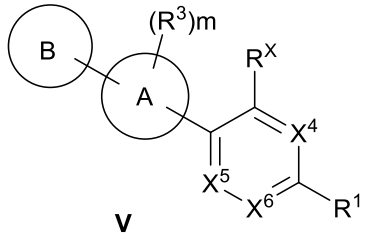
## CLAIMS

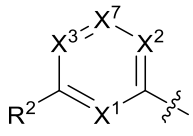
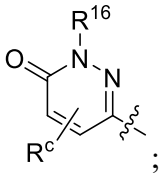
1. A compound represented by formula V, or a tautomer, a stereoisomer, a hydrate, a solvate, or a pharmaceutically acceptable salt thereof:



V

wherein

ring A is a 5- to 6-membered heteroaryl ring;

ring B is selected from  and ;

$X^1$ is N or $CR^5$;

$X^2$ is N or $CR^6$;

$X^3$ is N or $CR^7$;

$X^4$ is N or $CR^8$;

$X^5$ is N or $CR^9$;

$X^6$ is N or $CR^{10}$;

$X^7$ is N or $CR^4$;

$R^1$ is a $-ZR^{12}$ group, wherein Z is independently selected from $-C_{0-6}$ alkyl-$NR^{11}$-$C_{0-6}$ alkyl-, -$C_{0-6}$ alkyl-$NR^{11}SO_2$-$C_{0-6}$ alkyl-, -$C_{0-6}$ alkyl-$SO_2NR^{11}$-$C_{0-6}$ alkyl-, -$C_{0-6}$ alkyl-S(=O)(=NH)-$C_{0-6}$ alkyl-, and -$C_{0-6}$ alkyl-$SO_2$-$C_{0-6}$ alkyl-;

$R^2$ is halogen or a $-Y-R^{13}$ group, wherein Y is -$C_{0-6}$ alkyl-, -$C_{0-6}$ alkyl-$NR^{13}$-$C_{0-6}$ alkyl-, -$C_{0-6}$ alkyl-O-$C_{0-6}$ alkyl-, -$C_{0-6}$ alkyl-S-$C_{0-6}$ alkyl-, -$C_{0-6}$ alkyl-S(=O)-$C_{0-6}$ alkyl-, -$C_{0-6}$ alkyl-$S(=O)_2$-$C_{0-6}$ alkyl-, -$C_{0-6}$ alkyl-$SO_2NR^{13}$-$C_{0-6}$ alkyl-, -$C_{0-6}$ alkyl-S(=O)(=NH)-, -$C_{0-6}$ alkyl-$NR^{13}$-$SO_2$-$C_{0-6}$ alkyl-, -$C_{0-6}$ alkyl-$NR^{13}SO_2NR^{13}$-$C_{0-6}$ alkyl-, -$C_{0-6}$ alkyl-C(=O)-$C_{0-6}$ alkyl-, -$C_{0-6}$ alkyl-$NR^{13}$C(=O)-$C_{0-6}$ alkyl-, -$C_{0-6}$ alkyl-(C=O)$NR^{13}$-$C_{0-6}$ alkyl-, or -$C_{0-6}$ alkyl-C(=O)-O-$C_{0-6}$ alkyl-; or $-Y-R^{13}$ is $-N=S(=O)-(R^{13})_2$, wherein two $R^{13}$ are alternatively combined with the sulfur atom to which they are attached to form a saturated or partially saturated 3-, 4-, 5-, or 6-membered monocyclic ring comprising 0, 1, 2, or 3 N atoms and 0, 1, or 2 atoms selected from O and S;

$R^3$ is selected from halogen, hydroxyl, cyano, amino, $C_{1-6}$ alkyl, $C_{1-6}$ alkoxy, $C_{1-6}$ haloalkyl, -

$OC_{1-6}$ alkyl, and -$OC_{1-6}$ haloalkyl;

m is selected from 0, 1, 2, 3, and 4;

$R^4$ is selected from hydrogen, halogen, cyano, $C_{1-8}$ alkyl, -$OC_{1-8}$ alkyl, $C_{1-4}$ haloalkyl, -$OR^{4a}$, -$OR^{4b}$, -$C_{0-6}$ alkyl-(C=O)-N-($C_{0-6}$ alkyl)$_2$, -$C_{0-6}$ alkyl-$SO_2$N-($C_{0-6}$ alkyl)$_2$, $R^{4a}$, and $R^{4b}$;

$R^5$ is selected from hydrogen, halogen, cyano, $C_{1-6}$ alkyl, $C_{1-4}$ haloalkyl, $C_{3-8}$ cycloalkyl, halogenated $C_{3-8}$ cycloalkyl, -O-$C_{1-8}$ alkyl, and -O-$R^{5a}$, wherein $R^{5a}$ is a saturated, partially saturated, or unsaturated 3-, 4-, 5-, 6-, or 7-membered monocyclic ring comprising 0, 1, 2, or 3 N atoms and 0, 1, or 2 atoms selected from O and S; or

alternatively, $R^2$ and $R^5$ can be combined with the carbon atom to which they are each attached to form a saturated or partially saturated 5- or 6-membered monocyclic ring fused to the phenyl ring, wherein the 5- or 6-membered monocyclic ring comprises 0, 1, 2, or 3 N atoms and 0 or 1 atom selected from O and S, and further wherein the 5- or 6-membered monocyclic ring is substituted with 0, 1, 2, or 3 groups selected from: halogen, $C_{1-6}$ alkyl, $C_{1-4}$ haloalkyl, -$OR^a$, -$OC_{1-4}$ haloalkyl, cyano, -$NR^aR^a$, and oxo;

$R^7$ is selected from hydrogen, halogen, cyano, $C_{1-8}$ alkyl, $C_{3-8}$ cycloalkyl, $C_{3-8}$ halocycloalkyl, $C_{1-4}$ haloalkyl, -O-$C_{1-8}$ alkyl, and $R^{7a}$; or alternatively, $R^2$ and $R^7$ are combined with the carbon atom to which they are each attached to form a saturated or partially saturated 5- or 6-membered monocyclic ring fused to the phenyl ring, wherein the 5- or 6-membered monocyclic ring comprises 0, 1, 2, or 3 N atoms and 0 or 1 atom selected from O and S, and further wherein the 5- or 6-membered monocyclic ring is substituted with 0, 1, 2, or 3 groups selected from: halogen, $C_{1-6}$ alkyl, $C_{1-4}$ haloalkyl, -$OR^a$, -$OC_{1-4}$ haloalkyl, CN, -$NR^aR^a$, and oxo;

$R^6$, $R^8$, and $R^9$ are each independently selected from hydrogen, halogen, cyano, $C_{1-8}$ alkyl, -O-$C_{1-8}$ alkyl cycloalkyl, $C_{3-8}$ halocycloalkyl, and $C_{1-4}$ haloalkyl;

$R^{10}$ is hydrogen, halogen, hydroxyl, cyano, $C_{1-8}$ alkyl, $C_{3-8}$ cycloalkyl, $C_{3-8}$ halocycloalkyl, $C_{1-4}$ haloalkyl, -O-$R^{10a}$, or -O-$R^{10b}$;

$R^{11}$ is hydrogen, $R^{11a}$, or $R^{11b}$;

$R^{12}$ is hydrogen, halogen, hydroxyl, cyano,$R^{12a}$, or $R^{12b}$;

$R^{13}$ is hydrogen, halogen, cyano, $R^{13a}$, or $R^{13b}$;

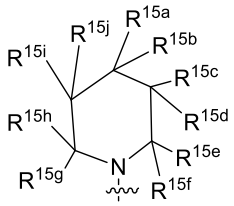
$R^{16}$ is hydrogen, $R^{16a}$, or $R^{16b}$;

$R^{4a}$, $R^{7a}$, $R^{10a}$, $R^{11a}$, $R^{12a}$, $R^{13a}$, and $R^{16a}$ are each independently selected from the group consisting of: a saturated, partially saturated, or unsaturated 3-, 4-, 5-, 6-, or 7-membered monocyclic ring or 4-, 5-, 6-, 7-, 8-, 9-, 10-, 11-, or 12-membered bicyclic ring comprising 0, 1, 2, or 3 N atoms and 0, 1, or 2 atoms selected from O and S, wherein the monocyclic or bicyclic ring is substituted with 0, 1, 2, or 3 groups selected from: halogen, cyano, amino, $C_{1-6}$

alkyl, $C_{1-6}$ haloalkyl, $-OR^a$, $-OC_{1-6}$ haloalkyl, $-C(=O)R^b$, $-C(=O)OR^a$, $-C(=O)NR^aR^a$, $-C(=NR^a)NR^aR^a$, $-OC(=O)R^b$, $-OC(=O)NR^aR^a$, $-OC_{2-6}$ alkyl $NR^aR^a$, $-OC_{2-6}$ alkyl $OR^a$, $-SR^a$, $-S(=O)R^b$, $-S(=O)_2R^b$, $-S(=O)_2NR^aR^a$, $-NR^aR^a$, $-N(R^a)C(=O)R^b$, $-N(R^a)C(=O)OR^b$, $-N(R^a)C(=O)NR^aR^a$, $-N(R^a)C(=NR^a)NR^aR^a$, $-N(R^a)S(=O)_2R^b$, $-N(R^a)S(=O)_2NR^aR^a$, $-NR^aC_{2-6}$ alkyl $NR^aR^a$, $-NR^aC_{2-6}$ alkyl $OR^a$, $-C_{1-6}$ alkyl $NR^aR^a$, $-C_{1-6}$ alkyl $OR^a$, $-C_{1-6}$ alkyl $N(R^a)C(=O)R^b$, $-C_{1-6}$ alkyl $OC(=O)R^b$, $-C_{1-6}$ alkyl $C(=O)NR^aR^a$, $-C_{1-6}$ alkyl $C(=O)OR^a$, $R^{14}$, and oxo;

$R^{4b}$, $R^{10b}$, $R^{11b}$, $R^{12b}$, $R^{13b}$, and $R^{16b}$ are each independently selected from the group consisting of: $C_{1-6}$ alkyl substituted with 0, 1, 2, 3, 4, or 5 groups selected from the group consisting of: halogen, cyano, $C_{1-6}$ alkyl, $C_{1-6}$ haloalkyl, $-C_{0-6}NR^aR^a$, $-OR^a$, $-C(=O)OR^a$, and a saturated, partially saturated, or unsaturated 3-, 4-, 5-, or 6-membered monocyclic ring;

$R^{14}$ is independently selected from the group consisting of: a saturated, partially saturated, or unsaturated 3-, 4-, 5-, 6-, or 7-membered monocyclic ring or 4-, 5-, 6-, 7-, 8-, 9-, 10-, 11-, or 12-membered bicyclic ring comprising 0, 1, 2, or 3 N atoms and 0, 1, or 2 atoms selected from O and S, wherein the monocyclic or bicyclic ring is substituted with 0, 1, 2, or 3 groups selected from: halogen, cyano, amino, $C_{1-6}$ alkyl, $C_{1-6}$ haloalkyl, $-OR^a$, $-OC_{1-6}$ haloalkyl, $-C(=O)R^b$, $-C(=O)OR^a$, $-C(=O)NR^aR^a$, $-C(=NR^a)NR^aR^a$, $-OC(=O)R^b$, $-OC(=O)NR^aR^a$, $-OC_{2-6}$ alkyl $NR^aR^a$, $-OC_2$-$C_6$ alkyl $OR^a$, $-SR^a$, $-S(=O)R^b$, $-S(=O)_2R^b$, $-S(=O)_2NR^aR^a$, $-NR^aR^a$, $-N(R^a)C(=O)R^b$, $-N(R^a)C(=O)OR^b$, $-N(R^a)C(=O)NR^aR^a$, $-N(R^a)C(=NR^a)NR^aR^a$, $-N(R^a)S(=O)_2R^b$, $-N(R^a)S(=O)_2NR^aR^a$, $-NR^aC_{2-6}$ alkyl $NR^aR^a$, $-NR^aC_{2-6}$ alkyl $OR^a$, $-C_{1-6}$ alkyl $NR^aR^a$, $-C_{1-6}$ alkyl $OR^a$, $-C_{1-6}$ alkyl $N(R^a)C(=O)R^b$, $-C_{1-6}$ alkyl $OC(=O)R^b$, $-C_{1-6}$ alkyl $C(=O)NR^aR^a$, $-C_{1-6}$ alkyl $C(=O)OR^a$, and oxo;

$R^x$ is 

;

$R^{15a}$, $R^{15b}$, $R^{15c}$, $R^{15d}$, $R^{15e}$, $R^{15f}$, $R^{15g}$, $R^{15h}$, $R^{15i}$ and $R^{15j}$ are each independently hydrogen, halogen,$R^{15o}$, or $R^{15p}$; or

alternatively, each of the pairs of $R^{15a}$ and $R^{15b}$, $R^{15c}$ and $R^{15d}$, $R^{15e}$ and $R^{15f}$, $R^{15g}$ and $R^{15h}$, $R^{15i}$ and $R^{15j}$ are independently combined with the carbon atom to which they are attached to form a saturated or partially saturated 3-, 4-, 5-, or 6-membered monocyclic ring spiro-attached to the $R^x$ ring, wherein the 3-, 4-, 5-, or 6-membered monocyclic ring comprises 0, 1, 2, or 3 N atoms and 0, 1, or 2 atoms selected from O and S, and further wherein the 3-, 4-, 5-, or 6-membered monocyclic ring is substituted with 0, 1, 2, or 3 groups selected from: halogen, $C_{1-}$

$_6$ alkyl, $C_{1-4}$ haloalkyl, -$OR^a$, -$OC_{1-4}$ haloalkyl, CN, -$NR^aR^a$, and oxo; or

yet alternatively, each of the pairs of $R^{15a}$ and $R^{15b}$, $R^{15c}$ and $R^{15d}$, $R^{15e}$ and $R^{15f}$, $R^{15g}$ and $R^{15h}$, $R^{15i}$ and $R^{15j}$ are independently combined to form a double bond;

$R^{15o}$ is selected from a saturated, partially saturated, or unsaturated 3-, 4-, 5-, 6-, or 7-membered monocyclic ring or 8-, 9-, 10-, 11-, or 12-membered bicyclic ring, wherein the monocyclic or bicyclic ring comprises 0, 1, 2, or 3 N atoms and 0, 1, or 2 atoms selected from O and S, and further wherein the monocyclic or bicyclic ring is substituted with 0,

