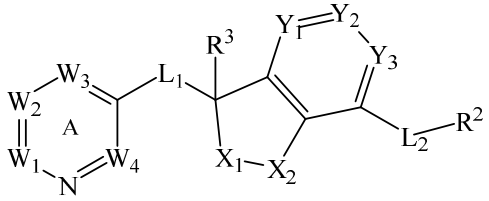
What is claimed is:

1.A compound having the structure of formula (I) or a pharmaceutically acceptable salt, stereoisomers, or isotopic isomers thereof,



Formula (I)

wherein, X_1 represents O, S, NR^a, $(CR^LR^{L'})_m$, C(O);

wherein, X_2 represents O, S, NR^a, $(CR^TR^{T'})_n$, C(O);

wherein, W_1 independently represents CR^{W1} or N;

wherein, W_2 independently represents CR^{W2} or N;

wherein, W_3 independently represents CR^{W3} or N;

wherein, W_4 independently represents CR^{W4} or N;

wherein, Y_1 independently represents CR^{Y1} or N;

wherein, Y_2 independently represents CR^{Y2} or N;

wherein, Y_3 independently represents CR^{Y3} or N;

wherein, each R^{W1}, R^{W2}, R^{W3}, R^{W4}, R^{Y1}, R^{Y2}, R^{Y3} independently represents hydrogen, deuterium, C_1-C_6 alkyl, deuterated C_1-C_6 alkyl, halogen, nitro, $-OR^a$, $-SR^a$, $-P(O)R^aR^b$, -CN, $-S(O)_2R^a$, $-S(O)R^a$, $-SF_5$, $-NR^aR^b$, $-CR^aR^bNR^aR^b$, $-NR^aCOR^b$, $-CONR^aR^b$, C_1-C_6 haloalkyl, C_1-C_6 haloalkoxy, C_1-C_6 haloalkylthio, hydroxy (C_1-C_6 alkyl); or each R^{W1}, R^{W2}, R^{W3}, R^{W4}, R^{Y1}, R^{Y2}, R^{Y3} independently represents C_3-C_{10} cycloalkyl, C_6-C_{10} cycloalkenyl, 4-10 membered heterocycloalkyl, 6-10 membered heterocycloalkenyl, C_6-C_{10} aryl, 5-10 membered heteroaryl, which are substituted by 0-4 substituents selected from deuterium, halogen, C_1-C_6 alkyl, C_2-C_6 alkenyl, C_2-C_6 alkynyl, C_3-C_6 cycloalkyl, C_3-C_6 heterocycloalkyl, $-OR^a$, oxo, hydroxy (C_1-C_6 alkyl), NR^aR^b, $-CR^aR^bNR^aR^b$, -CN, C_1-C_6 haloalkyl, C_1-C_6 haloalkoxy, $-SO_3R^a$, $-SR^a$, $-SF_5$, $-C(O)R^a$, $-C(O)OR^a$, $-OC(O)R^a$, $-OC(O)NR^aR^b$, $-NR^aCOR^b$ and $-CONR^aR^b$;

or W^1 and W^2 together with the atom which they are attached to form a 5-6 membered saturated or unsaturated ring fused to ring A, and the said ring may optionally contain 0, 1, 2 or 3 heteroatoms selected from O, N, and S;

wherein, L_1 represents absent, $-(CR^aR^b)_o$-, $-CR^aR^bO$-, $-OCR^aR^b$-, -O-, -S-, $-S(O)_2$-, -C(O)-, $-NR^a$-, $-S(O)_2NR^a$-, -OC(O)-, -C(O)O-, $-NR^aS(O)_2$-, $-CR^aR^bNR^a$-, or $-NR^aCR^aR^b$-;

wherein, L_2 represents $-C(O)NR^a$- or $-NR^aC(O)$-;

