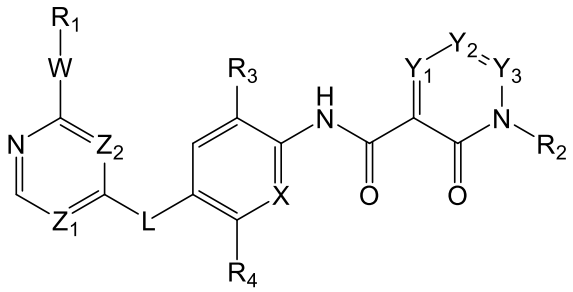
CLAIMS

1. A compound of formula (I):



(I)

or a pharmaceutically acceptable salt thereof, and/or a deuterate, a solvate, a racemic mixture, an enantiomer, a diastereomer and a tautomer thereof, wherein

X is N or CR_5;

Z_1 and Z_2 are each independently N or CR_6;

Y_1 is N or CR_7; Y_2 is N or CR_8; Y_3 is N or CR_9;

L is O or CH_2;

W is absent or NH;

R_1 is phenyl, 5-12 membered heteroaryl, 4-6 membered heterocyclyl or C_{3-8} cycloalkyl, each of which is optionally substituted with one or more groups chosen from: halogen, -CN, C_{1-6} alkyl, C_{2-6} alkenyl, C_{2-6} alkynyl, C_{1-6} haloalkyl, -(C_{1-6} alkylene)$_n$-NH_2, -(C_{1-6} alkylene)$_n$-NH(C_{1-6} alkyl), -(C_{1-6} alkylene)$_n$-N(C_{1-6} alkyl)$_2$, -(C_{1-6} alkylene)$_n$-OH, -(C_{1-6} alkylene)$_n$-O-(C_{1-6} alkyl) or -(C_{1-6} alkylene)$_n$-O-(C_{1-6} haloalkyl);

R_2 is hydrogen, -CN, C_{1-6} alkyl, C_{2-6} alkenyl, C_{2-6} alkynyl, C_{1-6} haloalkyl, -(C_{1-6} alkylene)-NH_2, -(C_{1-6} alkylene)-NH(C_{1-6} alkyl), -(C_{1-6} alkylene)-N(C_{1-6} alkyl)$_2$, -(C_{1-6} alkylene)-O-(C_{1-6} alkyl), -(C_{1-6} alkylene)-O-(C_{1-6} haloalkyl), -(C_{1-6} alkylene)-OH, C_{3-8} cycloalkyl or 4-6 membered heterocyclyl;

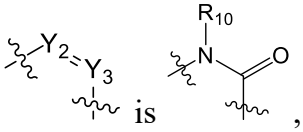
R_3, R_4, R_5, R_6, R_7 and R_8 are each independently chosen from: hydrogen, halogen, -CN, C_{1-6} alkyl, C_{1-6} haloalkyl, -O(C_{1-6} alkyl), -O(C_{1-6} haloalkyl) or -OH;

R_9 is hydrogen, halogen, -CN, C_{1-6} alkyl, C_{1-6} haloalkyl, -O(C_{1-6} alkyl), -O(C_{1-6} haloalkyl), -OH, -(C_{1-6} alkylene)-OH, -NH_2, -NH(C_{1-6} alkyl), -N(C_{1-6} alkyl)$_2$ or C_{3-8} cycloalkyl;

n is 0 or 1;

or when Y_3 is CR_9, R_2 and R_9 together with the N atoms and C atoms to which they are attached form a 5-6 membered heteroaromatic ring or 5-6 membered heterocycle;

or when Y_2 is CR_8 and Y_3 is CR_9, R_8 and R_9 together with the C atoms to which they are attached form a benzene ring;



or is , wherein R_{10} is hydrogen or C_{1-6} alkyl;

provided that when X is CH, Z_1 is not N;

wherein the term "cycloalkyl" refers to a saturated or partially unsaturated cyclic hydrocarbon radical.

2. The compound of claim 1, or a pharmaceutically acceptable salt thereof, and/or a deuterate, a solvate, a racemic mixture, an enantiomer, a diastereomer and a tautomer thereof, wherein X is N.

3. The compound of claim 1, or a pharmaceutically acceptable salt thereof, and/or a deuterate, a solvate, a racemic mixture, an enantiomer, a diastereomer and a tautomer thereof, wherein X is CR_5; R_5 is hydrogen, halogen, C_{1-6} alkyl or -O(C_{1-6} alkyl).

4. The compound of claim 1, or a pharmaceutically acceptable salt thereof, and/or a deuterate, a solvate, a racemic mixture, an enantiomer, a diastereomer and a tautomer thereof, wherein Z_1 and Z_2 are each independently CR_6.

5. The compound of claim 4, or a pharmaceutically acceptable salt thereof, and/or a deuterate, a solvate, a racemic mixture, an enantiomer, a diastereomer and a tautomer thereof, wherein both Z_1 and Z_2 are CH.

6. The compound of claim 1, or a pharmaceutically acceptable salt thereof, and/or a deuterate, a solvate, a racemic mixture, an enantiomer, a diastereomer and a tautomer thereof, wherein Y_1 is CR_7, Y_2 is CR_8, and Y_3 is CR_9; R_7 and R_8 are each independently chosen from: hydrogen, halogen, C_{1-6} alkyl or -O(C_{1-6} alkyl), R_9 is hydrogen, C_{1-6} alkyl, C_{1-6} haloalkyl, -O(C_{1-6} alkyl), $-NH_2$, -NH(C_{1-6} alkyl) or -N(C_{1-6} alkyl)$_2$; preferably, R_7 is

hydrogen or -O(C_{1-6} alkyl), R_8 is hydrogen, halogen or C_{1-6} alkyl, R_9 is hydrogen, C_{1-6} alkyl, C_{1-6} haloalkyl, -O(C_{1-6} alkyl), -NH_2, -NH(C_{1-6} alkyl) or -N(C_{1-6} alkyl)$_2$; and more preferably, R_7 is hydrogen, R_8 is chosen from hydrogen or fluoro, and R_9 is hydrogen or methyl.

7. The compound of claim 1, or a pharmaceutically acceptable salt thereof, and/or a deuterate, a solvate, a racemic mixture, an enantiomer, a diastereomer and a tautomer thereof, wherein Y_1 is CR_7, Y_2 is N, and Y_3 is CR_9; R_7 is hydrogen, C_{1-6} alkyl or -O(C_{1-6} alkyl); R_9 is hydrogen, C_{1-6} alkyl, C_{1-6} haloalkyl or C_{3-6} cycloalkyl; preferably, R_7 is hydrogen; R_9 is hydrogen, C_{1-6} alkyl or C_{3-6} cycloalkyl; and more preferably, R_7 is hydrogen; R_9 is hydrogen or methyl.