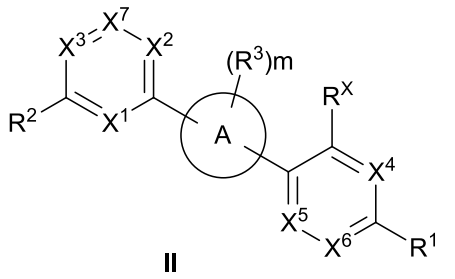
1, 2, 3, or 4 groups selected from: halogen, $C_{1-6}$ alkyl, $C_{1-4}$ haloalkyl, -$OR^a$, -$OC_{1-4}$ haloalkyl, CN, -$C(=O)OR^a$, -$C(=O)R^b$, -$C(=O)NR^aR^a$, -$C(=NR^a)NR^aR^a$, -$OC(=O)R^b$, -$OC(=O)NR^aR^a$, -$OC_{2-6}$ alkyl $NR^aR^a$, -$NR^aR^a$, -$OC_{2-6}OR^a$, -$SR^a$, -$S(=O)R^b$, -$S(=O)_2R^b$, -$S(=O)_2NR^aR^a$, -$NR^aC(=O)R^b$, -$NR^aC(=O)OR^b$, -$NR^aC(=O)NR^aR^a$, -$NR^aC(=NR^a)NR^aR^a$, -$NR^aS(=O)_2NR^b$, -$NR^aS(=O)_2NR^aR^a$, -$R^aC_{2-6}$ alkyl $NR^aR^a$, -$NR^aC_{2-6}$ alkyl $OR^a$, -$C_{1-6}$ alkyl $NR^aR^a$, -$C_{1-6}$ alkyl $OR^a$, -$C_{1-6}$ alkyl $OC(=O)R^b$, -$C_{1-6}$ alkyl $NR^aC(=O)R^b$, -$C_{1-6}$ alkyl $NR^aC(=O)NR^aR^a$, -$C_{1-6}$ alkyl-$C(=O)OR^a$, and oxo;

$R^{15p}$ is selected from $C_{1-8}$ alkyl substituted with 0, 1, 2, 3, 4, or 5 groups selected from halogen, $C_{1-4}$ haloalkyl, CN, -$C(=O)OR^a$, -$OR^a$, -$OC_{1-4}$ haloalkyl, and -$NR^aR^a$;

$R^a$ and $R^c$ are independently selected from H and $R^b$;

$R^b$ is independently selected from $C_{1-6}$ alkyl, phenyl, and benzyl, wherein the $C_{1-6}$ alkyl is substituted with 0, 1, 2, or 3 substituents selected from: halogen, hydroxyl, -$OC_{1-6}$ alkyl, -$NH_2$, -$NHC_{1-6}$ alkyl, -$OC(=O)C_{1-6}$ alkyl, and -$N(C_{1-6}$ alkyl$)C_{1-6}$ alkyl; and the phenyl or benzyl is substituted with 0, 1, 2, or 3 substituents selected from: halogen, $C_{1-6}$ alkyl, $C_{1-4}$ haloalkyl, -OH, -$OC_{1-6}$ alkyl, -$NH_2$, -$NHC_{1-6}$ alkyl, -$OC(=O)C_{1-6}$ alkyl, and -$N(C_{1-6}$ alkyl$)C_{1-6}$ alkyl.

2. The compound represented by formula V, or the tautomer, the stereoisomer, the hydrate, the solvate, or the pharmaceutically acceptable salt thereof as claimed in claim 1, wherein the compound represented by formula V has structural formula II:




II ,

wherein

$X^1$ is N or $CR^5$;

$X^2$ is N or $CR^6$;

$X^3$ is N or $CR^7$;

$X^4$ is N or $CR^8$;

$X^5$ is N or $CR^9$;

$X^6$ is N or $CR^{10}$;

$X^7$ is N or $CR^4$;

ring A is a 5- to 6-membered heteroaryl ring;

$R^1$ is a $-ZR^{12}$ group, wherein Z is independently selected from $-C_{0-6}$ alkyl-$NR^{11}$-$C_{0-6}$ alkyl-, $-C_{0-6}$ alkyl-$NR^{11}SO_2$-$C_{0-6}$ alkyl-, $-C_{0-6}$ alkyl-$SO_2NR^{11}$-$C_{0-6}$ alkyl-, $-C_{0-6}$ alkyl-S(=O)(=NH)-$C_{0-6}$ alkyl-, and $-C_{0-6}$ alkyl-$SO_2$-$C_{0-6}$ alkyl-;

$R^2$ is halogen or a $-Y-R^{13}$ group, wherein Y is $-C_{0-6}$ alkyl-, $-C_{0-6}$ alkyl-$NR^{13}$-$C_{0-6}$ alkyl-, $-C_{0-6}$ alkyl-O-$C_{0-6}$ alkyl-, $-C_{0-6}$ alkyl-S-$C_{0-6}$ alkyl-, $-C_{0-6}$ alkyl-S(=O)-$C_{0-6}$ alkyl-, $-C_{0-6}$ alkyl-$S(=O)_2$-$C_{0-6}$ alkyl-, $-C_{0-6}$ alkyl-$SO_2NR^{13}$-$C_{0-6}$ alkyl-, $-C_{0-6}$ alkyl-S(=O)(=NH)-, $-C_{0-6}$ alkyl-$NR^{13}$-$SO_2$-$C_{0-6}$ alkyl-, $-C_{0-6}$ alkyl-$NR^{13}SO_2NR^{13}$-$C_{0-6}$ alkyl-, $-C_{0-6}$ alkyl-C(=O)-$C_{0-6}$ alkyl-, $-C_{0-6}$ alkyl-$NR^{13}$C(=O)-$C_{0-6}$ alkyl-, $-C_{0-6}$ alkyl-(C=O)$NR^{13}$-$C_{0-6}$ alkyl-, or $-C_{0-6}$ alkyl-C(=O)-O-$C_{0-6}$ alkyl-;

$R^3$ is selected from halogen, hydroxyl, cyano, amino, $C_{1-6}$ alkyl, $C_{1-6}$ alkoxy, $C_{1-6}$ haloalkyl, $-OC_{1-6}$ alkyl, and $-OC_{1-6}$ haloalkyl;

m is selected from 0, 1, 2, 3, and 4;

$R^4$ is selected from hydrogen, halogen, cyano, $C_{1-8}$ alkyl, $-OC_{1-8}$ alkyl, $C_{1-4}$ haloalkyl, $-OR^{4a}$, $-OR^{4b}$, $-C_{0-6}$ alkyl-(C=O)-N-($C_{0-6}$ alkyl)$_2$, $-C_{0-6}$ alkyl-$SO_2$N-($C_{0-6}$ alkyl)$_2$, $R^{4a}$, and $R^{4b}$;

$R^5$ is selected from hydrogen, halogen, cyano, $C_{1-6}$ alkyl, $C_{1-4}$ haloalkyl, $C_{3-8}$ cycloalkyl, halogenated $C_{3-8}$ cycloalkyl, $-O-C_{1-8}$ alkyl, and $-O-R^{5a}$, wherein $R^{5a}$ is a saturated, partially saturated, or unsaturated 3-, 4-, 5-, 6-, or 7-membered monocyclic ring comprising 0, 1, 2, or 3 N atoms and 0, 1, or 2 atoms selected from O and S; or

alternatively, $R^2$ and $R^5$ can be combined with the carbon atom to which they are each attached to form a saturated or partially saturated 5- or 6-membered monocyclic ring fused to the phenyl ring, wherein the 5- or 6-membered monocyclic ring comprises 0, 1, 2, or 3 N atoms and 0 or 1 atom selected from O and S, and further wherein the 5- or 6-membered monocyclic ring is substituted with 0, 1, 2, or 3 groups selected from: halogen, $C_{1-6}$ alkyl, $C_{1-4}$ haloalkyl, $-OR^a$, $-OC_{1-4}$ haloalkyl, cyano, $-NR^aR^a$, and oxo;

$R^7$ is selected from hydrogen, halogen, cyano, $C_{1-8}$ alkyl, $C_{3-8}$ cycloalkyl, $C_{3-8}$ halocycloalkyl, $C_{1-4}$ haloalkyl, $-O-C_{1-8}$ alkyl, and $R^{7a}$; or alternatively, $R^2$ and $R^7$ are combined with the carbon atom to which they are each attached to form a saturated or partially saturated 5- or 6-membered monocyclic ring fused to the phenyl ring, wherein the 5- or 6-membered monocyclic ring comprises 0, 1, 2, or 3 N atoms and 0 or 1 atom selected from O and S, and further wherein the

5- or 6-membered monocyclic ring is substituted with 0, 1, 2, or 3 groups selected from: halogen, $C_{1-6}$ alkyl, $C_{1-4}$ haloalkyl, -$OR^a$, -$OC_{1-4}$ haloalkyl, CN, -$NR^aR^a$, and oxo;

$R^6$, $R^8$, and $R^9$ are each independently selected from hydrogen, halogen, cyano, $C_{1-8}$ alkyl, -O-$C_{1-8}$ alkyl, $C_{3-8}$ cycloalkyl, $C_{3-8}$ halocycloalkyl, and $C_{1-4}$ haloalkyl;

$R^{10}$ is hydrogen, halogen, hydroxyl, cyano, $C_{1-8}$ alkyl, $C_{3-8}$ cycloalkyl, $C_{3-8}$ halocycloalkyl, $C_{1-4}$ haloalkyl, -O-$R^{10a}$, or -O-$R^{10b}$;

$R^{11}$ is hydrogen, $R^{11a}$, or $R^{11b}$;

$R^{12}$ is hydrogen, halogen, hydroxyl, cyano, $R^{12a}$, or $R^{12b}$;

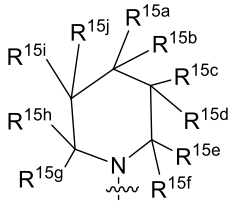
$R^{13}$ is hydrogen, halogen, cyano, $R^{13a}$, or $R^{13b}$;

$R^{4a}$, $R^{7a}$, $R^{10a}$, $R^{11a}$, $R^{12a}$, and $R^{13a}$ are each independently selected from the group consisting of: a saturated, partially saturated, or unsaturated 3-, 4-, 5-, 6-, or 7-membered monocyclic ring or 4-, 5-, 6-, 7-, 8-, 9-, 10-, 11-, or 12-membered bicyclic ring comprising 0, 1, 2, or 3 N atoms and 0, 1, or 2 atoms selected from O and S, wherein the monocyclic or bicyclic ring is substituted with 0, 1, 2, or 3 groups selected from: halogen, cyano, amino, $C_{1-6}$ alkyl, $C_{1-6}$ haloalkyl, -$OR^a$, -$OC_{1-6}$ haloalkyl, -$C(=O)R^b$, -$C(=O)OR^a$, -$C(=O)NR^aR^a$, -$C(=NR^a)NR^aR^a$, -$OC(=O)R^b$, -$OC(=O)NR^aR^a$, -$OC_{2-6}$ alkyl $NR^aR^a$, -$OC_{2-6}$ alkyl $OR^a$, -$SR^a$, -$S(=O)R^b$, -$S(=O)_2R^b$, -$S(=O)_2NR^aR^a$, -$NR^aR^a$, -$N(R^a)C(=O)R^b$, -$N(R^a)C(=O)OR^b$, -$N(R^a)C(=O)NR^aR^a$, -$N(R^a)C(=NR^a)NR^aR^a$, -$N(R^a)S(=O)_2R^b$, -$N(R^a)S(=O)_2NR^aR^a$, -$NR^aC_{2-6}$ alkyl $NR^aR^a$, -$NR^aC_{2-6}$ alkyl $OR^a$, -$C_{1-6}$ alkyl $NR^aR^a$, -$C_{1-6}$ alkyl $OR^a$, -$C_{1-6}$ alkyl $N(R^a)C(=O)R^b$, -$C_{1-6}$ alkyl $OC(=O)R^b$, -$C_{1-6}$ alkyl $C(=O)NR^aR^a$, -$C_{1-6}$ alkyl $C(=O)OR^a$, $R^{14}$, and oxo;

$R^{4b}$, $R^{10b}$, $R^{11b}$, $R^{12b}$, and $R^{13b}$ are each independently selected from the group consisting of: $C_{1-6}$ alkyl substituted with 0, 1, 2, 3, 4, or 5 groups selected from the group consisting of: halogen, cyano, $C_{1-6}$ alkyl, $C_{1-6}$ haloalkyl, -$C_{0-6}NR^aR^a$, -$OR^a$, -$C(=O)OR^a$, and a saturated, partially saturated, or unsaturated 3-, 4-, 5-, or 6-membered monocyclic ring;

$R^{14}$ is independently selected from the group consisting of: a saturated, partially saturated, or unsaturated 3-, 4-, 5-, 6-, or 7-membered monocyclic ring or 4-, 5-, 6-, 7-, 8-, 9-, 10-, 11-, or 12-membered bicyclic ring comprising 0, 1, 2, or 3 N atoms and 0, 1, or 2 atoms selected from O and S, wherein the monocyclic or bicyclic ring is substituted with 0, 1, 2, or 3 groups selected from: halogen, cyano, amino, $C_{1-6}$ alkyl, $C_{1-6}$ haloalkyl, -$OR^a$, -$OC_{1-6}$ haloalkyl, -$C(=O)R^b$, -$C(=O)OR^a$, -$C(=O)NR^aR^a$, -$C(=NR^a)NR^aR^a$, -$OC(=O)R^b$, -$OC(=O)NR^aR^a$, -$OC_{2-6}$ alkyl $NR^aR^a$, -$OC_2$-$C_6$ alkyl $OR^a$, -$SR^a$, -$S(=O)R^b$, -$S(=O)_2R^b$, -$S(=O)_2NR^aR^a$, -$NR^aR^a$, -$N(R^a)C(=O)R^b$, -$N(R^a)C(=O)OR^b$, -$N(R^a)C(=O)NR^aR^a$, -$N(R^a)C(=NR^a)NR^aR^a$, -$N(R^a)S(=O)_2R^b$, -$N(R^a)S(=O)_2NR^aR^a$, -$NR^aC_{2-6}$ alkyl $NR^aR^a$, -$NR^aC_{2-6}$ alkyl $OR^a$, -$C_{1-6}$ alkyl $NR^aR^a$, -$C_{1-6}$ alkyl $OR^a$, -$C_{1-6}$ alkyl $N(R^a)C(=O)R^b$, -$C_{1-6}$ alkyl $OC(=O)R^b$, -$C_{1-6}$ alkyl $C(=O)NR^aR^a$, -$C_{1-6}$ alkyl

C(=O)OR[a], and oxo;

$R^x$ is 

;

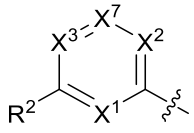
$R^{15a}$, $R^{15b}$, $R^{15c}$, $R^{15d}$, $R^{15e}$, $R^{15f}$, $R^{15g}$, $R^{15h}$, $R^{15i}$ and $R^{15j}$ are each independently hydrogen, halogen or $C_{1-8}$ alkyl substituted with 0, 1, 2, 3, 4, or 5 groups selected from halogen, $C_{1-4}$ haloalkyl, CN; or

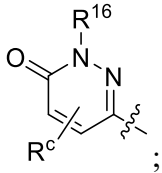
alternatively, $R^{15a}$ and $R^{15b}$ are combined with the carbon atom to which they are attached to form a saturated 3-membered monocarbocyclic ring spiro-attached to the $R^x$ ring;

$R^a$ is independently selected from H and $R^b$;

$R^b$ is independently selected from $C_{1-6}$ alkyl, phenyl, and benzyl, wherein the $C_{1-6}$ alkyl is substituted with 0, 1, 2, or 3 substituents selected from: halogen, hydroxyl, -$OC_{1-6}$ alkyl, -$NH_2$, -$NHC_{1-6}$ alkyl, -$OC(=O)C_{1-6}$ alkyl, and -$N(C_{1-6}$ alkyl)$C_{1-6}$ alkyl; and the phenyl or benzyl is substituted with 0, 1, 2, or 3 substituents selected from: halogen, $C_{1-6}$ alkyl, $C_{1-4}$ haloalkyl, -OH, -$OC_{1-6}$ alkyl, -$NH_2$, -$NHC_{1-6}$ alkyl, -$OC(=O)C_{1-6}$ alkyl, and -$N(C_{1-6}$ alkyl)$C_{1-6}$ alkyl.

