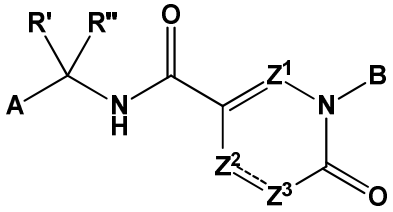
Claims

[Claim 1]

A compound of Formula I below, or a solvate, stereoisomer or pharmaceutically acceptable salt thereof:

[Formula I]



wherein

$\overline{\text{------}}$ is a single bond or a double bond;

Z^1 is N or CH;

when Z^1 is N, then Z^2 and Z^3 are both CHR^1 and $\overline{\text{------}}$ is a single bond, or Z^2 and Z^3 are both CR^1 and $\overline{\text{------}}$ is a double bond;

when Z^1 is CH, then Z^2 is N or CR^1, Z^3 is CR^1, and $\overline{\text{------}}$ is a double bond; or

when Z^1 is N, Z^2 and Z^3 are both CR^1, and $\overline{\text{------}}$ is a double bond, then two R^1 may be optionally linked to each other together with the carbon atom to which they are attached to form a thiophene or pyrrole ring;

each R^1 is independently selected from the group consisting of H, halogen, CN, OH, NR^bR^c, C_1-C_6 alkoxy, C_1-C_6 acylamino, C_1-C_6 alkylsulfonylamino, C_1-C_6 alkyl, C_2-C_6 alkenyl, C_2-C_6 alkynyl, C_3-C_6 cycloalkyl, C_6-C_{10} aryl, C_6-C_{10} aryloxy, (C_6-C_{10} aryl)-(C_1-C_6 alkyl)oxy and C_6-C_{10} arylamino;

R' and R" are each independently H or C_1-C_3 alkyl, or R' and R" may be taken together with the carbon atom to which they are attached to form C_3-C_4 cycloalkyl, and said C_1-C_3 alkyl and C_3-C_4 cycloalkyl may be optionally substituted with at least one halogen, OH, CN, C_1-C_3 alkoxy or NR^bR^c;

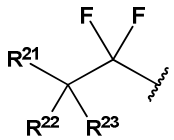
A is Cy_1 or Cy_1-Y-Cy_2;

Y is O, S, or a direct bond;

Cy_1 is C_6-C_{10} aryl or 5- or 6-membered heteroaryl containing 1 or 2 heteroatoms selected from N, O and S;

Cy_1 may be optionally substituted with 1 to 3 R^{2a};

R^{2a} is selected from the group consisting of H, halogen, OH, CN, oxo, SF_5, NR^bR^c, -Si(C_{1-3} alkyl)$_3$, -SO_2R^b, -C(O)R^b, C_1-C_6 alkyl, C_1-C_6 haloalkyl, C_1-C_6 alkoxy, C_1-C_6 haloalkoxy, C_3-C_6

cycloalkyl and 

,

R^{21} is H, halogen, OH, NR^bR^c, C_1-C_6 alkoxy or C_1-C_6 acyloxy, and R^{22} and R^{23} are each independently H, halogen or C_1-C_2 alkyl;

Cy_2 is C_6-C_{10} aryl, phenyl fused with C_3-C_6 cycloalkyl, or 5- or 6-membered heteroaryl containing 1 or 2 heteroatoms selected from N, O and S;

Cy_2 may be optionally substituted with 1 to 3 R^{2b};

R^{2b} is selected from the group consisting of H, halogen, OH, CN, oxo, NR^bR^c; C_1-C_6 alkyl; C_1-C_6 alkyl substituted with halogen, CN, OH, NR^bR^c or C_1-C_6 alkoxy; C_1-C_6 alkyl optionally interrupted by 1 to 3 oxygen atoms and/or nitrogen atoms; and C_1-C_6 alkyl substituted with hydroxy-(C_1-C_6 alkyl)amino-;

B is H, C_1-C_6 alkyl, C_1-C_6 haloalkyl, C_1-C_6 hydroxyalkyl, C_1-C_6 alkoxy-C_1-C_6 alkyl, C_1-C_6 alkyl substituted with NR^bR^c, -$(CH_2)_o$-Cy_3 or -$(CH_2)_o$-Cy_3-W-Cy_4;

W is NH, C(O) or a direct bond;

o is an integer of 0 or 1;

Cy_3 is selected from the group consisting of C_3-C_8 cycloalkyl, C_3-C_8 cycloalkenyl, 5- or 6-membered saturated or partially unsaturated heterocycloalkyl containing 1 or 2 heteroatoms selected from N, O and S, bridged bicyclic C_{5-10} cycloalkyl, C_6-C_{10} aryl, phenyl fused with a 5- or 6-membered cyclic group containing 1 heteroatom selected from N, O and S, and 5- to 10-membered heteroaryl containing 1 to 3 heteroatoms selected from N, O and S;

Cy_3 may be optionally substituted with 1 to 3 R^{3a},

R^{3a} is selected from the group consisting of H, halogen, OH, CN, oxo, C_1-C_6 alkyl; C_1-C_6 alkyl substituted with halogen, OH, CN or C_1-C_6 alkoxy; C_3-C_6 cycloalkyl, C_1-C_6 alkoxy, C_1-C_6 haloalkoxy, C_1-C_6 haloalkylamino, C_1-C_6 hydroxyalkylamino, (C_3-C_6 cycloalkyl)carbonylamino, -NR^bR^c, -NR^bCOR^c, -$NR^bC(O)OR^c$, -SO_2R^b, -$C(O)R^b$, -$C(O)OR^b$, -$NR^bSO_2R^c$ and -$CONR^{b1}R^{c1}$;

Cy_4 is selected from the group consisting of saturated or partially unsaturated 4- to 10-membered heterocycloalkyl containing 1 or 2 heteroatoms selected from N, O or S, C_6-C_{10} aryl, and 5- or 6-membered heteroaryl containing 1 to 4 heteroatoms selected from N, O and S;

Cy_4 may be optionally substituted with 1 to 3 R^{3b},

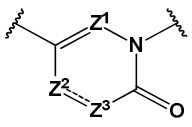
R^{3b} is H, deuterium, halogen, OH, CN, oxo, NR^bR^c, C_1-C_6 alkyl, C_1-C_6 alkyl substituted with deuterium, C_1-C_6 haloalkyl, C_1-C_6 hydroxyalkyl, C_1-C_6 alkoxy-C_1-C_6 alkyl, C_1-C_6 alkoxy or C_1-C_6 haloalkoxy;

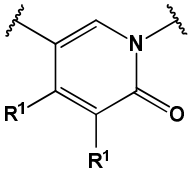
R^b and R^c are each independently H or C_1-C_6 alkyl; and

one of R^{b1} and R^{c1} is H or C_1-C_6 alkyl, and the other of R^{b1} and R^{c1} is H, C_1-C_6 alkyl, C_1-C_6 alkyl substituted with NR^bR^c, or C_1-C_6 alkyl substituted with C_1-C_6 alkoxy.

[Claim 2]

The compound, or solvate, stereoisomer or pharmaceutically acceptable salt thereof according to claim 1, characterized in that in Formula I above,



is selected from the group consisting of


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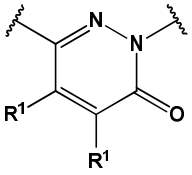

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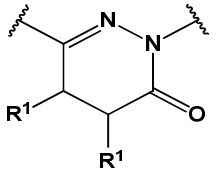

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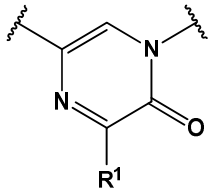

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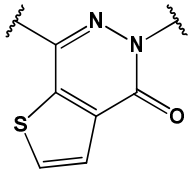

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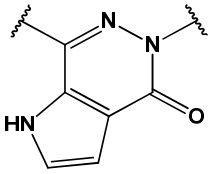
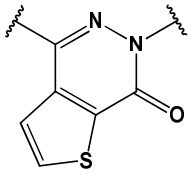


, and


,
wherein said R^1 is the same or different from each other.

[Claim 3]

The compound, or solvate, stereoisomer or pharmaceutically acceptable salt thereof according to claim 1, characterized in that each R^1 is independently selected from the group consisting of H, F, Br, Cl, I, CN, OH, OCH_3, amino, methylamino, dimethylamino, ethylamino, acetylamino, methylsulfonylamino, ethylsulfonylamino, methyl, ethyl, ethenyl, ethynyl, cyclopropyl, cyclobutyl, cyclopentyl, phenyl, phenoxy, benzyloxy and phenylamino.

[Claim 4]

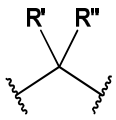
The compound, or solvate, stereoisomer or pharmaceutically acceptable salt thereof according to claim 1, characterized in that one of two R^1 substituted on the same ring is H and the other is not H.

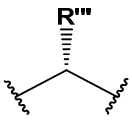
[Claim 5]

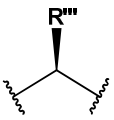
The compound, or solvate, stereoisomer or pharmaceutically acceptable salt thereof according to claim 1, characterized in that two R^1 substituted on the same ring are both H.

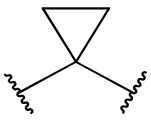
[Claim 6]

The compound, or solvate, stereoisomer or pharmaceutically acceptable salt thereof according to claim 1, characterized in that in Formula I,



is 

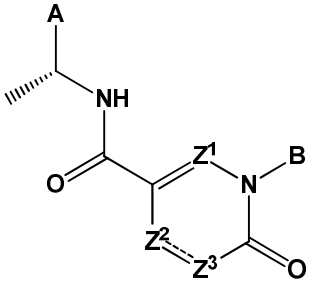
, 

, or 
, and R''' is methyl or ethyl.

[Claim 7]

The compound, or solvate, stereoisomer or pharmaceutically acceptable salt thereof according to claim 6, characterized in that the compound is a compound represented by Formula IA below:

[Formula IA]



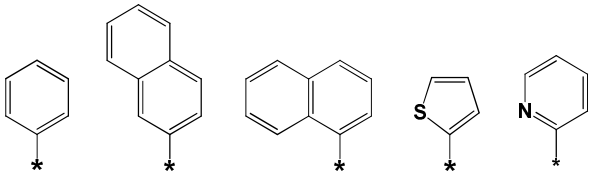
wherein A, Z^1, Z^2, Z^3 and B are as defined in claim 1.

[Claim 8]

The compound, or solvate, stereoisomer or pharmaceutically acceptable salt thereof according to claim 1, characterized in that A is Cy_1, and Cy_1 is phenyl, naphthalenyl, thiophenyl or pyridinyl.

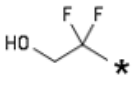
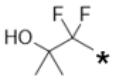
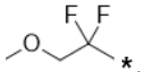
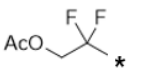
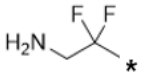
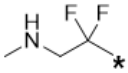
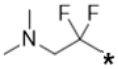
[Claim 9]

The compound, or solvate, stereoisomer or pharmaceutically acceptable salt thereof according to claim 1, characterized in that Cy_1 has any one of the following ring structures optionally substituted with 1 to 3 R^{2a}:



[Claim 10]

The compound, or solvate, stereoisomer or pharmaceutically acceptable salt thereof according to claim 1, characterized in that Cy_1 may be optionally substituted with 1 to 3 R^{2a}, and each R^{2a} is independently selected from the group consisting of F, Cl, Br, I, OH, CN, SF_5, -

$Si(CH_3)_3$, CH_3SO_2-, methyl, ethyl, propyl, isopropyl, CF_3, CHF_2, CH_2F, NH_2, CH_3NH_2-, $(CH_3)_2N$-, methoxy, ethoxy, OCF_3, $OCHF_2$, OCH_2F, cyclopropyl, cyclobutyl, cyclopentyl,  ,  ,  ,  ,  ,  and  .

[Claim 11]

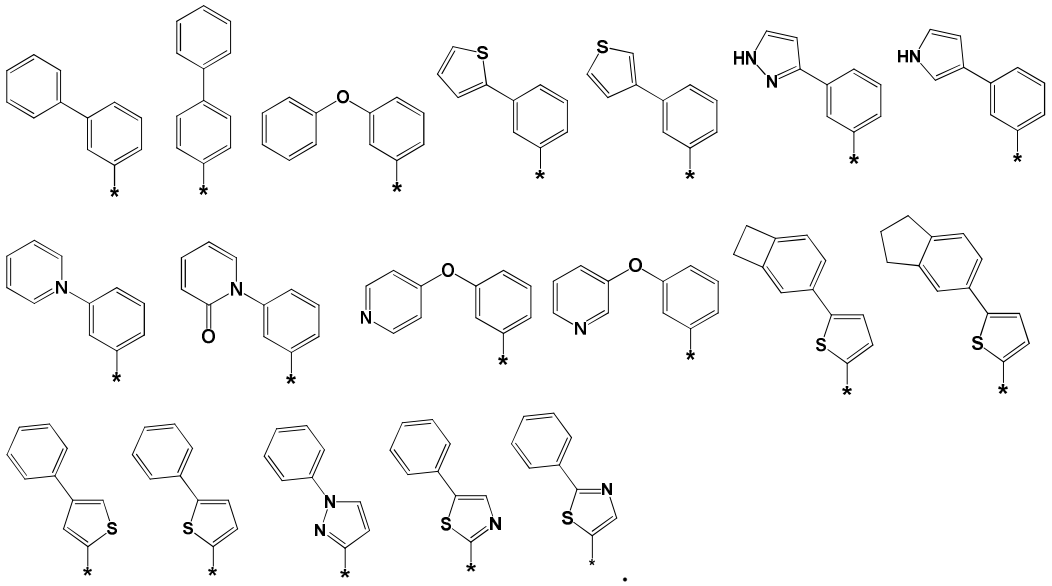
The compound, or solvate, stereoisomer or pharmaceutically acceptable salt thereof according to claim 1, characterized in that

Cy_1 is phenyl, and Cy_2 is phenyl, pyrrolyl, pyrazolyl, thiophenyl, pyridinyl, or 2-oxo-1,2-dihydropyridinyl, or

Cy_1 is thiazolyl, thiophenyl or pyrazolyl, and Cy_2 is phenyl, 2,3-dihydroindenyl or bicyclo[4.2.0]octa-1,3,5-trienyl.

[Claim 12]

The compound, or solvate, stereoisomer or pharmaceutically acceptable salt thereof according to claim 1, characterized in that Cy_1-Y-Cy_2 has any one of the following ring structures optionally substituted with R^{2a} and R^{2b}:

 .

