), 7.13 (d, *J* = 8.3 Hz, 1H), 5.18 (s, 1H), 4.57 (s, 2H), 4.39 (s, 1H), 3.87 (s, 3H), 2.62 (s, 3H), 1.23 (s, 2H), 1.05 (s, 2H).	398	95%
6-37		Me	^{1}H NMR (400 MHz, DMSO) δ 14.71 (s, 1H), 9.63 (s, 1H), 8.92 (s, 1H), 8.51 (s, 1H), 7.98 (d, *J* = 8.5 Hz, 1H), 7.67 (s, 1H), 7.52 (d, *J* = 8.3 Hz, 1H), 7.32 (d, *J* = 8.5 Hz, 1H), 4.43 (m, 3H), 3.94 (s, 3H), 3.43 (s, 2H), 2.80 (d, *J* = 24.7 Hz, 6H), 2.62 (s, 3H), 1.23 (s, 2H), 1.07 (s, 2H).	482	95%
6-38		Me	^{1}H NMR (400 MHz, DMSO) δ 14.74(s, 1H), 8.90 (s, 1H), 7.93 (d, *J* = 9.2 Hz, 1H), 7.10 (d, *J* = 8.0 Hz, 1H), 7.02 (s, 1H), 6.86 (d, *J* = 8.0 Hz, 1H), 6.13 (s, 2H), 4.38 (m, 1H), 2.62 (s, 3H), 1.23 (m, 2H), 1.05 (m, 2H).	382	98%
6-39		Me	^{1}H NMR (400 MHz, DMSO) δ 14.67 (s, 1H), 10.11 (s, 1H), 8.91(s, 1H), 7.97 (d, *J* = 8.7 Hz, 1H), 7.33 (d, *J* = 1.6 Hz, 1H), 7.29 (d, *J* = 1.6 Hz, 1H), 6.45 – 6.21 (s, 2H), 4.41 – 4.30 (m, 1H), 2.74 – 2.56 (s, 3H), 1.33 – 1.17 (d, *J* = 6.6 Hz, 2H), 1.12 – 0.96 (t, *J* = 3.1 Hz, 2H).	410	98%
6-40		Me	^{1}H NMR (400 MHz, DMSO) δ 14.69 (s, 1H), 11.53 (s, 1H), 8.90 (s, 1H), 8.16 (s, 1H), 7.95 (d, *J* = 8.7 Hz, 1H), 7.08 (d, *J* = 1.7 Hz, 1H), 7.02(d, *J* = 1.7 Hz, 1H), 6.21 (s, 2H), 4.48 – 4.16 (m, 1H), 2.64 (s, 3H), 1.35 – 1.21 (d, *J* = 6.8 Hz, 2H), 1.12 – 1.01 (m, 2H).	425	98%

6-41		Me	^{1}H NMR (400 MHz, DMSO) δ 14.64 (s, 1H), 8.90 (s, 1H), 7.96 (d, J = 8.8 Hz, 1H), 7.36 (d, J = 1.6 Hz, 1H), 7.4 (d, J = 1.6 Hz, 1H), 6.36 (s, 2H), 4.52 – 4.26 (m, 1H), 2.63 (s, 3H), 1.35 – 1.15 (d, J = 6.6 Hz, 2H), 1.10 – 0.99 (m, 2H).	407	98%
6-42		Me	^{1}H NMR (400 MHz, DMSO) δ 14.68 (s, 1H), 8.89 (s, 1H), 794 (d, J = 8.7 Hz, 1H), 7.06 (d, J = 1.5 Hz, 1H), 6.95 (d, J = 1.5 Hz, 1H), 6.22 (s, 2H), 4.57 – 4.46 (s, 1H), 4.42 – 4.30 (m, 1H), 2.63 (s, 3H), 1.33 – 1.15 (d, J = 6.2 Hz, 2H), 1.12 – 0.90 (m, 1H).	406	95%
6-43		OMe	^{1}H NMR (400 MHz, DMSO) δ 14.70 (s, 1H), 8.80 (s, 1H), 7.90 (d, J = 9.1 Hz, 1H), 7.06 (s, 1H), 7.01 (s, 1H), 6.13 (s, 2H), 5.31 (t, J = 5.6 Hz, 1H), 4.54 (d, J = 5.6 Hz, 2H), 4.34 – 4.12 (mz, 1H), 3.44 (s, 3H), 1.33 – 0.99 (m, 4H).	428	97%
6-44		Me	^{1}H NMR (400 MHz, DMSO) δ 14.69 (s, 1H), 8.89 (s, 1H), 7.93 (d, J = 8.7 Hz, 1H), 6.97 (s, 1H), 6.93 (s, 1H), 6.73 (dd, J = 17.7, 11.3 Hz, 1H), 6.20 (s, 2H), 6.00 (d, J = 17.6 Hz, 1H), 5.49 (d, J = 11.5 Hz, 1H), 4.53 – 4.25 (m, 1H), 2.75 – 2.57 (s, 3H), 1.32 – 1.17 (d, J = 6.7 Hz, 2H), 1.11 – 0.89 (s, 2H).	408	95%
6-45		OMe	^{1}H NMR (400 MHz, DMSO) δ 14.66 (s, 1H), 8.80(s, 1H), 7.90 (d, J = 9.1 Hz, 1H), 7.17 (s, 1H), 7.09 (s, 1H), 6.23 (s, 2H), 4.49 (s, 1H), 4.34 – 4.14 (m, 1H), 3.47 – 3.42 (s, 3H), 1.31 – 0.96 (m, 4H).	422	98%
6-46		OMe	^{1}H NMR (400 MHz, DMSO) δ 14.62 (s, 1H), 8.81 (s, 1H), 7.93 (d, J = 9.1 Hz, 1H), 7.45 (s, 1H), 7.44(s, 1H), 6.36 (s, 2H), 4.39 – 4.04 (m, 1H), 3.46 (s, 3H), 1.26 – 1.06 (m, 4H).	423	98%
6-47		OMe	^{1}H NMR (400 MHz, DMSO) δ 14.65 (s, 1H), 8.80 (s, 1H), 7.92 (d, J = 9.1 Hz, 1H), 7.30 (s, 1H), 7.19(s, 11H), 7.17(t, J = 56 Hz, 1H), 6.27 (s, 2H), 4.33 – 4.17 (m, 1H), 3.45(s, 3H), 1.29 – 0.97 (m, 4H).	448	92%