3. The compound represented by formula V, or the tautomer, the stereoisomer, the hydrate, the solvate, or the pharmaceutically acceptable salt thereof as claimed in claim 1, wherein,

ring B is selected from 

and 

;

$X^1$ is N or $CR^5$;

$X^2$ is N or $CR^6$;

$X^3$ is N or $CR^7$;

$X^4$ is N or $CR^8$;

$X^5$ is N or $CR^9$;

$X^6$ is N or $CR^{10}$;

$X^7$ is N or $CR^4$;

$R^1$ is a -$ZR^{12}$ group, wherein Z is independently selected from -$C_{0-6}$ alkyl-$NR^{11}$-$C_{0-6}$ alkyl-, -$C_{0-6}$ alkyl-$NR^{11}SO_2$-$C_{0-6}$ alkyl-, -$C_{0-6}$ alkyl-$SO_2NR^{11}$-$C_{0-6}$ alkyl-, -$C_{0-6}$ alkyl-S(=O)(=NH)-$C_{0-6}$ alkyl-, and -$C_{0-6}$ alkyl-$SO_2$-$C_{0-6}$ alkyl-;

$R^2$ is halogen or a -Y-$R^{13}$ group, wherein Y is -$C_{0-6}$ alkyl-, -$C_{0-6}$ alkyl-$NR^{13}$-$C_{0-6}$ alkyl-, -$C_{0-6}$ alkyl-O-$C_{0-6}$ alkyl-, -$C_{0-6}$ alkyl-S-$C_{0-6}$ alkyl-, -$C_{0-6}$ alkyl-S(=O)-$C_{0-6}$ alkyl-, -$C_{0-6}$ alkyl-$S(=O)_2$-

$C_{0-6}$ alkyl-, -$C_{0-6}$ alkyl-$SO_2NR^{13}$-$C_{0-6}$ alkyl-, -$C_{0-6}$ alkyl-S(=O)(=NH)-, -$C_{0-6}$ alkyl-$NR^{13}$-$SO_2$-$C_{0-6}$ alkyl-, -$C_{0-6}$ alkyl-$NR^{13}SO_2NR^{13}$-$C_{0-6}$ alkyl-, -$C_{0-6}$ alkyl-C(=O)-$C_{0-6}$ alkyl-, -$C_{0-6}$ alkyl-$NR^{13}$C(=O)-$C_{0-6}$ alkyl-, -$C_{0-6}$ alkyl-(C=O)$NR^{13}$-$C_{0-6}$ alkyl-, or -$C_{0-6}$ alkyl-C(=O)-O-$C_{0-6}$ alkyl-;

$R^3$ is selected from halogen, hydroxyl, cyano, amino, $C_{1-6}$ alkyl, $C_{1-6}$ alkoxy, $C_{1-6}$ haloalkyl, -$OC_{1-6}$ alkyl, and -$OC_{1-6}$ haloalkyl;

m is selected from 0, 1, 2, 3, and 4;

$R^4$ is selected from hydrogen, halogen, cyano, $C_{1-8}$ alkyl, -$OC_{1-8}$ alkyl, and $C_{1-4}$ haloalkyl;

$R^5$ is selected from hydrogen, halogen, cyano, $C_{1-6}$ alkyl, and $C_{1-4}$ haloalkyl ;

$R^7$ is selected from hydrogen, halogen, cyano, $C_{1-8}$ alkyl, $C_{1-4}$ haloalkyl, and -O-$C_{1-8}$ alkyl;

$R^6$, $R^8$, and $R^9$ are each independently selected from hydrogen, halogen, cyano, $C_{1-8}$ alkyl, and $C_{1-4}$ haloalkyl;

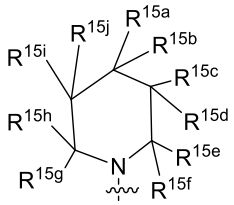
$R^{10}$ is hydrogen, halogen, hydroxyl, cyano, $C_{1-8}$ alkyl, $C_{3-8}$ cycloalkyl, or $C_{1-4}$ haloalkyl ;

$R^{11}$ is hydrogen, or $C_{1-6}$ alkyl ;

$R^{12}$ is hydrogen, halogen, hydroxyl, cyano; or $R^{12}$ is $C_{1-6}$ alkyl-$C_{3-6}$ cycloalkyl substituted with 0, 1, 2, 3 groups selected from the group consisting of: F, Cl, hydroxyl, methyl, ethyl, propyl, and butyl; or $R^{12}$ is a saturated 3-, 4-, 5-,6-membered monocyclic ring comprising 0, 1, or 2 atoms selected from O and S, wherein the monocyclic ring is substituted with 0, 1, 2, or 3 groups selected from: halogen, cyano, amino,$C_{1-6}$ alkyl, $C_{1-6}$ haloalkyl, -OH, -$C_{1-6}$ alkyl OH, oxo; or $R^{12}$ is $C_{1-6}$ alkyl substituted with 0, 1, 2, 3 groups selected from the group consisting of: halogen, cyano, OH, $C_{1-6}$ alkyl;

$R^{13}$ is hydrogen, halogen, cyano, a saturated 3-, 4-, 5-, 6-, 7-membered monocyclic ring or saturated 6-， 7-, 8-, 9-, 10,11,12-membered bicyclic ring comprising 0, 1, 2,or 3 N atoms and 0, 1, or 2 atoms selected from O and S, wherein the monocyclic or bicyclic ring is substituted with 0, 1, 2, or 3 groups selected from: halogen, cyano, $C_{1-6}$ alkyl, $C_{1-6}$ haloalkyl, -OH, -$OC_{1-6}$ haloalkyl, -$C_{1-6}$ alkyl OH, oxo; or $R^{13}$ is $C_{1-6}$ alkyl substituted with 0, 1, 2, 3 groups selected from the group consisting of: halogen, cyano, OH, $C_{1-6}$ alkyl, $C_{1-6}$ haloalkyl;

$R^{16}$ is hydrogen; or $R^{16}$ is a saturated 3-, 4-, 5-, 6-membered monocyclic ring comprising 0, 1 or 2 N atoms and 0, 1, or 2 atoms selected from O and S, wherein the monocyclic ring is substituted with 0, 1, 2, or 3 groups selected from: halogen, cyano, amino, $C_{1-6}$ alkyl and $C_{1-6}$ haloalkyl;

$R^x$ is 

;

$R^{15a}$, $R^{15b}$, $R^{15c}$, $R^{15d}$, $R^{15e}$, $R^{15f}$, $R^{15g}$, $R^{15h}$, $R^{15i}$ and $R^{15j}$ are each independently hydrogen, halogen or $C_{1-8}$ alkyl substituted with 0, 1, 2, 3, 4, or 5 groups selected from halogen, $C_{1-4}$ haloalkyl, CN; or

alternatively, $R^{15a}$ and $R^{15b}$ are combined with the carbon atom to which they are attached to form a saturated 3-membered monocarbocyclic ring spiro-attached to the $R^x$ ring;

$R^c$ is selected from H and $C_{1-6}$ alkyl being substituted with 0, 1, 2, or 3 substituents selected from: halogen, hydroxyl, -$OC_{1-6}$ alkyl.

4. The compound represented by formula V, or the tautomer, the stereoisomer, the hydrate, the solvate, or the pharmaceutically acceptable salt thereof as claimed in any one of claims 1-3,

$R^1$ is a -$ZR^{12}$ group, wherein Z is independently selected from -$C_{0-6}$ alkyl-$NR^{11}$-$C_{0-6}$ alkyl-, -$C_{0-6}$ alkyl-$NR^{11}SO_2$-$C_{0-6}$ alkyl-, -$C_{0-6}$ alkyl-$SO_2NR^{11}$-$C_{0-6}$ alkyl-, -$C_{0-6}$ alkyl-S(=O) (=NH)-$C_{0-6}$ alkyl-, -$C_{0-6}$ alkyl-$SO_2$-$C_{0-6}$ alkyl-;

$R^2$ is halogen or a -Y-$R^{13}$ group, wherein Y is -$C_{0-6}$ alkyl-, -$C_{0-6}$ alkyl-$NR^{13}$-$C_{0-6}$ alkyl-, -$C_{0-6}$ alkyl-O-$C_{0-6}$ alkyl-, -$C_{0-6}$ alkyl-$SO_2NH$-$C_{0-6}$ alkyl-;

$R^3$ is halogen, or $C_{1-6}$ alkyl;

m is selected from 0, 1, and 2;

$R^4$ is selected from hydrogen, halogen, and $C_{1-8}$ alkyl, $C_{1-4}$ haloalkyl;

$R^5$ is selected from hydrogen, and halogen;

$R^7$ is selected from hydrogen, halogen;

$R^6$, $R^8$, and $R^9$ are each independently selected from hydrogen and halogen;

$R^{10}$ is hydrogen and halogen;$R^{11}$ is hydrogen, or $C_{1-6}$ alkyl ;

$R^{12}$ is hydrogen, halogen, hydroxyl, cyano, $C_{1-6}$ alkyl-$C_{3-6}$ cycloalkyl substituted with 0, 1, 2, 3 groups selected from the group consisting of: F, Cl, hydroxyl, methyl, ethyl, propyl, and butyl, a saturated 3-, 4-, 5-membered monocyclic ring comprising 0 or 1 oxygen, wherein the monocyclic ring is substituted with 0, 1, 2, or 3 groups selected from: halogen, $C_{1-6}$ alkyl, $C_{1-6}$ haloalkyl, -OH, -$C_{1-6}$ alkyl OH, oxo; or $R^{12}$ is $C_{1-6}$ alkyl substituted with 0, 1, 2, 3 groups selected from the group consisting of: halogen, cyano, OH, $C_{1-6}$ alkyl;

$R^{13}$ is hydrogen, halogen, cyano, a saturated 3-, 4-, 5-, 6-membered monocyclic ring or

saturated 6-， 7-, 8-, 9-, or 10-membered bicyclic ring comprising 0, 1 or 2 N atoms and 0, 1, or 2 atoms selected from O and S, wherein the monocyclic or bicyclic ring is substituted with 0, 1, 2, or 3 groups selected from: halogen, cyano, $C_{1-6}$ alkyl, $C_{1-6}$ haloalkyl, -OH, -$OC_{1-6}$ haloalkyl, -$C_{1-6}$ alkyl OH, oxo; or $R^{13}$ is $C_{1-6}$ alkyl substituted with 0, 1, 2, 3 groups selected from the group consisting of: halogen, cyano, OH, $C_{1-6}$ alkyl;

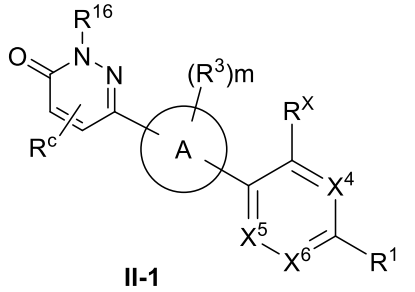
$R^{16}$ is hydrogen; a saturated 3-, 4-, 5-, 6-membered monocyclic ring comprising 0, 1 or 2 N atoms and 0, 1, or 2 atoms selected from O and S, wherein the monocyclic ring is substituted with 0, 1, 2, or 3 groups selected from: halogen, $C_{1-6}$ alkyl;

$R^{15a}$, $R^{15b}$, $R^{15c}$, $R^{15d}$, $R^{15e}$, $R^{15f}$, $R^{15g}$, $R^{15h}$, $R^{15i}$ and $R^{15j}$ are each independently hydrogen, halogen, or $C_{1-8}$ alkyl; or

alternatively, $R^{15a}$ and $R^{15b}$ can be independently combined with the carbon atom to which they are attached to form a saturated 3-membered monocyclic carbocyclic ring spiro-attached to the $R^x$ ring;

$R^c$ is H.

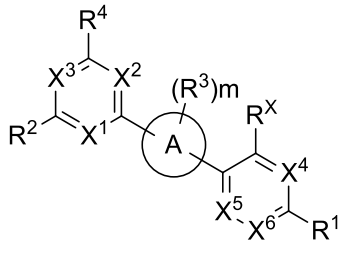
5. The compound represented by formula V, or the tautomer, the stereoisomer, the hydrate, the solvate, or the pharmaceutically acceptable salt thereof as claimed in claim 1, wherein the compound represented by formula V has structural formula II-1:




II-1 ,

wherein $X^4$, $X^5$, $X^6$, ring A, $R^1$, $R^3$, $R^{16}$, $R^c$, $R^x$, and m are as defined in claim 1.

6. The compound represented by formula V, or the tautomer, the stereoisomer, the hydrate, the solvate, or the pharmaceutically acceptable salt thereof as claimed in any one of claims 1-4, wherein the compound represented by formula V has structural formula I:




I ,

wherein $X^1$, $X^2$, $X^3$, $X^4$, $X^5$, $X^6$, ring A, $R^1$, $R^2$, $R^3$, $R^4$, $R^x$, and m are as defined in any one of claims 1-4.