8. The compound of claim 1, or a pharmaceutically acceptable salt thereof, and/or a deuterate, a solvate, a racemic mixture, an enantiomer, a diastereomer and a tautomer thereof, wherein L is O.

9. The compound of claim 1, or a pharmaceutically acceptable salt thereof, and/or a deuterate, a solvate, a racemic mixture, an enantiomer, a diastereomer and a tautomer thereof, wherein W is absent.

10. The compound of any one of claims 1-9, or a pharmaceutically acceptable salt thereof, and/or a deuterate, a solvate, a racemic mixture, an enantiomer, a diastereomer and a tautomer thereof, wherein R_1 is phenyl, 5-12 membered heteroaryl, 4-6 membered heterocyclyl or C_{3-8} cycloalkyl, each of which is optionally substituted with one or more groups chosen from: halogen, C_{1-6} alkyl, C_{1-6} haloalkyl, -(C_{1-6} alkylene)$_n$-NH_2, -(C_{1-6} alkylene)$_n$-NH(C_{1-6} alkyl), -(C_{1-6} alkylene)$_n$-N(C_{1-6} alkyl)$_2$ or -(C_{1-6} alkylene)$_n$-OH; preferably R_1 is phenyl, pyrazolyl, pyrrolyl, furanyl, thienyl, pyridyl, thiazolyl, 1,2,3-triazolyl, 1,2,4-triazolyl, imidazolyl, imidazo[1,2-a]pyridyl, piperazinyl or cyclohexenyl, each of which is optionally substituted with one or more groups chosen from: halogen, C_{1-6} alkyl, C_{1-6} haloalkyl, -(C_{1-6} alkylene)$_n$-NH_2, -(C_{1-6} alkylene)$_n$-NH(C_{1-6} alkyl), -(C_{1-6} alkylene)$_n$-N(C_{1-6} alkyl)$_2$ or -(C_{1-6} alkylene)$_n$-OH; more preferably R_1 is pyrazolyl or

pyrrolyl, each of which is optionally substituted with one or more groups chosen from: C_{1-6} alkyl, C_{1-6} haloalkyl, -(C_{1-6} alkylene)-NH_2, -(C_{1-6} alkylene)-NH(C_{1-6} alkyl), -(C_{1-6} alkylene)-N(C_{1-6} alkyl)$_2$ or -(C_{1-6} alkylene)-OH; and still more preferably R_1 is pyrazolyl or pyrrolyl, each of which is optionally substituted with one or more C_{1-6} alkyl, preferably methyl.

11. The compound of claim 10, or a pharmaceutically acceptable salt thereof, and/or a deuterate, a solvate, a racemic mixture, an enantiomer, a diastereomer and a tautomer thereof, wherein R_1 is phenyl optionally substituted with one or more halogen.

12. The compound of claim 10, or a pharmaceutically acceptable salt thereof, and/or a deuterate, a solvate, a racemic mixture, an enantiomer, a diastereomer and a tautomer thereof, wherein R_1 is furanyl, thienyl, pyridyl, thiazolyl, 1,2,3-triazolyl, 1,2,4-triazolyl, imidazolyl, imidazo[1,2-a]pyridyl, piperazinyl or cyclohexenyl, each of which is optionally substituted with one or more C_{1-6} alkyl.

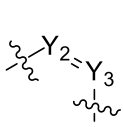
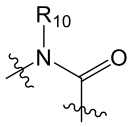
13. The compound of any one of claims 1-8, or a pharmaceutically acceptable salt thereof, and/or a deuterate, a solvate, a racemic mixture, an enantiomer, a diastereomer and a tautomer thereof, wherein W is NH; R_1 is pyrazolyl, pyridyl or thiazolyl, each of which is optionally substituted with one or more groups chosen from: halogen, C_{1-6} alkyl, C_{1-6} haloalkyl, -(C_{1-6} alkylene)-NH_2, -(C_{1-6} alkylene)-NH(C_{1-6} alkyl), -(C_{1-6} alkylene)-N(C_{1-6} alkyl)$_2$ or -(C_{1-6} alkylene)-OH; preferably R_1 is pyrazolyl, pyridyl or thiazolyl, each of which is optionally substituted with one or more groups chosen from: C_{1-6} alkyl or C_{1-6} haloalkyl.

14. The compound of any one of claims 1-13, or a pharmaceutically acceptable salt thereof, and/or a deuterate, a solvate, a racemic mixture, an enantiomer, a diastereomer and a tautomer thereof, wherein R_2 is hydrogen, C_{1-6} alkyl, C_{2-6} alkenyl, C_{1-6} haloalkyl, -(C_{1-6} alkylene)-N(C_{1-6} alkyl)$_2$, -(C_{1-6} alkylene)-O-(C_{1-6} alkyl), -(C_{1-6} alkylene)-OH, C_{3-6} cycloalkyl or 4-6 membered heterocyclyl, preferably R_2 is C_{1-6} alkyl, C_{2-6} alkenyl, -

(CH_2CH_2)-O-(C_{1-6} alkyl), -(CH_2CH_2)-OH, C_{3-6} cycloalkyl or oxetanyl, and more preferably R_2 is C_{1-6} alkyl, preferably methyl, ethyl or i-propyl.

15. The compound of any one of claims 1-14, or a pharmaceutically acceptable salt thereof, and/or a deuterate, a solvate, a racemic mixture, an enantiomer, a diastereomer and a tautomer thereof, wherein R_3 and R_4 are each independently chosen from: hydrogen, halogen, -CN, C_{1-6} alkyl or -O(C_{1-6} alkyl); and when X is CH, at least one of R_3 and R_4 is hydrogen; preferably wherein R_3 is hydrogen, halogen, -CN, C_{1-6} alkyl or -O(C_{1-6} alkyl); R_4 is hydrogen or C_{1-6} alkyl.

16. The compound of claim 1, or a pharmaceutically acceptable salt thereof, and/or a deuterate, a solvate, a racemic mixture, an enantiomer, a diastereomer and a tautomer thereof, wherein when Y_3 is CR_9, R_2 and R_9 together with the N atoms and C atoms to which they are attached form pyridine or pyrrolidine.