6-48		OMe	^{1}H NMR (400 MHz, DMSO) δ 14.67 (s, 1H), 8.80 (s, 1H), 7.93 (d, *J* = 9.1 Hz, 1H), 7.77 (s, 1H), 7.42 (t, *J* = 1.4 Hz, 1H), 7.28 (t, *J* = 1.3 Hz, 1H), 7.25 (s, 1H), 6.27 (s, 2H), 4.33 – 4.13 (m, 1H), 3.449 (s, 3H), 1.37 – 0.87 (m, 4H).	441	98%
6-49		OMe	^{1}H NMR (400 MHz, DMSO) δ 14.66 (s, 1H), 10.12 (d, *J* = 1.2 Hz, 1H), 8.81 (s, 1H), 7.93 (d, *J* = 9.5 Hz, 1H), 7.44 (s, 1H), 7.42 (s, 1H), 6.35 (s, 2H), 4.33 – 4.17 (m, 1H), 3.46 (s, 3H), 1.32 – 0.97 (m, 4H).	426	98%
6-50		OMe	^{1}H NMR (400 MHz, DMSO) δ 14.68 (s, 1H), 8.80 (s, 1H), 7.89 (d, *J* = 9.1 Hz, 1H), 6.83 – 6.80 (t, *J* = 1.3 Hz, 1H), 6.80 – 6.76 (t, *J* = 1.2 Hz, 1H), 6.11 (s, 2H), 4.34 – 4.12 (m, 1H), 3.86 (s, 3H), 3.31 (s, 3H), 1.26 – 1.02 (m, 4H).	428	98%
6-51		OMe	^{1}H NMR (400 MHz, DMSO) δ 14.70 – 14.61 (s, 1H), 8.84 – 8.78 (s, 1H), 7.96 – 7.88 (d, *J* = 9.0 Hz, 1H), 7.14(s, 1H), 7.13(s, 1H), 6.33 – 6.22 (s, 2H), 4.26 – 4.18 (m, 1H), 3.47 (s, 3H), 1.20 – 1.11 (m, 4H).	432	95%
6-52		OMe	^{1}H NMR (400 MHz, DMSO) δ 14.67 (s, 1H), 8.80 (s, 1H), 7.92 (d, *J* = 9.1 Hz, 1H), 7.77 (s, 1H), 7.42 (s, 1H), 7.28 (s, 1H), 7.25 (s, 1H), 6.27 (s, 2H), 4.22 (m, 1H), 3.44 (s, 3H), 1.17 (m, 4H).	441	85%
6-53			^{1}H NMR (400 MHz, DMSO) δ 14.49 (s, 1H), 8.83 (s, 1H), 7.94 (d, *J* = 8.0 Hz, 1H), 7.42 (s, 1H), 6.36 (s, 2H), 5.10 (m, 1H), 4.18(m, 1H), 3.47 (s, 3H), 1.82-1.63 (m, 4H).	441	98%