[Claim 13]

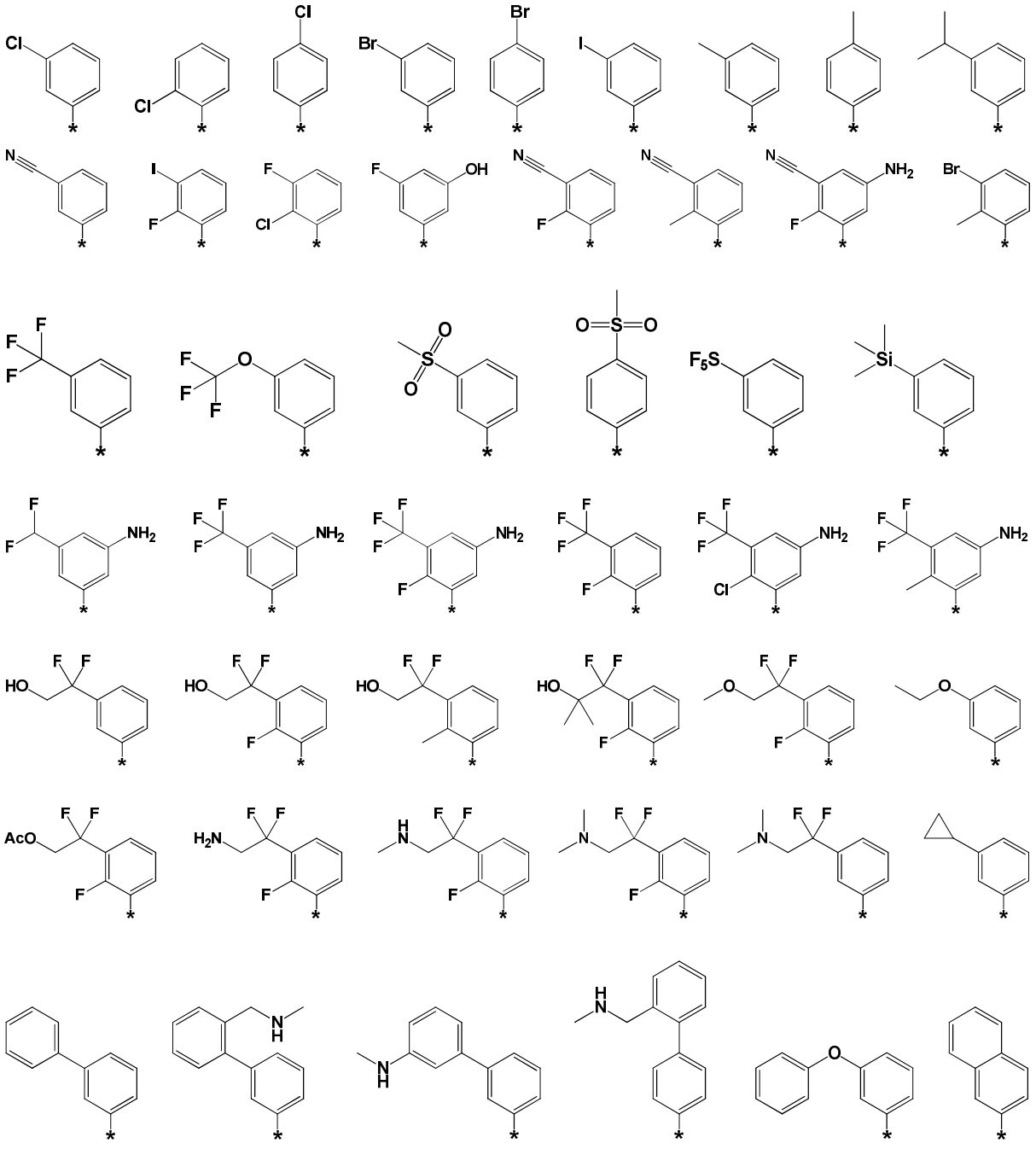
The compound, or solvate, stereoisomer or pharmaceutically acceptable salt thereof according to claim 1, characterized in that

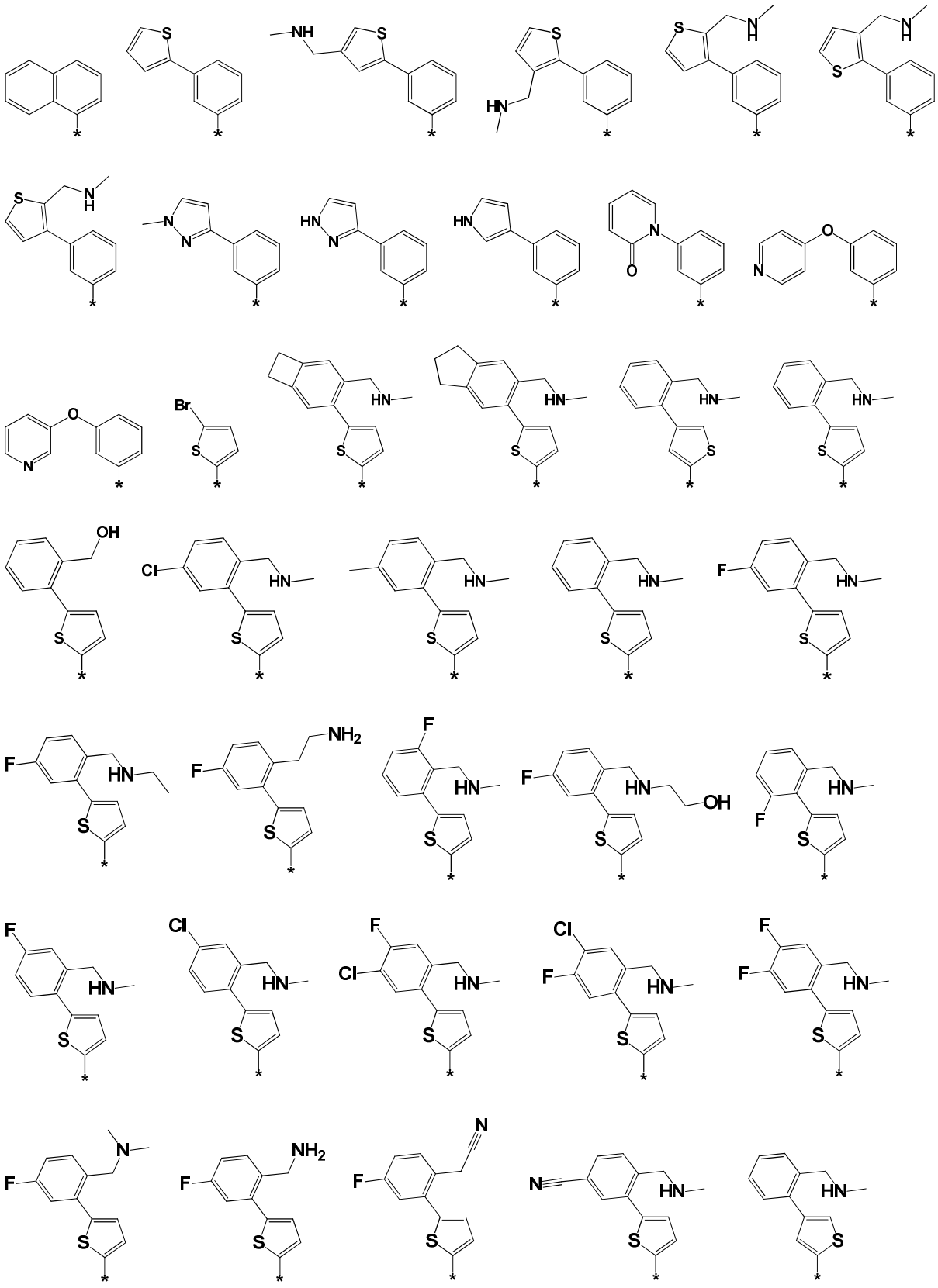
R^{2a} is H; and

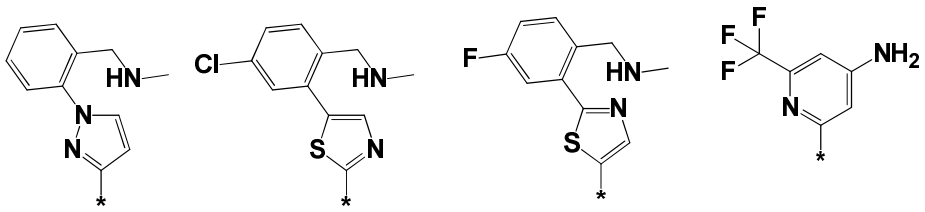
each R^{2b} is independently selected from the group consisting of H, F, Cl, Br, I, OH, CN, oxo, amino, CH_3NH-, $(CH_3)_2N$-, $(CH_3)_2NCH_2$- methyl, ethyl, cyanomethyl, hydroxymethyl, aminomethyl, CH_3NHCH_2-, $C_2H_5NHCH_2$- and $HOC_2H_4NHCH_2$-.

[Claim 14]

The compound, or solvate, stereoisomer or pharmaceutically acceptable salt thereof according to claim 1, characterized in that A in Formula I is selected from the following structures:





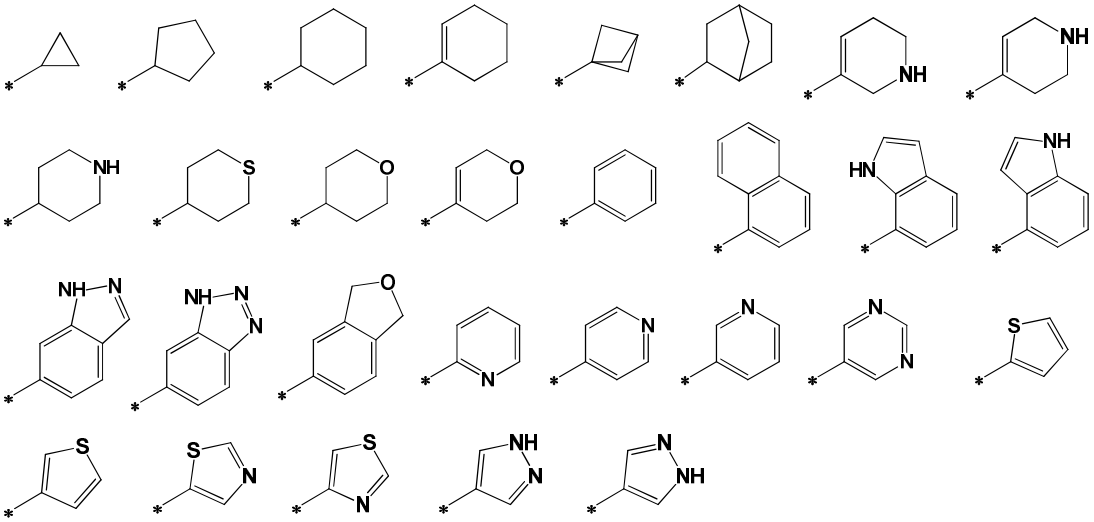


[Claim 15]

The compound, or solvate, stereoisomer or pharmaceutically acceptable salt thereof according to claim 1, characterized in that Cy_3 is C_3-C_6 cycloalkyl, C_3-C_6 cycloalkenyl, tetrahydropyranyl, dihydropyranyl, thianyl, 1,1-dioxothianyl, piperidinyl, dihydropyridinyl, tetrahydropyridinyl, bicyclo[1.1.1]pentanyl, bicyclo[2.2.1]heptanyl, C_{6-10} aryl, thiophenyl, thiazolyl, pyrazolyl, pyridinyl, pyrimidinyl, dihydroisobenzofuranyl, indolyl, indazolyl or benzotriazolyl.

[Claim 16]

The compound, or solvate, stereoisomer or pharmaceutically acceptable salt thereof according to claim 1, characterized in that Cy_3 has any one of the following ring structures optionally substituted with 1 to 3 R^{3a}:



[Claim 17]

The compound, or solvate, stereoisomer or pharmaceutically acceptable salt thereof according to claim 1, characterized in that R^{3a} is selected from the group consisting of H, F, Cl, Br, I, OH, CN, oxo, methyl, ethyl, amino, CH_3NH-, $(CH_3)_2NH$-, 1,1,1-trifluoropropan-2-ylamino, CH_3CONH-, $(CH_3CO)(CH_3)N$-, CH_3OCONH-, cyclopropylcarbonylamino, hydroxymethyl, 1-hydroxyethyl, 2-hydroxypropan-2-yl, methoxy, ethoxy, isopropoxy, methoxymethyl, 2-methoxyethyl, $OCHF_2$, OCF_3, CH_3SO_2-, CH_3CO-, CH_3SO_2NH-, -COOH, -$COOC(CH_3)_3$, -

$CONH_2$, -$CONHCH_3$, -$CONHC_2H_5$, -$CON(CH_3)_2$, -$CONHC_2H_4OCH_3$ and -$CONHC_2H_4N(CH_3)_2$.

[Claim 18]

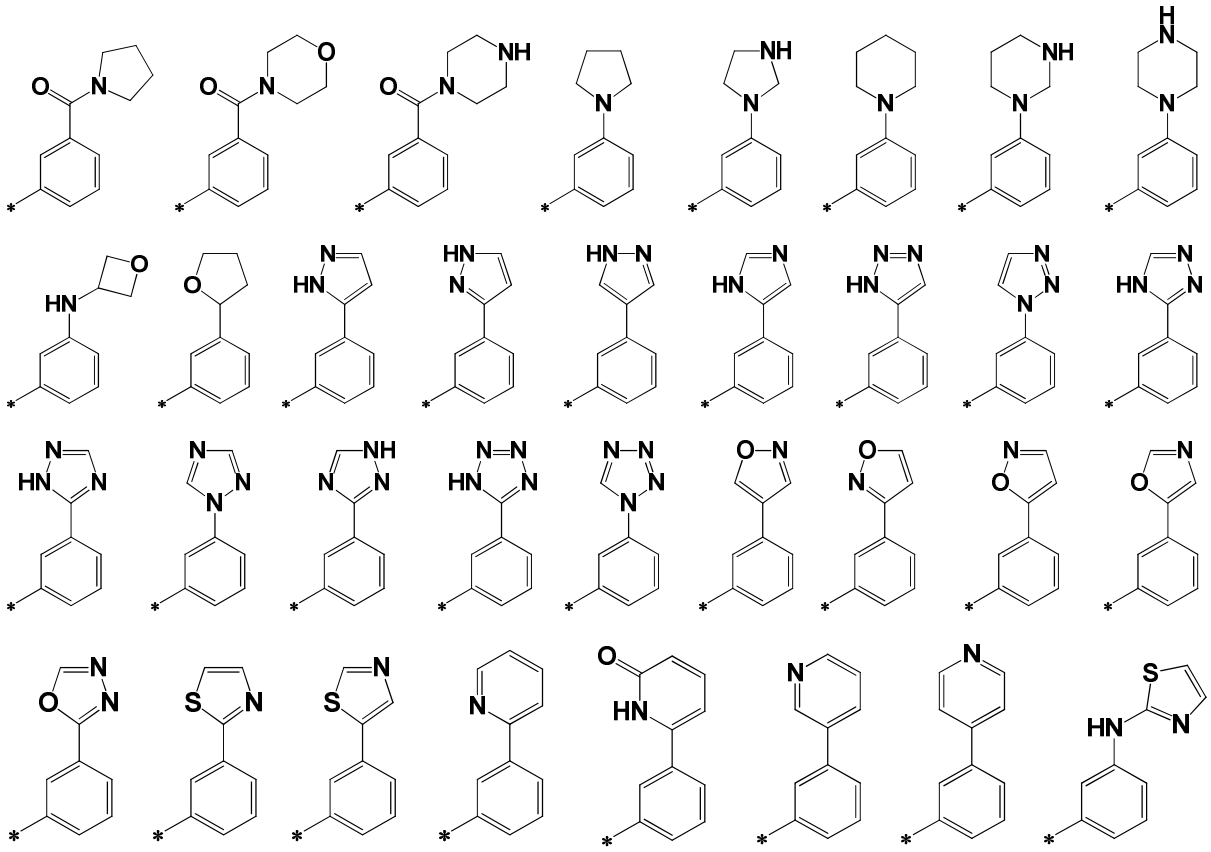
The compound, or solvate, stereoisomer or pharmaceutically acceptable salt thereof according to claim 1, characterized in that

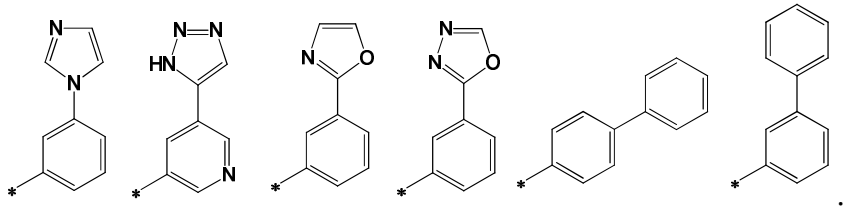
Cy_3 is phenyl or pyridinyl; and

Cy_4 is oxetanyl, tetrahydrofuranyl, pyrrolidinyl, 2-oxo-pyrrolidinyl, piperidinyl, morpholinyl, imidazolidinyl, 2-oxo-imidazolidinyl, piperazinyl, 2-oxo-piperazinyl, hexahydropyrimidinyl, 2-oxo-hexahydropyrimidinyl, phenyl, oxazolyl, isoxazolyl, thiazolyl, pyrazolyl, imidazolyl, oxadiazolyl, triazolyl, tetrazolyl, pyridinyl or 2-oxo-pyridinyl.