wherein, R^2 represents 5-10 membered heteroaryl, which are substituted by 0-4 substituents selected from deuterium, halogen, C_1-C_6 alkyl, C_2-C_6 alkenyl, C_2-C_6 alkynyl, C_3-C_6 cycloalkyl, $-OR^a$, oxo, hydroxy (C_1-C_6 alkyl), $-NR^aR^b$, $-CR^aR^bNR^aR^b$, -CN, C_1-C_6 haloalkyl, C_1-C_6 haloalkoxy, $-SO_3R^a$, $-SR^a$, $-S(O)_2R^a$, $-S(O)R^a$, $-SF_5$, $-C(O)R^a$, $-C(O)OR^a$, $-OC(O)R^a$, $-OC(O)NR^aR^b$, $-NR^aCOR^b$ and $-CONR^aR^b$;

wherein, R^3 represents hydrogen, halogen, C_1-C_6 haloalkyl, C_1-C_6 alkyl, or hydroxy;

or R^3 and W_3 together with the atom which they are attached to form a 5-7 membered saturated or unsaturated ring fused to ring A, and the said ring may optionally contain 0, 1 or 2 heteroatoms selected from O, N, and S; and further, the said ring may optionally be substituted by 0, 1 or 2 substituents selected from deuterium, halogen, C_1-C_6 alkyl, C_2-C_6 alkenyl, C_2-C_6 alkynyl, C_3-C_6 cycloalkyl, $-OR^a$, oxo, hydroxy (C_1-C_6 alkyl), NR^aR^b, -CN, C_1-C_6 haloalkyl, C_1-C_6 haloalkoxy, $-SO_3R^a$, $-SR^a$, $-SF_5$, $-C(O)R^a$, $-C(O)OR^a$, $-OC(O)R^a$, $-OC(O)NR^aR^b$, $-NR^aCOR^b$ and $-CONR^aR^b$;

wherein, each R^a and R^b independently represents hydrogen, deuterium, halogen, C_1-C_6 alkyl, C_1-C_6 haloalkyl, hydroxy (C_1-C_6 alkyl), C_3-C_{10} cycloalkyl, C_6-C_{10} aryl, 5-10 membered heteroaryl; or R^a and R^b together with the carbon atom which they are attached to form a 3-6 membered ring, and the said ring may optionally contain 0, 1 or 2 heteroatoms selected from O, N, and S; and further, the said ring may optionally be substituted by halogen, hydroxy and C_1-C_6 alkyl;

wherein, each R^L and $R^{L'}$ independently represents hydrogen, deuterium, halogen, C_1-C_6 alkyl, C_1-C_6 haloalkyl, hydroxy (C_1-C_6 alkyl), C_3-C_{10} cycloalkyl; or R^L and $R^{L'}$ together with the carbon atom which they are attached to form a 3-6 membered ring, and the said ring may optionally contain 0, 1 or 2 heteroatoms selected from O, N, and S; and further, the said ring may optionally be substituted by halogen, hydroxy and C_1-C_6 alkyl;

wherein, each R^T and $R^{T'}$ independently represents hydrogen, deuterium, halogen, C_1-C_6 alkyl, C_1-C_6 haloalkyl, hydroxy (C_1-C_6 alkyl), C_3-C_{10} cycloalkyl; or R^T and $R^{T'}$ together with the carbon atom which they are attached to form a 3-6 membered ring, and the said ring may optionally contain 0, 1 or 2 heteroatoms selected from O, N, and S; and further, the said ring may optionally be substituted by halogen, hydroxy and C_1-C_6 alkyl;

wherein, o, m, n represents the integer of 1, 2 or 3;

preferably, wherein W_1 represents CH, CCH_3, CF, CCF_3, $CCHF_2$, CCH_2F, $C(OCH_3)$, CNH_2, $CNHCH_3$, $CN(CH_3)_2$, CCH_2NHCH_3, $CCH_2N(CH_3)_2$, C(CN) or N; or

preferably, wherein W_3 represents CH, CCH_3, CF, CCF_3, $CCHF_2$, CCH_2F, $C(OCH_3)$, CNH_2, $CNHCH_3$, C(CN) or N; or