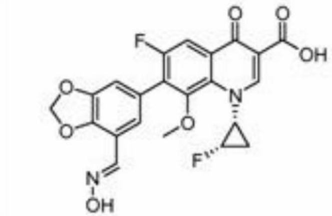
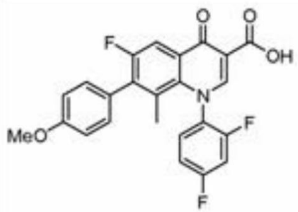
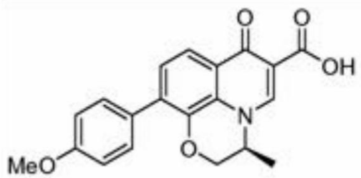
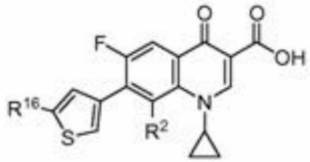
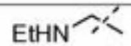
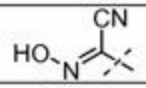
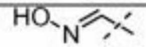
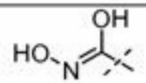
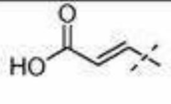
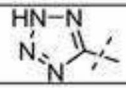
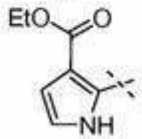
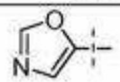
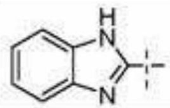
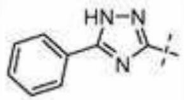
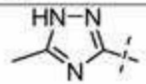
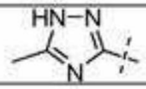
6-54		^{1}H NMR (400 MHz, DMSO) δ 14.50 (s, 1H), 11.55 (s, 1H), 8.83 (s, 1H), 8.16 (s, 1H), 7.92 (d, J = 8.0 Hz, 1H), 7.27 (s, 1H), 7.10 (s, 1H), 6.22 (s, 1H), 5.10 (m, 1H), 4.18(m, 1H), 3.47 (s, 3H), 1.82-1.63 (m, 4H).	459	95%
6-55		^{1}H NMR (400 MHz, DMSO) δ 14.47 (s, 1H), 8.82 (s, 1H), 8.10 (d, J = 8.7 Hz, 1H), 8.00 – 7.87 (m, 1H), 7.66 (t, J = 9.4 Hz, 1H), 7.37 (t, J = 8.3 Hz, 1H), 7.21 (d, J = 8.0 Hz, 2H), 7.06 (d, J = 8.1 Hz, 2H), 3.81 (s, 3H).	440	99%
6-56		^{1}H NMR (400 MHz, DMSO) δ 15.44 – 15.10 (s, 1H), 9.12 – 8.99 (t, J = 1.7 Hz, 1H), 8.03 – 7.92 (dt, J = 8.4, 1.8 Hz, 1H), 7.67 – 7.56 (dd, J = 8.6, 2.5 Hz, 3H), 7.16 – 6.98 (m, 2H), 5.03 – 4.89 (d, J = 7.3 Hz, 1H), 4.60 – 4.47 (d, J = 11.4 Hz, 1H), 4.44 – 4.33 (d, J = 11.5 Hz, 1H), 3.86 – 3.75 (t, J = 1.7 Hz, 3H), 1.53 – 1.42 (d, J = 6.3 Hz, 3H).	352	99%

表 7

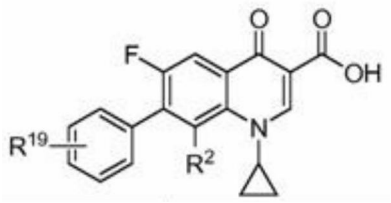


化合物编号	R^{16} =	R^2 =	NMR	MS (MH^+)	HPLC
7-1	H	Me	^{1}H NMR (400 MHz, DMSO) δ 14.74 (s, 1H), 8.90 (s, 1H), 7.95 (d, J = 9.3 Hz, 1H), 7.80 (s, 2H), 7.27 (s, 1H), 4.39 (s, 1H), 2.68 (s, 3H), 1.23 (s, 3H), 1.03 (s, 2H).	344	100%
7-2		Me	^{1}H NMR (400 MHz, DMSO) δ 14.69 (s, 1H), 9.37 (s, 2H), 8.91 (s, 1H), 7.96 (d, J = 8.9 Hz, 1H), 7.87 (s, 1H), 7.51 (s, 1H), 4.43 (s, 3H), 3.00 (d, J = 6.2 Hz, 2H), 2.71 (s, 3H), 1.24 (d, J = 6.4 Hz, 5H), 1.03 (s, 2H).	401	95%
7-3		Me	^{1}H NMR (400 MHz, DMSO) δ 14.70 (s, 1H), 13.87 (s, 1H), 8.91 (s, 1H), 7.98 (d, J = 8.1 Hz, 2H), 7.60 (s, 1H), 4.41 (s, 1H), 2.70 (s, 3H), 1.23 (s, 2H), 1.06 (s, 2H).	412	100%
7-4	CH_2CN	Me	^{1}H NMR (400 MHz, DMSO) δ 14.75 (s, 1H), 8.90 (s, 1H), 7.95 (d, J = 8.8 Hz, 1H), 7.76 (s, 1H), 7.22 (s, 1H). 5.76(s, 2H), 4.40 (m, 1H), 2.69 (s, 3H), 1.23 (m, 2H), 1.04 (s, 2H).	383	97%
7-5	CHO	Me	^{1}H NMR (400 MHz, DMSO) δ 14.67 (s, 1H), 10.03 (s, 1H), 8.92 (s, 1H), 8.39 (s, 1H), 8.23 (s, 1H), 7.99 (d, J = 9.1 Hz, 1H), 4.42 (s, 1H), 2.71 (s, 3H), 1.24 (d, J = 6.4 Hz, 2H), 1.05 (s, 2H).	372	98%
7-6		Me	^{1}H NMR (400 MHz, DMSO) δ 14.70 (s, 1H), 11.34 (d, J = 16.3 Hz, 1H), 8.90 (s, 1H), 8.40 (s, 1H), 7.96 (d, J = 8.6 Hz, 1H), 7.78 (s, 1H), 7.42 (d, J = 14.9 Hz, 1H), 4.40 (s, 1H), 2.71 (s, 3H), 1.24 (d, J = 5.8 Hz, 2H), 1.04 (s, 2H).	387	96%
7-7		Me	^{1}H NMR (400 MHz, DMSO) δ 13.57 – 13.17 (m, 1H), 11.49 (s, 1H), 9.30 (s, 1H), 8.77 (s, 1H), 8.09 (s, 1H), 7.90 (d, J = 9.3 Hz, 1H), 7.83 (s, 1H), 4.33 (s, 1H), 2.66 (s, 3H), 1.22 (d, J = 7.5 Hz, 2H), 0.97 (s, 2H).	403	100%
7-8	$CONH_2$	Me	^{1}H NMR (400 MHz, DMSO) δ 14.70 (s, 1H), 8.91 (s, 1H), 8.12 (s, 1H), 7.98 (m, 2H), 7.89 (s, 1H), 7.57 (s, 1H), 4.41 (s, 1H), 2.71 (s, 3H), 1.25 (d, J = 5.7 Hz, 2H), 1.03 (s, 2H).	387	100%