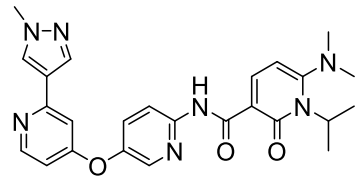
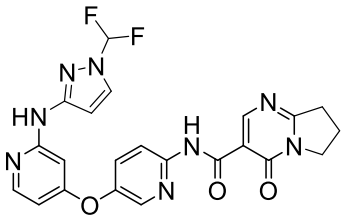
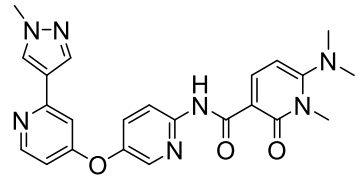
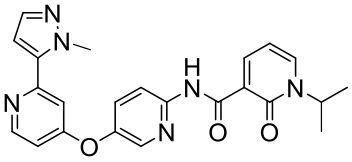
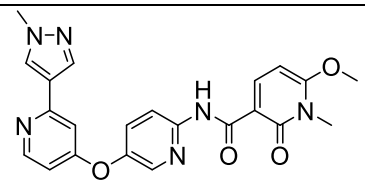
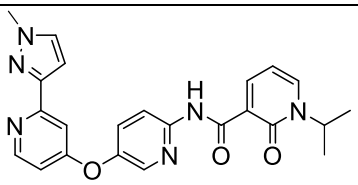
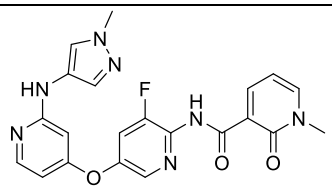
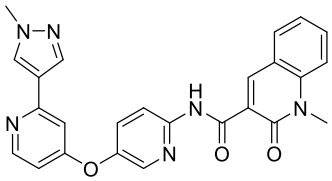
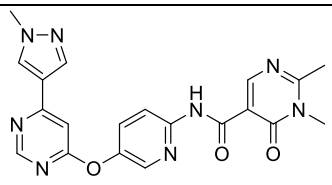
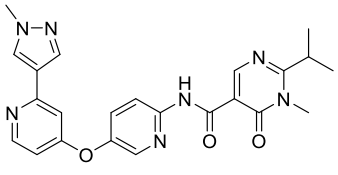
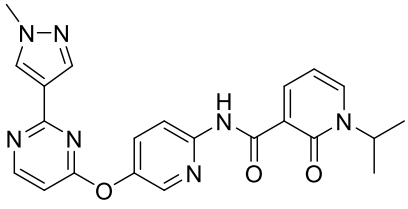
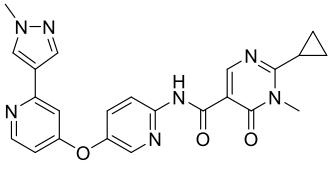
17. The compound of claim 1, or a pharmaceutically acceptable salt thereof, and/or a deuterate, a solvate, a racemic mixture, an enantiomer, a diastereomer and a tautomer thereof, wherein  is  ;R_{10} is C_{1-6} alkyl.

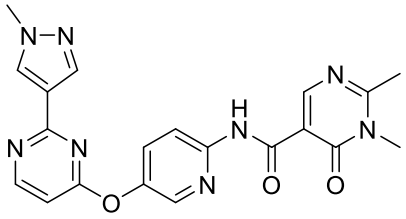
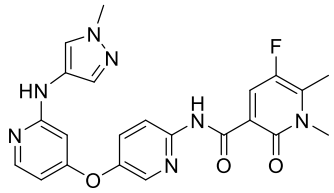
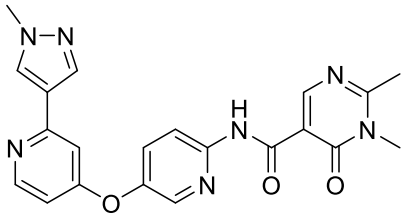
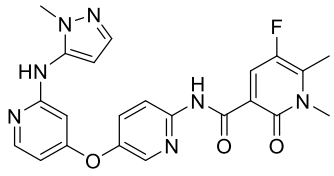
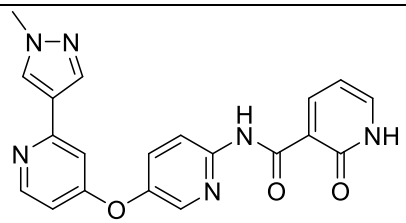
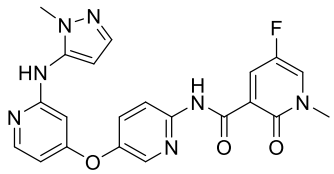
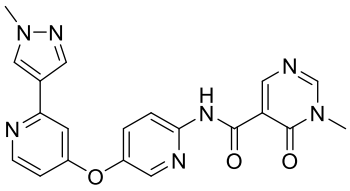
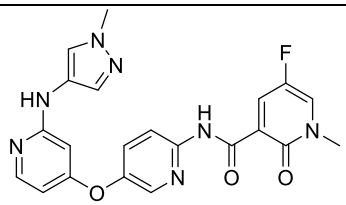
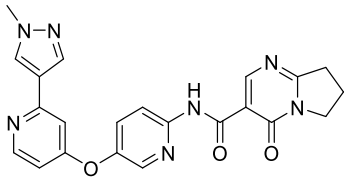
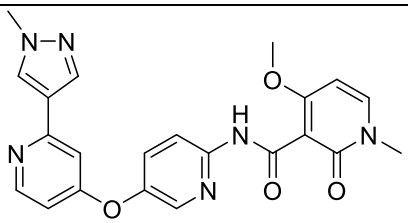
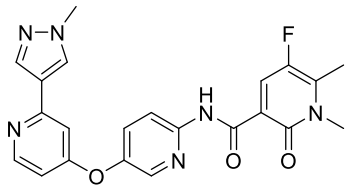
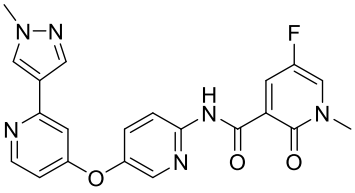
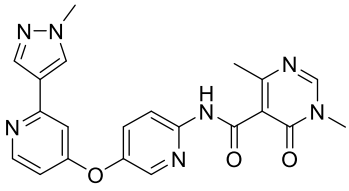
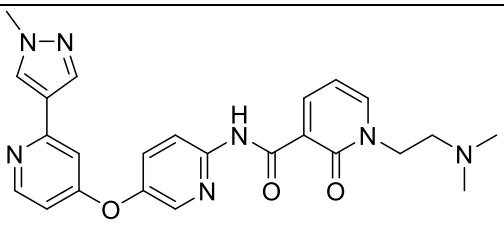
18. The compound of claim 1, or a pharmaceutically acceptable salt thereof, and/or a deuterate, a solvate, a racemic mixture, an enantiomer, a diastereomer and a tautomer thereof, wherein X is CR_5; Z_1 and Z_2 are each independently CR_6; Y_1 is CR_7; Y_2 is N or CR_8; Y_3 is CR_9; W is absent; R_1 is 5-6 membered heteroaryl optionally substituted with one or more C_{1-6} alkyl; R_2 is C_{1-6} alkyl; R_3, R_4, R_5, R_6, R_7 and R_8 are each independently chosen from: hydrogen, halogen, C_{1-6} alkyl or -O(C_{1-6} alkyl), and at least one of R_3 and R_4 is hydrogen; R_9 is hydrogen or C_{1-6} alkyl.