[Claim 19]

The compound, or solvate, stereoisomer or pharmaceutically acceptable salt thereof according to claim 1, characterized in that Cy_3-W-Cy_4 has any one of the following ring structures optionally substituted with R^{3a} and R^{3b}:





[Claim 20]

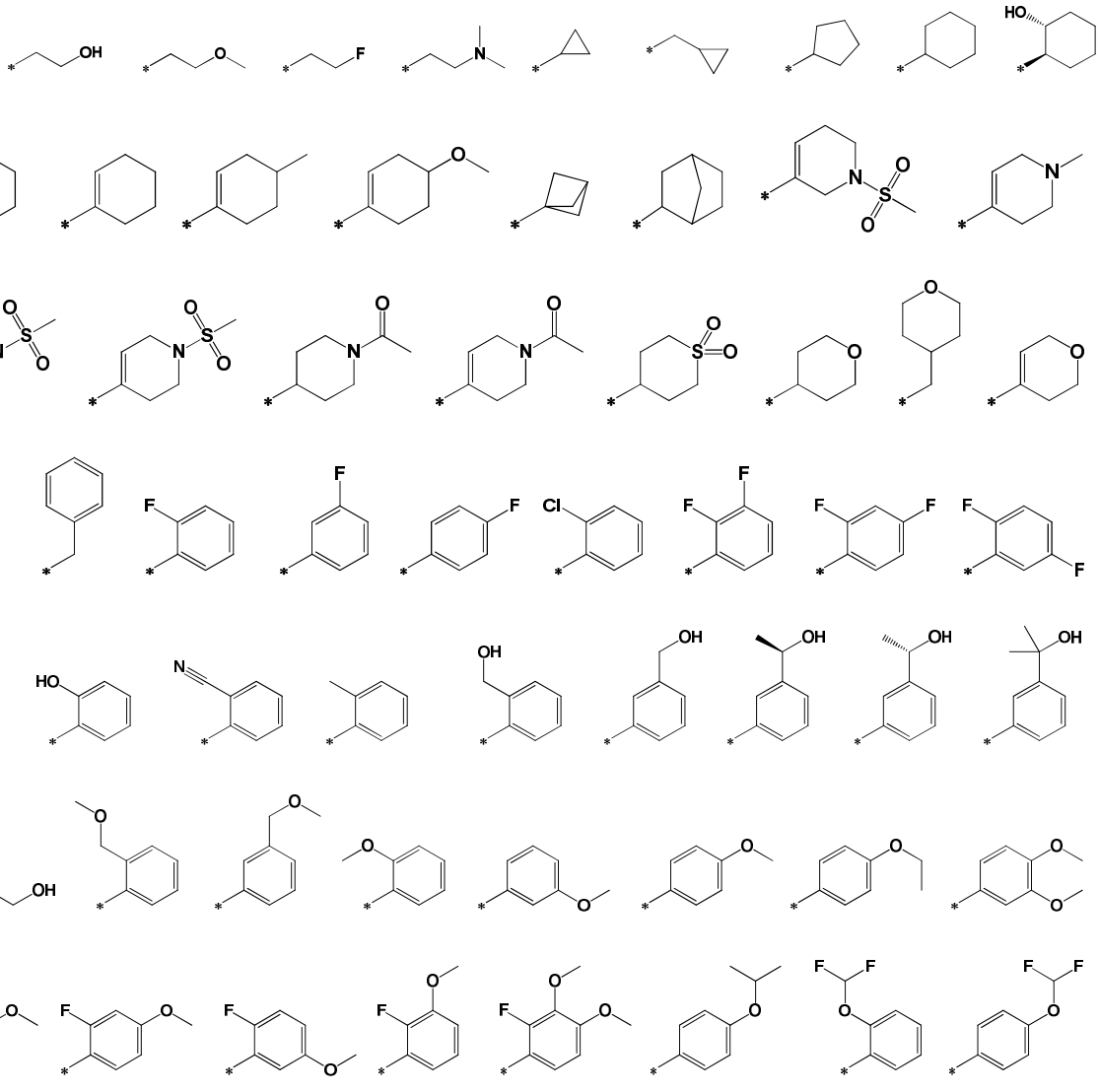
The compound, or solvate, stereoisomer or pharmaceutically acceptable salt thereof according to claim 1, characterized in that

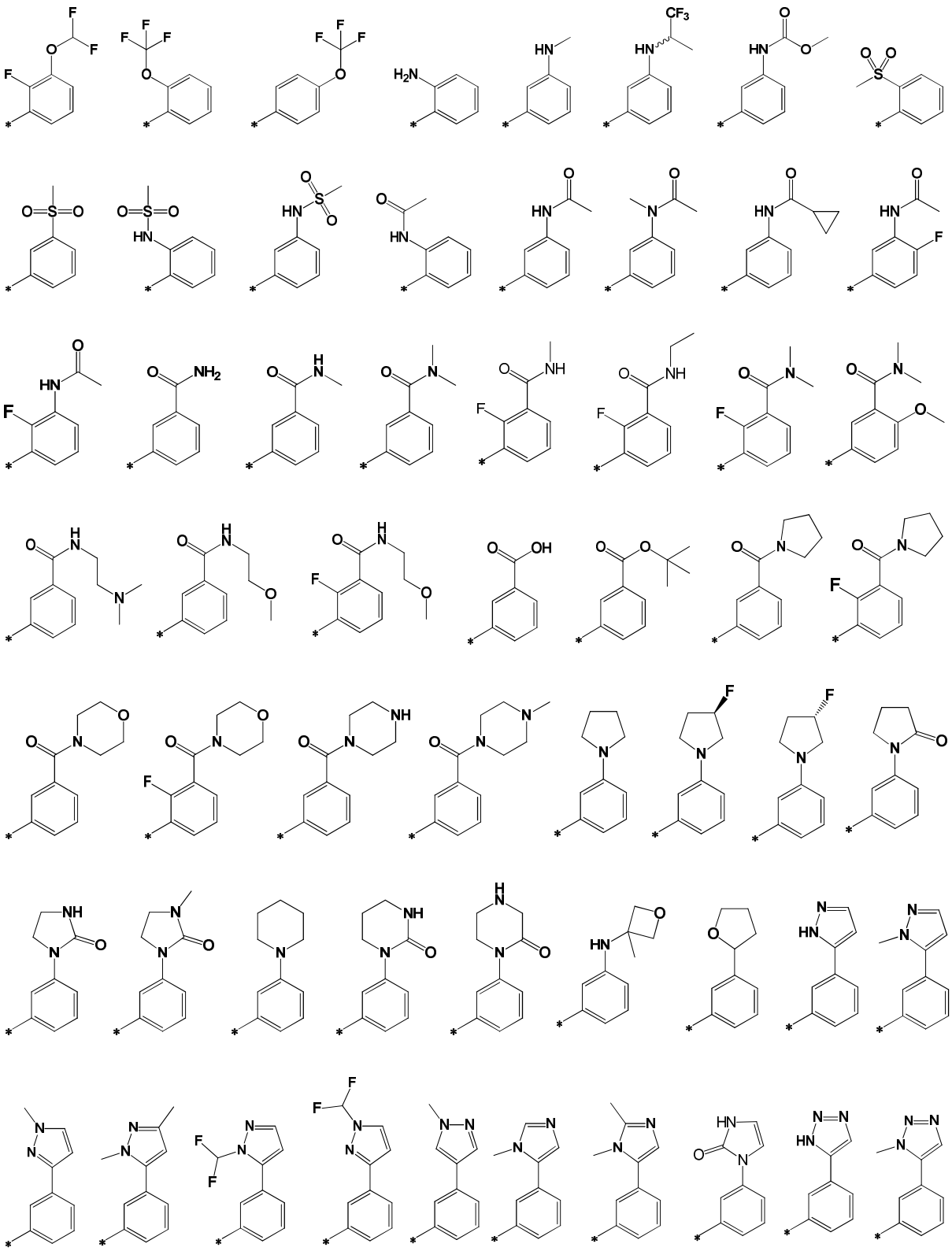
R^{3a} is H or F; and

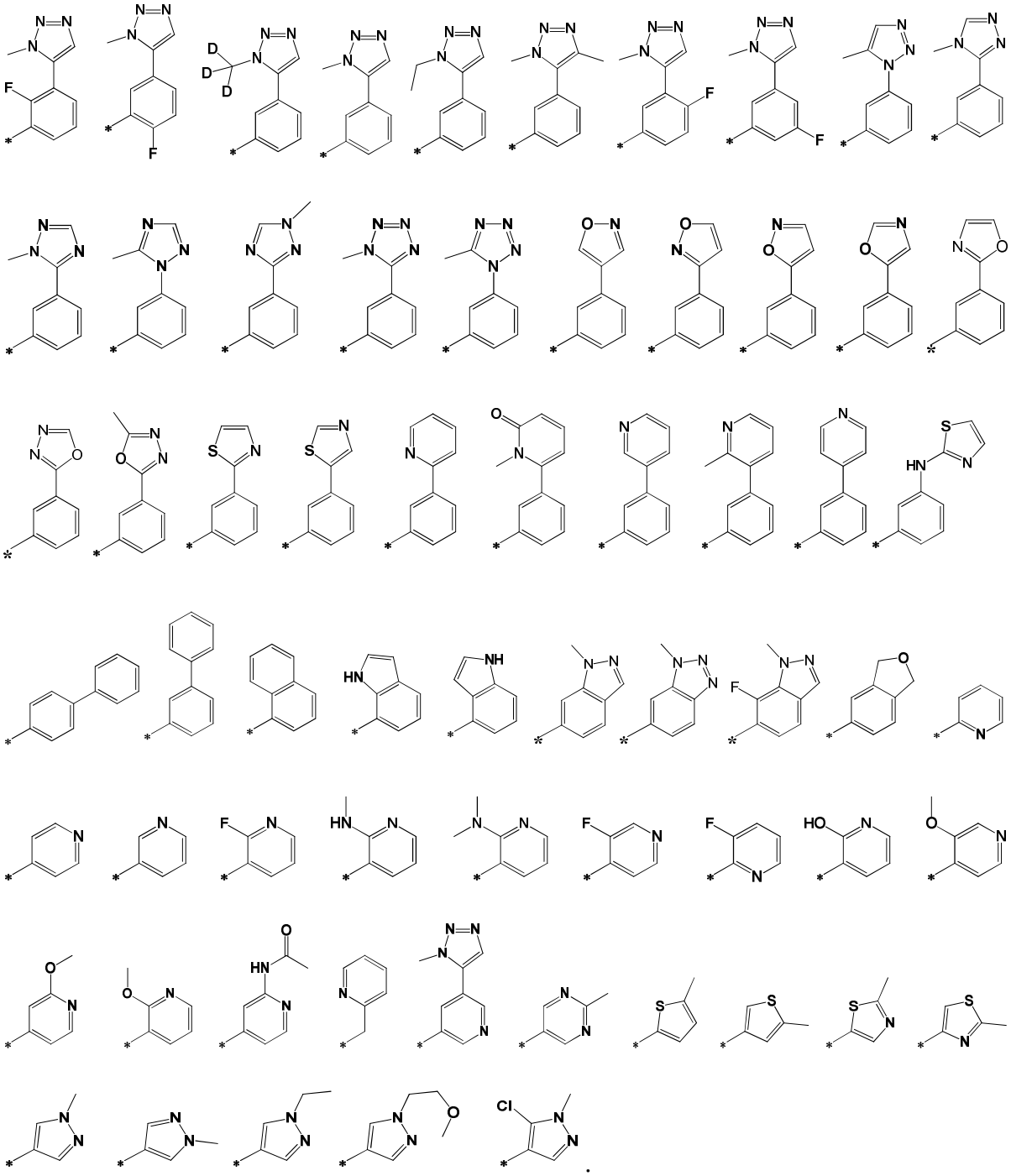
R^{3b} is selected from the group consisting of H, F, oxo, methyl, ethyl, CHF_2 and CD_3.

[Claim 21]

The compound, or solvate, stereoisomer or pharmaceutically acceptable salt thereof according to claim 1, characterized in that B is any one of the following structures:

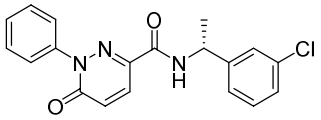
H, CH_3, 





[Claim 22]