7. The compound represented by formula V, or the tautomer, the stereoisomer, the hydrate, the solvate, or the pharmaceutically acceptable salt thereof as claimed in any one of claims 1-7, wherein the ring A is 5- to 6-membered heteroaryl comprising 1-3 heteroatoms;

m is 0, 1, 2;

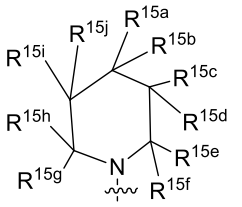
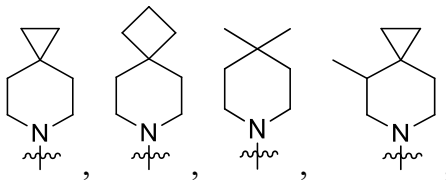
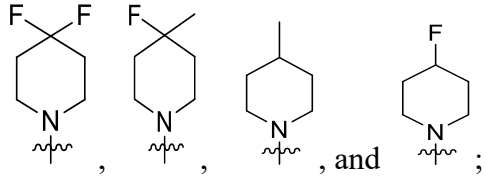
$R^3$ is selected from halogen, $C_{1-6}$ alkyl, and $C_{1-6}$ haloalkyl;

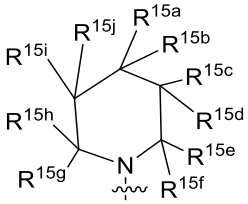
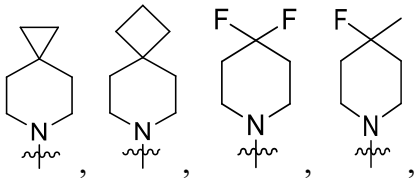
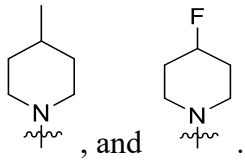
preferably, the heteroatom is selected from N, O, and S; when a plurality of heteroatoms are present, the heteroatoms are identical or different;

preferably, ring A is selected from pyrrole, pyrazole, imidazole, triazole, furan, oxazole, oxadiazole, thiophene, thiazole, thiadiazole, pyridine, pyrimidine, pyridazine, pyrazine, and triazine;

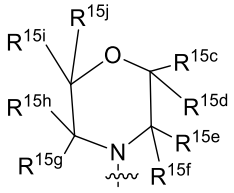
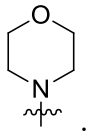
more preferably, ring A is selected from pyrazole, oxazole, oxadiazole, thiazole, thiadiazole, and triazole.

8. The compound represented by formula V, or the tautomer, the stereoisomer, the hydrate, the solvate, or the pharmaceutically acceptable salt thereof as claimed in any one of claims 1-7,

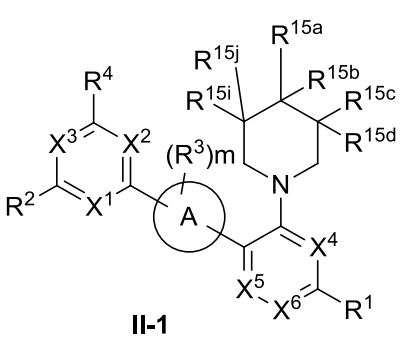
wherein the  group is selected from , , and ;

preferably, the  group is selected from , , and .

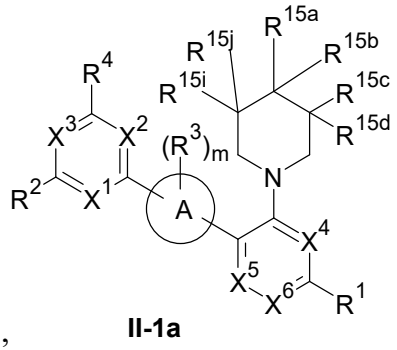
9. The compound represented by formula V, or the tautomer, the stereoisomer, the hydrate, the solvate, or the pharmaceutically acceptable salt thereof as claimed in any one of claims 1-8,

wherein the  group is selected from .

10. The compound represented by formula V, or the tautomer, the stereoisomer, the hydrate, the solvate, the pharmaceutically acceptable salt, or the prodrug thereof as claimed in any one of claims 1-9, wherein the compound represented by formula V has the following structure:


II-1

,


II-1a

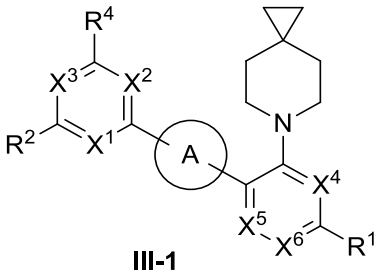
wherein $X^1$, $X^2$, $X^3$, $X^4$, $X^5$, and $X^6$ are as defined in any one of claims 1-9;

$R^1$, $R^2$, $R^3$, $R^4$, and m are as defined in any one of claims 1-9;

$R^{15a}$, $R^{15b}$, $R^{15c}$, $R^{15d}$, $R^{15i}$, and $R^{15j}$ are as defined in any one of claims 1-9;

ring A is as defined in any one of claims 1-9.

11. The compound represented by formula V, or the tautomer, the stereoisomer, the hydrate, the solvate, or the pharmaceutically acceptable salt thereof as claimed in any one of claims 1-4 and 5-10, wherein the compound represented by formula V has the following structure:


III-1

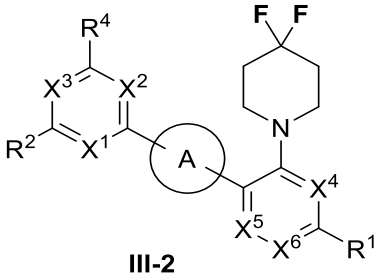
,

wherein $X^1$, $X^2$, $X^3$, $X^4$, $X^5$, and $X^6$ are as defined in any one of claims 1-4 and 5-10;

$R^1$, $R^2$, and $R^4$ are as defined in any one of claims 1-4 and 5-10;

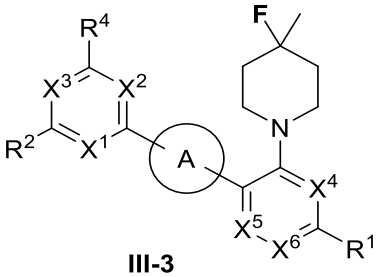
ring A is selected from pyrazole, oxazole, oxadiazole, thiazole, thiadiazole, and triazole.

12. The compound represented by formula V, or the tautomer, the stereoisomer, the hydrate, the solvate, or the pharmaceutically acceptable salt thereof as claimed in any one of claims 1-4 and 5-10, wherein the compound represented by formula V has the following structure:



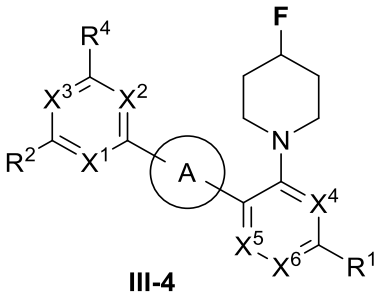
III-2

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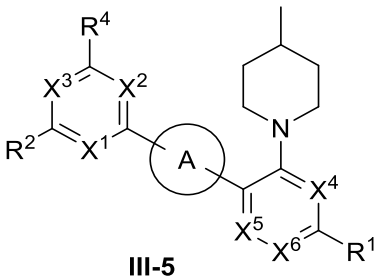
III-3

,



III-4

, or



III-5

,

wherein $X^1$, $X^2$, $X^3$, $X^4$, $X^5$, and $X^6$ are as defined in any one of claims 1-4 and 5-10;

$R^1$, $R^2$, and $R^4$ are as defined in any one of claims 1-4 and 5-10;

ring A is selected from pyrazole, oxazole, oxadiazole, thiazole, thiadiazole, and triazole.

13. The compound represented by formula V, or the tautomer, the stereoisomer, the hydrate, the solvate, or the pharmaceutically acceptable salt thereof as claimed in any one of claims 1-12, wherein $R^1$ is $-ZR^{12}$,

wherein Z is selected from -$C_{0-6}$ alkyl-NH-$C_{0-6}$ alkyl-, -$C_{0-6}$ alkyl-$NHSO_2$-$C_{0-6}$ alkyl-, -$C_{0-6}$ alkyl-$SO_2NH$-$C_{0-6}$ alkyl-, -$C_{0-6}$ alkyl-S(=O)(=NH)-$C_{0-6}$ alkyl-, and -$C_{0-6}$ alkyl-$SO_2$-$C_{0-6}$ alkyl-;

$R^{12}$ is halogen, hydroxyl, cyclopropyl or epoxybutane substituted with 0, 1, 2, or 3 groups selected from: fluoro, $C_{1-6}$ alkyl, $C_{1-6}$ haloalkyl, -OH, -$OC_{1-6}$ haloalkyl, and -$C_{1-6}$ alkyl-OH,$C_{1-6}$ alkyl substituted with 0, 1, 2 or 3groups selected from the group consisting of: hydroxyl, fluoro, and methyl, $C_{1-6}$ alkyl-$C_{3-6}$ cycloalkyl substituted with 0, 1, 2, 3 groups selected from the group consisting of: F, Cl, hydroxyl, methyl, ethyl, propyl, and butyl;

preferably, Z is selected from -NH-$C_{0-6}$ alkyl-, -$NHSO_2$-$C_{0-6}$ alkyl-, -$SO_2NH$-$C_{0-6}$ alkyl-, -S(=O)(=NH)-$C_{0-6}$ alkyl-, -$SO_2$-$C_{0-6}$ alkyl-, and -$CH_2$-$SO_2$-$C_{0-6}$ alkyl-.

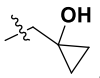
14. The compound represented by formula V, or the tautomer, the stereoisomer, the hydrate, the solvate, the pharmaceutically acceptable salt, or the prodrug thereof as claimed in any one of claims 1-13, wherein the Z is -NH-, -$NHSO_2$-, -$SO_2NH$-, -S(=O)(=NH)-, -$SO_2$-, or -$CH_2$-$SO_2$-;

preferably, the Z is -$NHSO_2$- or -$SO_2NH$-.

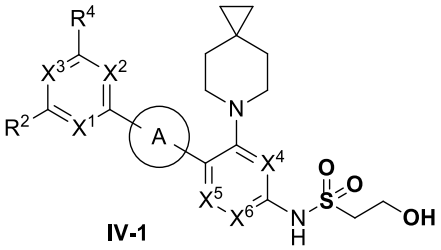
15. The compound represented by formula V, or the tautomer, the stereoisomer, the hydrate, the solvate, or the pharmaceutically acceptable salt thereof as claimed in any one of claims 1-

14, wherein

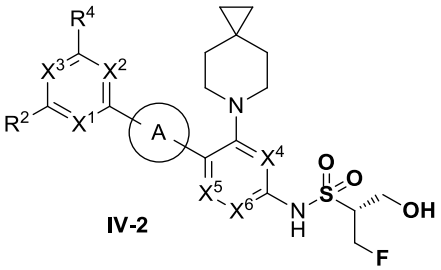
, $R^{12}$ is halogen, hydroxyl, cyclopropyl or epoxybutane substituted with 0, 1 or 2 groups selected from: fluoro, $C_{1-6}$ alkyl, -OH, and -$C_{1-6}$ alkyl-OH; or $C_{1-6}$ alkyl substituted with 0, 1 or 2 groups selected from hydroxyl and fluoro; or $C_{1-6}$ alkyl-$C_{3-6}$ cycloalkyl substituted with 0, 1, or 2 groups selected from the group consisting of: F, Cl, hydroxyl, methyl, ethyl, propyl, and butyl;

preferably, the $R^{12}$ is selected from -$CH_2CH_2OH$, *tert*-butyl, , methyl, -$CH_2F$, , , , cyclopropyl, -$CH_2$-cyclopropyl, , , , , and oxetanyl.

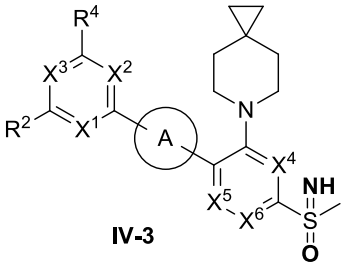
16. The compound represented by formula V, or the tautomer, the stereoisomer, the hydrate, the solvate, or the pharmaceutically acceptable salt thereof as claimed in any one of claims 1-4 and 6-15, wherein the compound represented by formula V has the following structure:



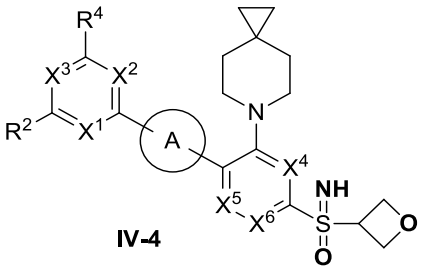
IV-1



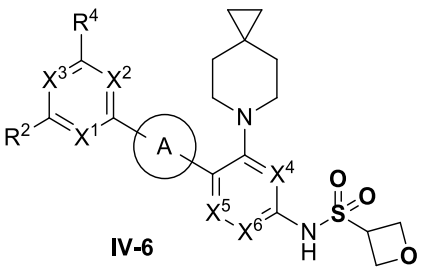
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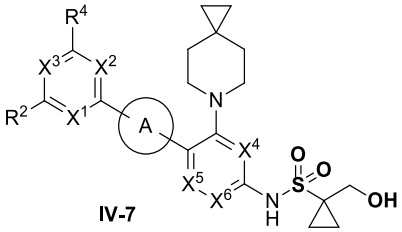
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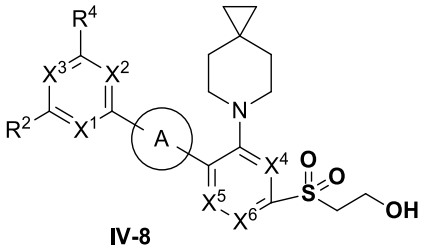
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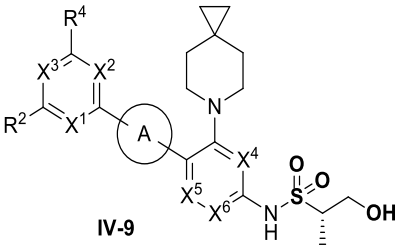
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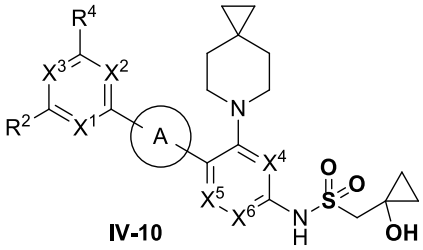
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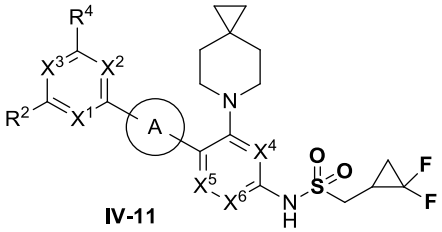
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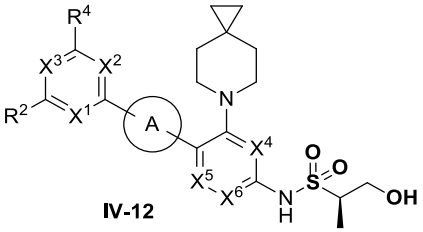
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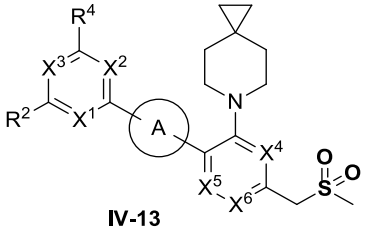
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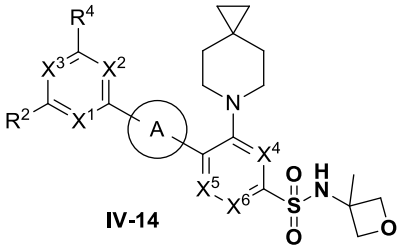
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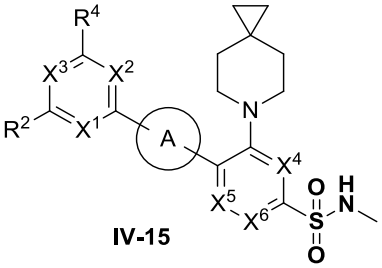
IV-12



