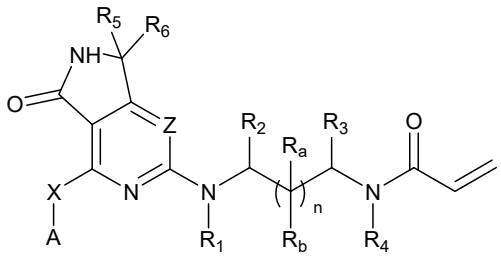
CLAIMS

1. A compound of formula (I), or a pharmaceutically acceptable salt, stereoisomer, or solvate thereof:



(I)

wherein X is a bond, NR_{a1}, S, SO, SO_2 or O; wherein R_{a1} is hydrogen, hydroxy or C_{1-8} alkyl;

A is C_{6-10} aryl, a 4- to 7-membered saturated or unsaturated monoheterocyclic ring, a 5- to 6-membered monocyclic heteroaryl ring, or an 8- to 10-membered bicyclic heteroaryl ring;

Z is N or CR_{b1}; wherein R_{b1} is hydrogen, halogen, cyano, C_{1-8} alkyl, halogenated C_{1-8} alkyl, C_{1-8} alkoxy, C_{3-8} cycloalkyl or C_{3-8} cycloalkoxy;

R_5 and R_6 are each independently hydrogen;

n is 0 or 1; wherein

(i) when n is 0, R_1 and R_3 are each independently hydrogen, halogen, hydroxy, alkoxy, or C_{1-8} alkyl; R_2 and R_4 are bonded together to form a 4- to 7-membered saturated or unsaturated monoheterocyclic ring;

(ii) when n is 0, R_2 and R_4 are each independently hydrogen, halogen, hydroxy, alkoxy, or C_{1-8} alkyl; R_1 and R_3 are bonded together to form a 4- to 7-membered saturated or unsaturated monoheterocyclic ring;

(iii) when n is 0, R_2 is hydrogen, halogen, or C_{1-8} alkyl; R_3 is bonded with R_1 and R_4 to form a bridged heterocycle; or R_3 is hydrogen, halogen, or C_{1-8} alkyl; R_2 is bonded with R_1 and R_4 to form a bridged heterocycle;

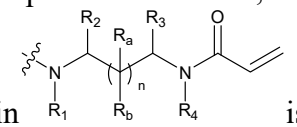
(iv) when n is 1, R_2 and R_3 are each independently hydrogen, halogen, hydroxy, alkoxy, or C_{1-8} alkyl; R_a and R_1 are bonded and R_b and R_4 are bonded together to form a spiro heterocyclic ring;

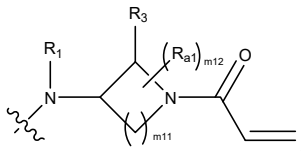
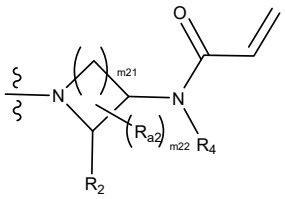
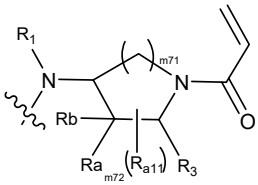
(v) when n is 1, R_2, R_3 and R_b are each independently hydrogen, halogen, hydroxy, alkoxy, or C_{1-8} alkyl; R_a is bonded with R_1 and R_4 respectively together to form a bridged heterocyclic ring;

(vi) when n is 1, R_1, R_3, R_a, R_b are each independently hydrogen, halogen, hydroxy, alkoxy, or C_{1-8} alkyl; R_2 and R_4 are bonded together to form a 5- to 7-membered saturated or unsaturated monoheterocyclic ring;

the alkyl, cycloalkyl, alkoxy, aryl, saturated or unsaturated monoheterocyclic ring, monocyclic heteroaryl ring, bicyclic heteroaryl ring, spiro heterocyclic ring, or bridged heterocyclic ring is unsubstituted or substituted with 1, 2 or 3 substituents selected from the group consisting of: hydroxymethyl, hydroxyethyl, hydroxy, carboxy, halogen, $-O(CH_2)_pOC_{1-8}$ alkyl, $-O(CH_2)_pOH$,

-$(CH_2)_pOC_{1-8}$ alkyl, 4- to 6-membered saturated monoheterocyclic ring, C_{1-8} alkyl, C_{3-8} cycloalkyl, halogenated C_{1-8} alkyl, halogenated C_{3-8} cycloalkyl, hydroxy-substituted C_{1-8} alkyl, $NR_{a0}R_{b0}$, -C(O)OC_{1-6} alkyl, acetyl, C_{1-8} alkoxy, C_{1-8} alkoxy-substituted C_{1-8} alkyl, halogenated C_{1-8} alkoxy, -SO_2C_{1-8} alkyl, C_{6-10} aryl, 5- to 6-membered monocyclic heteroaryl or -Y-L; wherein Y is $(CH_2)_q$ or C(O); L is a 4- to 6-membered saturated monoheterocyclic ring or a 5- to 6-membered monocyclic heteroaryl ring; and p and q are each independently 1, 2 or 3; R_{a0} and R_{b0} are each independently hydrogen, acetyl, C_{1-8} alkyl, C_{1-8} alkoxy-substituted C_{1-8} alkyl.

2. The compound of claim 1, or a pharmaceutically acceptable salt, stereoisomer, or solvate thereof, wherein  is a structure as shown in formula (A), (B) or (C):

 ,  , 

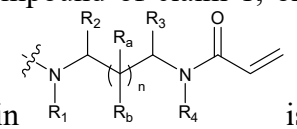
(A) (B) (C)

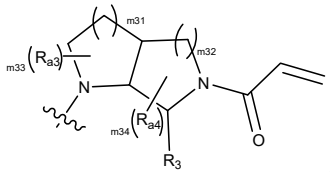
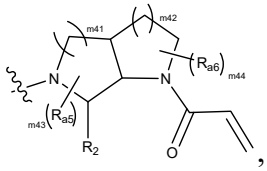
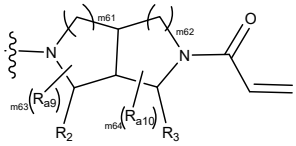
wherein, m11 and m21 are each independently 1, 2, 3 or 4; m71 is 1, 2 or 3;

m12 and m22 are each independently 0, 1, 2, 3 or 4; m72 is 0, 1, 2 or 3;

R_{a1}, R_{a2}, and R_{a11} are each independently halogen, C_{1-8} alkyl, halogenated C_{1-8} alkyl, hydroxy-substituted C_{1-8} alkyl, C_{1-8} alkoxy, C_{1-8} alkoxy-substituted C_{1-8} alkyl, or C_{3-8} cycloalkyl;

R_1, R_2, R_3, R_4, R_a and R_b are as defined in claim 1.

3. The compound of claim 1, or a pharmaceutically acceptable salt, stereoisomer, or solvate thereof, wherein  is a structure as shown in formula (D), (E) or (F):

 ,  , 

(D) (E) (F)

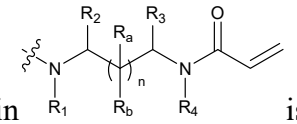
wherein, m31, m32, m41, m42, m61 and m62 are each independently 0, 1, 2, or 3;

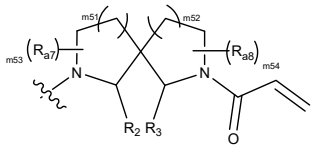
m33, m34, m43, m44, m63 and m64 are each independently 0, 1, 2, or 3;

R_{a3}, R_{a4}, R_{a5}, R_{a6}, R_{a9} and R_{a10} are each independently halogen, C_{1-8} alkyl, halogenated C_{1-8} alkyl, hydroxy-substituted C_{1-8} alkyl, C_{1-8} alkoxy, C_{1-8} alkoxy-substituted C_{1-8} alkyl, or C_{3-8} cycloalkyl;

R_2 and R_3 are as defined in claim 1.

4. The compound of claim 1, or a pharmaceutically acceptable salt, stereoisomer, or solvate

thereof, wherein  is a structure as shown in formula (G):



(G)

wherein, m51 and m52 are each independently 0, 1, 2, or 3;

m53 and m54 are each independently 0, 1, 2, 3 or 4;

R_{a7} and R_{a8} are each independently halogen, C_{1-8} alkyl, halogenated C_{1-8} alkyl, hydroxy-substituted C_{1-8} alkyl, C_{1-8} alkoxy, C_{1-8} alkoxy-substituted C_{1-8} alkyl, or C_{3-8} cycloalkyl;

R_2 and R_3 are as defined in claim 1.