preferably, wherein W_4 represents CH, CCH_3, CF, CCF_3, $CCHF_2$, CCH_2F, $C(OCH_3)$, CNH_2, $CNHCH_3$, C(CN) or N; or

preferably, wherein Y_1 represents CH, CCH_3, CF, CCl, CCF_3, $CCHF_2$, CCH_2F, $C(OCH_3)$, C(CN) or N; or

preferably, wherein Y_2 represents CH, CCH_3, CF, CCl, CCF_3, $CCHF_2$, CCH_2F, $C(OCH_3)$, C(CN) or N; or

preferably, wherein Y_3 represents CH, CCH_3, CF, CCl, CCF_3, $CCHF_2$, CCH_2F, $C(OCH_3)$, C(CN) or N; or

preferably, wherein X_1 represents $-CH_2-$, $-CF_2-$, -CHF-, -O-, -S-, -CHOH-, $-CH_2CH_2-$ or $-C(CH_3)_2-$; or

preferably, wherein X_2 represents $-CH_2-$, $-CF_2-$, -CHF-, -O-, -S-, -CHOH-, $-CH_2CH_2-$ or $-C(CH_3)_2-$; or

preferably, wherein L_1 represents $-CH_2-$, -CHF-, $-CF_2-$, -O-, -NH- or $-NCH_3-$.

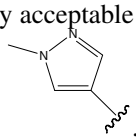
2. The compound or the pharmaceutically acceptable salt, the stereoisomers, or the isotopic isomers thereof according to claim 1, wherein R^{W2} represents C_1-C_6 alkyl, halogen, -OH, $O(C_1$-C_6 alkyl); or R^{W2} represents C_3-C_{10} cycloalkyl, C_6-C_{10} cycloalkenyl, 4-10 membered heterocycloalkyl, 6-10 membered heterocycloalkenyl, C_6-C_{10} aryl, 5-10 membered heteroaryl, which are substituted by 0-4 substituents selected from deuterium, halogen, C_1-C_6 alkyl, C_2-C_6 alkenyl, C_2-C_6 alkynyl, C_3-C_6 cycloalkyl, C_3-C_6 heterocycloalkyl, $-OR^a$, oxo, hydroxy (C_1-C_6 alkyl), NR^aR^b, $-CR^aR^bNR^aR^b$, -CN, C_1-C_6 haloalkyl, C_1-C_6 haloalkoxy, $-SO_3R^a$, $-SR^a$, $-SF_5$, $-C(O)R^a$, $-C(O)OR^a$, $-OC(O)R^a$, $-OC(O)NR^aR^b$, $-NR^aCOR^b$ and $-CONR^aR^b$.

3. The compound or the pharmaceutically acceptable salt, the stereoisomers, or the isotopic isomers thereof according to claim 1, wherein R^{W2} represents C_3-C_{10} cycloalkyl, C_6-C_{10} cycloalkenyl, 4-10 membered heterocycloalkyl, 6-10 membered heterocycloalkenyl, C_6-C_{10} aryl, 5-10 membered heteroaryl, which are substituted by 0-4 substituents selected from deuterium, halogen, C_1-C_6 alkyl, C_2-C_6 alkenyl, C_2-C_6 alkynyl, C_3-C_6 cycloalkyl, C_3-C_6 heterocycloalkyl, $-OR^a$, oxo, hydroxy (C_1-C_6 alkyl), -CN, C_1-C_6 haloalkyl, C_1-C_6 haloalkoxy, $-SO_3R^a$, $-SR^a$, $-SF_5$, $-C(O)R^a$, $-C(O)OR^a$, $-OC(O)R^a$, $-OC(O)NR^aR^b$, $-NR^aCOR^b$ and $-CONR^aR^b$.