The compound, or solvate, stereoisomer or pharmaceutically acceptable salt thereof according to claim 1, characterized in that the compound is selected from: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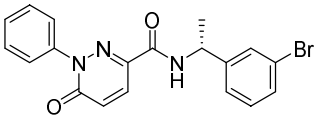
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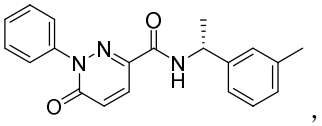
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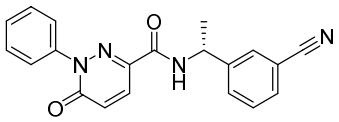
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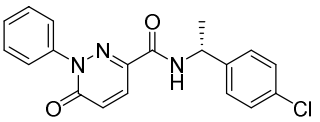
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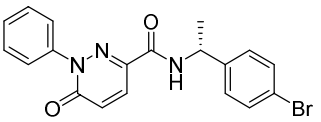
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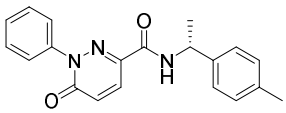
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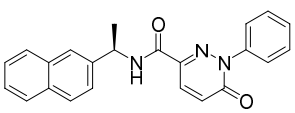
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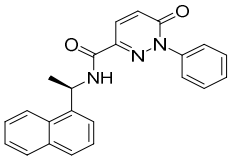
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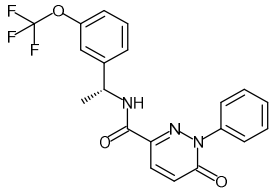
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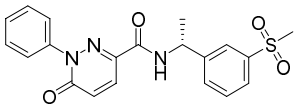
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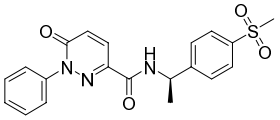
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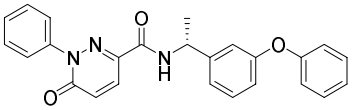
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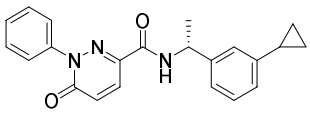
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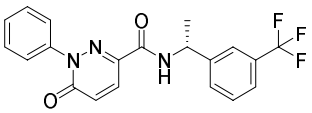
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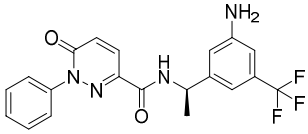
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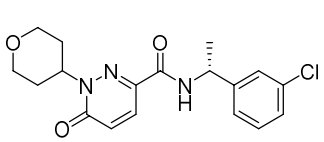
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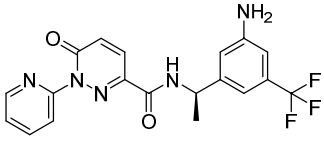
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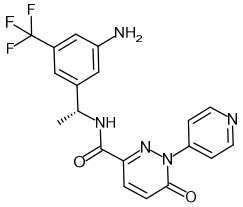
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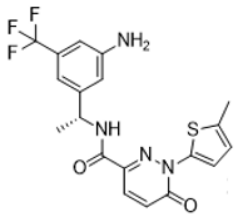
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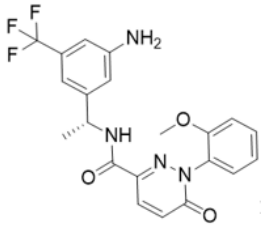
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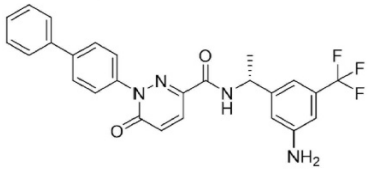
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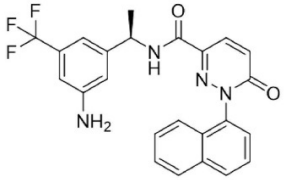
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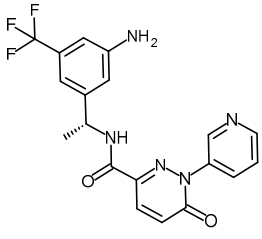
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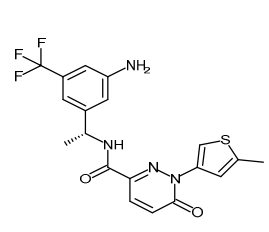
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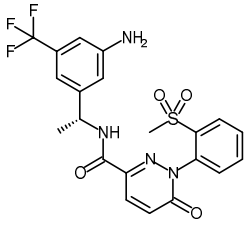
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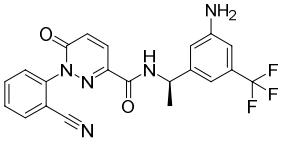
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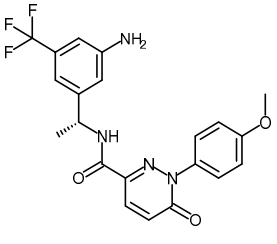
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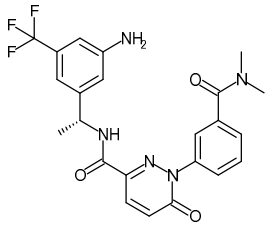
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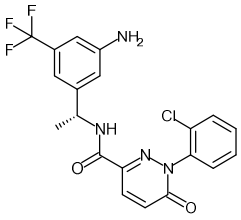
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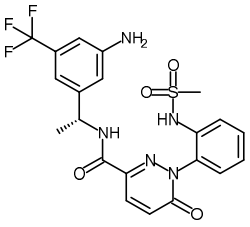
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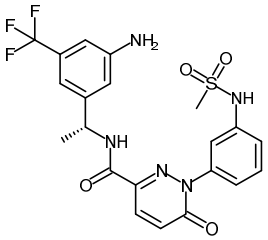
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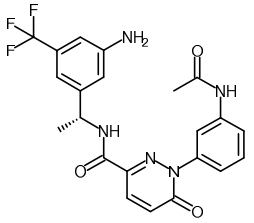
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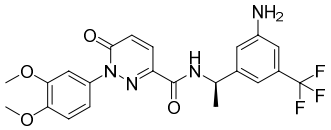
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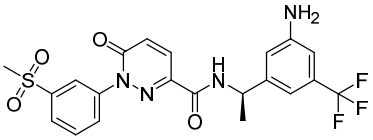
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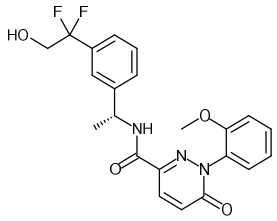
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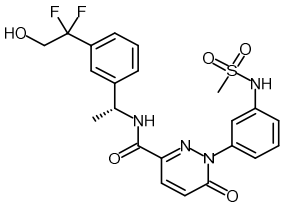
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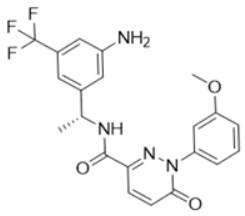
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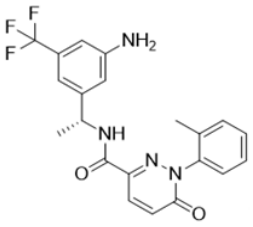
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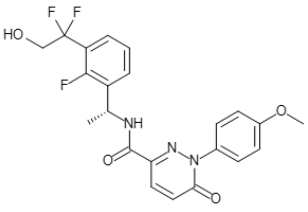
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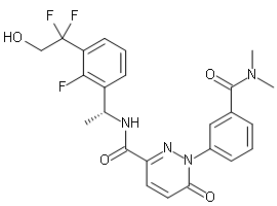
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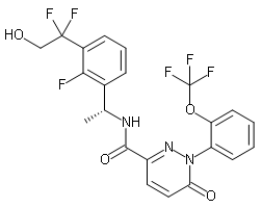
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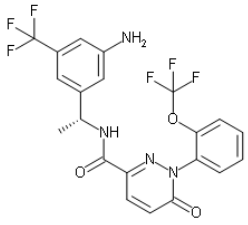
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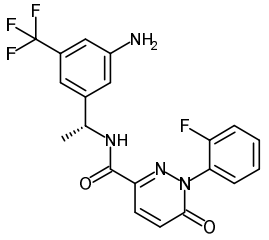
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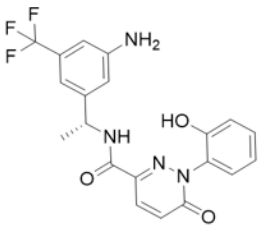
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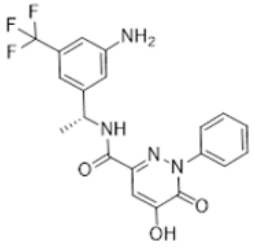
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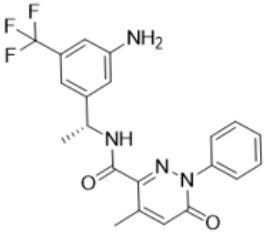
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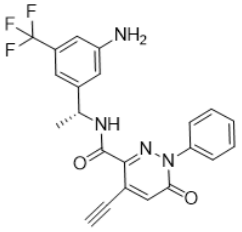
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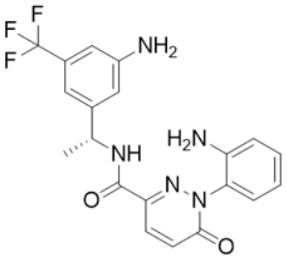
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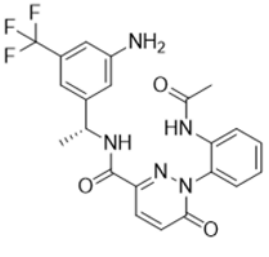
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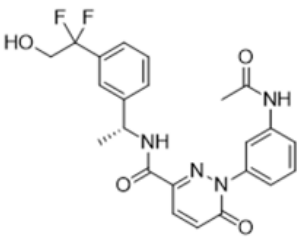
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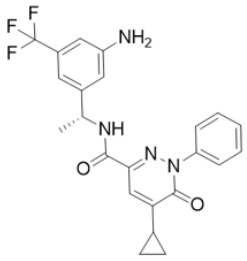
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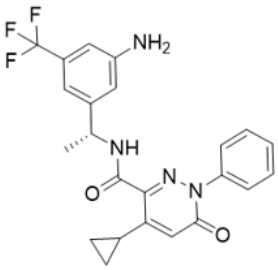
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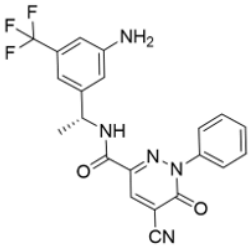
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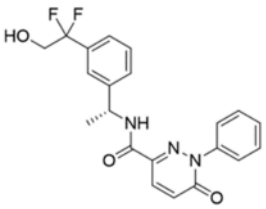
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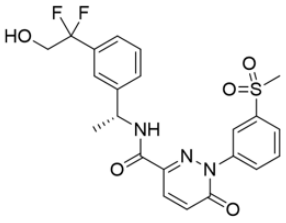
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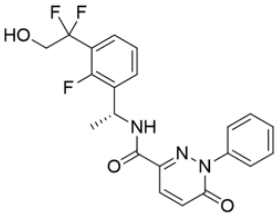
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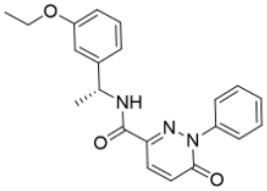
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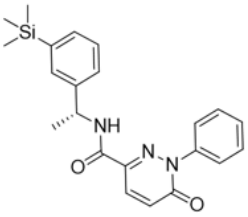
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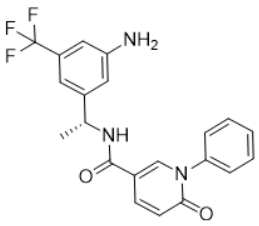
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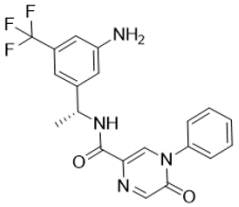
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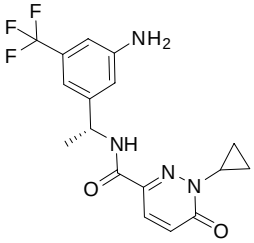
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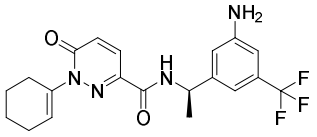
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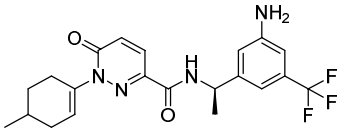
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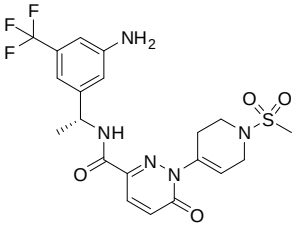
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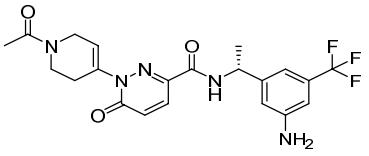
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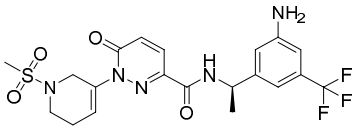
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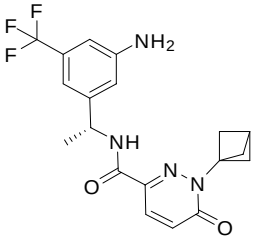
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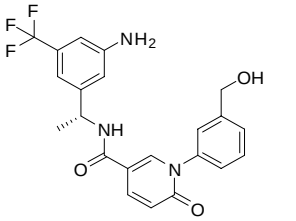
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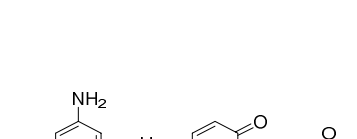
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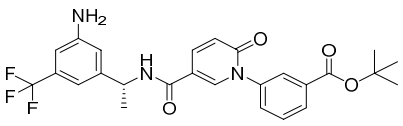
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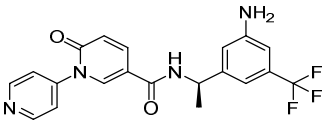
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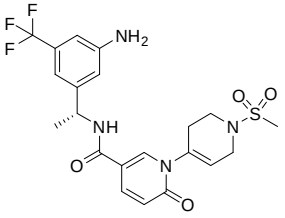
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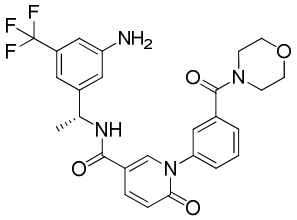
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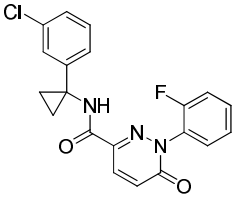
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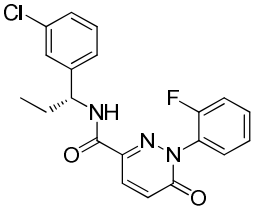
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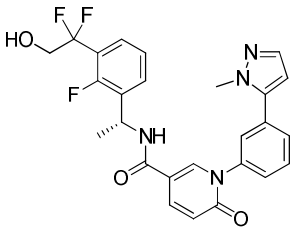
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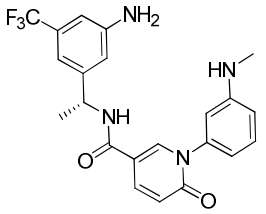
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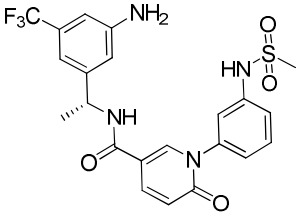