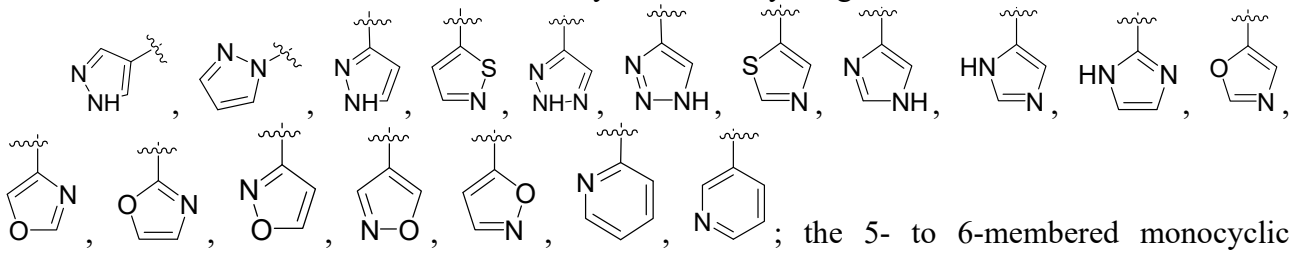
5. The compound of claim 1, or a pharmaceutically acceptable salt, stereoisomer, or solvate thereof, wherein X is a bond or NR_{a1}; wherein R_{a1} is hydrogen or C_{1-3} alkyl.

6. The compound of any of the preceding claims, or a pharmaceutically acceptable salt, stereoisomer, or solvate thereof, wherein A is C_{6-10} aryl or a 5- to 6-membered monocyclic heteroaryl ring; A is optionally substituted with 1, 2 or 3 substituents selected from a group A1 consisting of halogen, $-O(CH_2)_pOC_{1-8}$ alkyl, $-O(CH_2)_pOH$, $-(CH_2)_pOC_{1-8}$ alkyl, 4- to 6-membered saturated monoheterocyclic ring, C_{1-8} alkyl, C_{3-8} cycloalkyl, halogenated C_{1-8} alkyl, halogenated C_{3-8} cycloalkyl, hydroxy-substituted C_{1-8} alkyl, hydroxymethyl, hydroxyethyl, hydroxy, carboxy, $NR_{a0}R_{b0}$, $-C(O)OC_{1-6}$ alkyl, acetyl, C_{1-8} alkoxy, C_{1-8} alkoxy-substituted C_{1-8} alkyl, halogenated C_{1-8} alkoxy, $-SO_2C_{1-8}$ alkyl, C_{6-10} aryl, 5- to 6-membered monocyclic heteroaryl and -Y-L; wherein Y is $(CH_2)_q$ or C(O); L is a 4- to 6-membered saturated monoheterocyclic ring; and p and q are each independently 1, 2 or 3; R_{a0} and R_{b0} are each independently hydrogen, acetyl, C_{1-8} alkyl, or C_{1-8} alkoxy-substituted C_{1-8} alkyl.

7. The compound of any of the preceding claims, or a pharmaceutically acceptable salt, stereoisomer, or solvate thereof, wherein X is NH; A is C_{6-10} aryl or a 5- to 6-membered monocyclic heteroaryl ring; A is optionally substituted with 1, 2 or 3 substituents selected from a group A1 consisting of halogen, $-O(CH_2)_pOC_{1-8}$ alkyl, $-O(CH_2)_pOH$, $-(CH_2)_pOC_{1-8}$ alkyl, 4- to 6-membered saturated monoheterocyclic ring, C_{1-8} alkyl, C_{3-8} cycloalkyl, halogenated C_{1-8} alkyl, halogenated C_{3-8} cycloalkyl, hydroxy-substituted C_{1-8} alkyl, hydroxymethyl, hydroxyethyl, hydroxy, carboxy, $NR_{a0}R_{b0}$, $-C(O)OC_{1-6}$ alkyl, acetyl, C_{1-8} alkoxy, C_{1-8} alkoxy-substituted C_{1-8} alkyl, halogenated C_{1-8} alkoxy, $-SO_2C_{1-8}$ alkyl, C_{6-10} aryl, 5- to 6-membered monocyclic heteroaryl and -Y-L; wherein Y is $(CH_2)_q$ or C(O); L is a 4- to 6-membered saturated monoheterocyclic ring; and p and q are each independently 1, 2 or 3; R_{a0} and R_{b0} are each independently hydrogen, acetyl, C_{1-8} alkyl, or C_{1-8} alkoxy-substituted C_{1-8} alkyl.

8. The compound of any of the preceding claims 1 to 6, or a pharmaceutically acceptable salt, stereoisomer, or solvate thereof, wherein X is a bond; A is a 5- to 6-membered monocyclic heteroaryl ring; A is optionally substituted with 1, 2 or 3 substituents selected from a group A1 consisting of halogen, $-O(CH_2)_pOC_{1-8}$ alkyl, $-O(CH_2)_pOH$, $-(CH_2)_pOC_{1-8}$ alkyl, 4- to 6-membered saturated monoheterocyclic ring, C_{1-8} alkyl, C_{3-8} cycloalkyl, halogenated C_{1-8} alkyl, halogenated C_{3-8} cycloalkyl, hydroxy-substituted C_{1-8} alkyl, hydroxymethyl, hydroxyethyl, hydroxy, carboxy, $NR_{a0}R_{b0}$, $-C(O)OC_{1-6}$ alkyl, acetyl, C_{1-8} alkoxy, C_{1-8} alkoxy-substituted C_{1-8} alkyl, halogenated C_{1-8} alkoxy, $-SO_2C_{1-8}$ alkyl, C_{6-10} aryl, 5- to 6-membered monocyclic heteroaryl and -Y-L; wherein Y is $(CH_2)_q$ or C(O); L is a 4- to 6-membered saturated monoheterocyclic ring; and p and q are each independently 1, 2 or 3; R_{a0} and R_{b0} are each independently hydrogen, acetyl, C_{1-8} alkyl, or C_{1-8} alkoxy-substituted C_{1-8} alkyl.

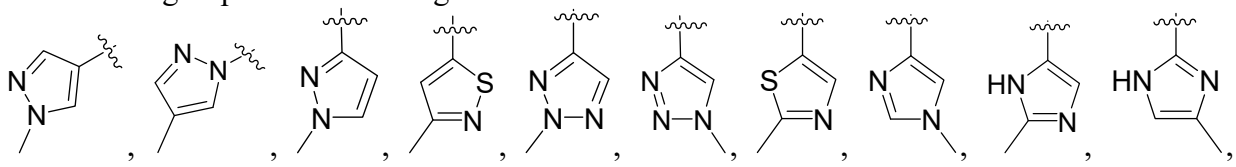
9. The compound of claim 1, or a pharmaceutically acceptable salt, stereoisomer, or solvate thereof, wherein the 5- to 6-membered monocyclic heteroaryl ring is selected from:

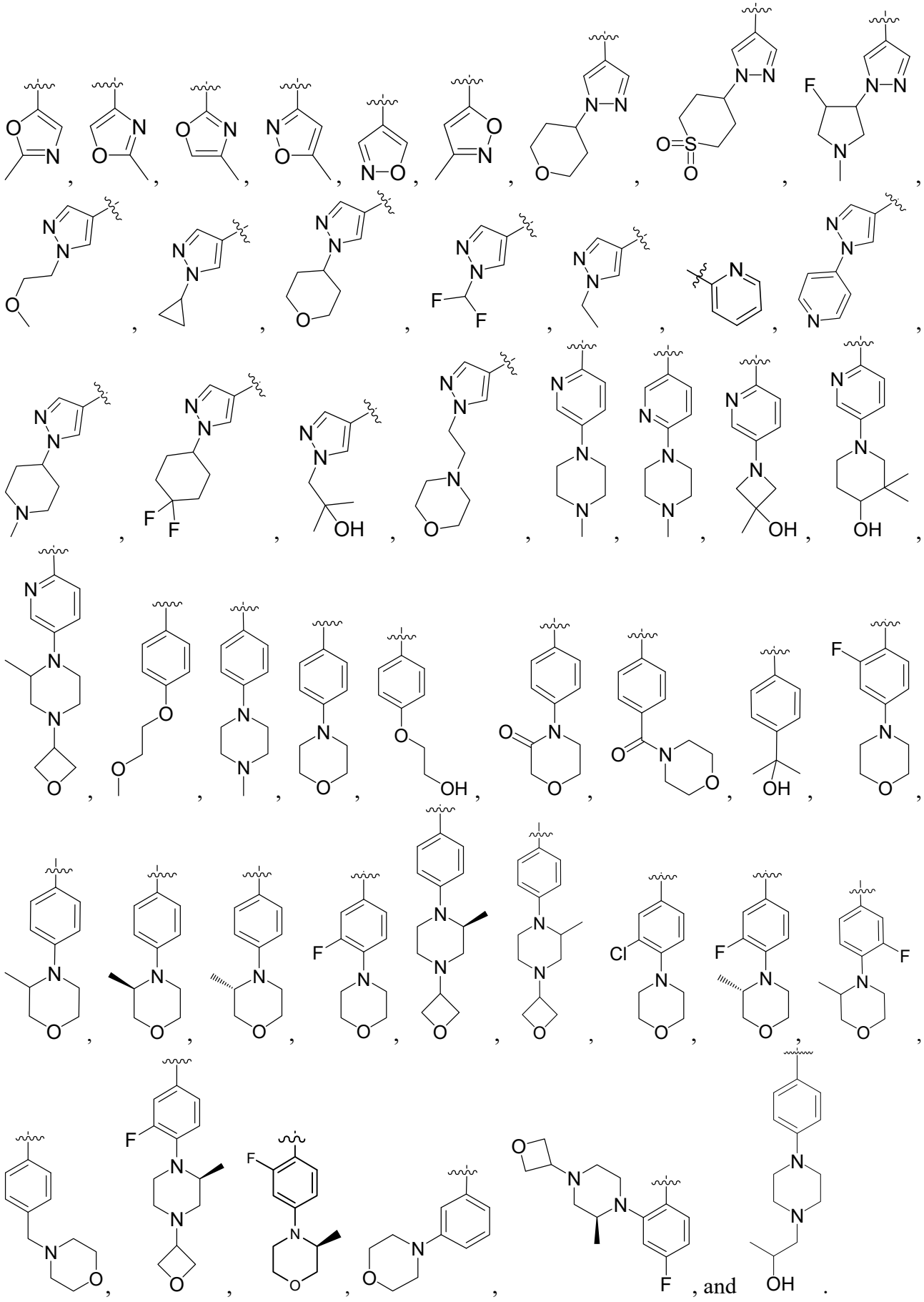


; the 5- to 6-membered monocyclic heteroaryl ring is optionally substituted with 1, 2 or 3 substituents selected from a group A1 consisting of halogen, $-O(CH_2)_pOC_{1-8}$ alkyl, $-O(CH_2)_pOH$, $-(CH_2)_pOC_{1-8}$ alkyl, 4- to 6-membered saturated monoheterocyclic ring, C_{1-8} alkyl, C_{3-8} cycloalkyl, halogenated C_{1-8} alkyl, halogenated C_{3-8} cycloalkyl, hydroxy-substituted C_{1-8} alkyl, hydroxymethyl, hydroxyethyl, hydroxy, carboxy, $NR_{a0}R_{b0}$, $-C(O)OC_{1-6}$ alkyl, acetyl, C_{1-8} alkoxy, C_{1-8} alkoxy-substituted C_{1-8} alkyl, halogenated C_{1-8} alkoxy, $-SO_2C_{1-8}$ alkyl, C_{6-10} aryl, 5- to 6-membered monocyclic heteroaryl and -Y-L; wherein Y is $(CH_2)_q$ or C(O); L is a 4- to 6-membered saturated monoheterocyclic ring; and p and q are each independently 1, 2 or 3; R_{a0} and R_{b0} are each independently hydrogen, acetyl, C_{1-8} alkyl, or C_{1-8} alkoxy-substituted C_{1-8} alkyl.

10. The compound of any of the preceding claims 1 to 5, or a pharmaceutically acceptable salt, stereoisomer, or solvate thereof, wherein X is NH; A is a structure selected from a group B1,

wherein the group B1 is consisting of:



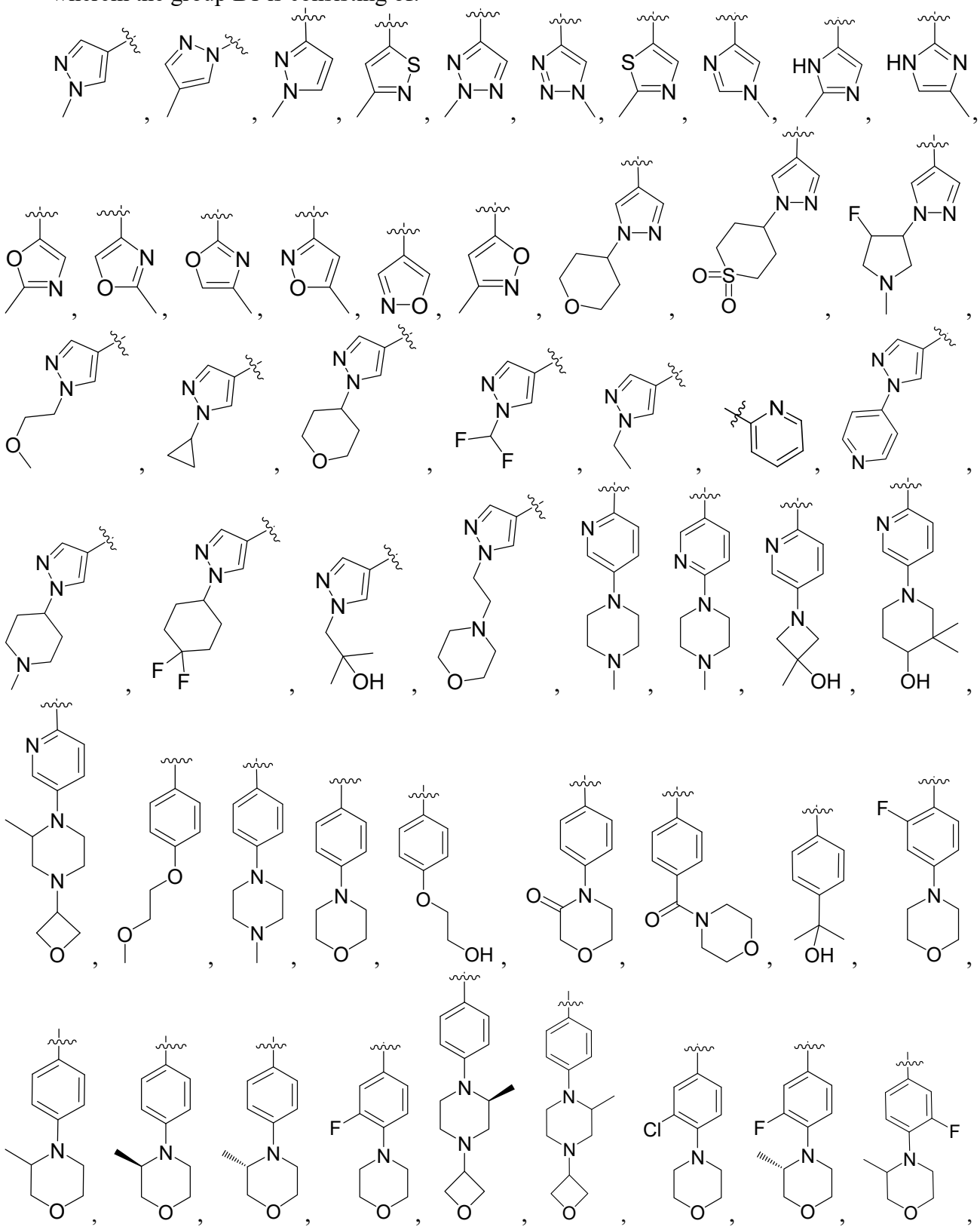


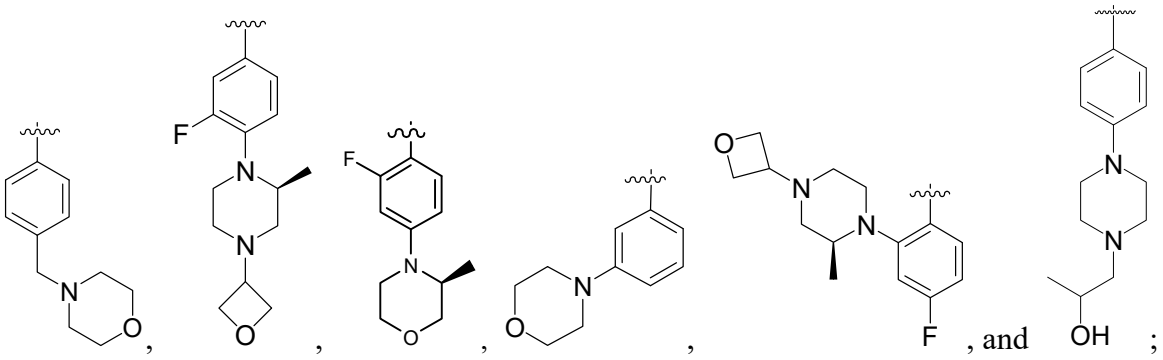
, and .