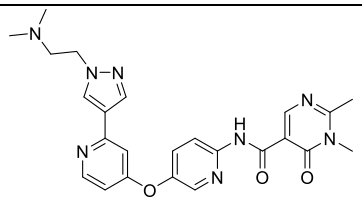
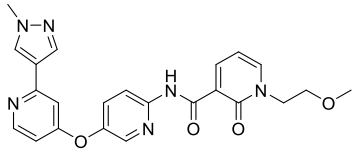
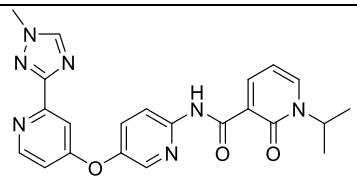
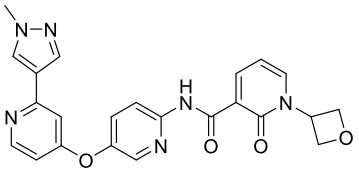
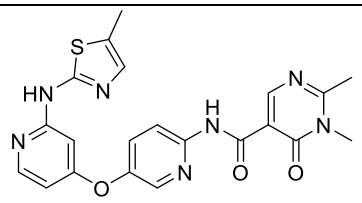
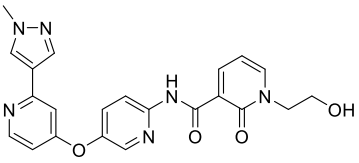
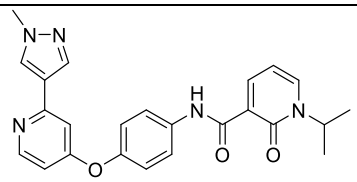
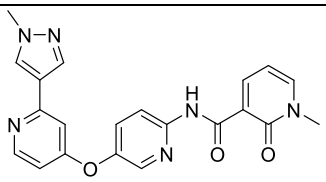
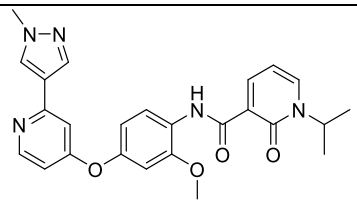
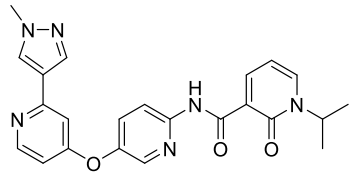
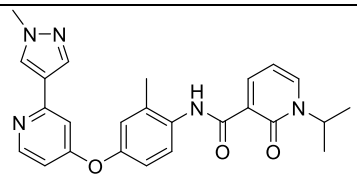
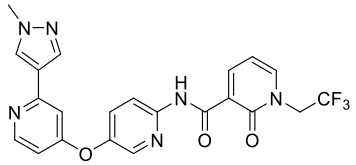
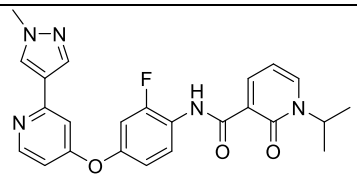
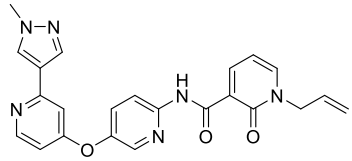
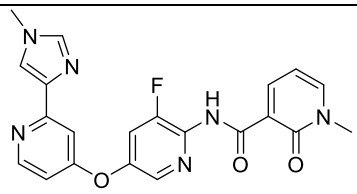
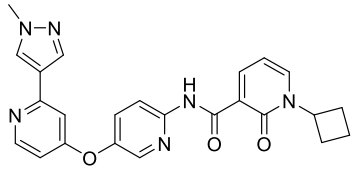
19. The compound of claim 18, or a pharmaceutically acceptable salt thereof, and/or a deuterate, a solvate, a racemic mixture, an enantiomer, a diastereomer and a tautomer thereof, wherein X is CH; both Z_1 and Z_2 are CH; Y_1 is CH; Y_2 is N or CH; Y_3