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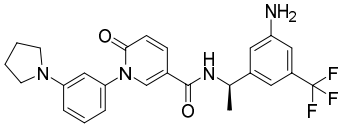
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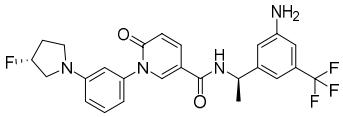
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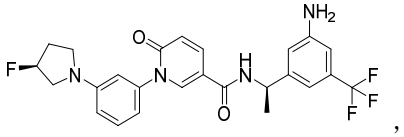
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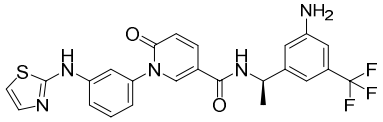
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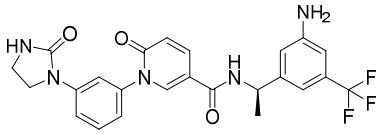
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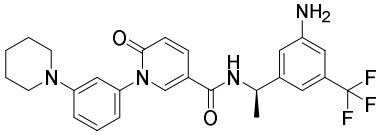
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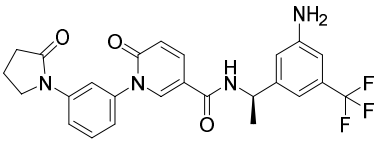
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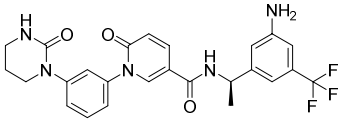
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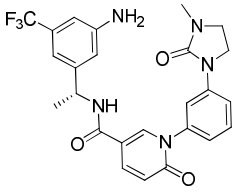
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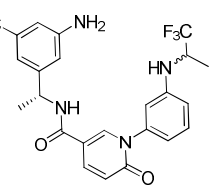
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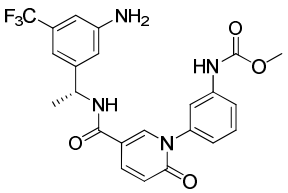
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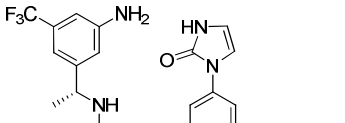
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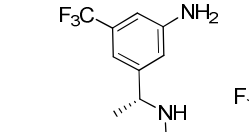
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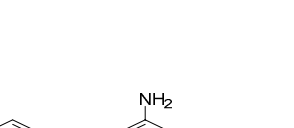
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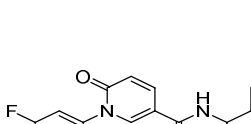
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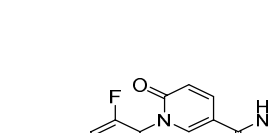
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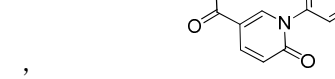
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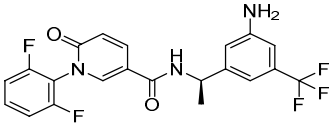
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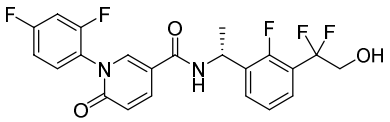
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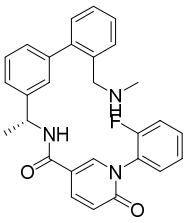
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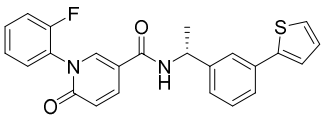
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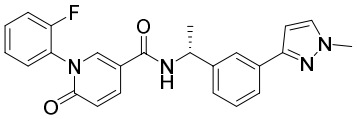
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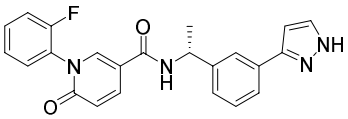
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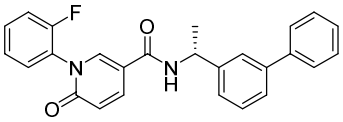
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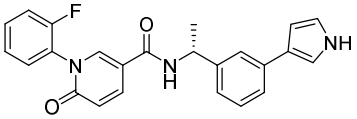
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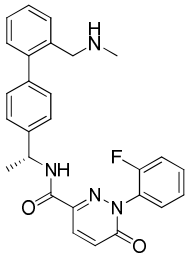
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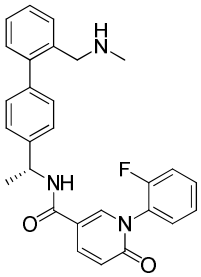
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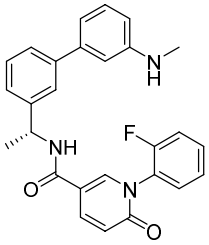
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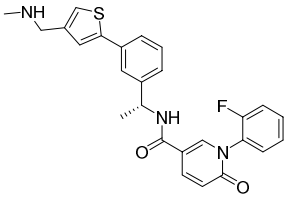
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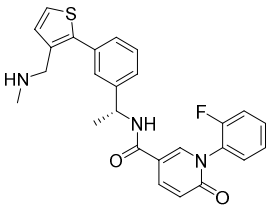
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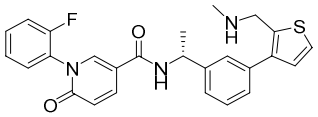
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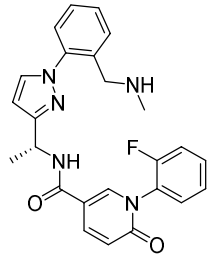
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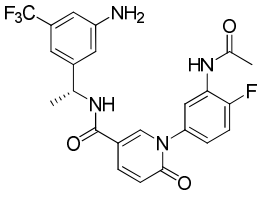
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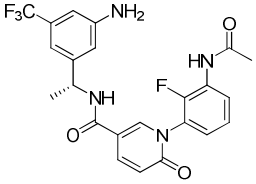
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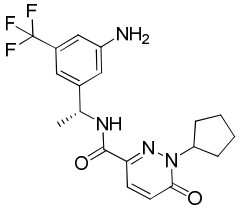
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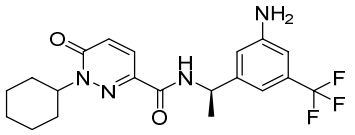
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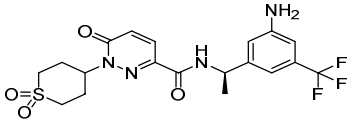
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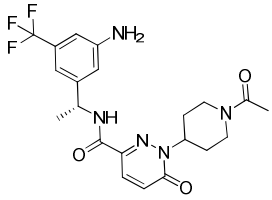
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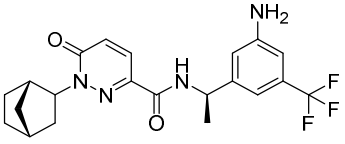
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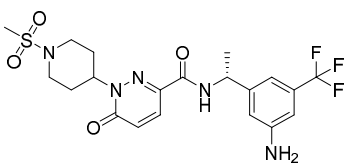
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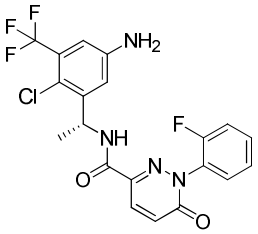
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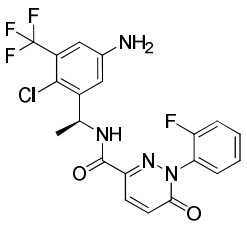
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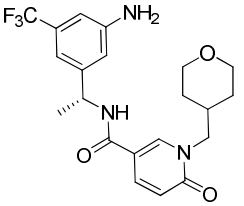
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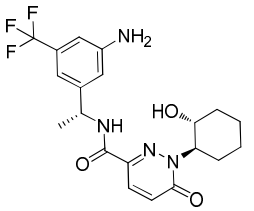
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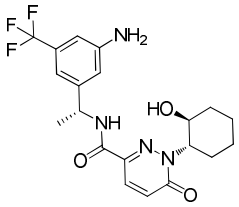
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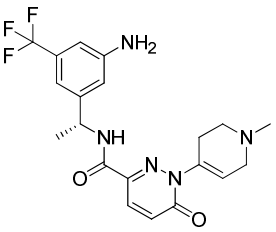
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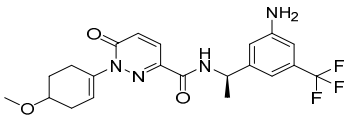
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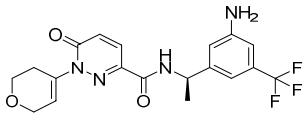
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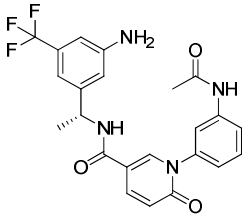
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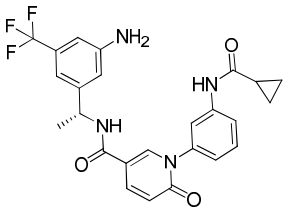
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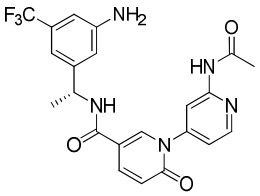
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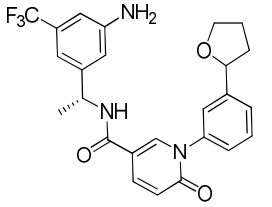
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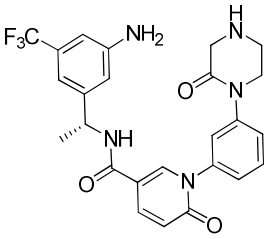
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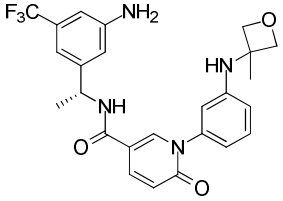
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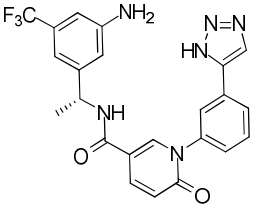
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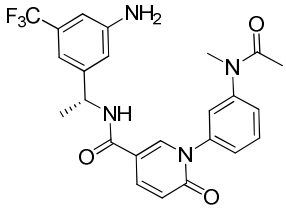
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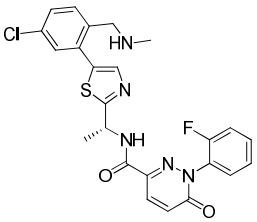
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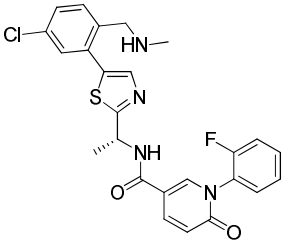
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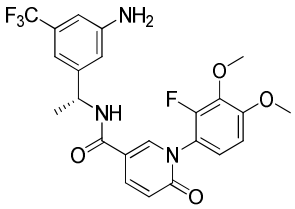
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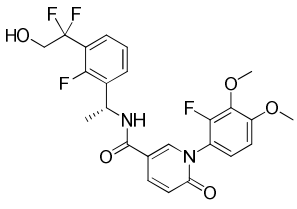
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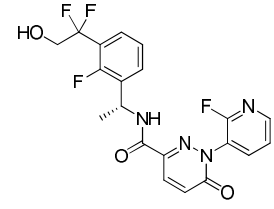
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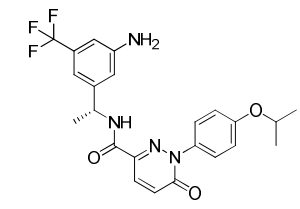
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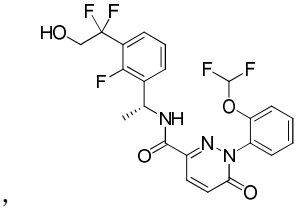
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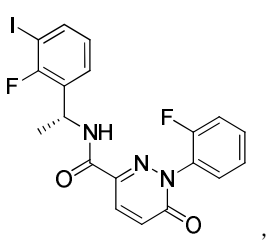
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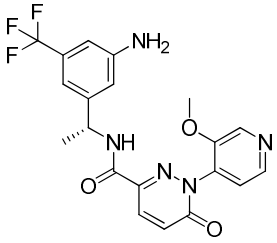
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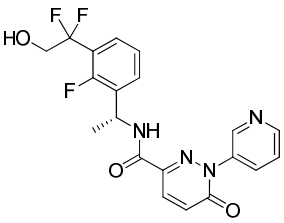
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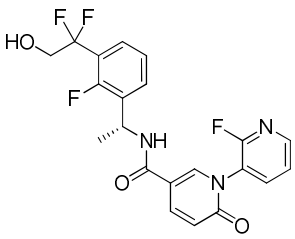
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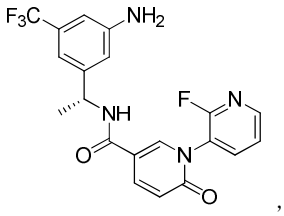
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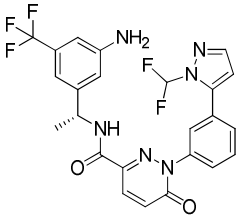
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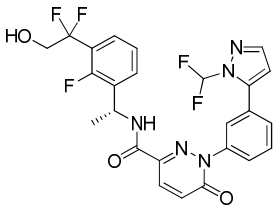
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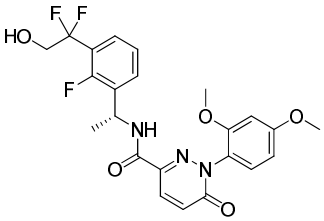
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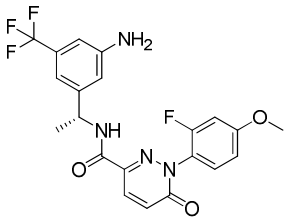
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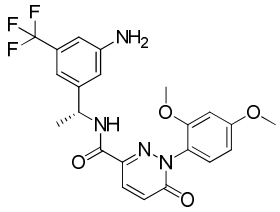
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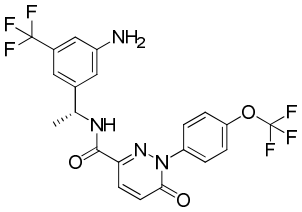
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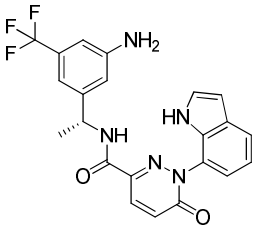
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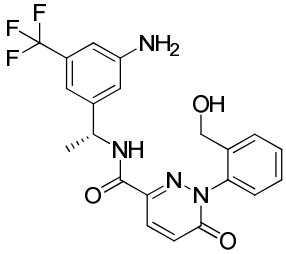
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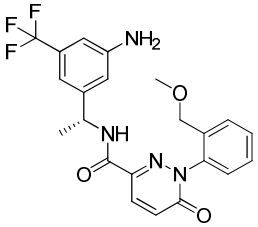
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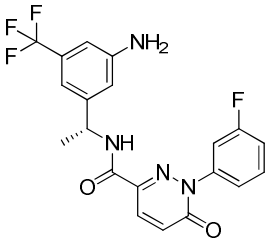
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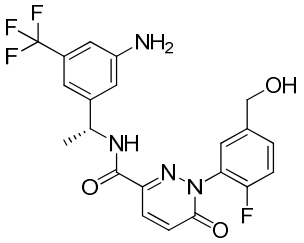