11. The compound of any of the preceding claims 1 to 5, or a pharmaceutically acceptable salt,

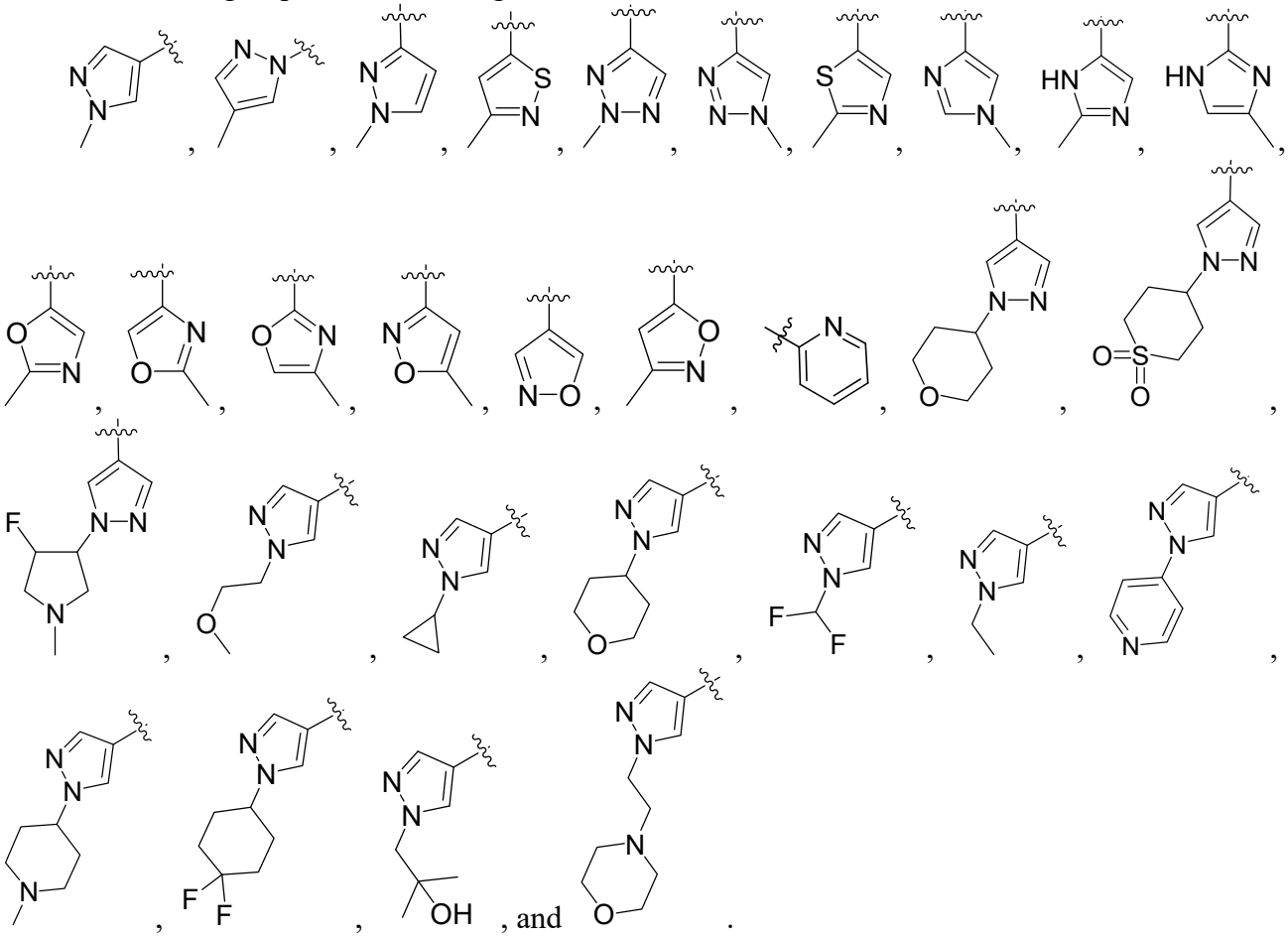
stereoisomer, or solvate thereof, wherein X is a bond; A is a structure selected from a group B1 or a group B2,

wherein the group B1 is consisting of:



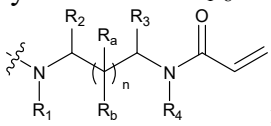


wherein the group B2 is consisting of:



12. The compound of claim 2, or a pharmaceutically acceptable salt, stereoisomer, or solvate thereof, wherein X is NH; A is C_{6-10} aryl or a 5- to 6-membered monocyclic heteroaryl ring; A is optionally substituted with 1, 2 or 3 substituents selected from a group A1 consisting of halogen, $-O(CH_2)_pOC_{1-8}$ alkyl, $-O(CH_2)_pOH$, $-(CH_2)_pOC_{1-8}$ alkyl, 4- to 6-membered saturated monoheterocyclic ring, C_{1-8} alkyl, C_{3-8} cycloalkyl, halogenated C_{1-8} alkyl, halogenated C_{3-8} cycloalkyl, hydroxy-substituted C_{1-8} alkyl, hydroxymethyl, hydroxyethyl, hydroxy, carboxy, $NR_{a0}R_{b0}$, $-C(O)OC_{1-6}$ alkyl, acetyl, C_{1-8} alkoxy, C_{1-8} alkoxy-substituted C_{1-8} alkyl, halogenated C_{1-8} alkoxy, $-SO_2C_{1-8}$ alkyl, C_{6-10} aryl, 5- to 6-membered monocyclic heteroaryl and -Y-L; wherein Y is $(CH_2)_q$ or C(O); L is a 4- to 6-membered saturated monoheterocyclic ring; and p and q are each independently 1, 2 or 3; R_{a0} and R_{b0} are each independently hydrogen, acetyl, C_{1-8} alkyl, or C_{1-8}