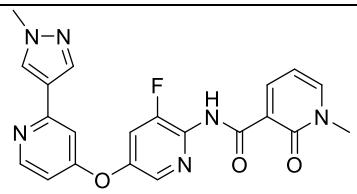
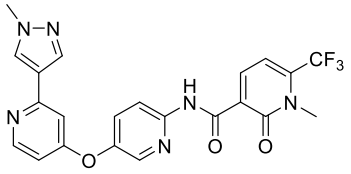
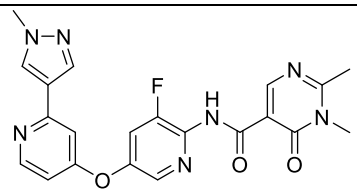
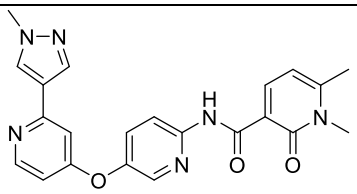
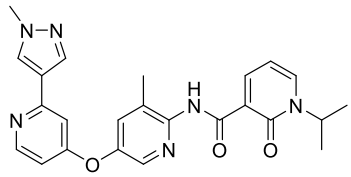
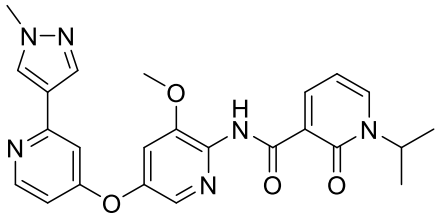
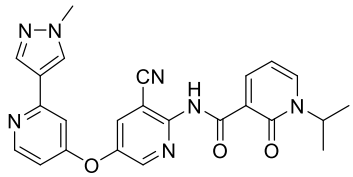
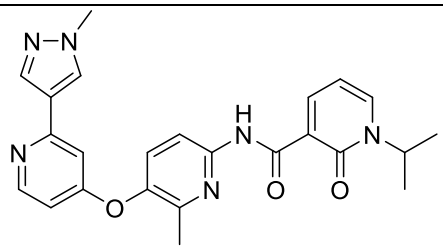
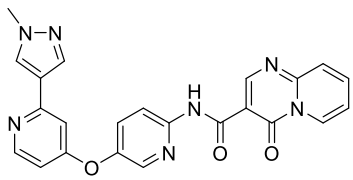
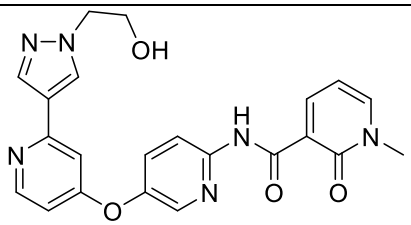
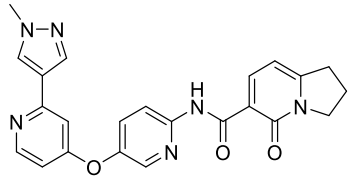
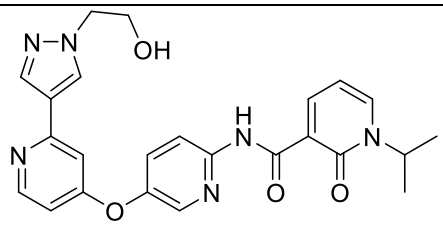
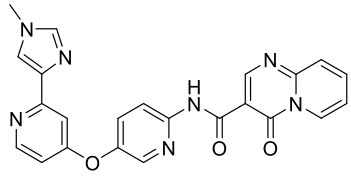
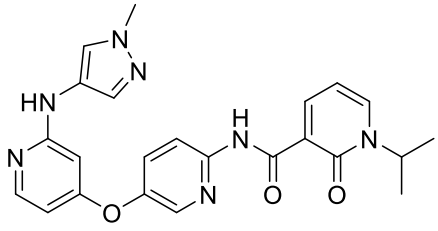
is CR_9; W is absent; R_1 is pyrazolyl optionally substituted with one or more C_{1-6} alkyl; R_2 is C_{1-6} alkyl; R_3 is hydrogen, halogen, C_{1-6} alkyl or -O(C_{1-6} alkyl); R_4 is hydrogen; R_9 is hydrogen or C_{1-6} alkyl.

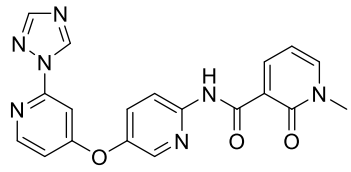
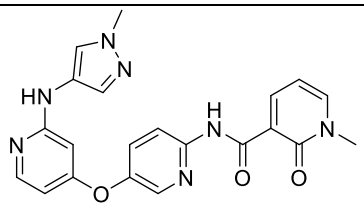
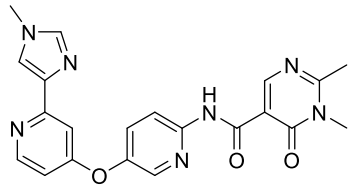
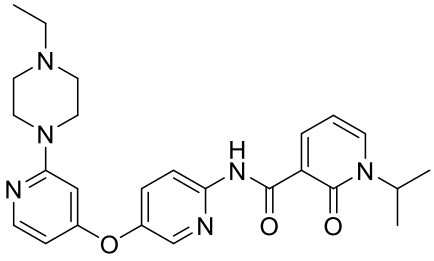
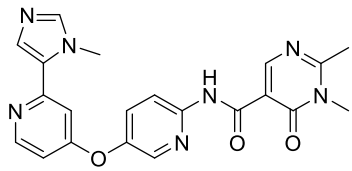
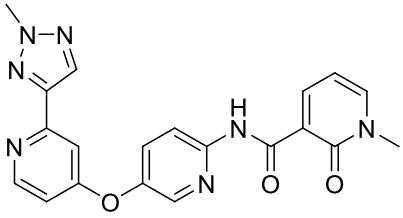
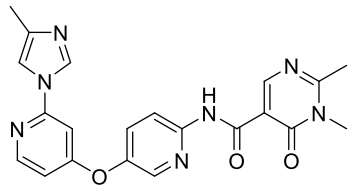
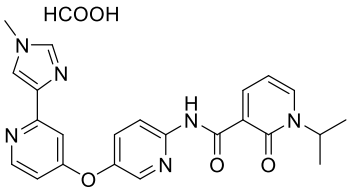
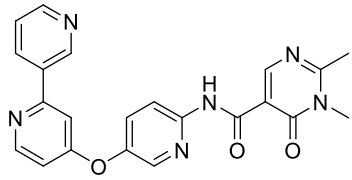
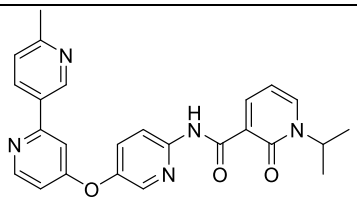
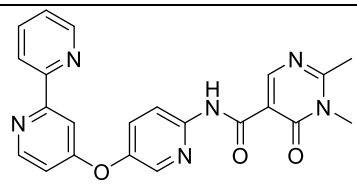
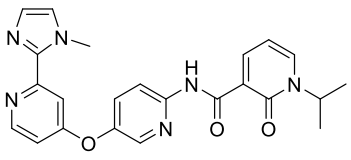
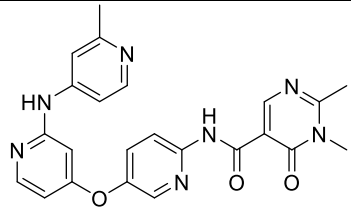
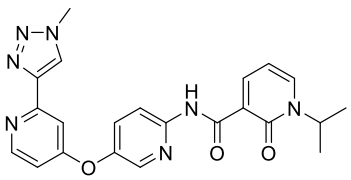
20. The compound of formula (I) of claim 1, or a pharmaceutically acceptable salt thereof, which is chosen from:

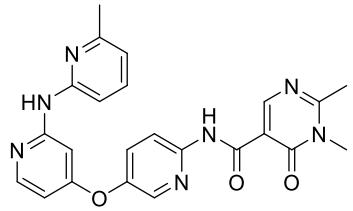
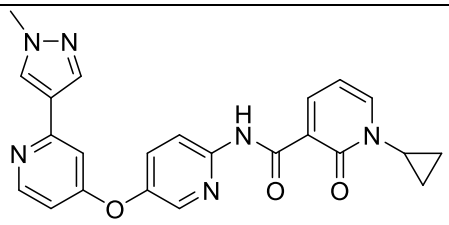
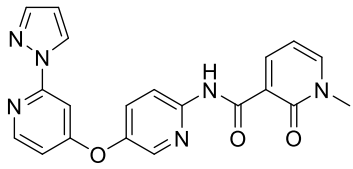
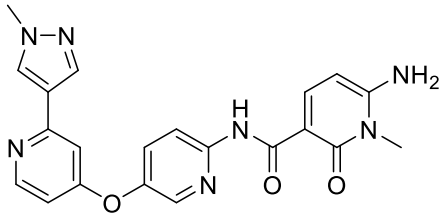
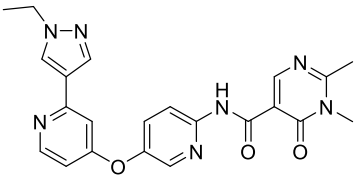
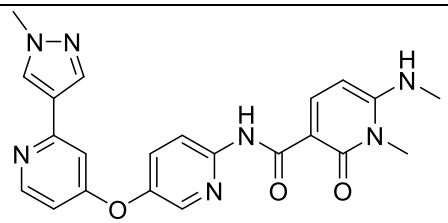
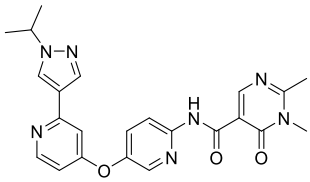
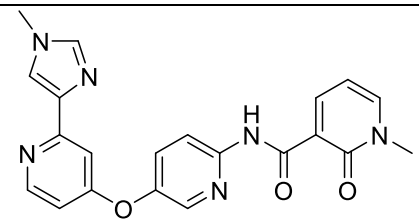
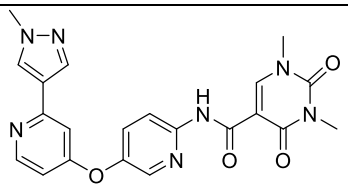
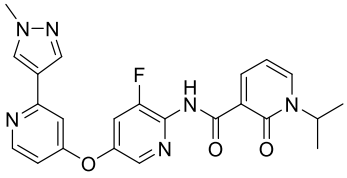
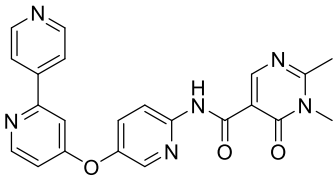
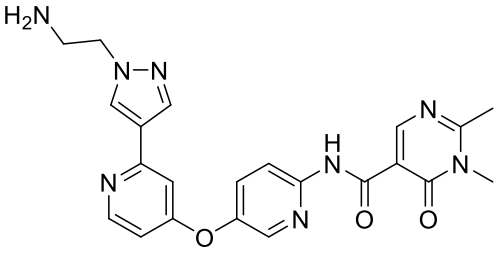
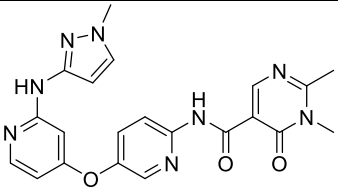
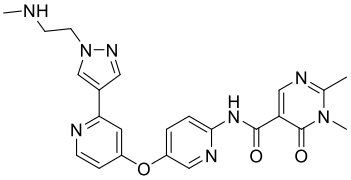
No.	Structural formula	No.	Structural formula
1		69	
2		70	
3		71	
4		72	
5		73	
6		74	

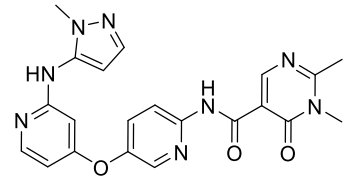
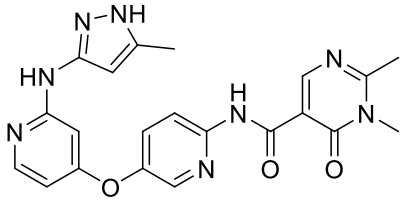
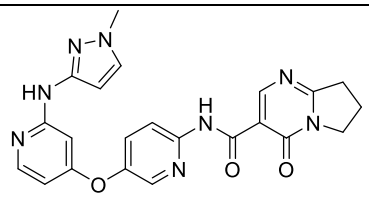
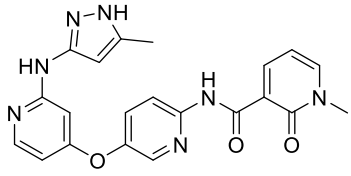
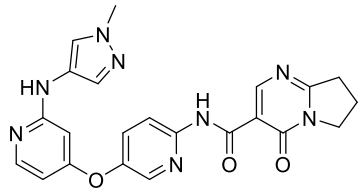
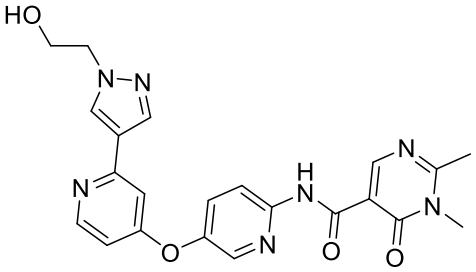
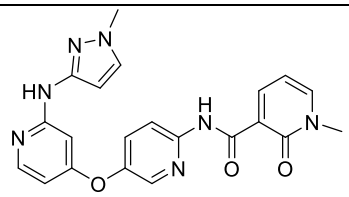
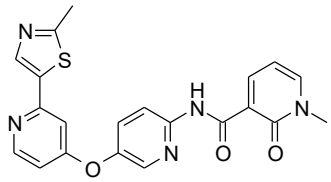
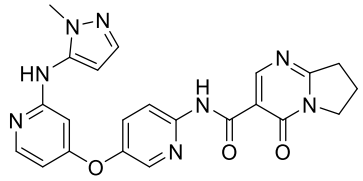
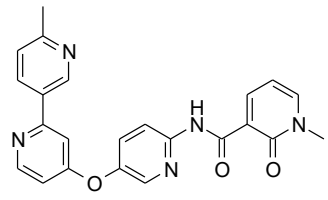
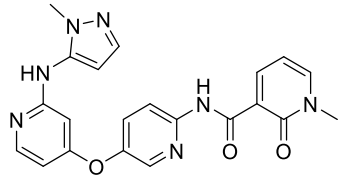
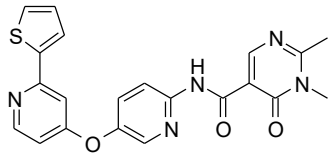
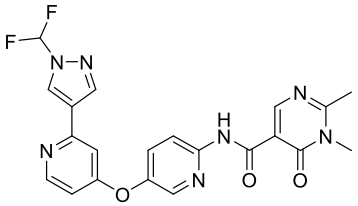
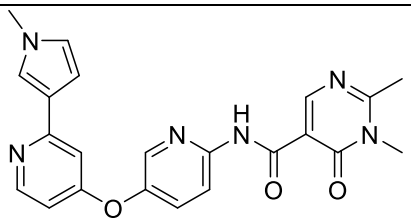
7		75	
8		76	
9		77	
10		78	
11		79	
12		80	
13		81	