4. The compound or the pharmaceutically acceptable salt, the stereoisomers, or the isotopic isomers thereof according to claim 1, wherein R^{W2} represents C_3-C_{10} cycloalkyl, C_6-C_{10} cycloalkenyl, 4-10 membered heterocycloalkyl, 6-10 membered heterocycloalkenyl, C_6-C_{10} aryl, 5-10 membered heteroaryl, which are substituted by 0-4 substituents selected from deuterium, halogen, C_1-C_6 alkyl, $-OR^a$, hydroxy (C_1-C_6 alkyl), -CN and C_1-C_6 haloalkyl.

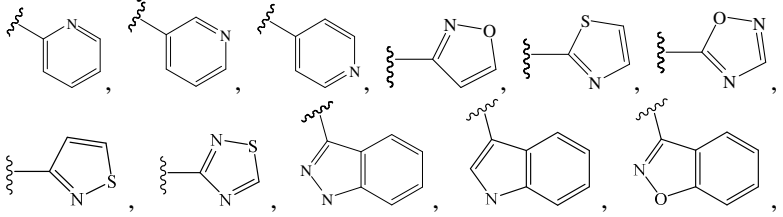
5. The compound or the pharmaceutically acceptable salt, the stereoisomers, or the isotopic isomers thereof according to claim 1, wherein R^{W2} represents 5-10 membered heteroaryl, which is substituted by 0-4 substituents selected from deuterium, halogen, C_1-C_6 alkyl, $-OR^a$, hydroxy (C_1-C_6 alkyl), -CN and C_1-C_6 haloalkyl.

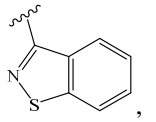
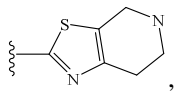
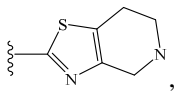
6. The compound or the pharmaceutically acceptable salt, the stereoisomers, or the isotopic isomers thereof according to claim 1, wherein R^{W2} represents pyrazolyl, triazolyl, oxazolyl, isoxazolyl, thiazolyl, imidazolyl, which are substituted by 0-4 substituents selected from deuterium, halogen, C_1-C_6 alkyl, $-OR^a$, hydroxy (C_1-C_6 alkyl), -CN and C_1-C_6 haloalkyl.

7. The compound or the pharmaceutically acceptable salt, the stereoisomers, or the isotopic isomers thereof according to claim 1, wherein R^{W2} represents .

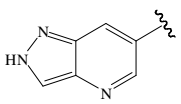
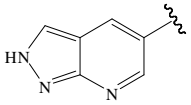
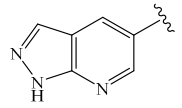
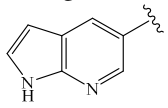
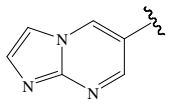
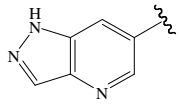
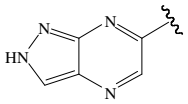
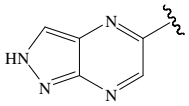
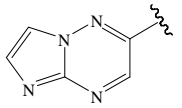
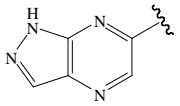
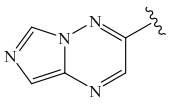
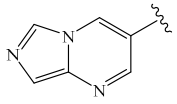
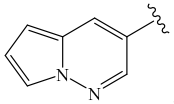
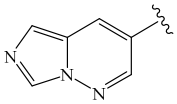
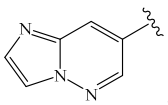
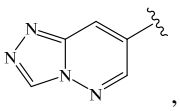
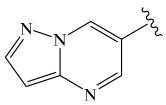
8. The compound or the pharmaceutically acceptable salt, the stereoisomers, or the isotopic isomers thereof according to claim 1, wherein R^2 represents 5-10 membered heteroaryl, which is substituted by 0-4 substituents selected from deuterium, halogen, C_1-C_6 alkyl, C_2-C_6 alkenyl, C_2-C_6 alkynyl, C_3-C_6 cycloalkyl, $-OR^a$, oxo, hydroxy (C_1-C_6 alkyl), $-NR^aR^b$, $-CR^aR^bNR^aR^b$, -CN, C_1-C_6 haloalkyl, C_1-C_6 haloalkoxy, or $-C(O)R^a$;