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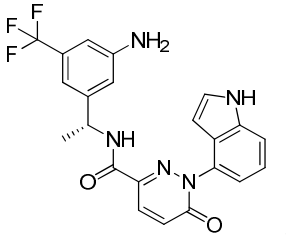
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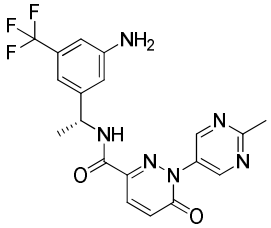
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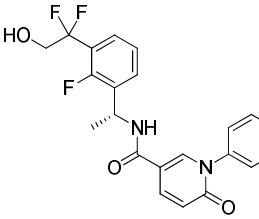
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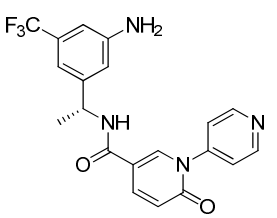
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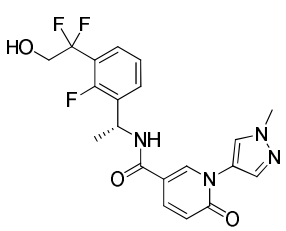
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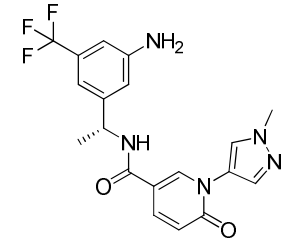
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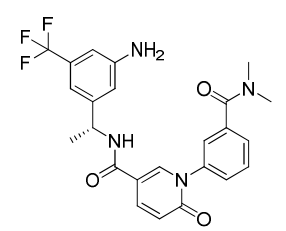
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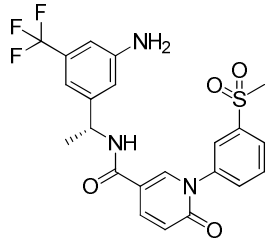
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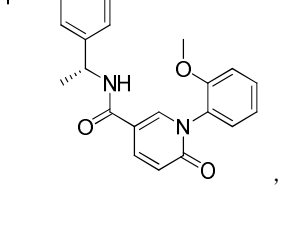
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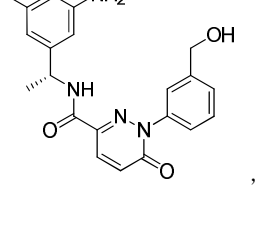
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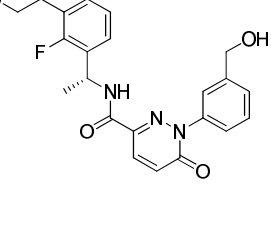
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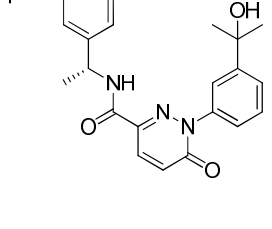
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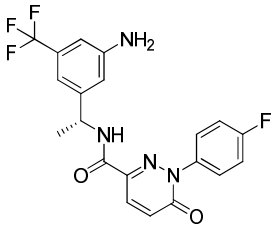
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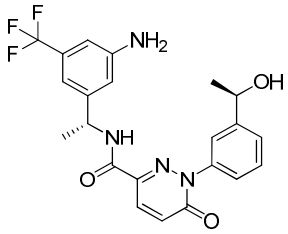
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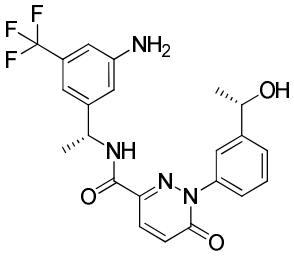
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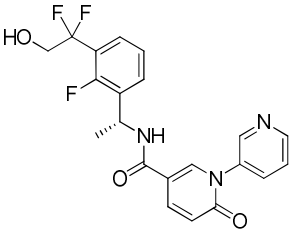
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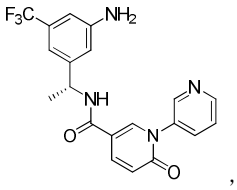
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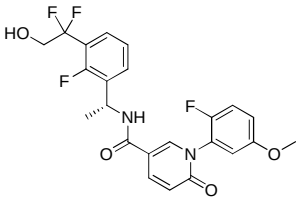
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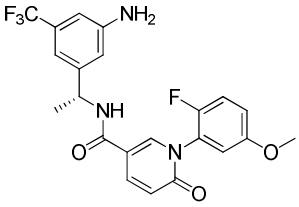
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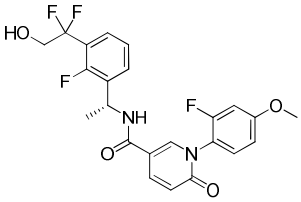
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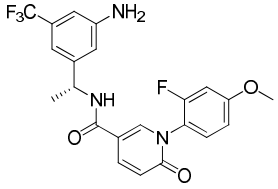
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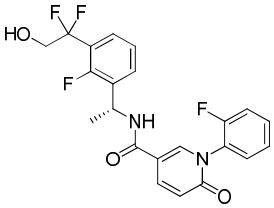
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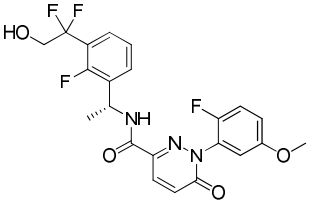
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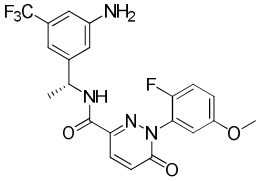
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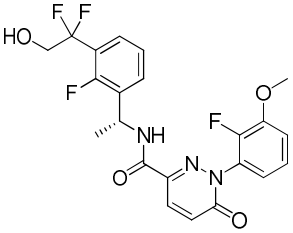
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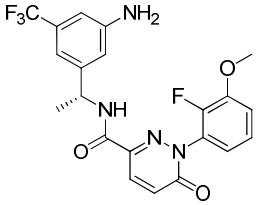
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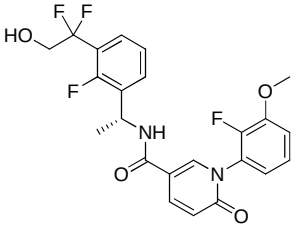
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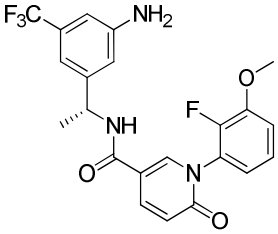
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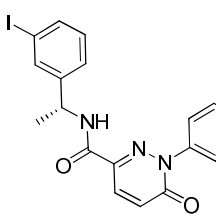
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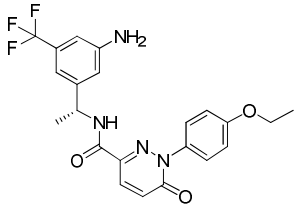
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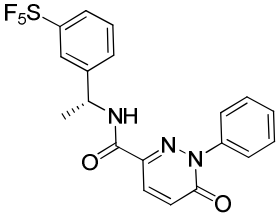
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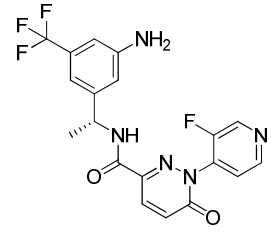
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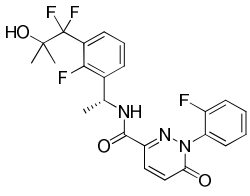
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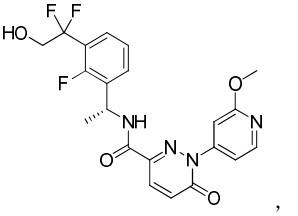
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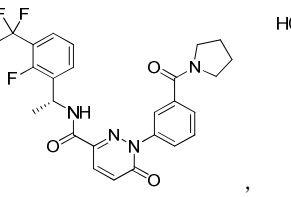
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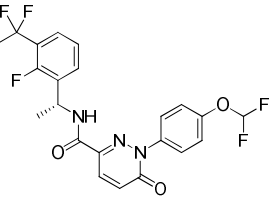
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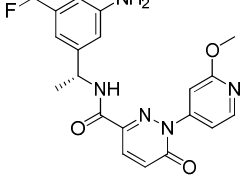
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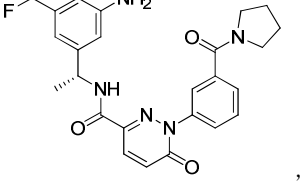
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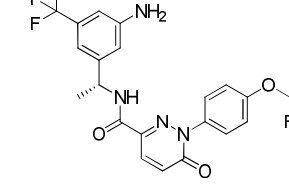
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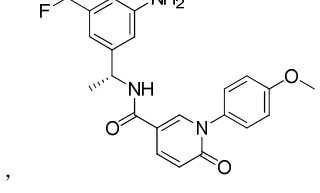
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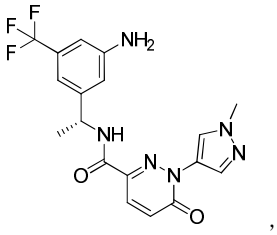
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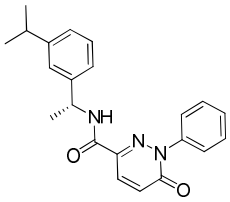
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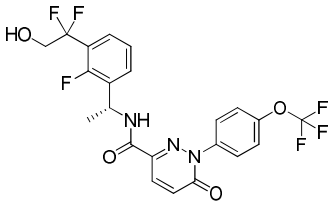
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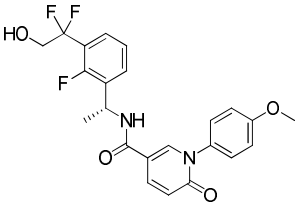
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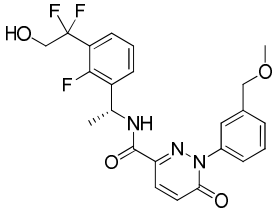
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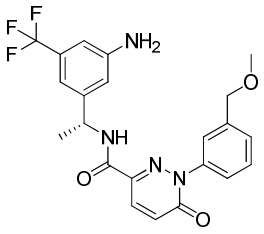
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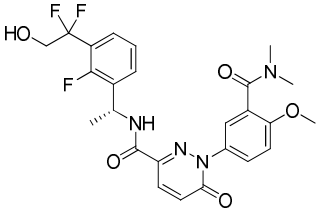
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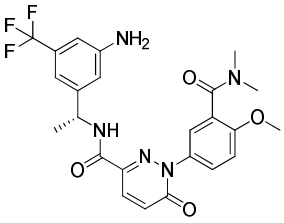
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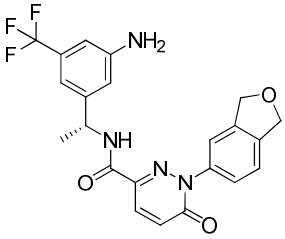
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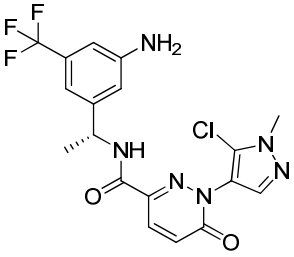
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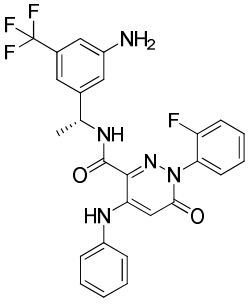
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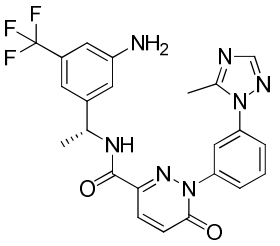
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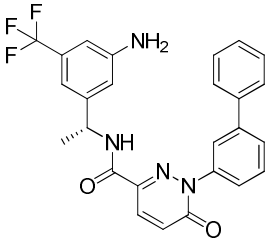
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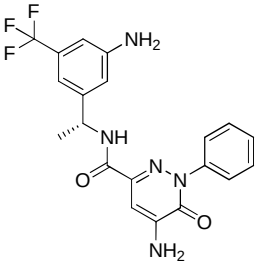
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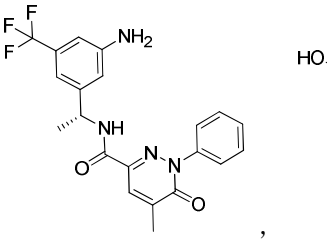
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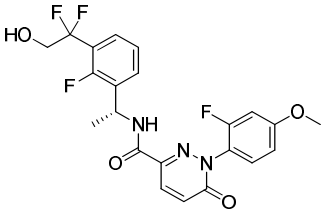
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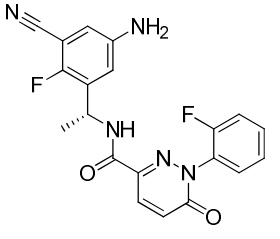
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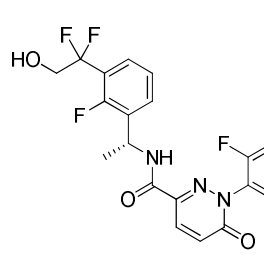
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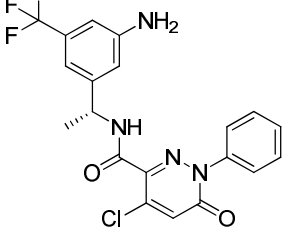
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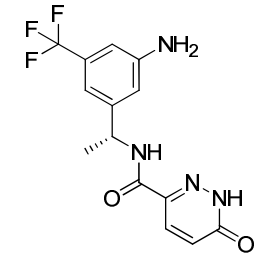
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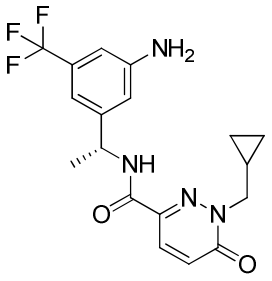
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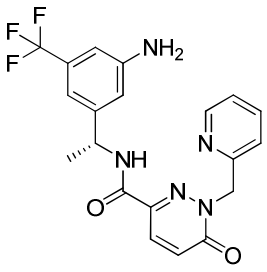
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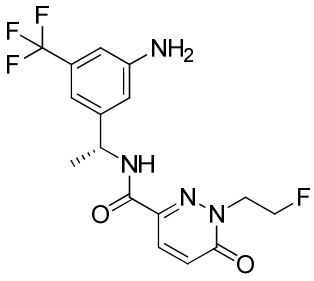
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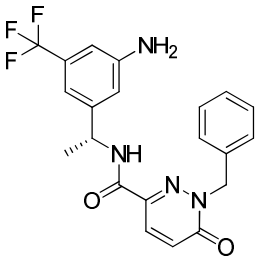
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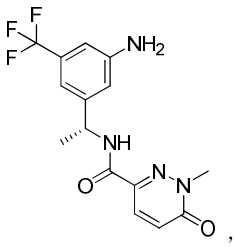
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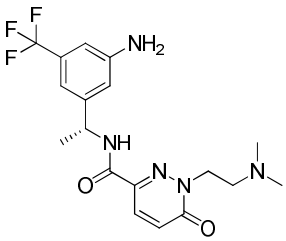
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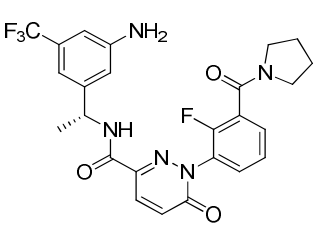
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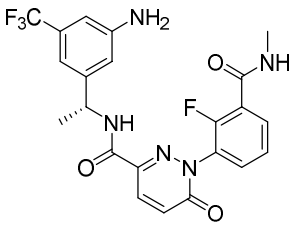
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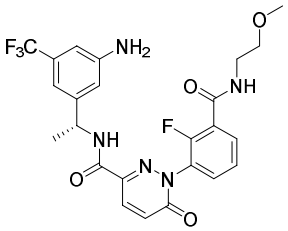
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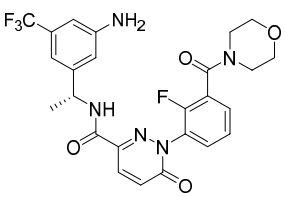
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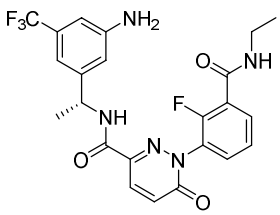
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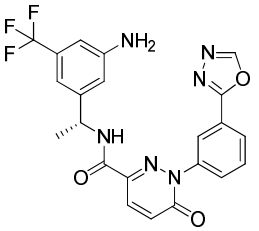
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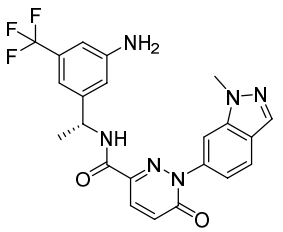
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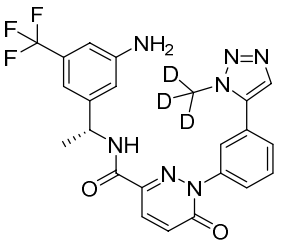
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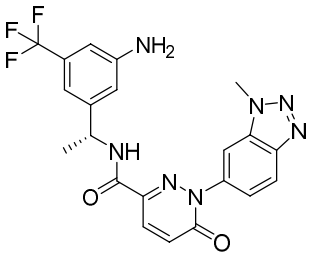
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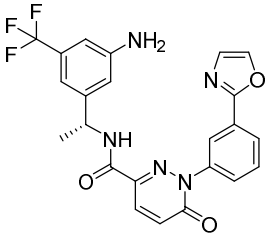
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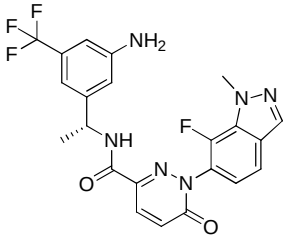
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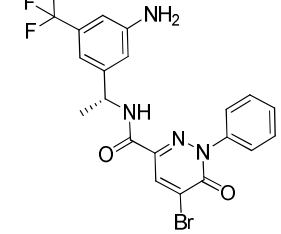
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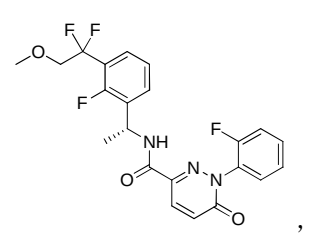