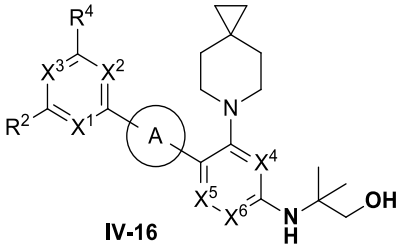
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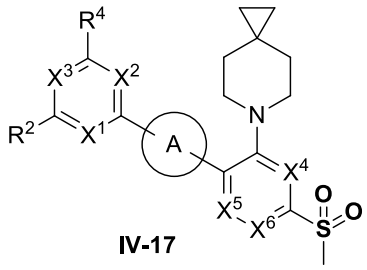
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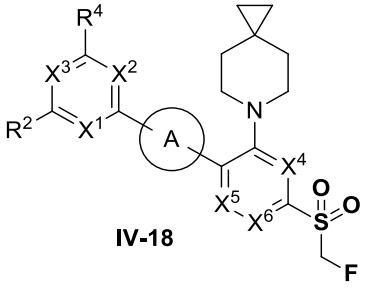
IV-15



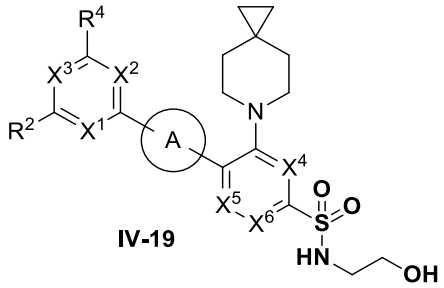
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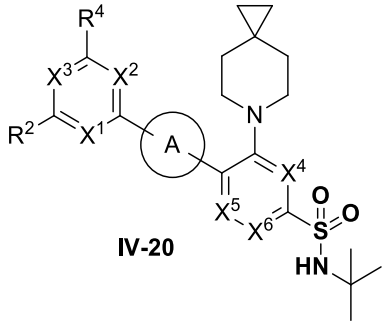
IV-17



IV-18

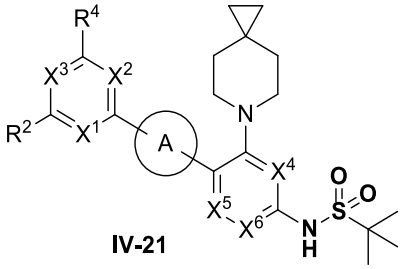


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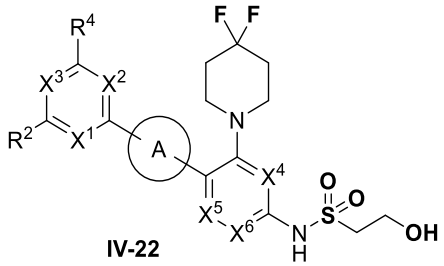
IV-20

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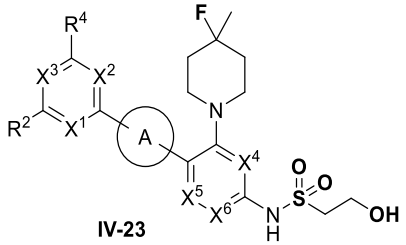
IV-21

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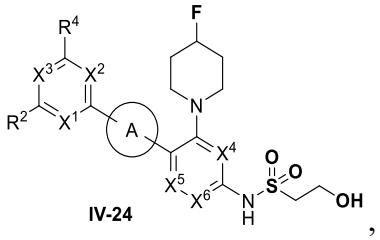
IV-22

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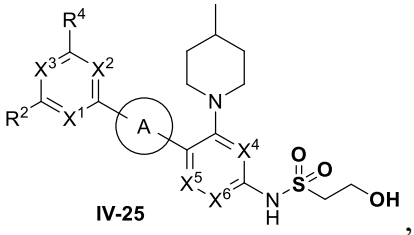
IV-23

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IV-24

, or



IV-25

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wherein $X^1$, $X^2$, $X^3$, $X^4$, $X^5$, and $X^6$ are as defined in any one of claims 1-4, 6-15;

$R^2$ and $R^4$ are as defined in any one of claims 14, 6-15;

ring A is selected from pyrazole, oxazole, oxadiazole, thiazole, thiadiazole, and triazole.

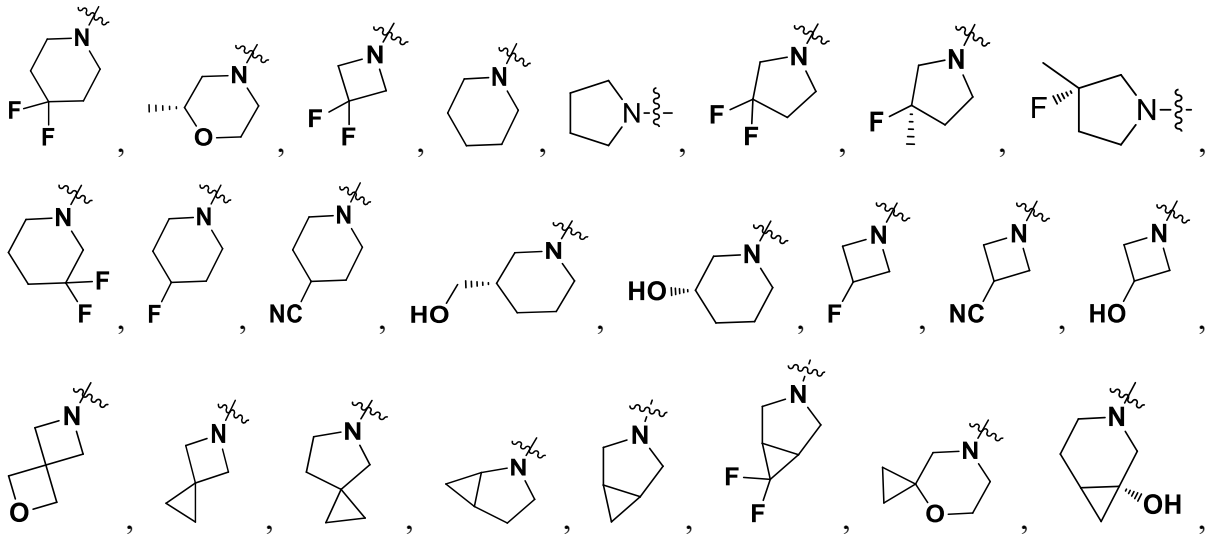
17. The compound represented by formula V, or the tautomer, the stereoisomer, the hydrate, the solvate, or the pharmaceutically acceptable salt thereof as claimed in any one of claims 1-16, wherein the $R^2$ is selected from F, Cl, Br, and a -Y-$R^{13}$ group, wherein Y is a bond, -NH-,

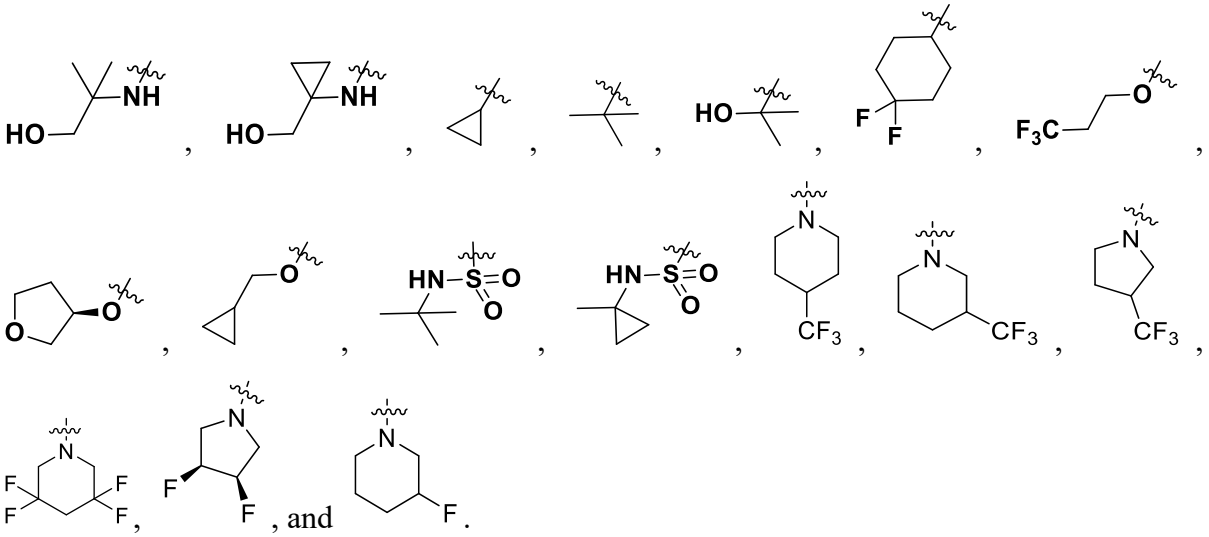
-NH-$(CH_2)_{0-4}$-, -O-$(CH_2)_{0-4}$-, or -$SO_2NH$-; and $R^{13}$ is a saturated 3-, 4-, 5-, 6--membered monocyclic ring or saturated 6-, 7-, 8-, 9-, 10-membered bicyclic ring comprising 0, 1, or 2 N atoms and 0 or 1 atom selected from O and S, wherein the monocyclic or bicyclic ring is substituted with 0, 1, 2, or 3 identical or different groups selected from: F, Cl, Br, $C_{1-6}$ alkyl, $C_{1-4}$ haloalkyl, -OH, -O$C_{1-4}$ haloalkyl, CN, -$C_{1-3}$ alkyl-OH and oxo; or $R^{13}$ is $C_{1-6}$ alkyl substituted with 0, 1, 2, or 3 identical or different substituents selected from F, Cl, Br, -OH and CN;

preferably, Y is a bond, and $R^{13}$ is a saturated 3-, 4-, 5-, or 6-membered monocyclic ring or 6-, 7-, 8-membered bicyclic ring comprising 0 or 1 N atom and 0 or 1 O atom, wherein the monocyclic or bicyclic ring is substituted with 0, 1, 2, or 3 identical or different groups selected from: F, Cl, Br, -$C_{1-3}$ alkyl, $C_{1-3}$ haloalkyl, -OH, CN, and -$C_{1-3}$ alkyl-OH,

preferably $R^{13}$ is a saturated 3-, 4-, 5- or 6-membered monocyclic ring or 6-, 7-, 8-membered bicyclic ring comprising 0 or 1 N atom and 0 or 1 O atom, the monocyclic or bicyclic ring is substituted with 0, 1, 2, or 3 identical or different group selected from F, Cl, Br, methyl, -OH, -$CH_2OH$, and trifluoromethyl; preferably, Y is -NH-, -NH-$(CH_2)_{0-4}$-, -O-$(CH_2)_{0-4}$-, or -$SO_2NH$-; $R^{13}$ is a saturated 3-, 4- or 5-membered monocyclic ring comprising 0 or 1 O atom, wherein the monocyclic ring is substituted with 0, 1 or 2 identical or different groups selected from: fluoro, methyl, trifluoromethyl, -OH, and $CH_2OH$; or $R^{13}$ is $C_{1-6}$ alkyl substituted with 0, 1 or 2 identical or different substituents, wherein the substituent is -OH, methyl, or F.

18. The compound represented by formula V, or the tautomer, the stereoisomer, the hydrate, or the solvate, the pharmaceutically acceptable salt thereof as claimed in any one of claims 1-4and 6-17, wherein the $R^2$ is selected from the following structures:





19. The compound, or the tautomer, the stereoisomer, the hydrate, the solvate, or the pharmaceutically acceptable salt thereof as claimed in any one of claims 1-18, wherein $X^1$ is N or -$CR^5$;

$X^2$ is N or $CR^6$;

$X^3$ is N or $CR^7$;

$X^4$ is N or $CR^8$;

$X^5$ is N or $CR^9$;

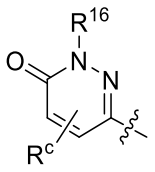
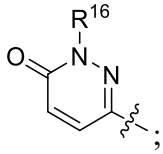
$X^6$ is N or $CR^{10}$;

$X^7$ is N or $CR^4$;

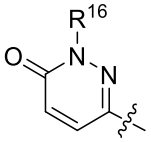
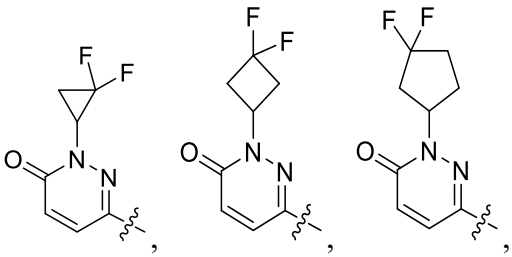
preferably, none, one, or two of the $X^1$, $X^2$, $X^3$, and $X^7$ are N;

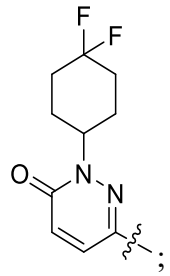
preferably, none, one, or two of the $X^4$, $X^5$, and $X^6$ are N.