preferably, wherein R^2 represents pyridinyl, indazolyl, indolyl, thiazolyl, isothiazolyl, imidazolyl, pyrazolyl, oxazolyl, isoxazolyl, 1,2,4-oxadiazolyl, 1,3,4-oxadiazolyl, pyridazinyl, piperazinyl, pyrazinyl, benzothienyl, 1,2-benzoisoxazolyl, benzo[d] isothiazolyl, which are substituted by 0-4 substituents selected from deuterium, halogen, C_1-C_6 alkyl, C_2-C_6 alkenyl, C_2-C_6 alkynyl, C_3-C_6 cycloalkyl, $-OR^a$, oxo, hydroxy (C_1-C_6 alkyl), $-NR^aR^b$, $-CR^aR^bNR^aR^b$, -CN, C_1-C_6 haloalkyl, and C_1-C_6 alkoxy; or

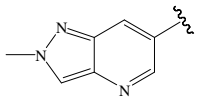
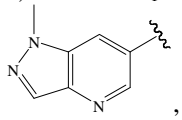
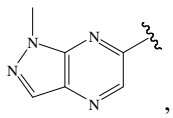
preferably, wherein R^2 represents .




, which are substituted by 0-4 substituents selected from deuterium, halogen, C_1-C_6 alkyl, C_2-C_6 alkenyl, C_2-C_6 alkynyl, C_3-C_6 cycloalkyl, -OR^a, oxo, hydroxy (C_1-C_6 alkyl), -NR^aR^b, -$CR^aR^bNR^aR^b$, -CN, C_1-C_6 haloalkyl, and C_1-C_6 alkoxy.

9. The compound or the pharmaceutically acceptable salt, the stereoisomers, or the isotopic isomers thereof according to claim 1, wherein W_1 and W_2 combine to form a ring fused to ring A having the following structure:

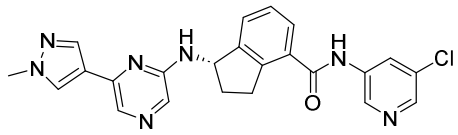
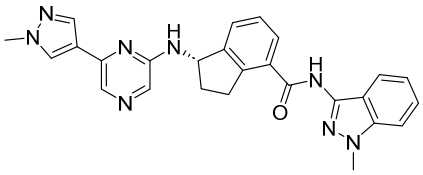
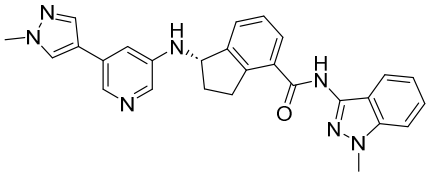
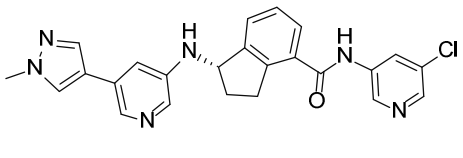
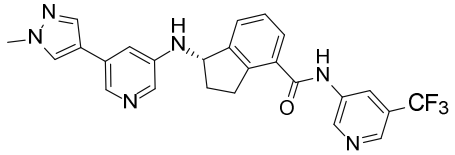
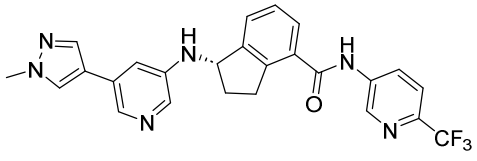
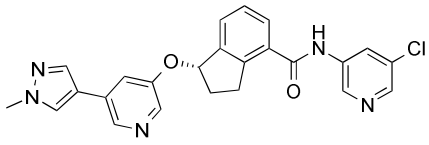
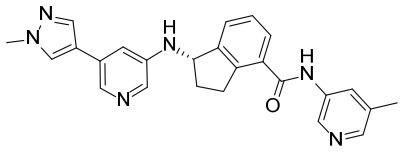

