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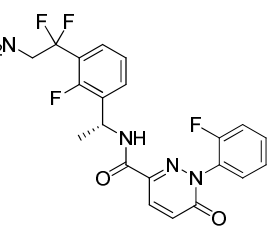
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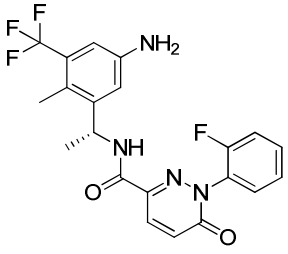
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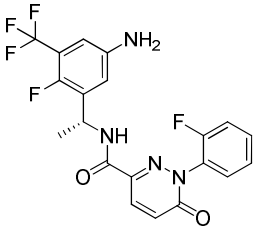
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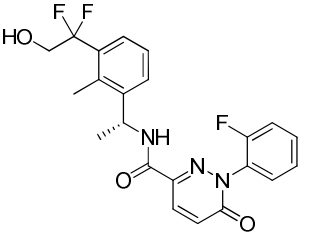
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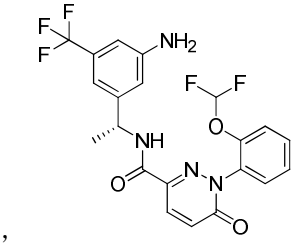
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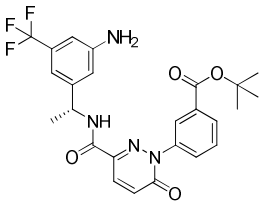
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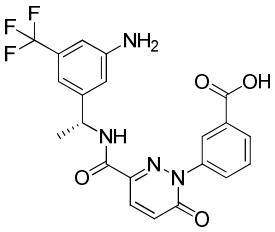
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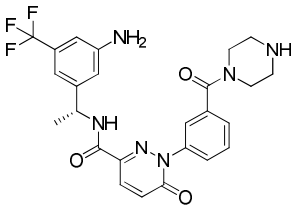
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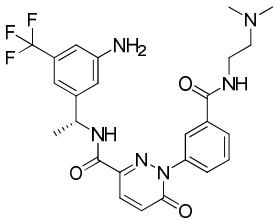
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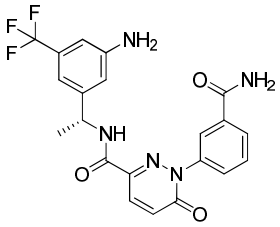
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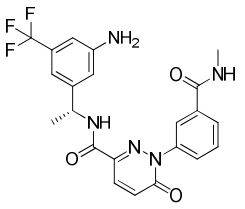
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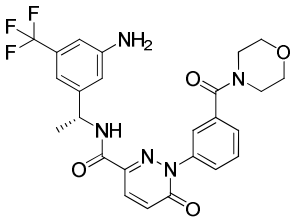
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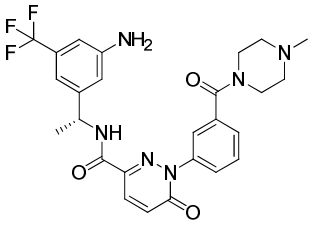
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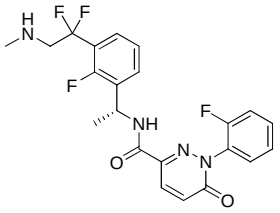
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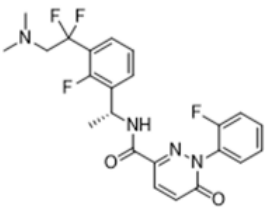
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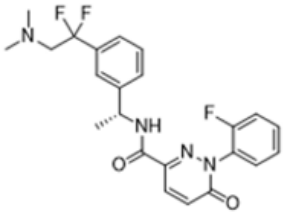
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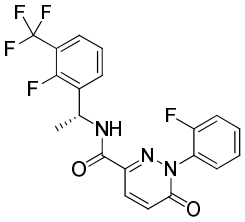
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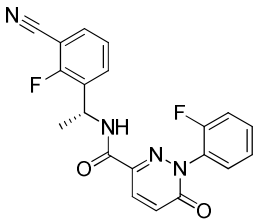
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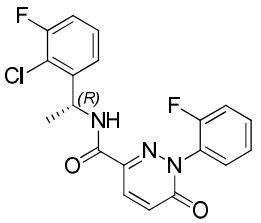
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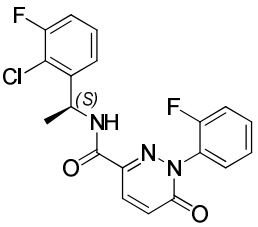
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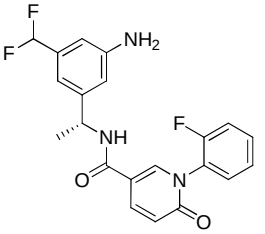
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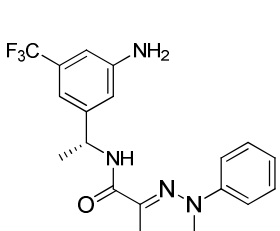
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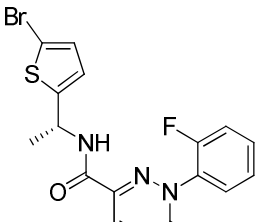
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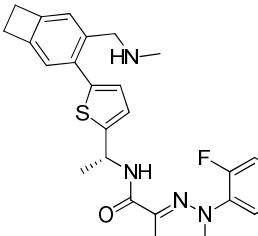
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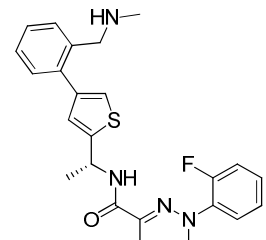
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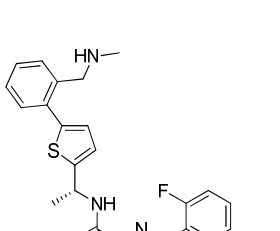
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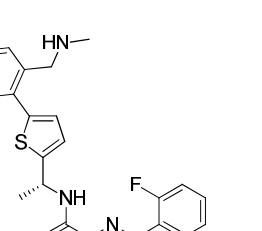
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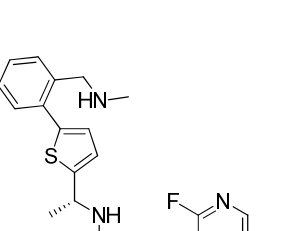
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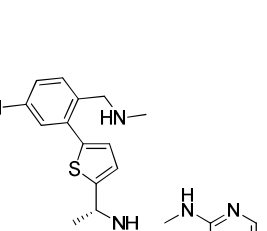
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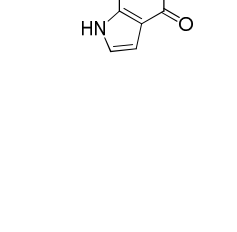
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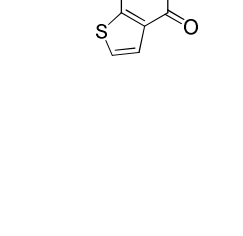
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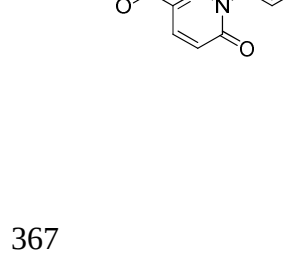
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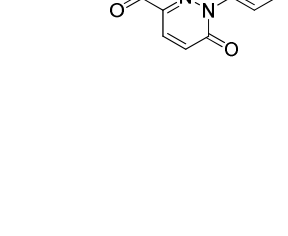
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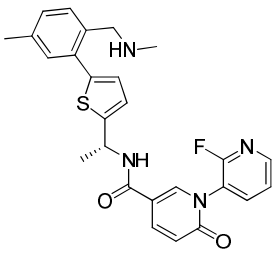
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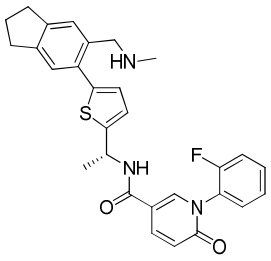
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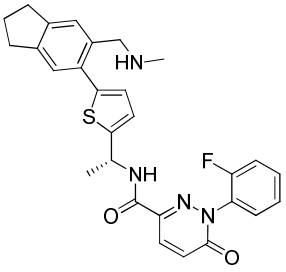
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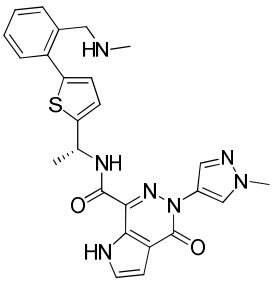
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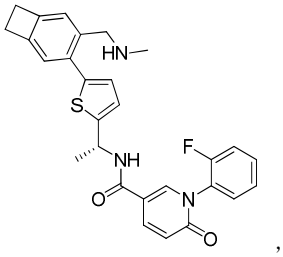
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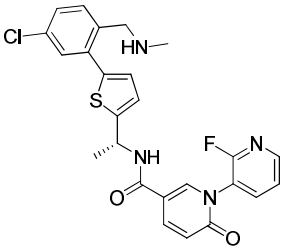
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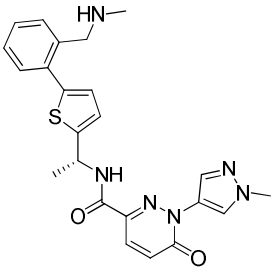
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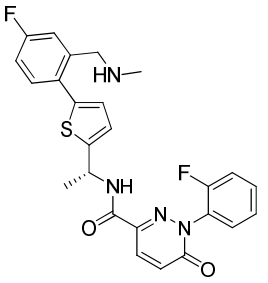
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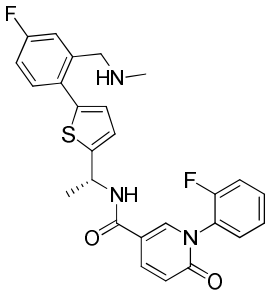
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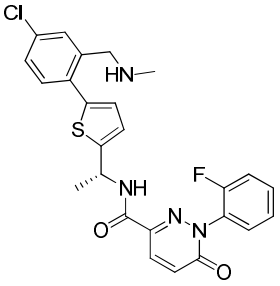
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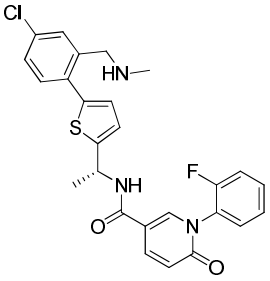
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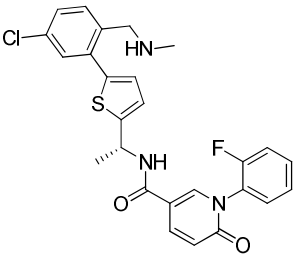
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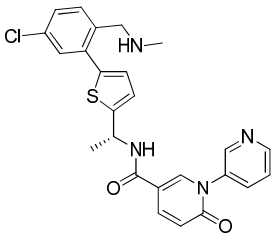
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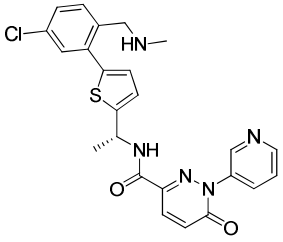
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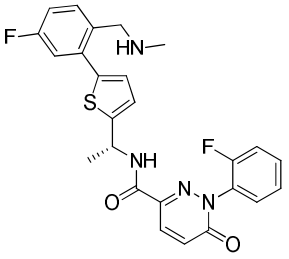
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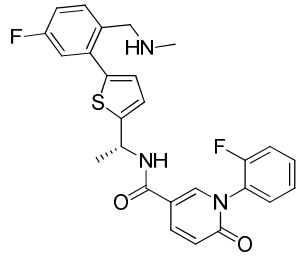
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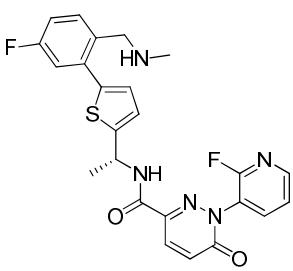
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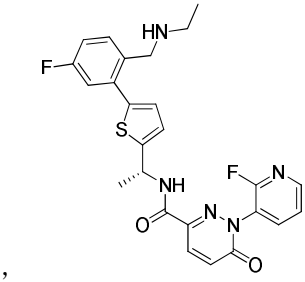
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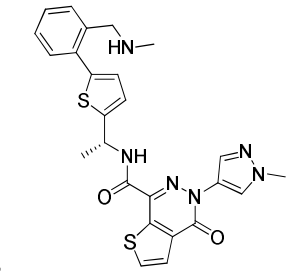
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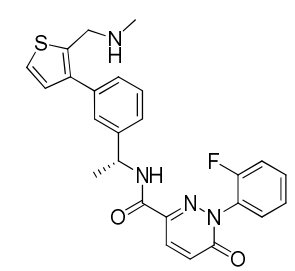
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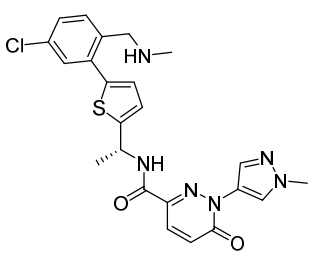
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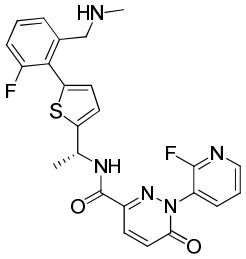
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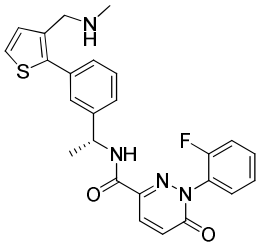
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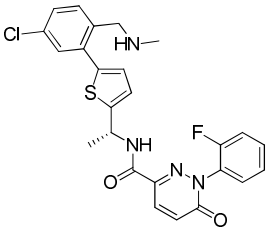
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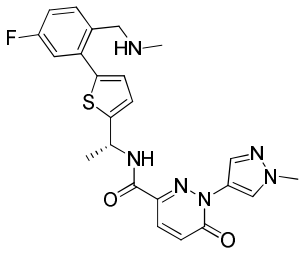
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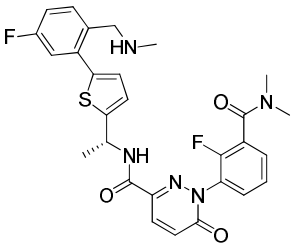
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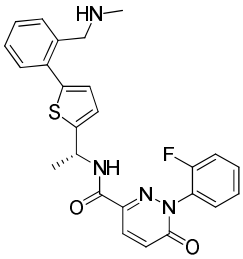
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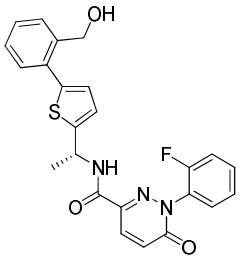
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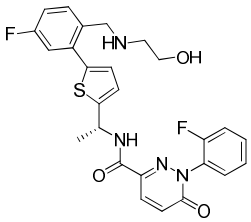
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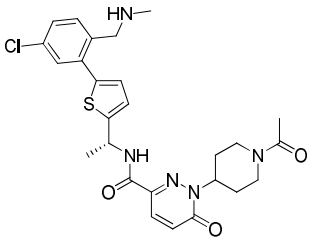
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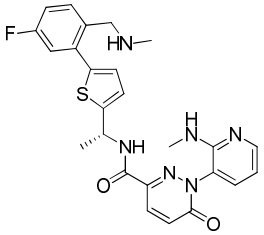
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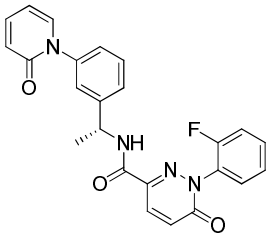
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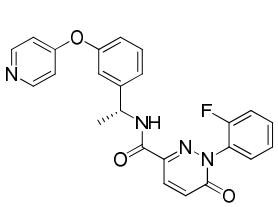
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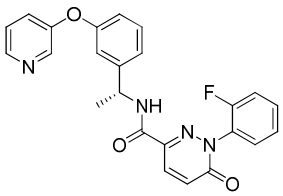
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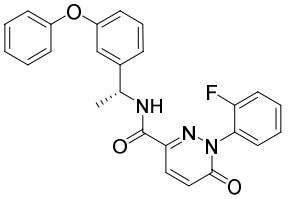
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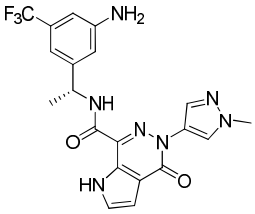
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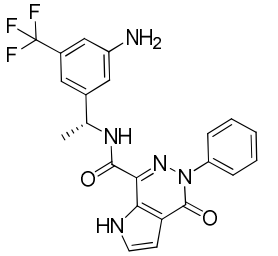
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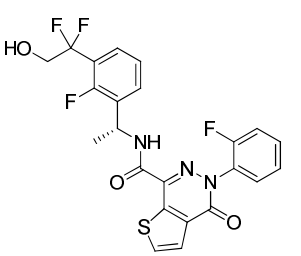
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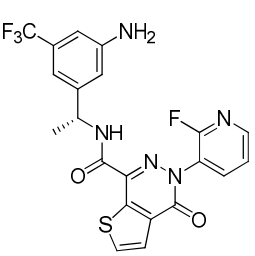
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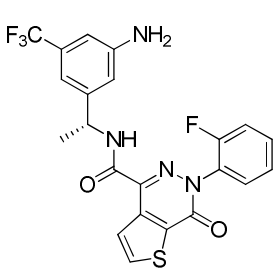
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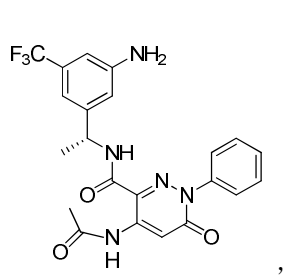
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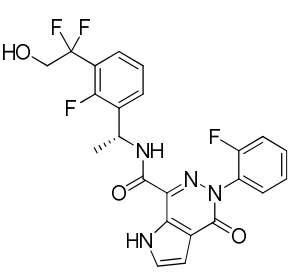
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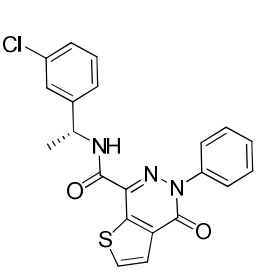
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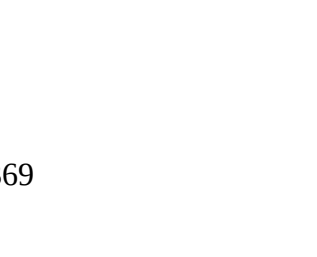
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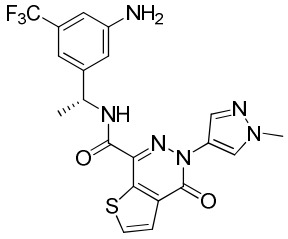
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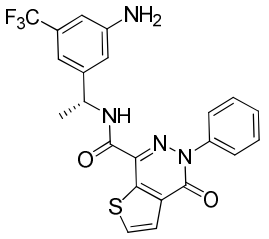