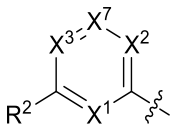
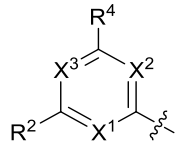
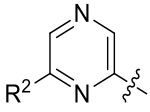
20. The compound represented by formula V, or the tautomer, the stereoisomer, the hydrate, the solvate, or the pharmaceutically acceptable salt thereof as claimed in claim 1, wherein

the  group has a structure of ;

$R^{16}$ is hydrogen; a saturated 3-, 4-, 5-, 6-membered carbocyclic monocyclic ring, wherein the monocyclic carbocyclic ring is substituted with 2 groups selected from halogen;

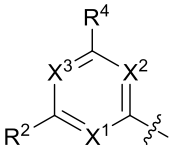
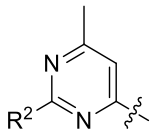
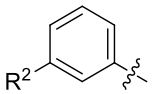
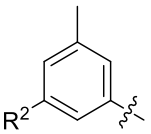
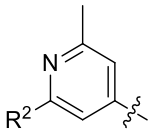
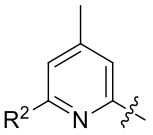
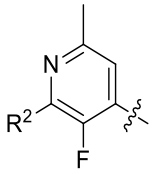
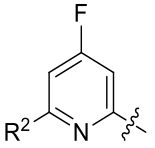
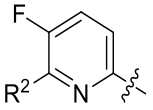
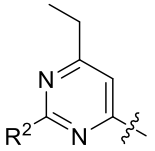
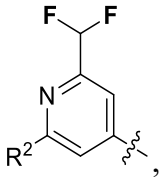
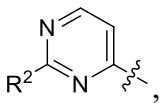
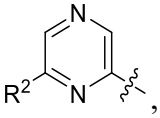
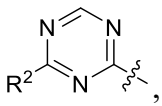
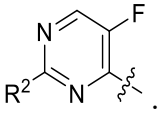
preferably, the  group has a structure of ,

or ;

the  group has a structure of  or ;

preferably, $X^1$ is N or CH, $X^2$ is N or CH, and $X^3$ is N or CH;

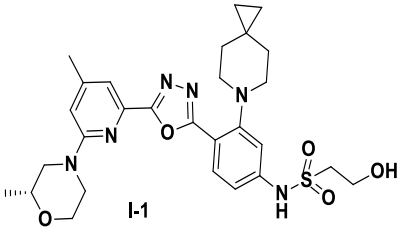
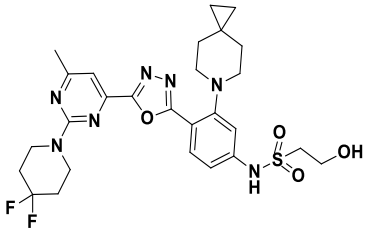
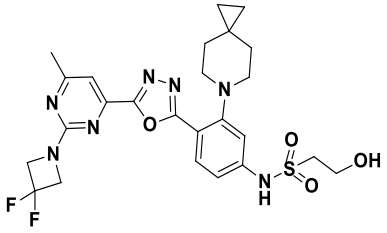
preferably, none, one, or two of the $X^1$, $X^2$, $X^3$, and $X^7$ are N;

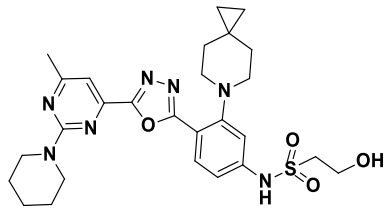
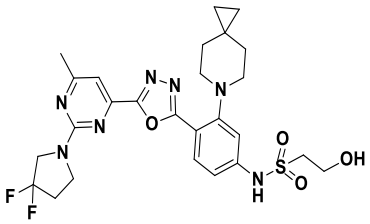
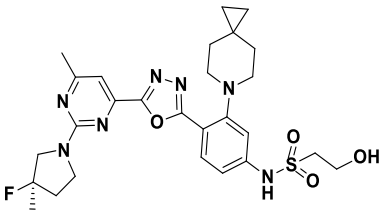
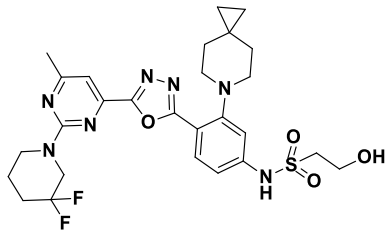
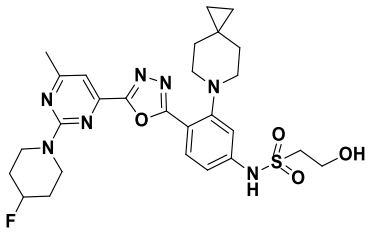
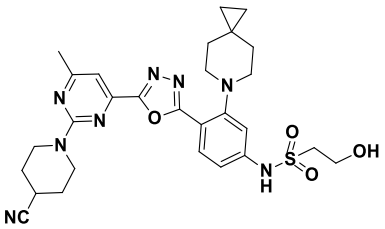
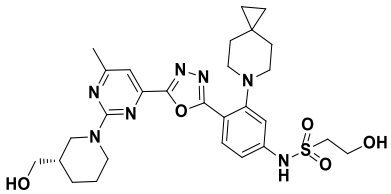
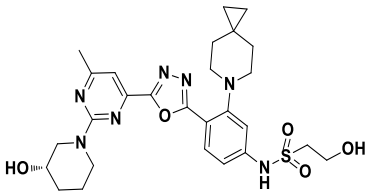
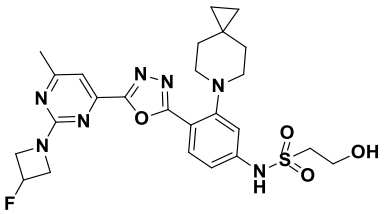
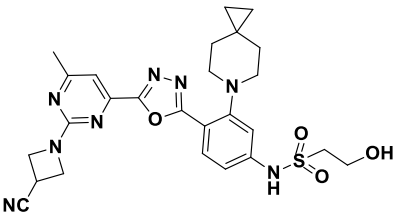
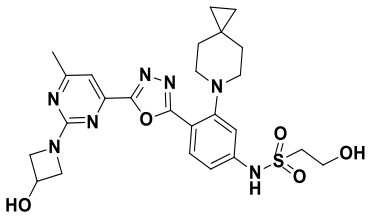
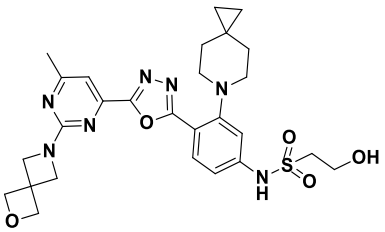
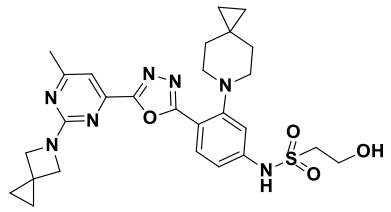
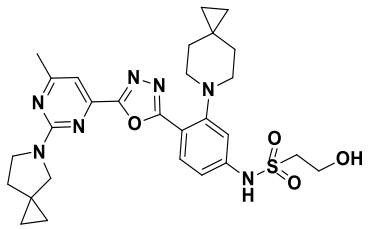
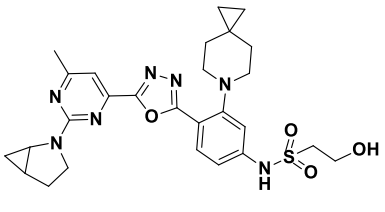
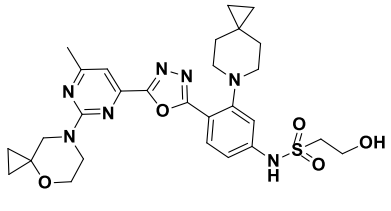
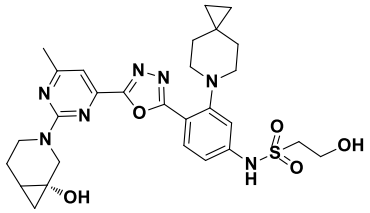
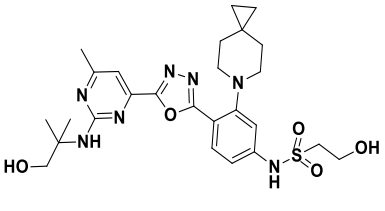
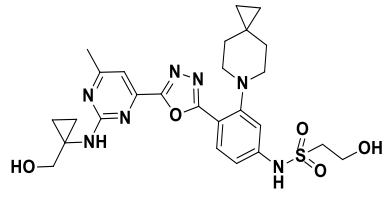
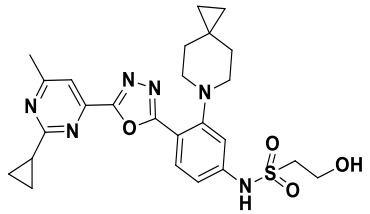
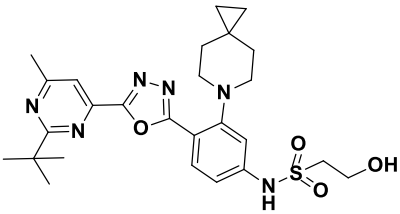
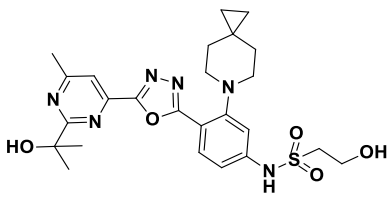
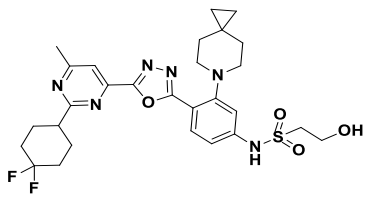
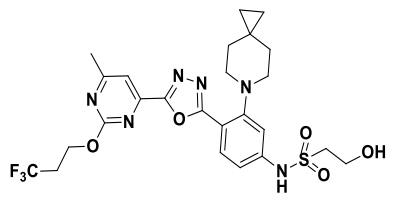
preferably, the  has a structure of , , , , , , , , , , , , , or .

21. The compound, or the tautomer, the stereoisomer, the hydrate, the solvate, or the pharmaceutically acceptable salt thereof as claimed in any one of claims 1-20, wherein the $R^4$ is selected from hydrogen, F, Cl, Br, $C_{1-6}$ alkyl, $C_{1-3}$ haloalkyl ;

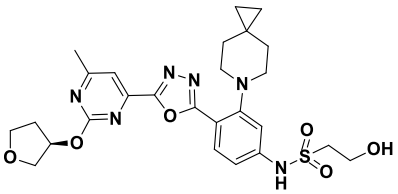
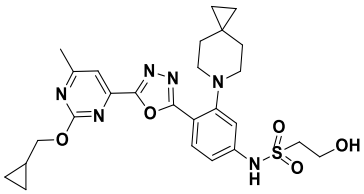
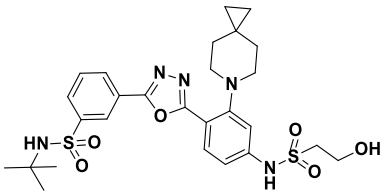
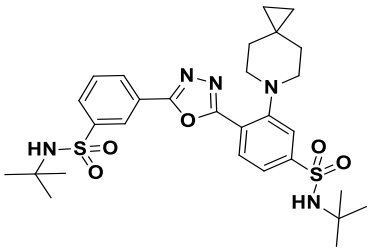
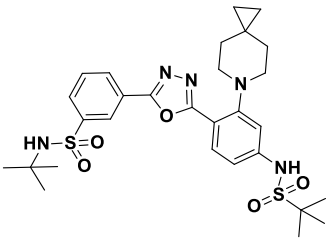
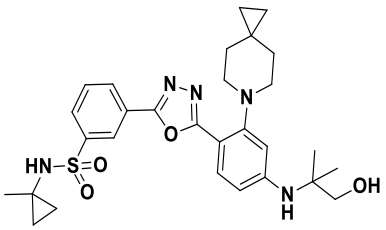
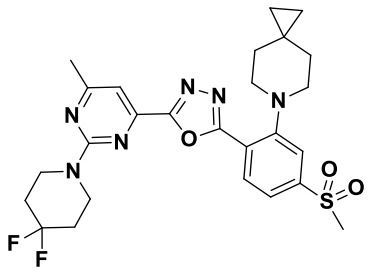
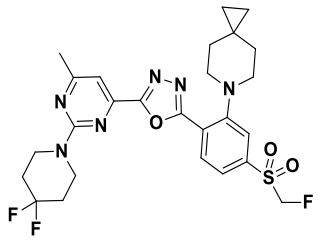
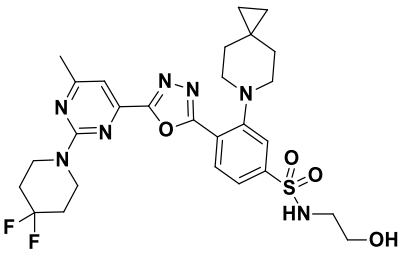
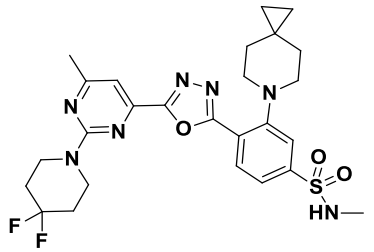
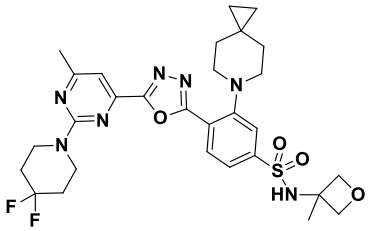
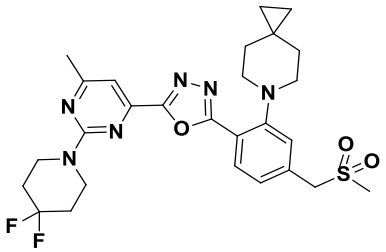
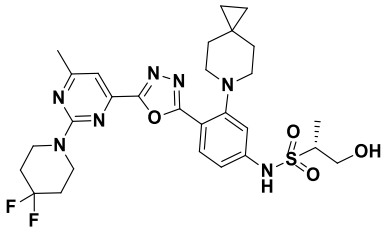
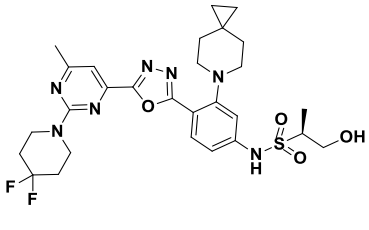
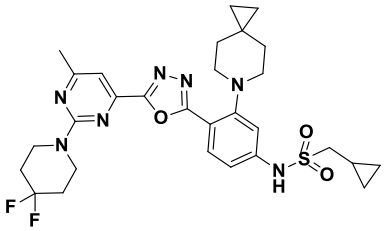
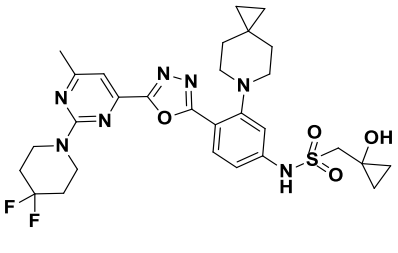
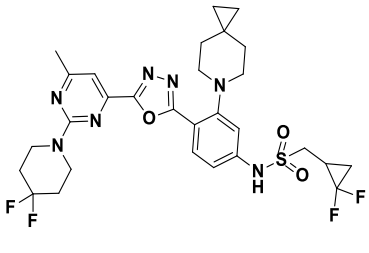
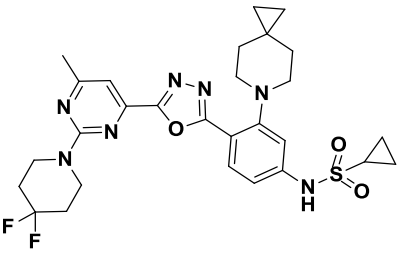
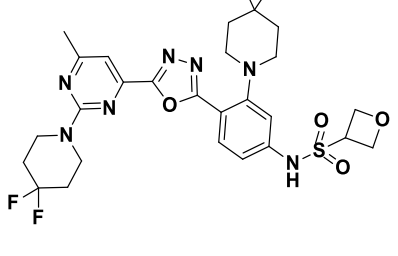
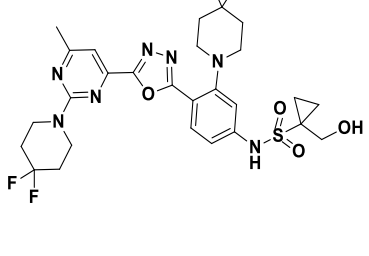
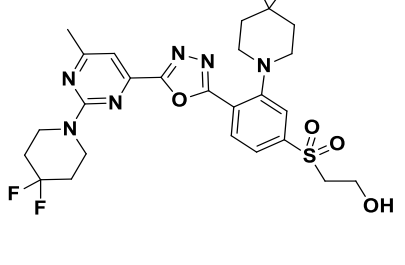
preferably, $R^4$ is selected from hydrogen, methyl, ethyl, difluoromethyl, halogen, methoxy, -$CF_3$;preferably, $R^4$ is hydrogen, methyl, ethyl, fluoro, or difluoromethyl.