7-9	CO_2H	Me	^{1}H NMR (400 MHz, DMSO) δ 14.69 (s, 1H), 13.34 (s, 1H), 8.91 (s, 1H), 8.12 (s, 1H), 7.96 (d, *J* = 8.7 Hz, 1H), 7.86 (s, 1H), 4.40 (s, 1H), 2.69 (s, 3H), 1.24 (d, *J* = 6.2 Hz, 2H), 1.05 (s, 2H).	388	100%
7-10		Me	^{1}H NMR (400 MHz, DMSO) δ 14.68 (s, 1H), 12.49 (s, 1H), 8.87 (s, 1H), 7.96 (d, *J* = 11.9 Hz, 2H), 7.81 (d, *J* = 15.8 Hz, 1H), 7.69 (s, 1H), 6.30 (d, *J* = 15.7 Hz, 1H), 4.40 (s, 1H), 2.71 (s, 3H), 1.24 (d, *J* = 6.4 Hz, 2H), 1.04 (s, 2H).	414	95%
7-11		Me	^{1}H NMR (400 MHz, DMSO) δ 14.69 (s, 1H), 8.92 (s, 1H), 8.13 (s, 1H), 8.00 (d, *J* = 8.7 Hz, 1H), 7.91 (s, 1H), 4.42 (s, 1H), 2.74 (s, 3H), 1.24 (s, 2H), 1.06 (s, 2H).	412	100%
7-12		Me	^{1}H NMR (400 MHz, DMSO) δ 14.75 (s, 1H), 11.75 (s, 1H), 8.90 (s, 1H), 7.97 (s, 1H), 7.58 (s, 1H), 7.46 (s, 1H), 7.26 (s, 1H) , 7.13 (s, 1H), 7.00 (s, 2H), 4.41 (s, 1H), 4.17 (d, *J* = 6.9 Hz, 2H), 2.75 (s, 3H), 1.99 (s, 2H), 1.23 (s, 3H), 1.04 (s, 2H), 0.85 (s, 2H).	481	100%
7-13		Me	^{1}H NMR (400 MHz, DMSO) δ 14.70 (s, 1H), 8.91 (s, 1H), 8.49 (s, 1H), 7.97 (d, *J* = 8.7 Hz, 1H), 7.91 (s, 1H), 7.64 (s, 2H), 4.41 (s, 1H), 2.73 (s, 3H), 1.25 (d, *J* = 6.5 Hz, 2H), 1.05 (s, 2H).	411	95%
7-14		Me	^{1}H NMR (400 MHz, DMSO) δ 14.90 – 14.46 (m, 1H), 8.93 (s, 1H), 8.05 (s, 1H), 8.02 (d, *J* = 8.4 Hz, 2H), 7.63 (s, 2H), 7.28 (s, 2H), 4.44 (s, 1H), 2.78 (s, 3H), 1.27 (d, *J* = 6.4 Hz, 2H), 1.07 (s, 2H).	460	100%
7-15		Me	^{1}H NMR (400 MHz, DMSO) δ 8.92 (s, 1H), 8.07 (d, *J* = 6.7 Hz, 2H), 7.99 (d, *J* = 8.8 Hz, 1H), 7.91 (s, 1H), 7.79 (s, 1H), 7.54 (s, 3H), 4.42 (s, 1H), 2.76 (s, 3H), 1.26 (d, *J* = 6.0 Hz, 3H), 1.07 (m, 2H).	487	95%
7-16		Me	^{1}H NMR (400 MHz, DMSO) δ 14.68 (b, 1H), 13.75 (s, 1H), 8.90 (s, 1H), 7.96 (d, *J* = 8.9 Hz, 1H), 7.77 (s, 1H), 7.61 (s, 1H), 4.47 – 4.32 (m, 1H), 2.73 (s, 3H), 2.41 (s, 3H), 1.25 (t, *J* = 6.3 Hz, 2H), 1.07 (s, 2H).	425	98%
7-17	CN	OMe	^{1}H NMR (400 MHz, DMSO) δ 14.63 (s, 1H), 8.80 (s, 1H), 8.42 (s, 1H), 7.28 (s, 1H), 7.96 (d, *J* = 9.2Hz, 1H), 4.47 – 4.32 (m, 1H), 3.47 (s, 3H), 1.23-1.15 (m, 4H).	385	98%
7-18		OMe	^{1}H NMR (400 MHz, DMSO) δ 8.57 (s, 1H), 7.72 (s, 2H), 7.58 (s, 1H), 7.43 (d, *J* = 9.7 Hz, 1H), 4.13 (m, 1H), 3.27 (s, 3H), 2.20 (s, 3H), 1.05 – 0.81 (m, 4H).	441	98%