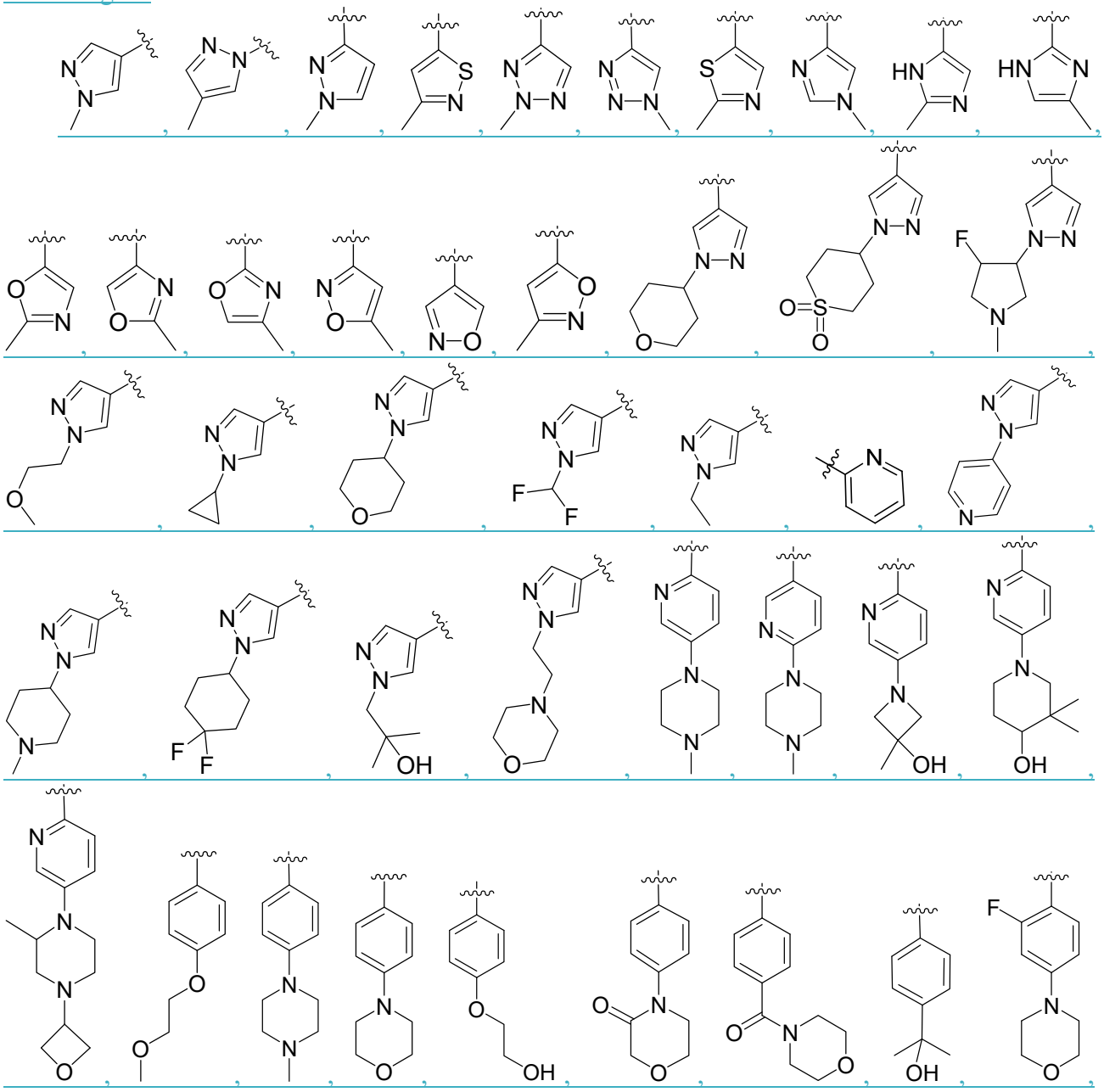
alkoxy-substituted C_{1-8} alkyl;

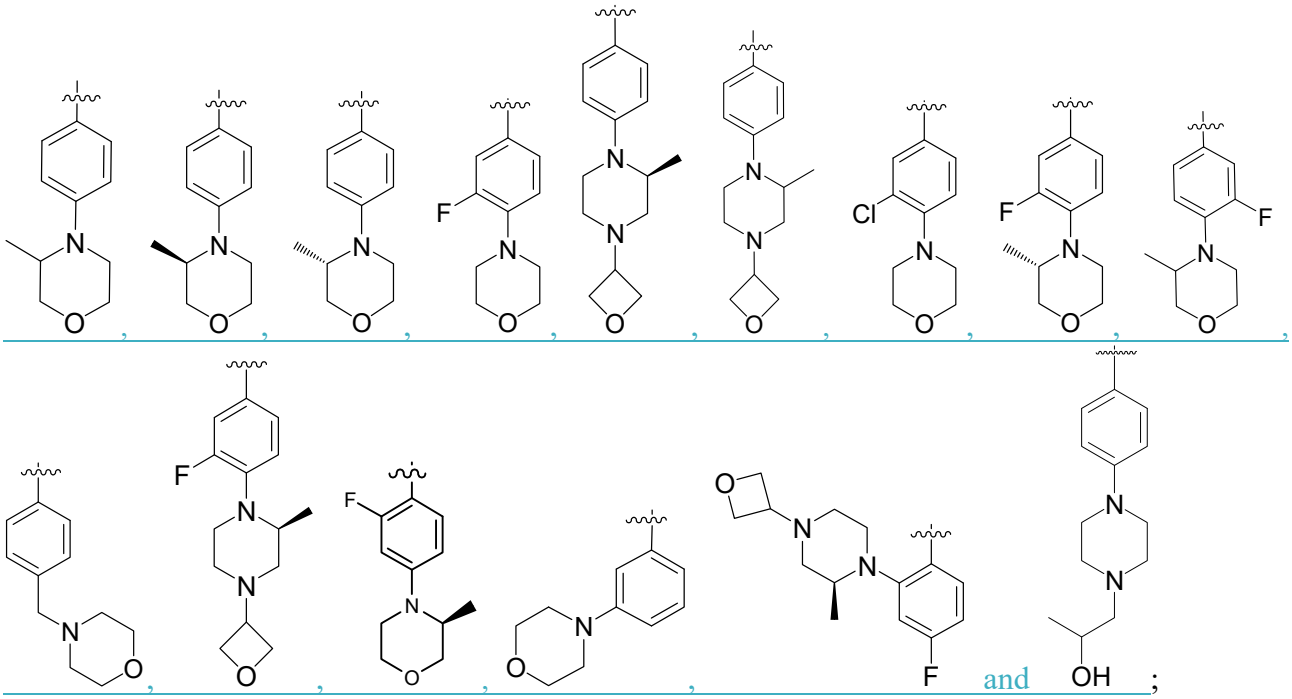


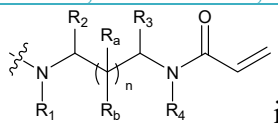
is a structure of formula (A); wherein the groups in the formula (A) are defined as in claim 2;

R_1 is hydrogen or C_{1-8} alkyl.

13. The compound of claim 2, or a pharmaceutically acceptable salt, stereoisomer, or solvate thereof, wherein X is NH; A is a structure selected from a group B1, wherein the group B1 is consisting of:



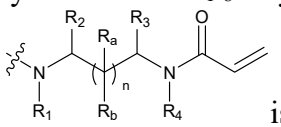




is a structure of formula (A); wherein the groups in the formula (A) are defined as in claim 2;

R_1 is hydrogen or C_{1-8} alkyl.

14. The compound of claim 2, or a pharmaceutically acceptable salt, stereoisomer, or solvate thereof, wherein X is a bond; A is a 5- to 6-membered monocyclic heteroaryl ring; A is optionally substituted with 1, 2 or 3 substituents selected from a group A1 consisting of halogen, $-O(CH_2)_pOC_{1-8}$ alkyl, $-O(CH_2)_pOH$, $-(CH_2)_pOC_{1-8}$ alkyl, 4- to 6-membered saturated monoheterocyclic ring, C_{1-8} alkyl, C_{3-8} cycloalkyl, halogenated C_{1-8} alkyl, halogenated C_{3-8} cycloalkyl, hydroxy-substituted C_{1-8} alkyl, hydroxymethyl, hydroxyethyl, hydroxy, carboxy, $NR_{a0}R_{b0}$, $-C(O)OC_{1-6}$ alkyl, acetyl, C_{1-8} alkoxy, C_{1-8} alkoxy-substituted C_{1-8} alkyl, halogenated C_{1-8} alkoxy, $-SO_2C_{1-8}$ alkyl, C_{6-10} aryl, 5- to 6-membered monocyclic heteroaryl and -Y-L; wherein Y is $(CH_2)_q$ or C(O); L is a 4- to 6-membered saturated monoheterocyclic ring; and p and q are each independently 1, 2 or 3; R_{a0} and R_{b0} are each independently hydrogen, acetyl, C_{1-8} alkyl, or C_{1-8} alkoxy-substituted C_{1-8} alkyl;