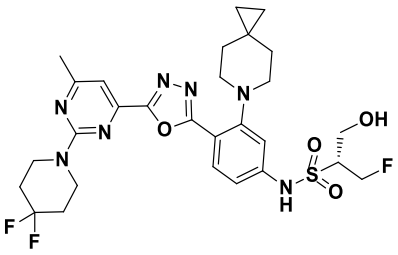
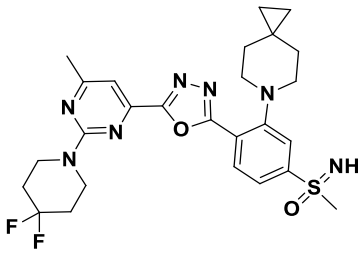
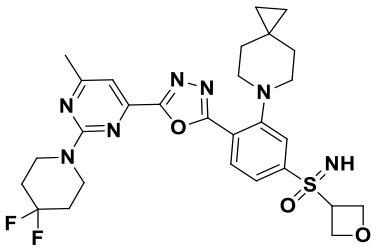
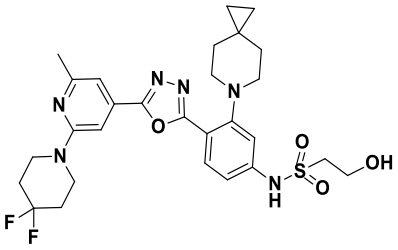
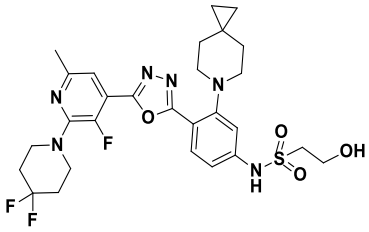
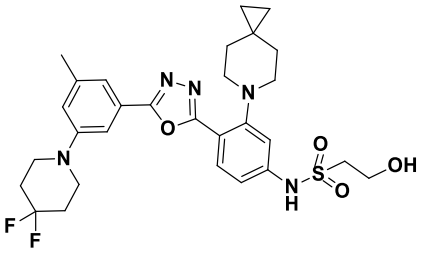
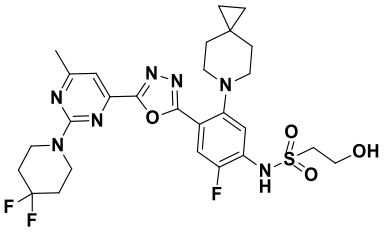
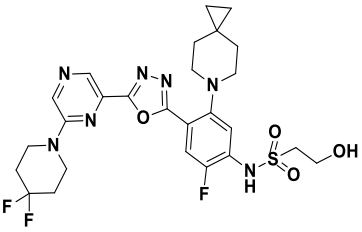
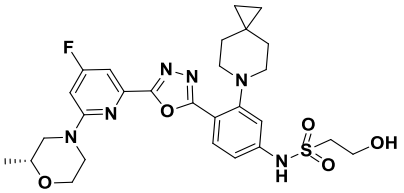
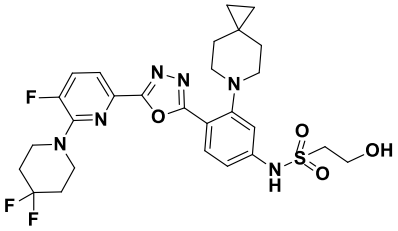
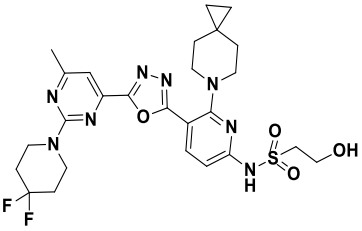
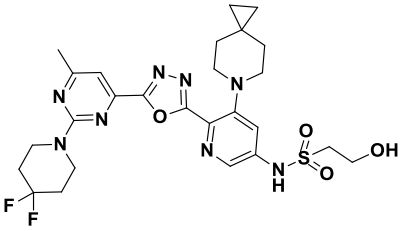
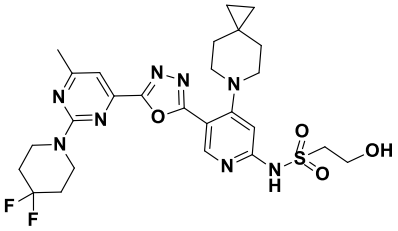
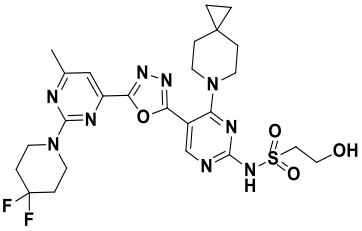
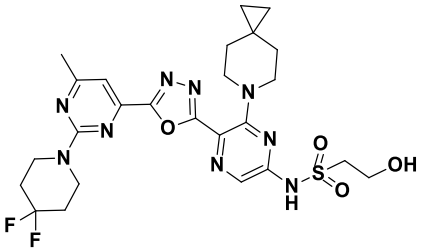
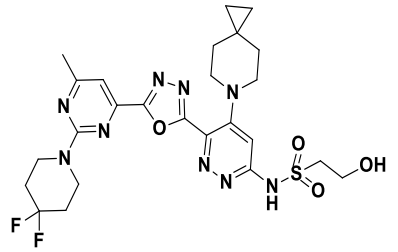
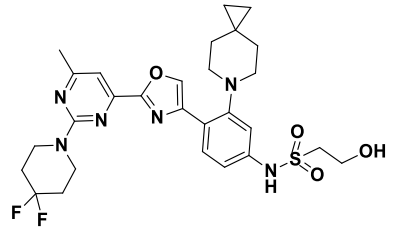
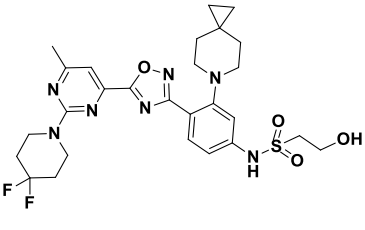
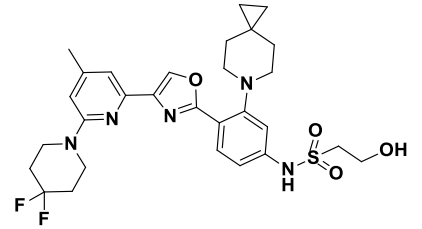
22. The compound represented by formula V, or the tautomer, the stereoisomer, the hydrate, the solvate, or the pharmaceutically acceptable salt thereof as claimed in claim 1, wherein the compound comprises:


I-1



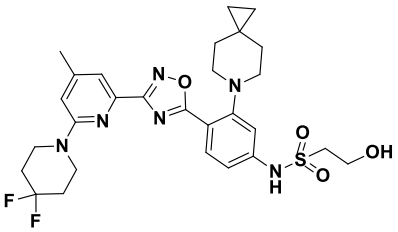
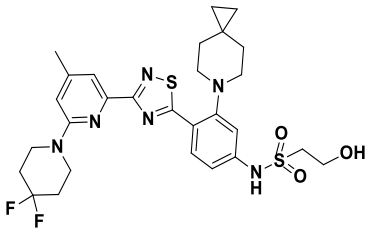
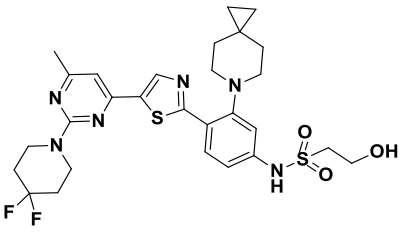
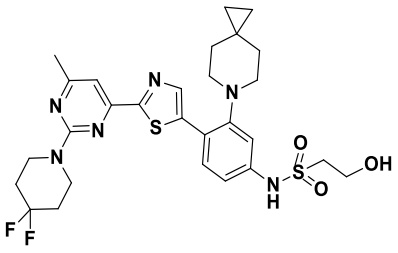
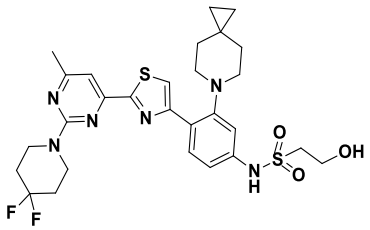
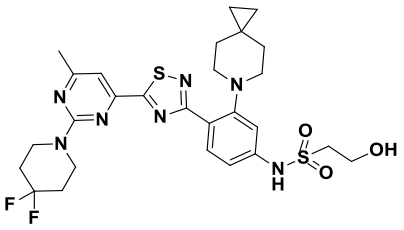
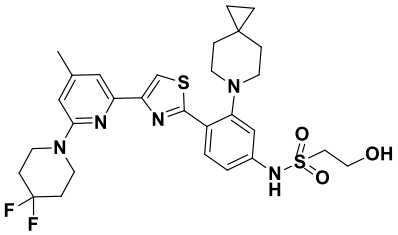
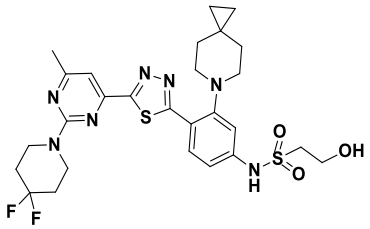
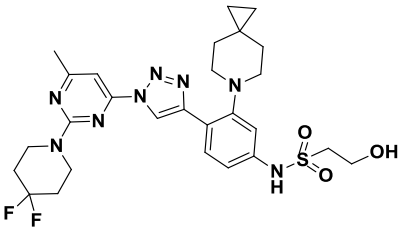
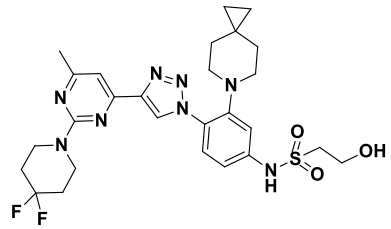
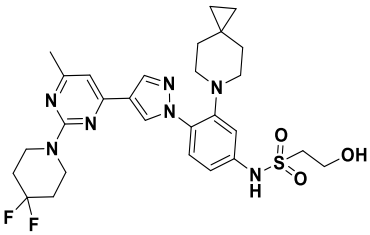
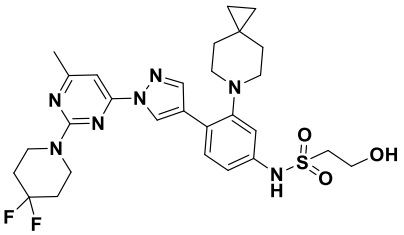
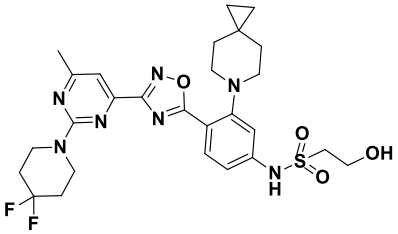
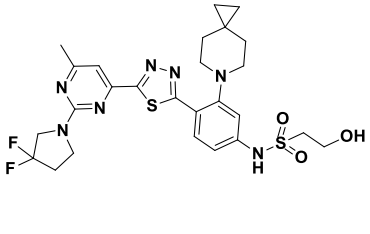
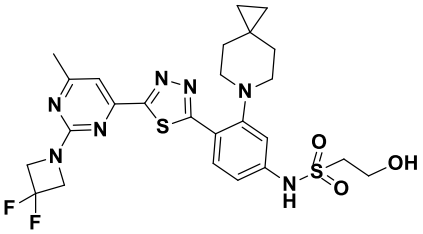
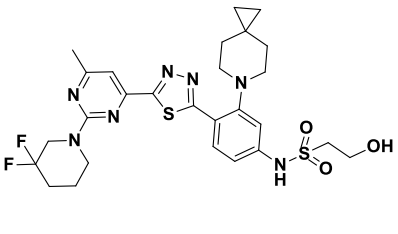
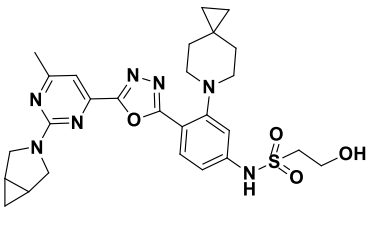
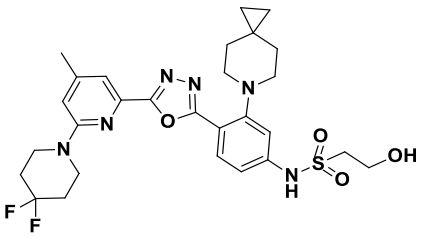
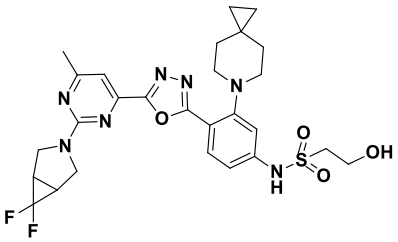
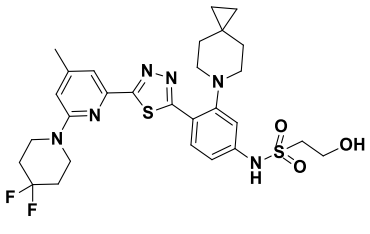
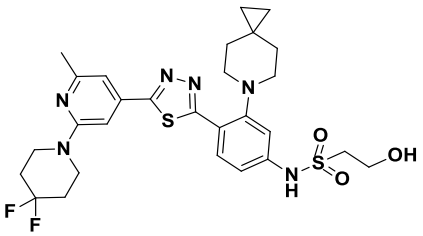



