7-19		Cl	^{1}H NMR (400 MHz, DMSO) δ 8.93 (s, 1H), 8.13(d, J = 8.0 Hz, 1H), 7.86 (s, 1H), 7.67 (s, 1H), 4.13 (m, 1H), 2.40 (s, 3H), 1.24 – 1.12 (m, 4H).	445	85%

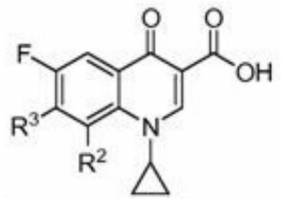
表8-1

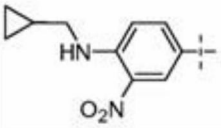
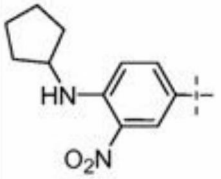
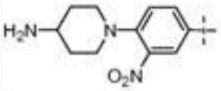
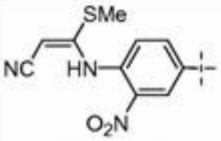
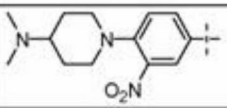
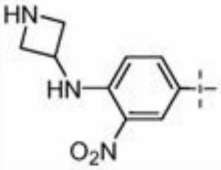
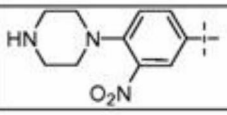
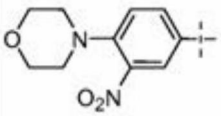
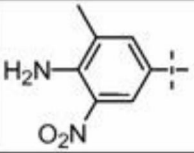


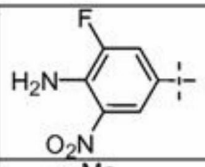
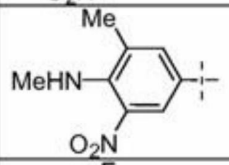
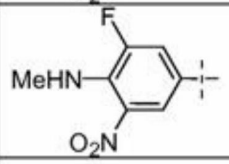
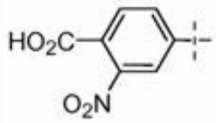
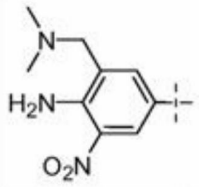
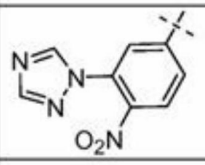
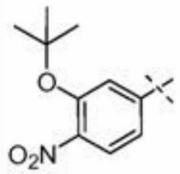
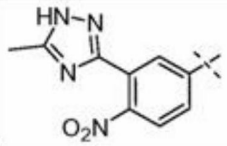
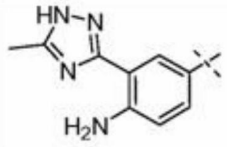
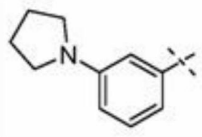
化合物编号	R^{19} =	R^2 =	MS(MH^+)
8-1	H	Me	352.36
8-2	3-NH2	Me	337.34
8-3	4-F	Me	355.33
8-4	4-CO2H	Me	381.35
8-5	2-NH2	Me	352.36
8-6	3-Me	Me	351.37
8-7	4-Me	Me	351.37
8-8	2,3-二甲基	Me	365.4
8-9	2-Cl	Me	371.79
8-10	4-Cl	Me	371.79
8-11	3-CO2H	Me	381.35
8-12	3-CF3	Me	405.34
8-13	3,4-二氯	Me	406.23
8-14	3-F	Me	355.33
8-15	4-tBu	Me	393.45
8-16	4-MeO	环丙基	393.41
8-17	4-Ph	Me	413.44
8-18	4-NO2	Me	382.34
8-19	3,4-二氯	MeO	404.24
8-20	4-MeO	Me	365.38
8-21	3,4-二甲基	Me	365.4
8-22	4-CF3	Me	405.34
8-24	3-CONH2	Me	380.37
8-25	4-NH2	Me	352.36
8-26	4-OH	Me	353.34

8-27	4-OMe	F	353.34
8-28	4-OMe	NO2	398.34
8-29	4-OMe	Cl	387.79
8-30	4-OMe	NH2	368.36
8-31	4-OMe	Br	432.24
8-32	4-OMe	H	353.34
8-33	4-OMe	CN	378.35
8-34	4-OMe	CH2F	385.36
8-35	4-OMe	MeO	383.37
8-36	4-OMe	CH2Br	446.27
8-37	4-OMe	CH2OH	383.37
8-38	4-OMe	CHF2	403.35
8-39	4-氨基-3-羟基	Me	368.36
8-40	4-OMe	CHO	381.35
8-41	4-OMe	C≡CH	377.37
8-42	4-OMe	Et	381.4
8-43	4-OMe	CH=CH2	379.38
8-44	3,4-二氨基	Me	367.37
8-45	4-氨基-3-硝基	Me	397.36
8-46	4-甲基氨基-3-硝基	Me	411.38
8-47	3-二甲基氨基	Me	380.41
8-48	2,4-二硝基-3-二甲基氨基	Me	470.41
8-49	4-硝基-3-二甲基氨基	Me	425.41
8-50	2-硝基-3-二甲基氨基	Me	425.41
8-51	4-二甲基氨基-3-硝基	Me	425.41
8-52	4-乙基氨基-3-硝基	Me	425.41
8-53	4-二甲基氨基	Me	380.41
8-54	3-甲酰基-4-硝基	Me	410.35
8-55	4-氨基-3-硝基	Me	413.36
8-56	3-氟-4-硝基	Me	400.33