, wherein the said ring may optionally be substituted by 0, 1 or 2 substituents selected from deuterium, halogen, C_1-C_6 alkyl, C_2-C_6 alkenyl, C_2-C_6 alkynyl, C_3-C_6 cycloalkyl, -OR^a, oxo, hydroxy (C_1-C_6 alkyl), NR^aR^b, -$CR^aR^bNR^aR^b$, -CN, C_1-C_6 haloalkyl, C_1-C_6 haloalkoxy, -SO_3R^a, -SR^a, -SF_5, -$C(O)R^a$, -$C(O)OR^a$, -$OC(O)R^a$, -$OC(O)NR^aR^b$, -NR^aCOR^b and -$CONR^aR^b$; and wherein the wavy line indicates the point of attachment with L_1.

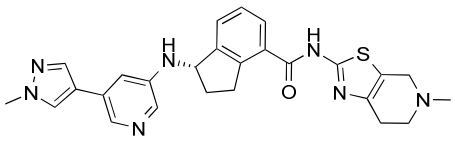
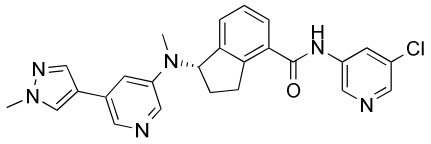
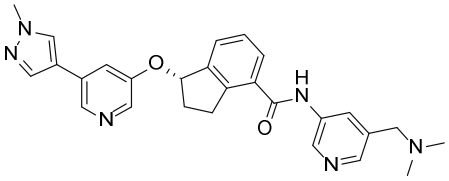
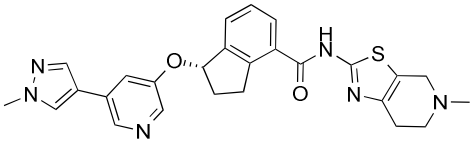
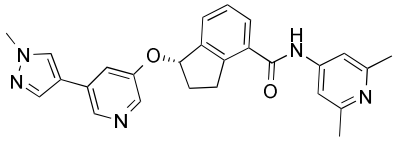
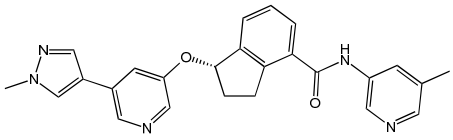
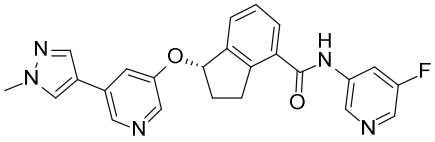
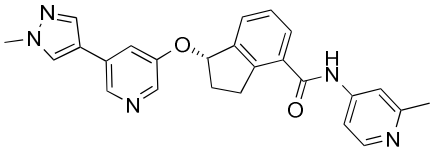
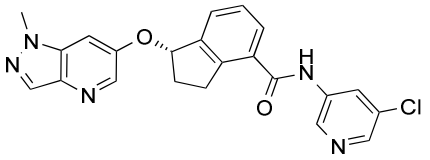
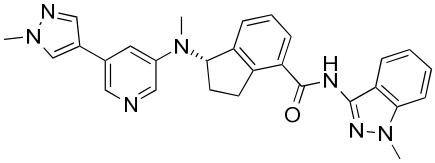
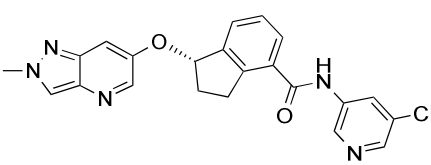
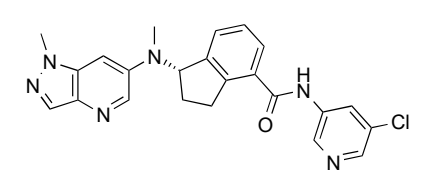
10. The compound or the pharmaceutically acceptable salt, the stereoisomers, or the isotopic isomers thereof according to claim 1, wherein W_1 and W_2 combine to form a ring fused to ring A having the following structure:

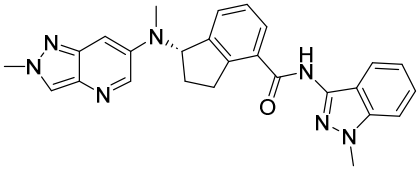
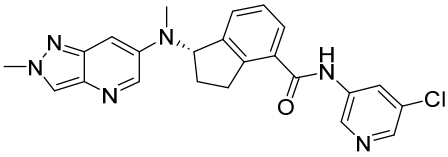
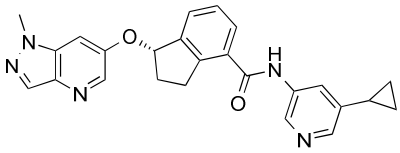
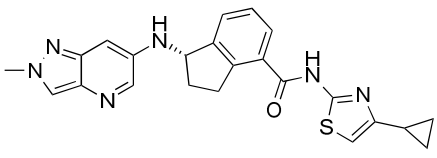
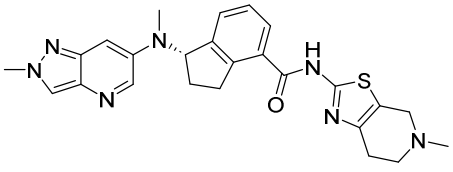
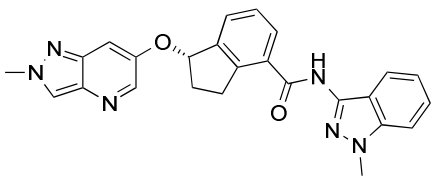
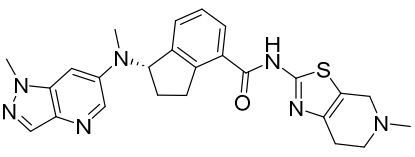
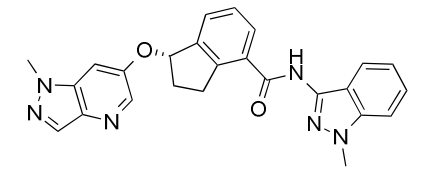



, wherein the wavy line indicates the point of attachment with L_1.

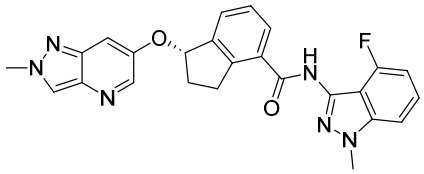
11. The compound or the pharmaceutically acceptable salt, the stereoisomers, or the isotopic isomers thereof according to claim 1, wherein R^3 represents hydrogen or CH_3.

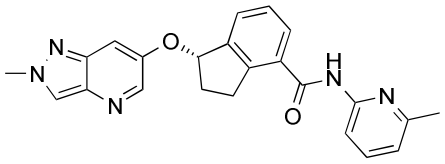
12. A compound selected from the following structures:

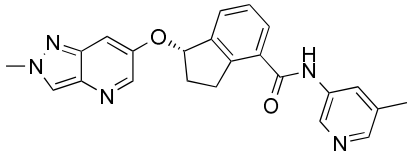















or a pharmaceutically acceptable salt, stereoisomers, or isotopic isomers thereof.

13. A pharmaceutical composition, wherein the composition comprises the compound or the pharmaceutically acceptable salt, the stereoisomers, or the isotopic isomers thereof according to any one of claims 1-12; and a pharmaceutically acceptable excipient.

14. The compound or the pharmaceutically acceptable salt, the stereoisomers, or the isotopic isomers thereof according to any one of claims 1-12 or the pharmaceutical composition according to claim 13 for use as a medicament.

15. Use of the compound or the pharmaceutically acceptable salt, the stereoisomers, or the isotopic isomers thereof according to any one of claims 1-12 or the pharmaceutical composition according to claim 13 in the manufacture of a medicament for the treatment of a CSF-1R related disease, wherein the CSF-1R related disease is preferably tumor.