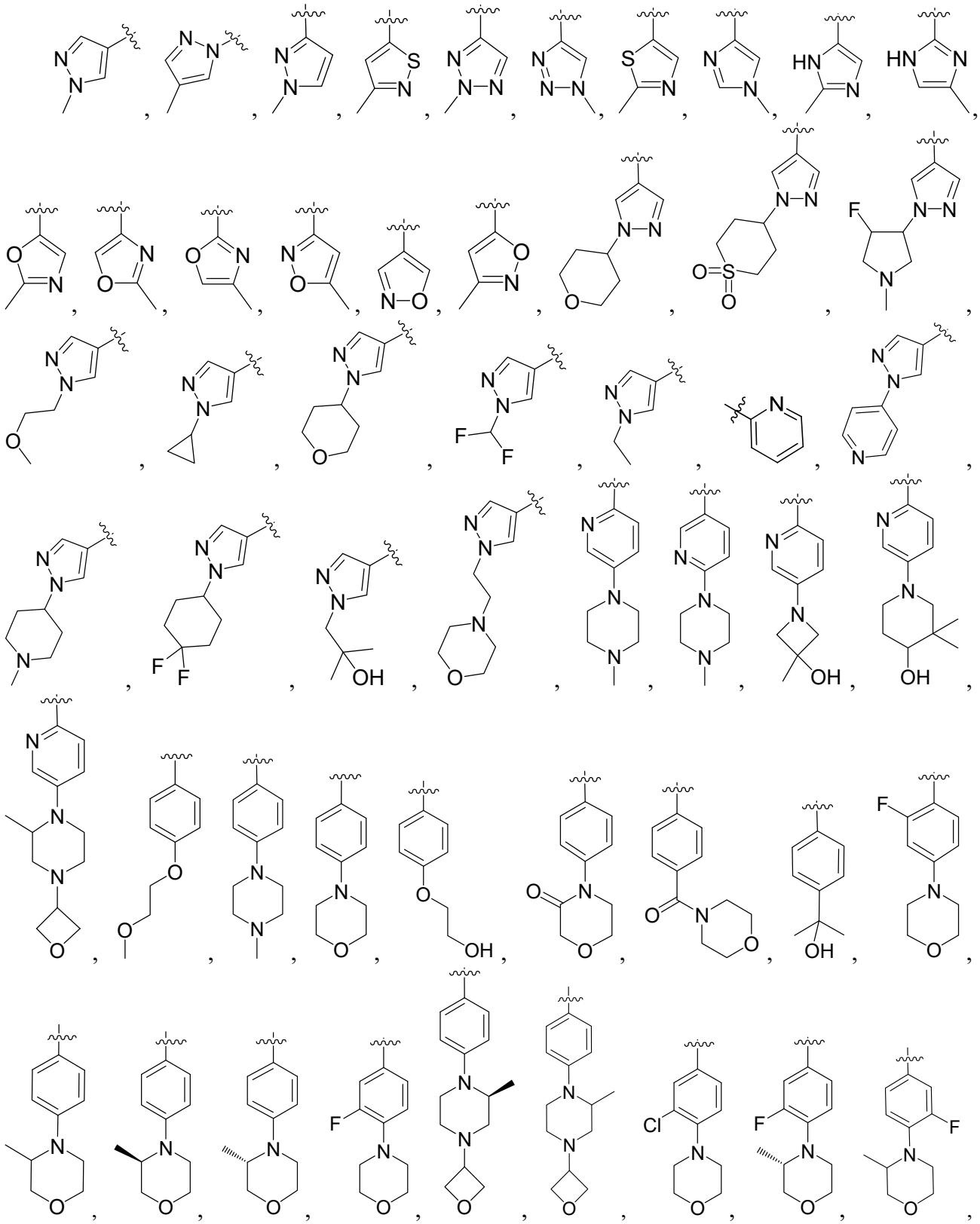


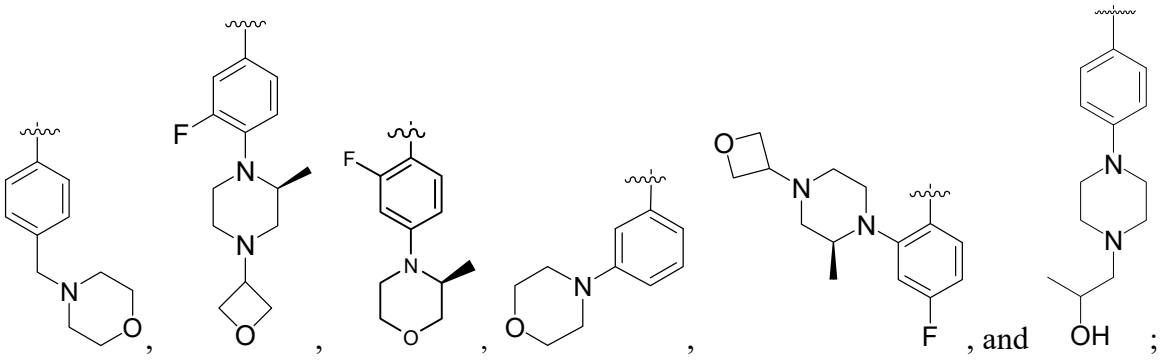
is a structure of formula (A); wherein the groups in the formula (A) are defined as in claim 2;

R_1 is hydrogen or C_{1-8} alkyl.

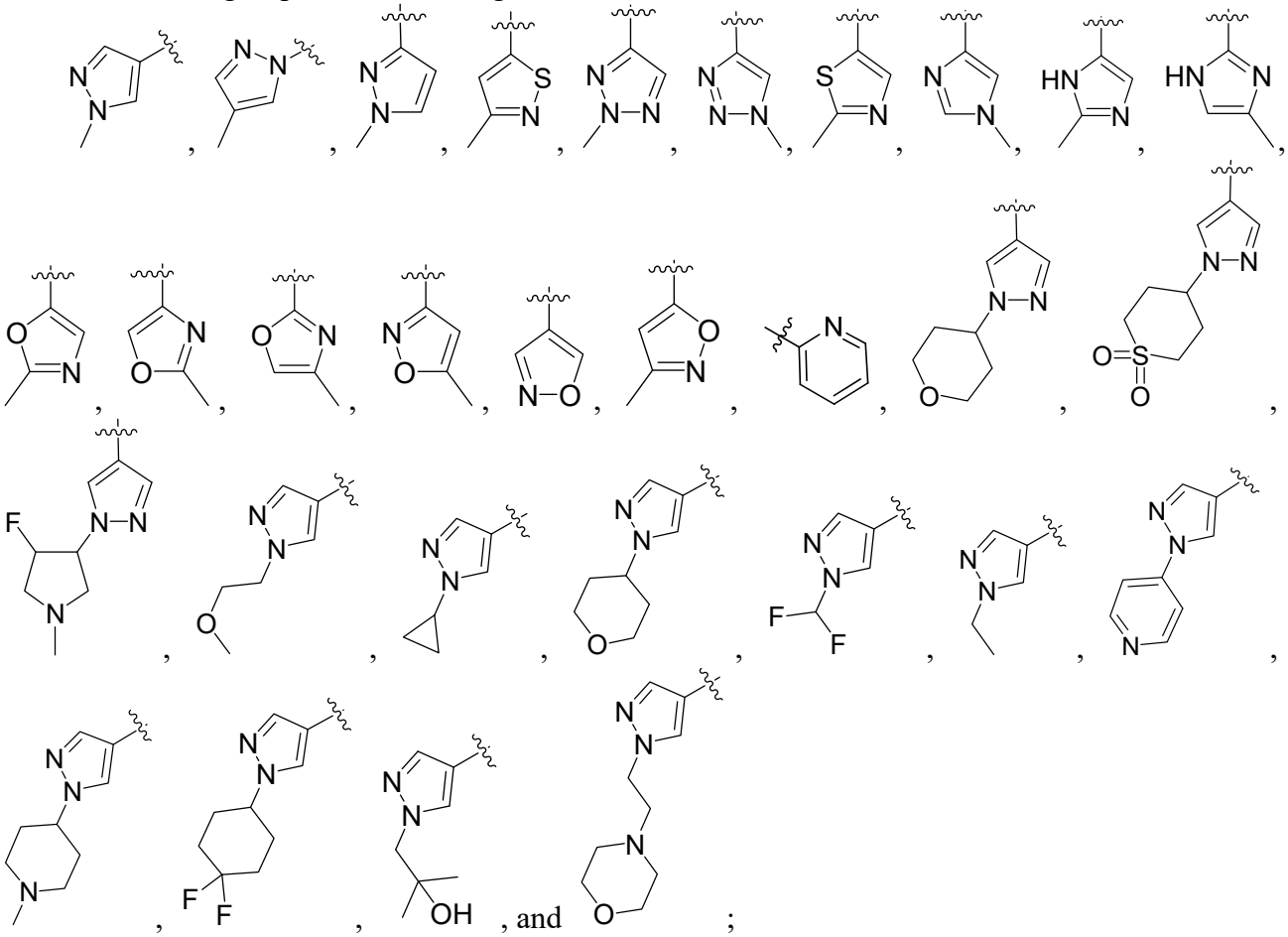
15. The compound of claim 2, or a pharmaceutically acceptable salt, stereoisomer, or solvate thereof, wherein X is a bond; A is a structure selected from a group B1 or a group B2;