表8-2



化合物编号	R^3 =	R^2 =	MS(MH^+)
8-57		Me	451.45
8-58		Me	465.47
8-59		Me	480.49
8-60		Me	495.48
8-61		Me	508.54
8-62		Me	452.44
8-63		Me	466.46
8-64		Me	467.45
8-65		Me	411.38

8-66		Me	415.35
8-67		Me	425.41
8-68		Me	429.37
8-69		Me	426.35
8-70		Me	454.45
8-71		Me	449.39
8-72		Me	454.45
8-73		Me	463.42
8-74		Me	447.46
8-75		Me	406.45

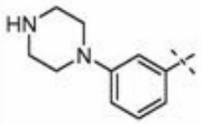
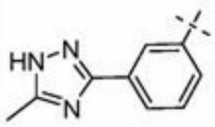
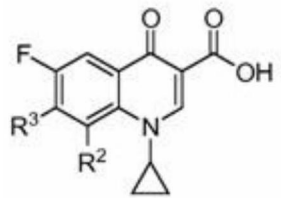
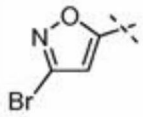
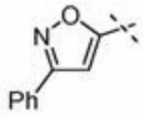
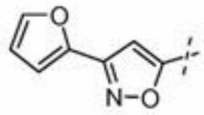
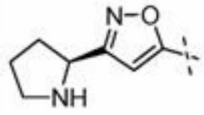
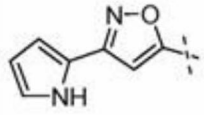
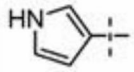
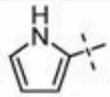
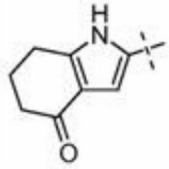
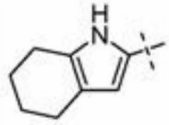
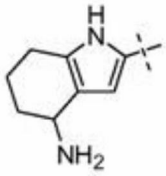
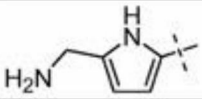
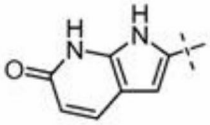
8-76		Me	421.46
8-77		Me	418.42

表9



化合物编号	R^3 =	R^2 =	MS(MH^+)
9-1		Me	407.19
9-2		Me	404.39
9-3		Me	394.35
9-4		Me	397.4
9-5		Me	392.38
9-6		Me	326.32
9-7		Me	326.32
9-8		Me	394.4
9-9		Me	380.41

9-10		Me	395.43
9-11		Me	355.36
9-12		Me	393.37
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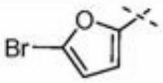
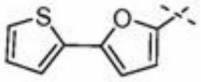
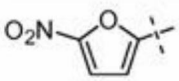
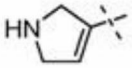
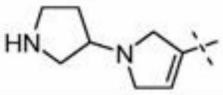
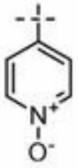
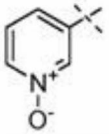
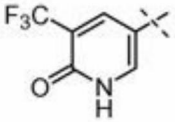
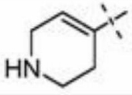
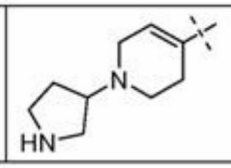
9-14		Me	406.2
9-15		Me	409.43
9-16		Me	372.3
9-17		Me	328.34
9-18		Me	397.44
9-19		Me	354.33
9-20		Me	354.33
9-21		Me	422.33
9-22		Me	342.36

9-24		Me	411.47

[0196] 实验实施例1

体外抗菌活性

将所有化合物溶于二甲基亚砜(DMSO,Merck,纯度>99.9%),以达到最终1mg/ml的所需浓度。

[0197] 通过肉汤微量稀释技术,用96孔微量稀释板测定了MIC(最小抑菌浓度)。抗微生物剂使用下面的MIC范围:0.008～8μg/ml进行了测试。将板填满100μl强化的梭状芽胞杆菌培养基(Oxoid;Unipath Ltd.,Basingstoke,United Kingdom),每孔包含最终的抗生素浓度。将板解冻并在包含80%N_2、15%CO_2、和5%H_2气氛的厌氧培养室(Thermal,USA)中预孵育3小时。通过从48小时强化的梭状芽胞杆菌培养基培养中暂停生长,制备了细菌接种物。最终接种物是约1.0x 10^{5-6}CFU/孔。将板在厌氧培养室中37℃孵育48小时。MIC定义为抑制可见生长的最低抗生素浓度。环丙沙星、万古霉素和甲硝唑用作阳性对照。其结果示于表10中。