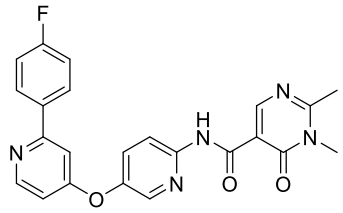
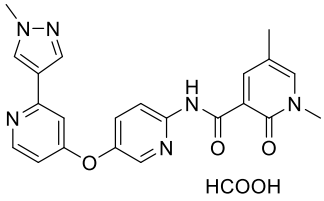
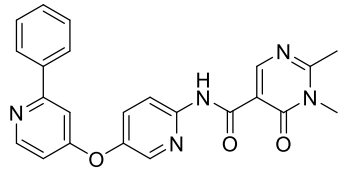
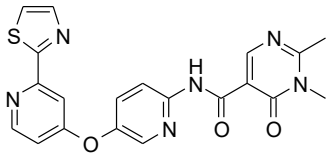
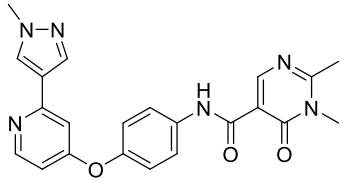
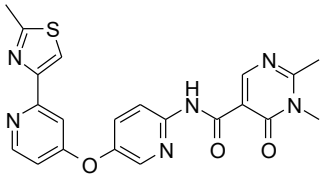
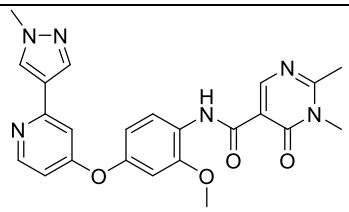
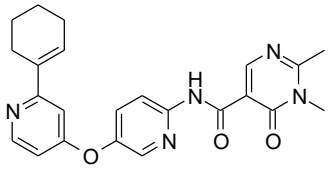
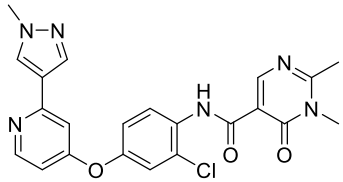
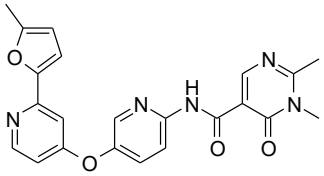
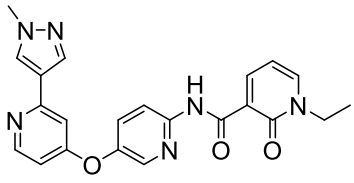
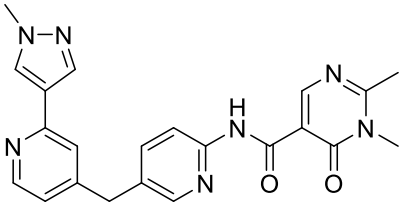
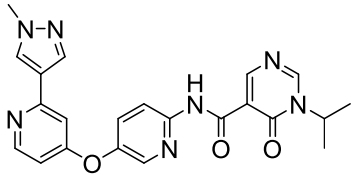
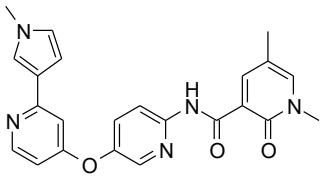
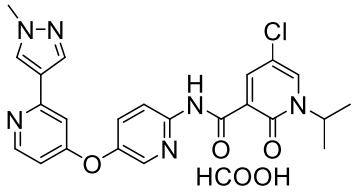
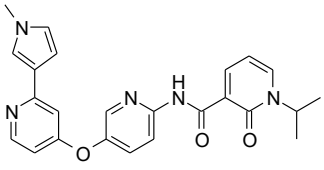
14		82	
15		83	
16		84	
17		85	
18		86	
19		87	
20		88	
21		89	