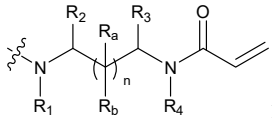
wherein the group B1 is consisting of:





wherein the group B2 is consisting of:

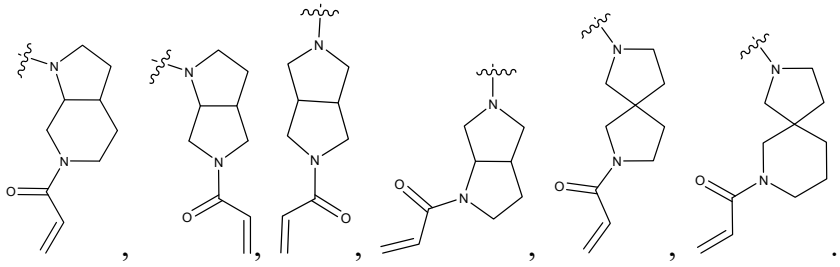




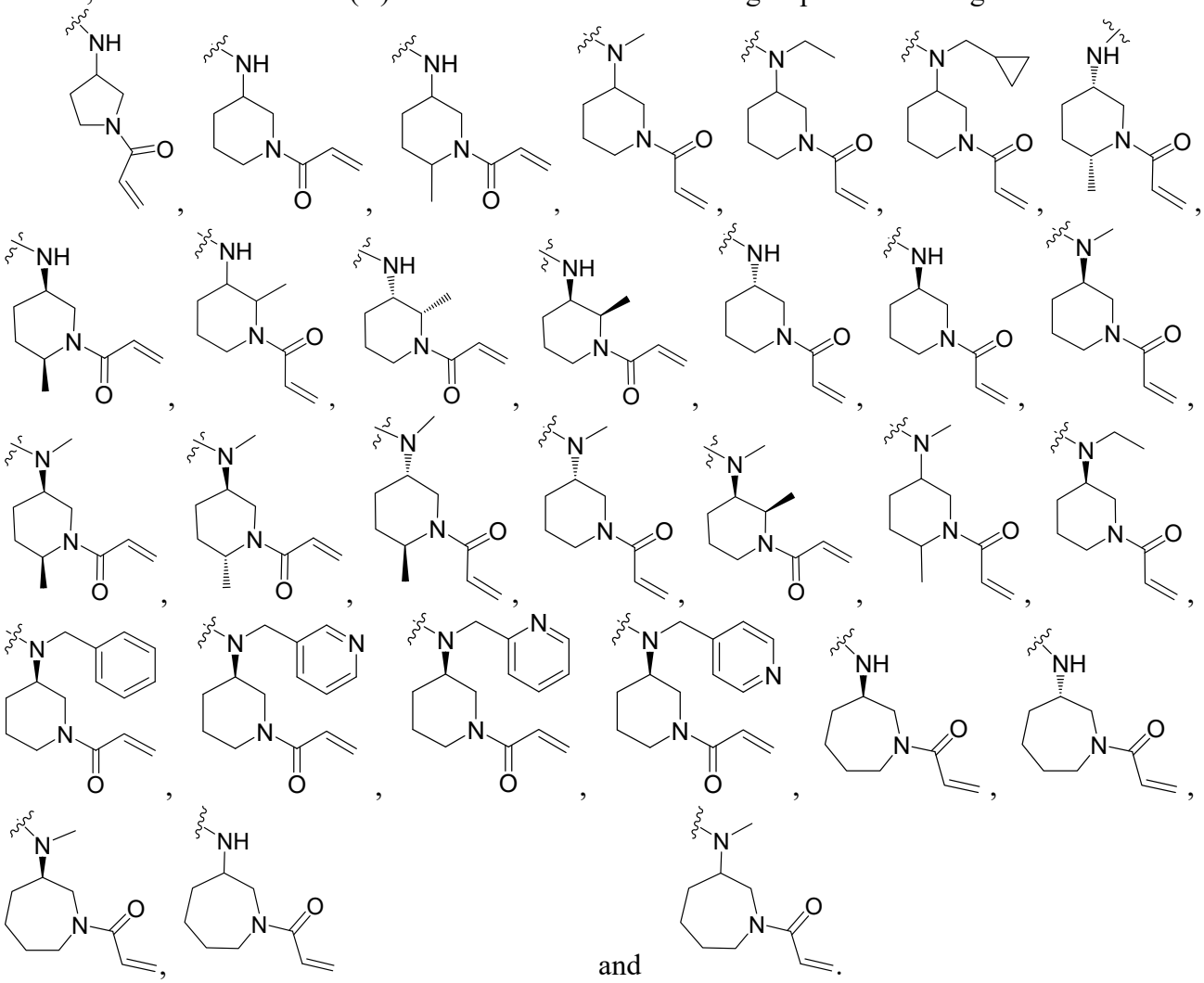
is a structure of formula (A); wherein the groups in the formula (A) are defined as in claim 2;

R_1 is hydrogen or C_{1-8} alkyl.

16. The compound of claim 3 or 4, or a pharmaceutically acceptable salt, stereoisomer, or solvate thereof, wherein formula (D), (E), (F) or (G) is selected from:

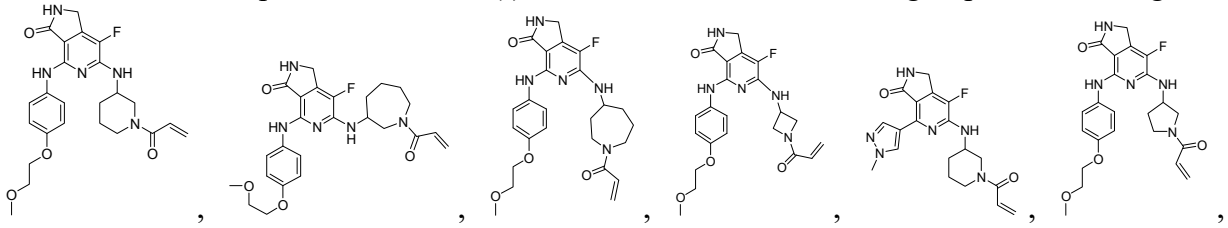


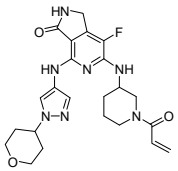
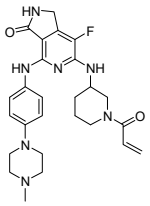
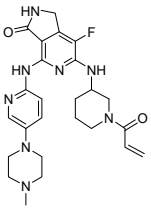
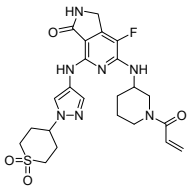
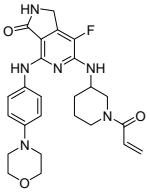
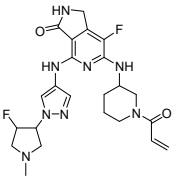
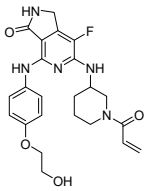
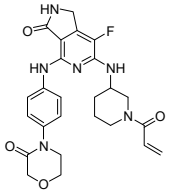
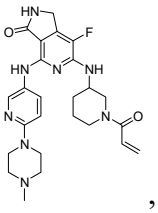
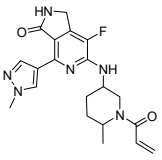
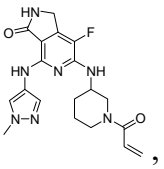
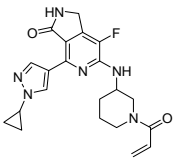
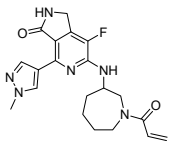
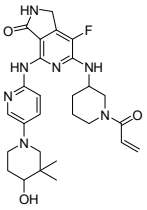
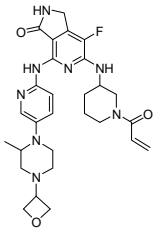
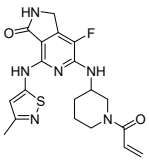
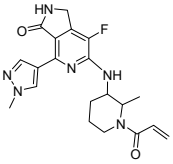
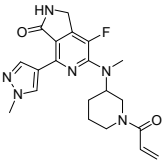
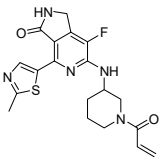
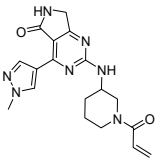
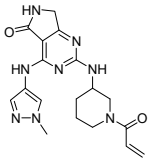
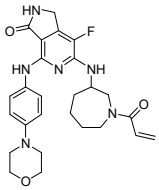
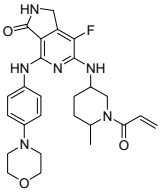
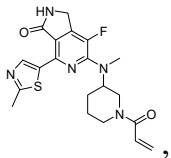
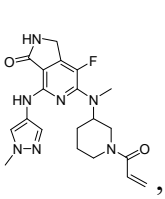
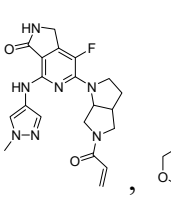
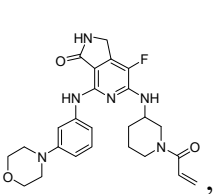
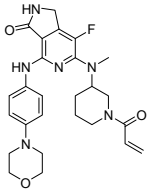
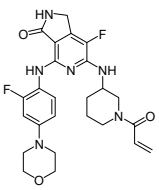
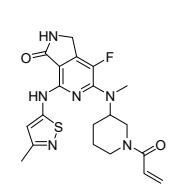
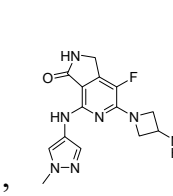
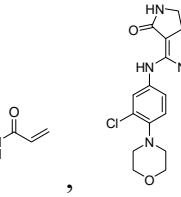
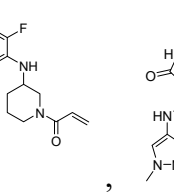
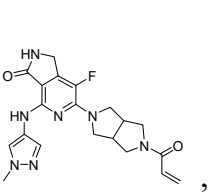
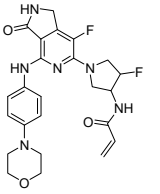
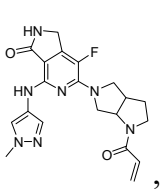
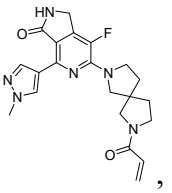
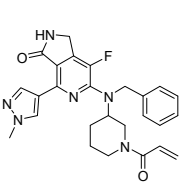
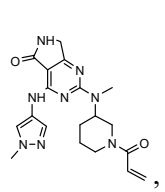
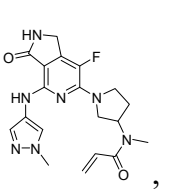
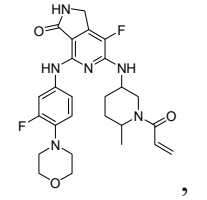
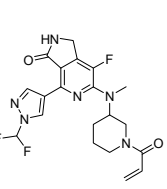
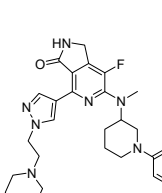
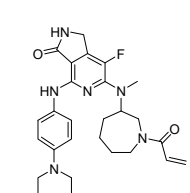
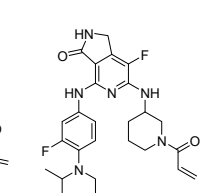
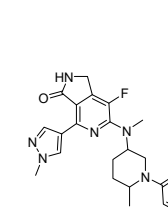
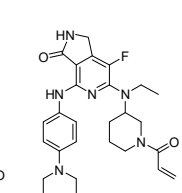
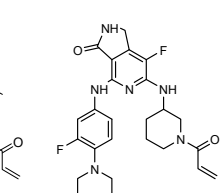
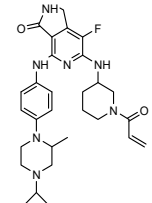
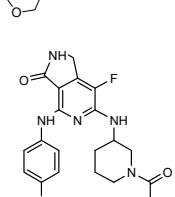
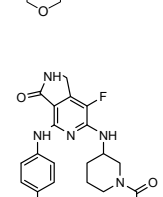
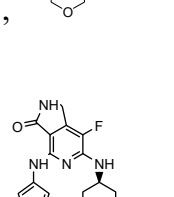
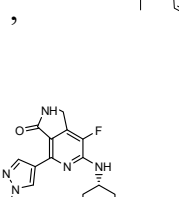
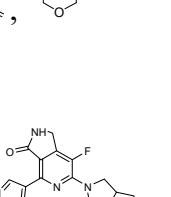
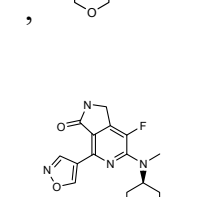
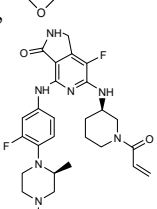
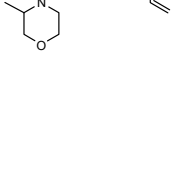
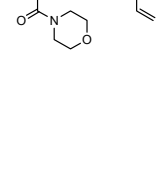
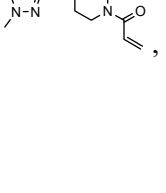
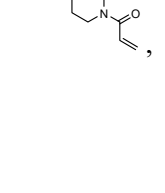
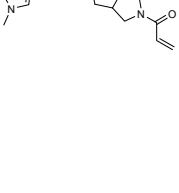
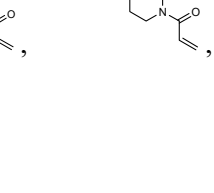
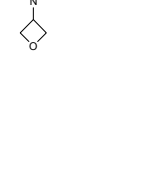
17. The compound of claim 2, or a pharmaceutically acceptable salt, stereoisomer, or solvate thereof, wherein the formula (A) is a structure selected from a group C1 consisting of:

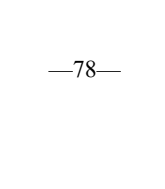


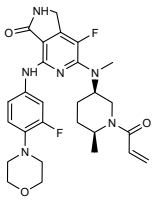
and

18. The compound of claim 1, or a pharmaceutically acceptable salt, stereoisomer, or solvate thereof, wherein the compound of formula (I) is a structure selected from a group D1 consisting of:



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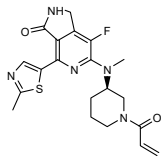
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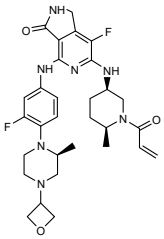
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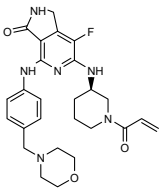
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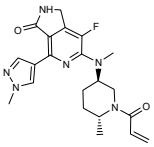
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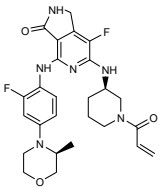
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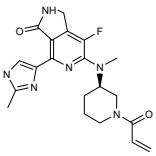
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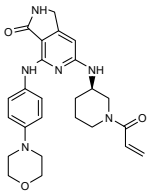
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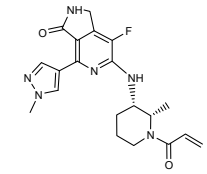
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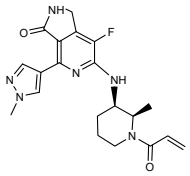
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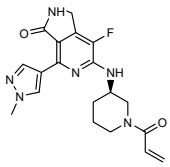
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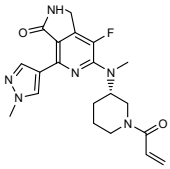
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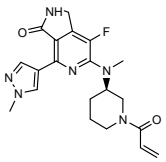
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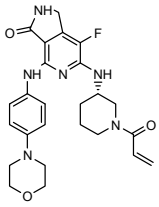
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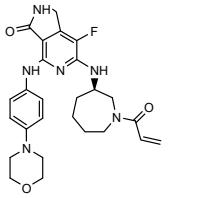
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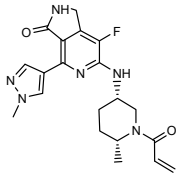
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19. A pharmaceutical composition comprising the compound of any of the preceding claims and a pharmaceutically acceptable carrier or excipient.

20. Use of the compound of any of claims 1-18 or the pharmaceutical composition of claim 19 in the preparation of a kinase inhibitor drug.