[0198] 表10:实施例化合物抗难辨梭菌的MIC(μg/mL)

化合物编号	难辨梭菌 ATCC43255	难辨梭菌 ATCC700057	难辨梭菌 ATCC70092	难辨梭菌 IQCC23903
2-18	0.016-0.063	0.016-0.063	≤0.008-0.063	0.032-0.063
2-46	0.032-0.125	0.032-0.25	0.063-0.25	0.125-0.25
5-14	0.125-0.25	0.125-0.5	0.125-0.25	0.125-0.5
2-49	0.063-0.25	0.063-0.25	0.063-0.5	0.063-0.25
3-11	≤0.008-0.032	0.016-0.032	≤0.008-0.032	≤0.008-0.063
2-31	≤0.008-0.032	0.016-0.032	0.016-0.032	0.016-0.063
1-2	0.032-0.125	0.032-0.125	0.032-0.125	0.063-0.25
3-21	0.016-0.032	0.016-0.063	0.016-0.063	0.032-0.063
2-38	0.016-0.032	0.016-0.032	0.032-0.063	0.016-0.032
3-30	0.032-0.063	0.063-0.125	0.063-0.125	0.063-0.25

。

[0199] 实验实施例2

体内抗菌功效

在仓鼠肠道感染的治疗模型中,评估了体内功效。雄性叙利亚金色仓鼠购自Charles River Laboratories(Kingston,NY,USA),且为约6周龄,在研究开始时重量为80至100g。将动物单独安置在滤过性聚碳酸酯动物箱式笼中,并配有水瓶,且Harlan Teklab Global Diet 2016经由食物储料漏斗可随意食用。在第0天将仓鼠预先用配制在阿拉伯胶中的克林

霉素(1mg/kg,p.o.)和万古霉素(50mg/kg,p.o.)治疗。在第7天,每只仓鼠通过口服管饲法接种0.5mL难辨梭菌ATCC 43255悬浮液(10^5CFU/躯体,p.o.)。为了准备此接种,将难辨梭菌在GAM琼脂(Japan)中37℃生长5天,通过离心收集细菌,用阿拉伯胶清洗两次,再悬浮在阿拉伯胶中,并使用稀释平板计数法测定了准确的细菌密度。在随后一天(第8天)开始化合物口服给药,所述化合物粉碎并配制在阿拉伯胶中。每天一次,连续5天以指定的剂量(10、2、和0.4mg/kg)对每组五只仓鼠给药治疗。对照包括未感染组和感染但未治疗组,和万古霉素用作阳性对照。每天观察仓鼠,记录临床体征(持续时间、发病时间、恢复或死亡时间),并对昏睡的明确垂死状态的动物实施安乐死。对发现死亡或在研究结束时(第37天)实施安乐死的动物进行剖检。其结果示于图1和图2中。

[0200] 制备实施例1

注射制剂由下列组分制得。

组分	量
化合物 1-2	200 mg
葡萄糖	250 mg
注射用蒸馏水	适量
总数	5 ml

将化合物1-2和葡萄糖溶于注射用蒸馏水中,并将该溶液加入到5ml的安瓿中,所述安瓿用氮气吹洗,然后在121℃灭菌15分钟,得到注射制剂。

[0201] 制备实施例2

薄膜包衣片由下列组分制得。

组分	量
化合物 2-18	100 g
Avicel(注册商标)	40 g
玉米淀粉	30 g
硬脂酸镁	2 g
TC-5(注册商标)	10 g
聚乙二醇 6000	3 g
蓖麻油	40 g
乙醇	40 g

将化合物2-18、Avicel(注册商标的微晶纤维素,AsahiKasei Corporation,Japan制造)、玉米淀粉和硬脂酸镁混和并捏合,为糖包衣使用常规捣杵(R 10mm)(Kikusui Seisakusho Ltd.,Japan制造)将混合物制片。将这样得到的片剂涂布薄膜包衣剂,得到薄膜包衣片,其中所述薄膜包衣剂由TC-5(注册商标的羟丙基甲基纤维素,Shin-Etsu Chemical Co.,Ltd.,Japan制造)、聚乙二醇6000、蓖麻油和乙醇组成。