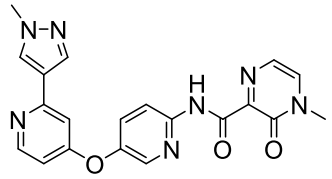
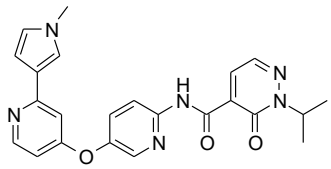
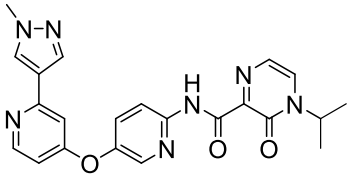
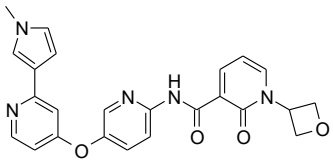
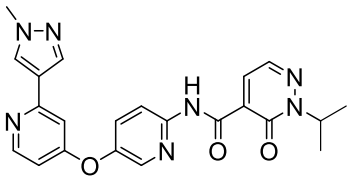
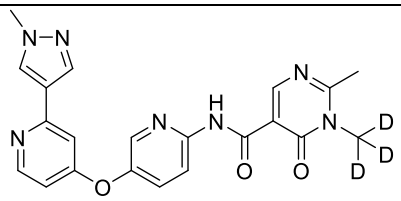
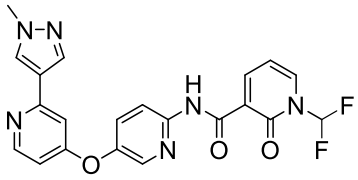
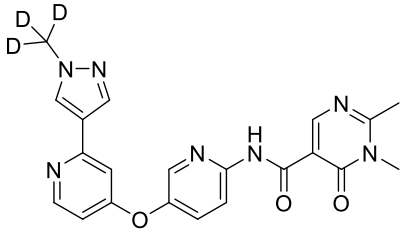
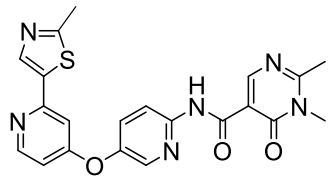
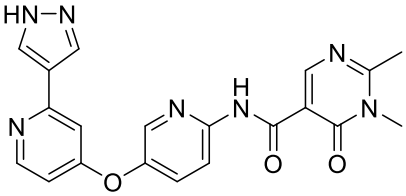
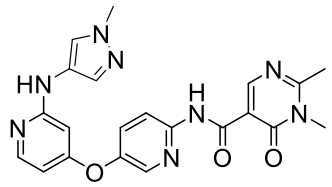
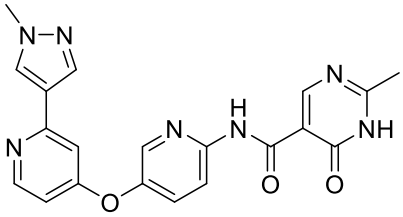
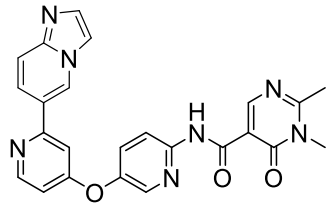
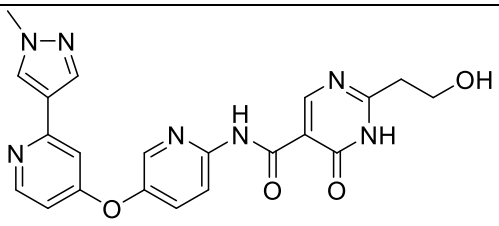
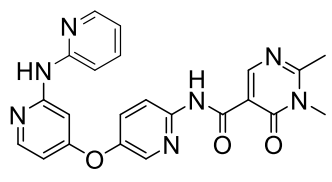
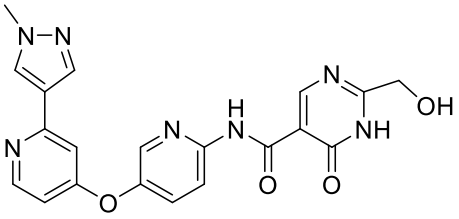
22		90	
23		91	
24		92	
25		93	
26		94	
27		95	
28		96	

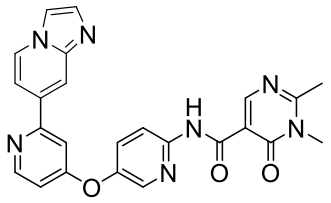
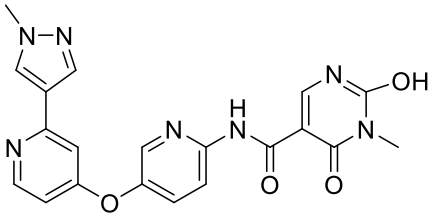
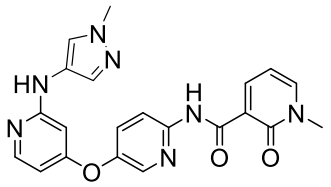
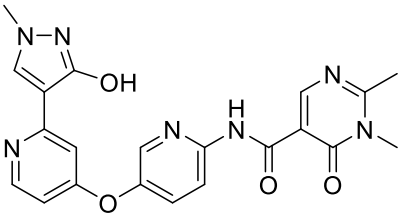
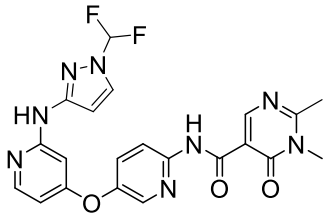
29		97	
30		98	
31		99	
32		100	
33		101	
34		102	
35		103	

36		104	
37		105	
38		106	
39		107	
40		108	
41		109	
42		110	

43		111	
44		112	
45		113	
46		114	
47		115	
48		116	
49		117	

50		118	
51		119	
52		120	
53		121	
54		122	
55		123	
56		124	
57		125	

58		126	
59		127	
60		128	
61		129	
62		130	
63		131	
64		132	
65		133	

66		134	
67		135	
68			

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21. A pharmaceutical composition, comprising the compound of any one of claims 1-20 or a pharmaceutically acceptable salt thereof, and optionally comprising a pharmaceutically acceptable excipient.

22. Use of the compound of any one of claims 1-20 or a pharmaceutically acceptable salt thereof in the manufacture of a medicament for the treatment of a disease in a subject, wherein the disease is cancer, an autoimmune disease, an inflammatory disease, a metabolic disease, a neurodegenerative disease, obesity or an obesity-related disease; preferably, wherein the cancer is chosen from solid tumor or hematologic malignancy; the autoimmune disease or inflammatory disease is chosen from arthritis (including rheumatoid arthritis and collagen-induced arthritis), osteoarthritis, pigmented villonodular synovitis (PVNS), systemic lupus erythematosus, multiple sclerosis, autoimmune nephritis, Crohn's disease, asthma or chronic obstructive pulmonary disease; and more preferably, wherein the cancer is chosen from ovarian cancer, lung cancer (including non-small cell lung cancer), brain tumor (including glioblastoma (GBM)), tenosynovial giant cell tumor, gastrointestinal stromal tumor (GIST), gastric cancer, esophageal cancer, colon cancer, colorectal cancer, pancreatic cancer, prostate cancer,

breast cancer, cervical cancer, melanoma, mesothelioma, mesothelial carcinoma, renal cancer, liver cancer, thyroid carcinoma, head and neck cancer, urothelial carcinoma, bladder cancer, endometrial cancer, choriocarcinoma, adrenal carcinoma, sarcoma, leukemia, lymphoma or myeloma.

23. A combination, comprising the compound of any one of claims 1-20 or a pharmaceutically acceptable salt thereof, and at least one additional therapeutic agent, for example, an anti-neoplastic agent, including a chemotherapeutic agent, an immune checkpoint inhibitor or agonist, and a targeted therapeutic agent.