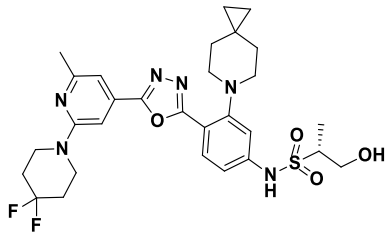
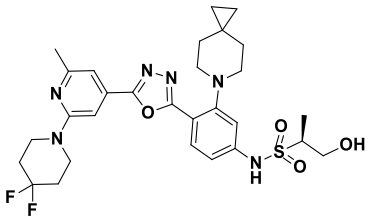
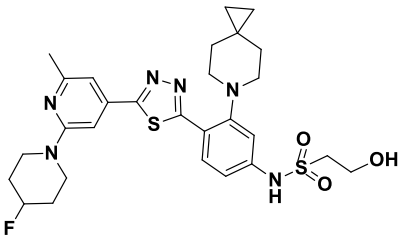
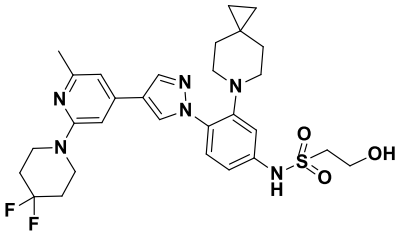
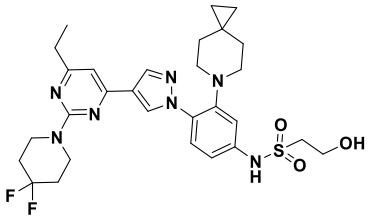
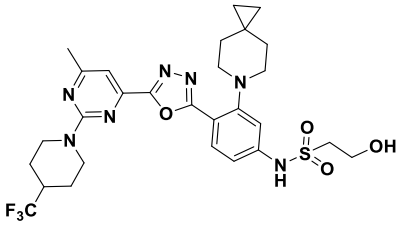
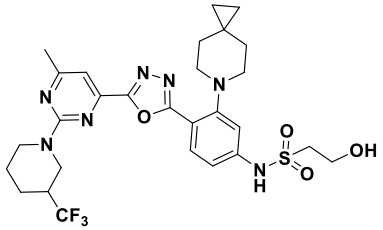
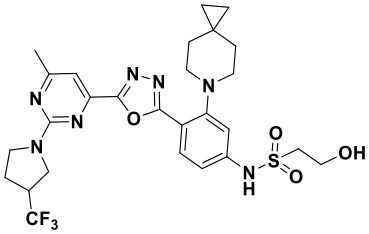
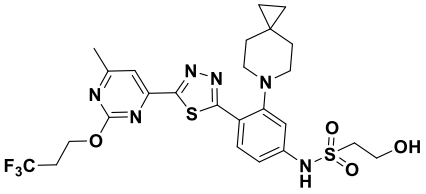
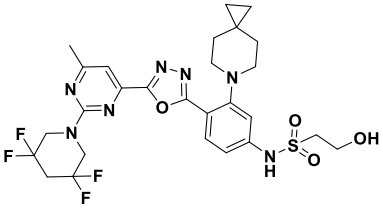
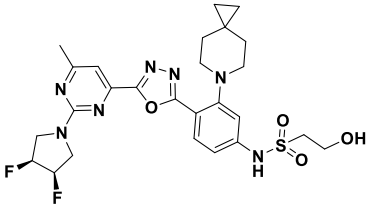
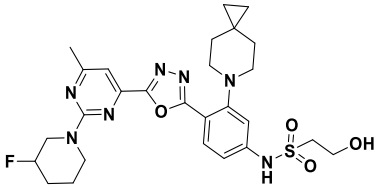
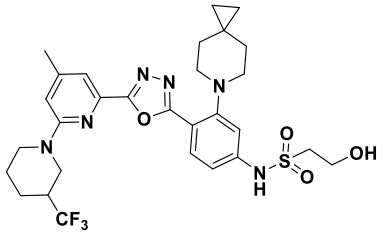
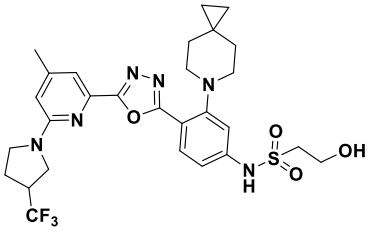
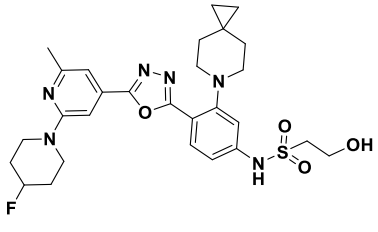
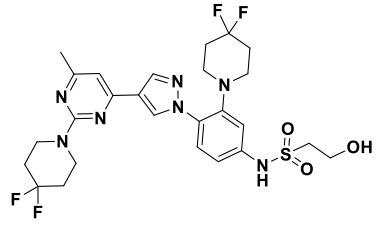
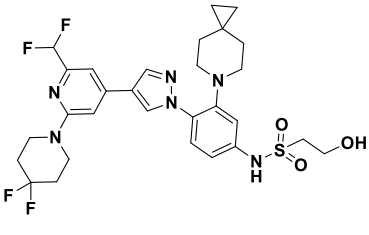
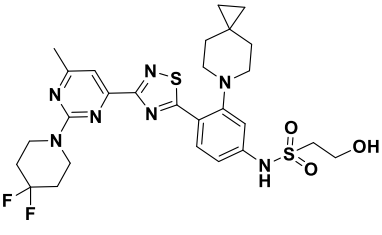
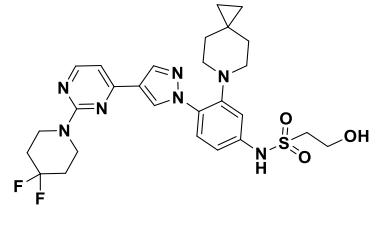
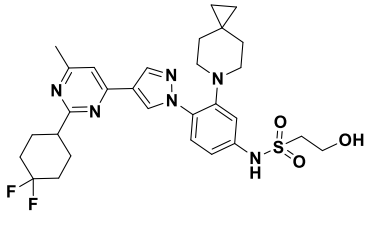
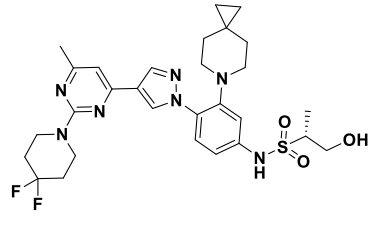






















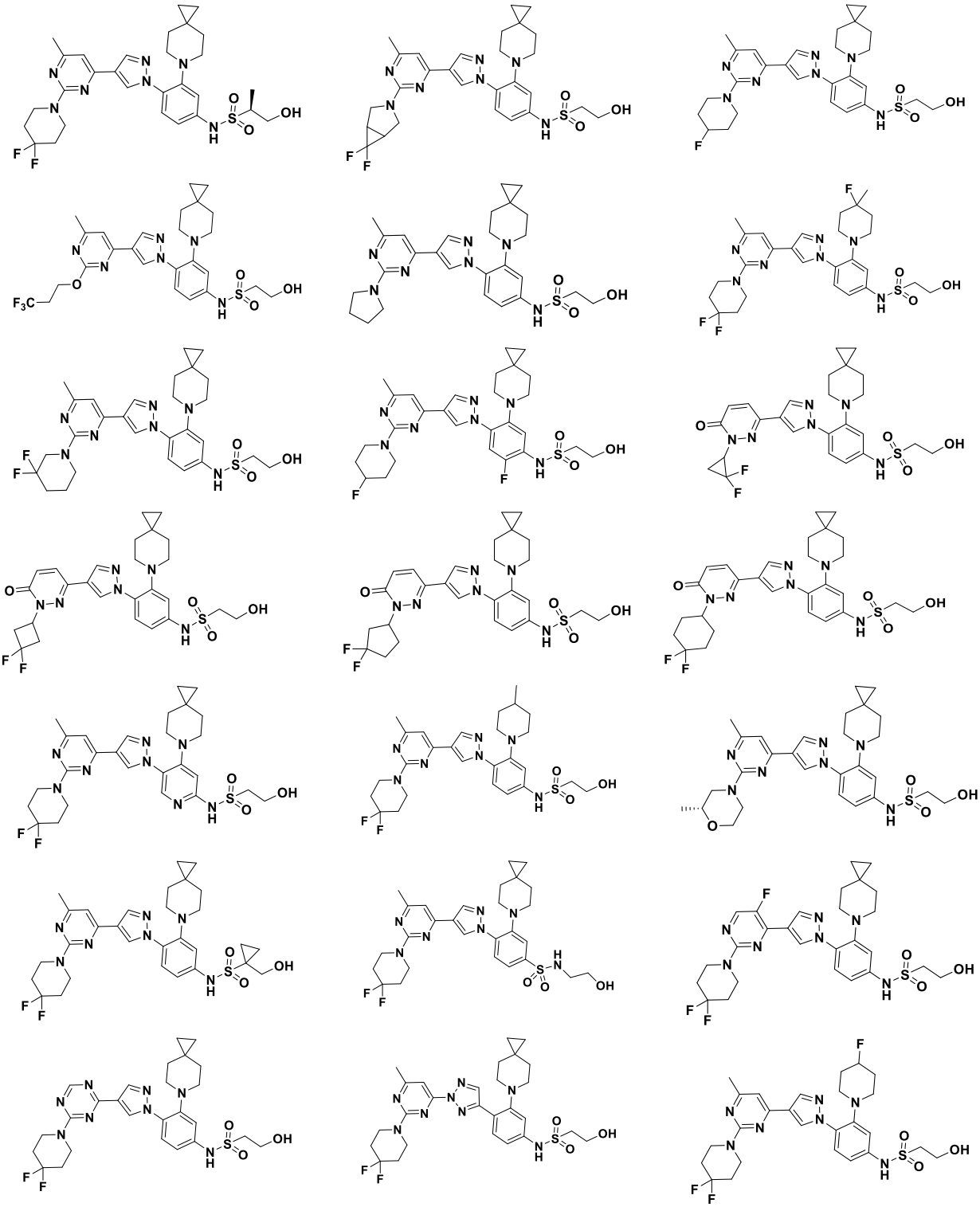








23. A pharmaceutical composition, comprising: the compound represented by formula V, or the tautomer, the stereoisomer, the hydrate, the solvate, or the pharmaceutically acceptable salt thereof as claimed in any one of claims 1-22, and a pharmaceutically acceptable carrier.

24. Use of the compound represented by formula V, or the tautomer, the stereoisomer, the hydrate, the solvate, the pharmaceutically acceptable salt, or the prodrug thereof as claimed in claims 1-22, or the pharmaceutical composition as claimed in claim 23

for manufacturing a medicament for preventing and/or treating a disease associated with KIF18A, wherein the disease associated with KIF18A is selected from a proliferative disorder of cancer, psoriasis, atopic dermatitis, an autoimmune disease, or an inflammatory bowel disease.

25. The use as claimed in claim 24, wherein the cancer is selected from mesothelioma, neuroblastoma, rectal cancer, colon cancer, familial adenomatous polyposis and hereditary non-polyposis colorectal cancer, esophageal cancer, lip cancer, laryngeal cancer, hypopharyngeal cancer, tongue cancer, salivary gland cancer, gastric cancer, adenocarcinoma, medullary thyroid cancer, papillary thyroid cancer, renal cancer, renal parenchymal carcinoma, ovarian cancer, cervical cancer, corpus uteri cancer, endometrial cancer, choriocarcinoma, pancreatic cancer, prostate cancer, bladder cancer, testicular cancer, breast cancer, urinary cancer, melanoma, brain tumor, lymphoma, head and neck cancer, acute lymphoblastic leukemia, chronic lymphoblastic leukemia, acute myeloid leukemia, chronic myeloid leukemia, hepatocellular carcinoma, gallbladder cancer, bronchial cancer, small cell lung cancer, non-small cell lung cancer, multiple myeloma, basal sarcoma, teratoma, retinoblastoma, choroidal melanoma, seminoma, rhabdomyosarcoma, osteosarcoma, chondrosarcoma, myoma, liposarcoma, fibrosarcoma, Ewing's sarcoma, and plasmacytoma.

26. The use as claimed in claim 24, wherein the autoimmune disease is selected from rheumatoid arthritis, systemic lupus erythematosus, Sjogren's syndrome, scleroderma, mixed connective tissue disease, dermatomyositis, polymyositis, Reiter's syndrome, autoimmune lymphoproliferative syndrome, multiple sclerosis, myasthenia gravis, and encephalomyelitis.

27. The use as claimed in claim 24, wherein the inflammatory bowel disease is selected from ulcerative colitis and Crohn's disease.