[0202] 制备实施例3

软膏由下列组分制备。

组分	量
化合物 3-11	2 g
纯羊毛脂	5 g
白蜂蜡	5 g
白凡士林	88 g
总量	100 g

将白蜂蜡加热制成液体，向其中加入化合物3-11、纯羊毛脂和白凡士林，将混合物加热，直到它变成液体。将混合物搅拌，直到它固化，得到软膏。

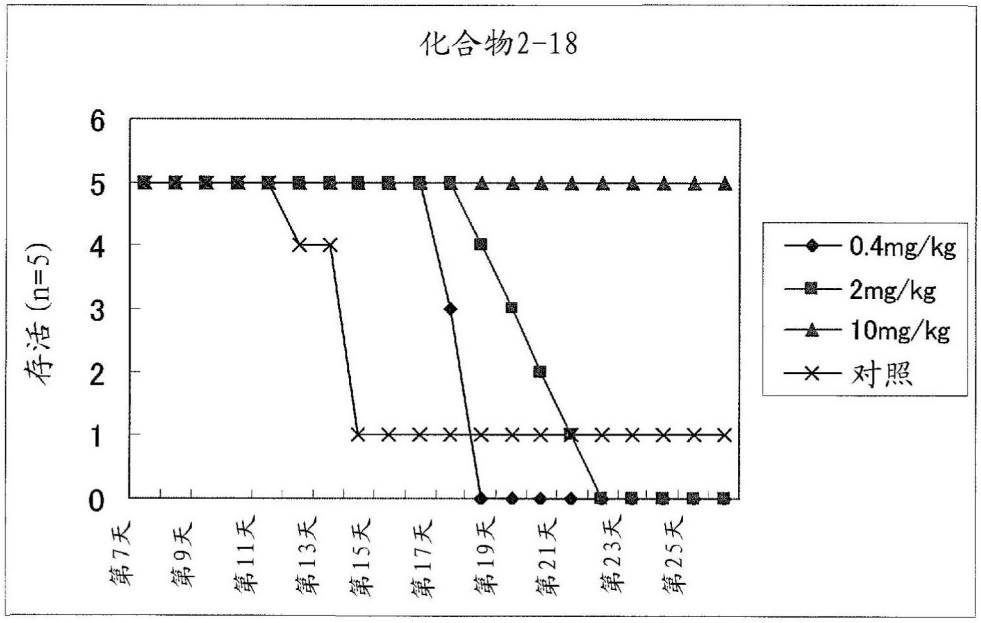

化合物2-18
存活(n=5)
0
1
2
3
4
5
6
第7天
第9天
第11天
第13天
第15天
第17天
第19天
第21天
第23天
第25天
0.4mg/kg
2mg/kg
10mg/kg
对照

图1

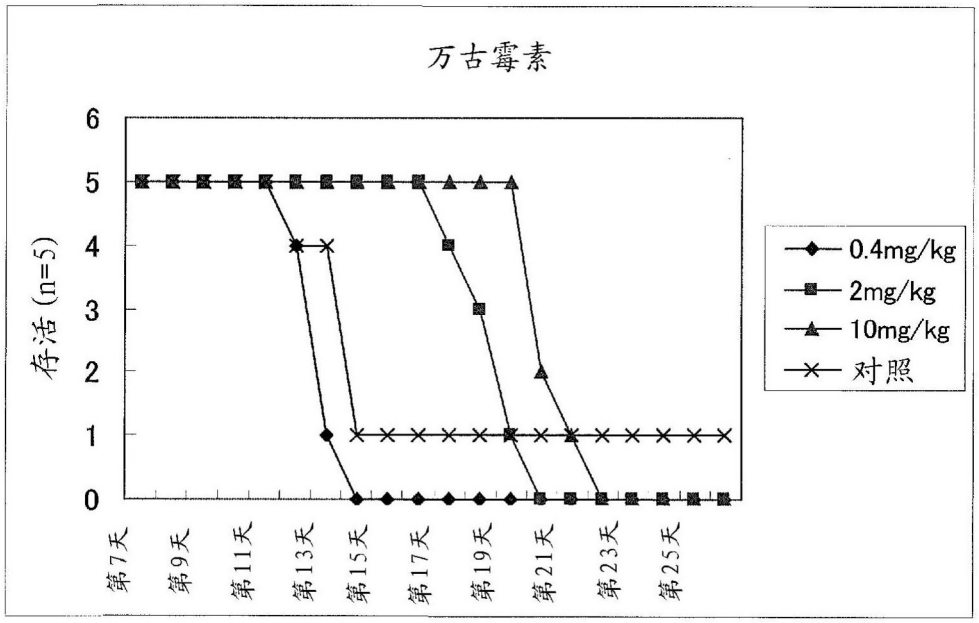
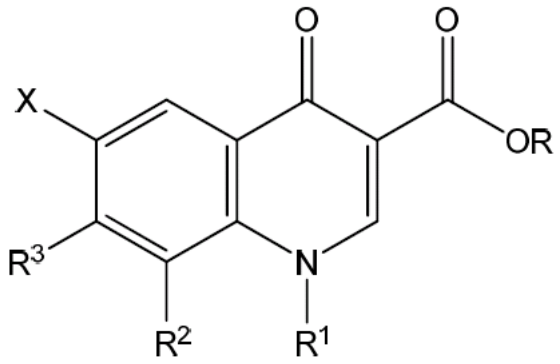

万古霉素
存活(n=5)
0
1
2
3
4
5
6
第7天
第9天
第11天
第13天
第15天
第17天
第19天
第21天
第23天
第25天
0.4mg/kg
2mg/kg
10mg/kg
对照

图2

Abstract

The present invention relates to quinolone compounds. The present invention provides a compound represented by the formula (I)



(I)

wherein X is a hydrogen atom or a fluorine atom; R is a hydrogen atom or alkyl; R^1 is (1) cyclopropyl optionally substituted by 1 to 3 halogen atoms or (2) phenyl optionally substituted by 1 to 3 halogen atoms; R^2 is alkyl, alkoxy, haloalkoxy, a halogen atom, cyano, etc.; and R^3 is 7-oxo-7,8-dihydro-1,8-naphthyridinyl, 3-pyridyl, etc., or a salt thereof. The compound of the present invention has excellent antimicrobial activity against *Clostridium difficile* and is useful for the prevention or treatment of intestinal infection such as *Clostridium difficile*-associated diarrhea.