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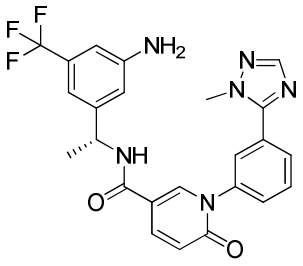
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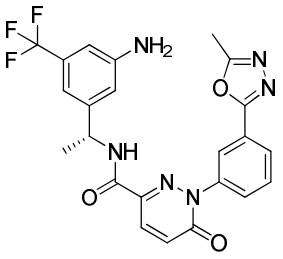
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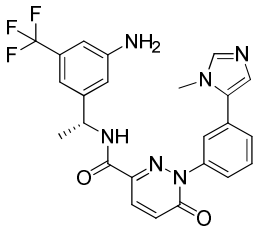
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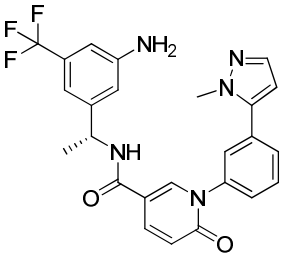
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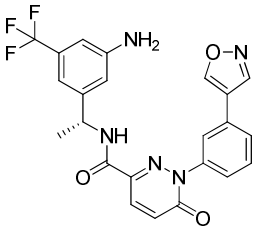
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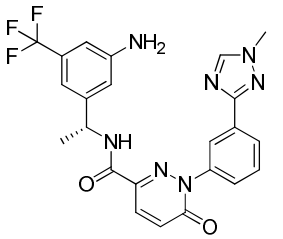
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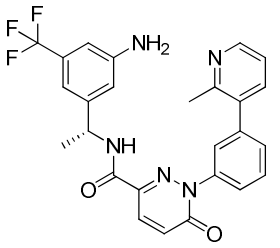
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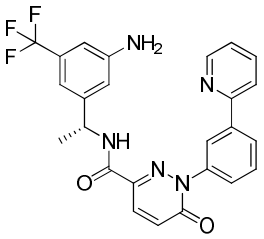
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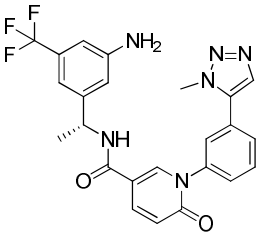
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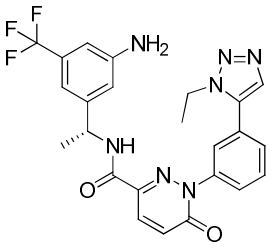
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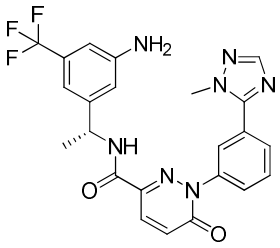
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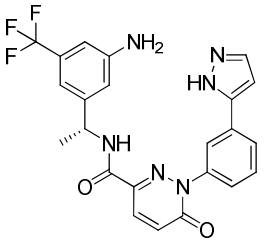
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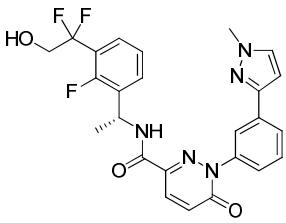
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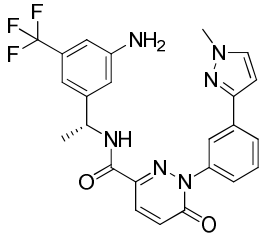
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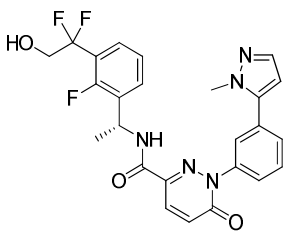
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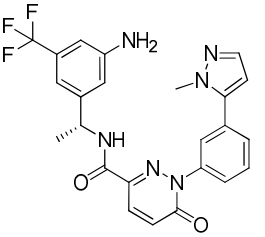
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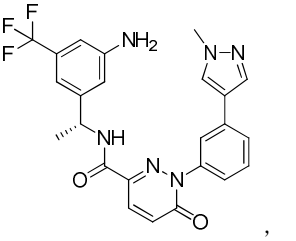
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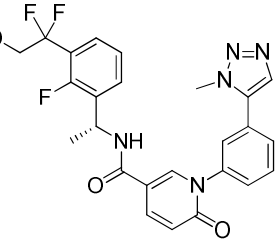
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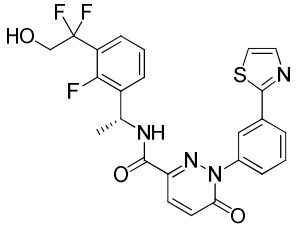
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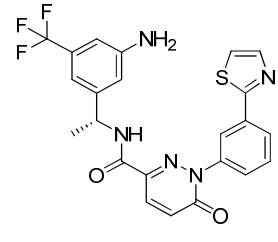
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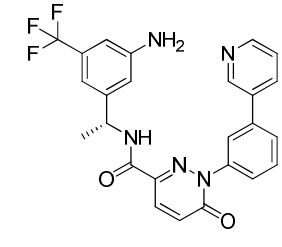
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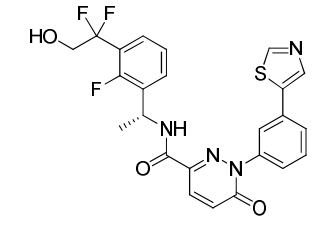
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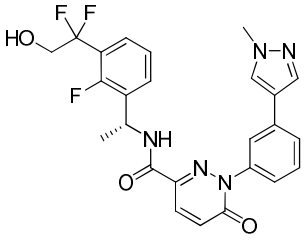
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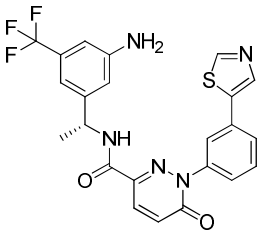
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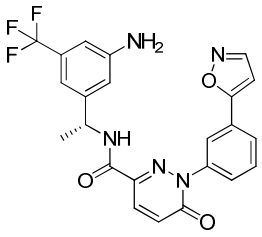
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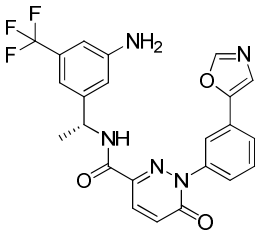
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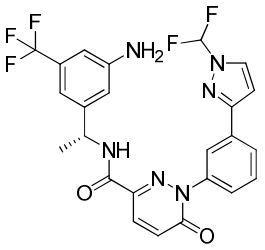
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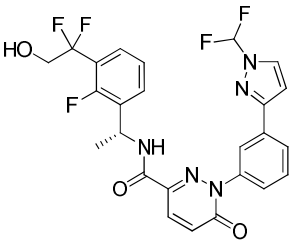
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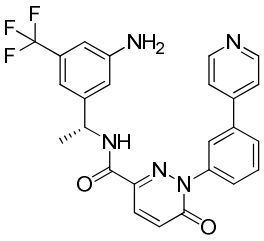
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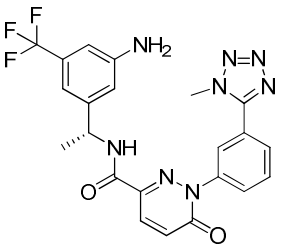
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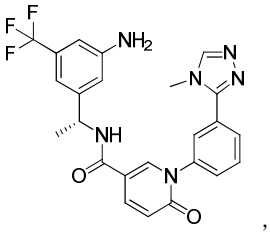
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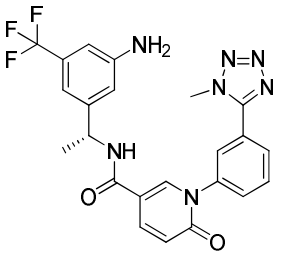
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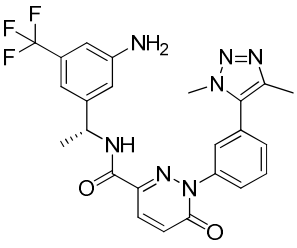
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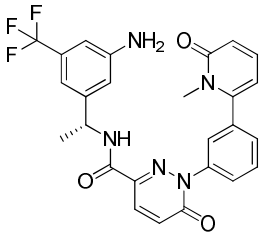
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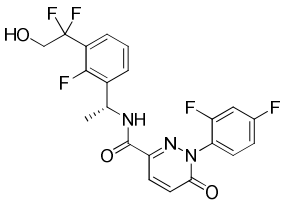
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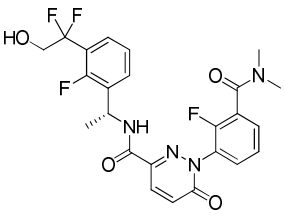
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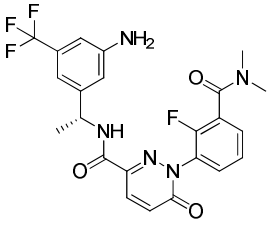
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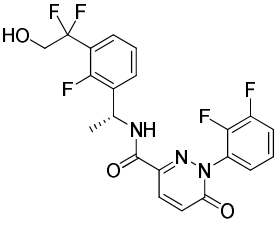
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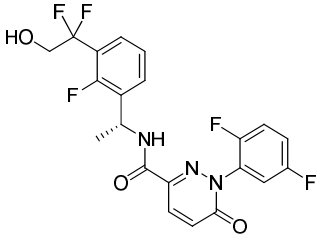
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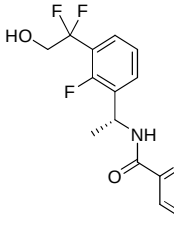
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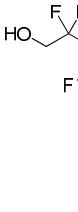
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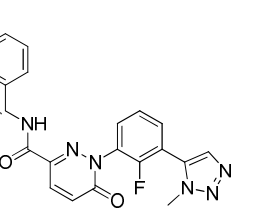
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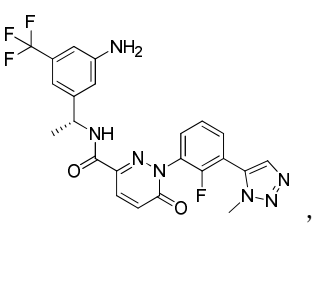
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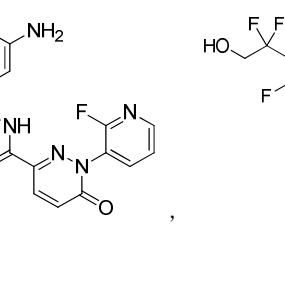
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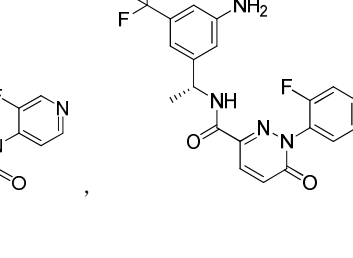
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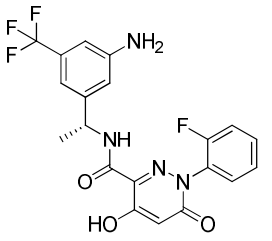
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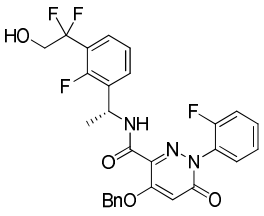
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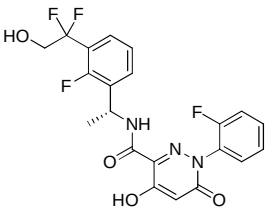
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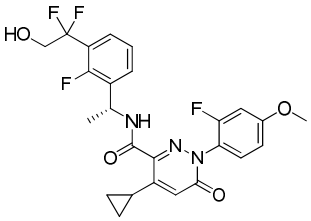
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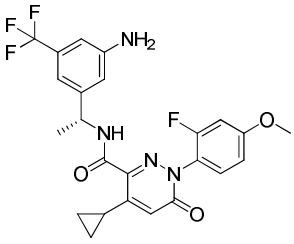
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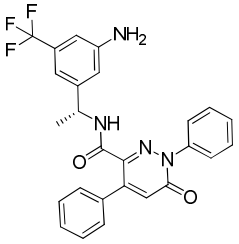
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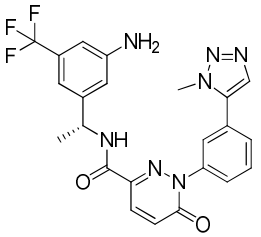
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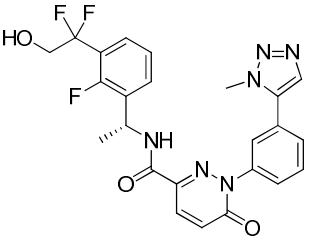
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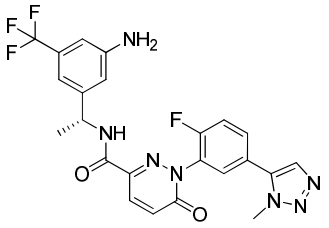
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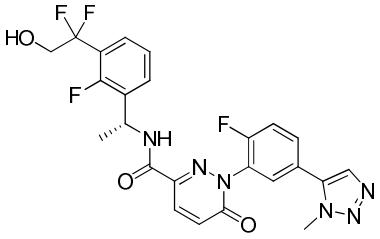
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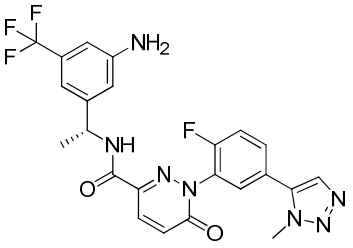
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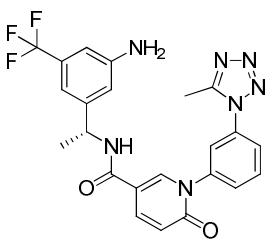
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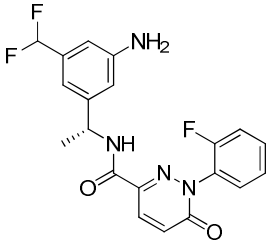
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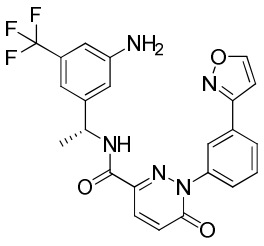
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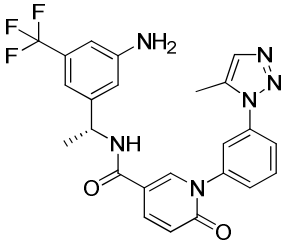
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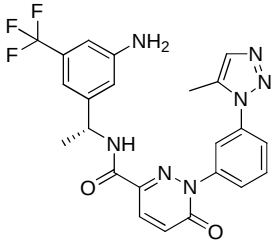
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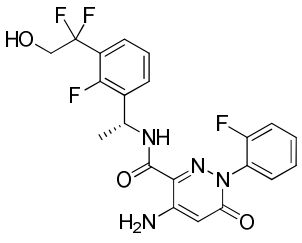
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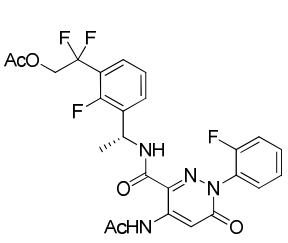
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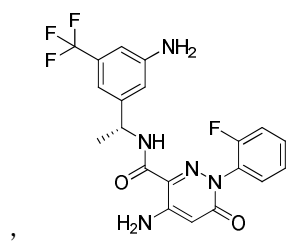
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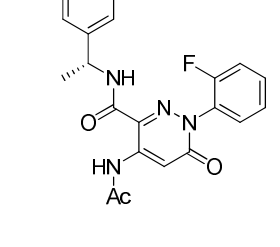
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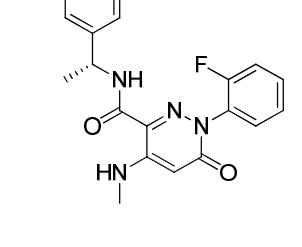
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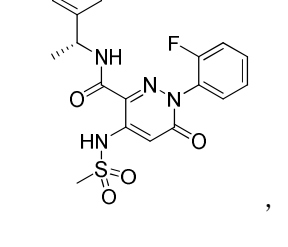
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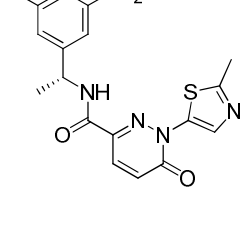
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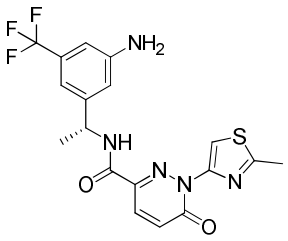
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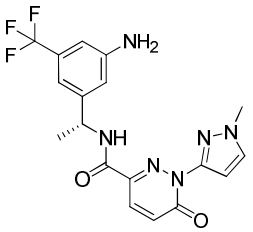
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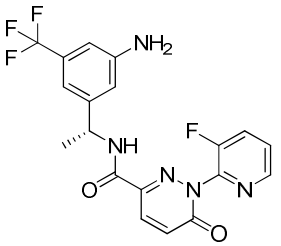
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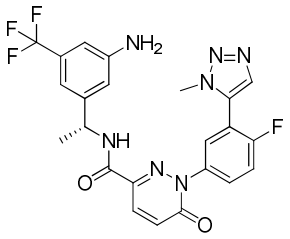
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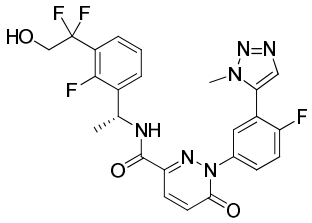
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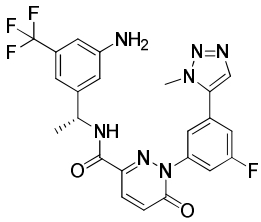
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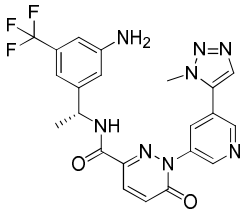
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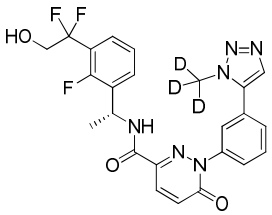
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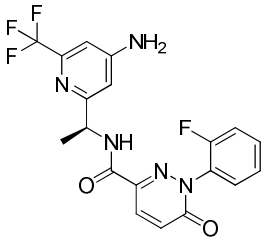
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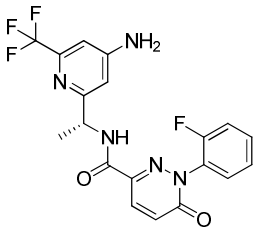
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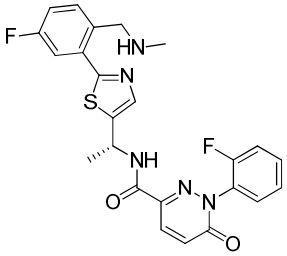
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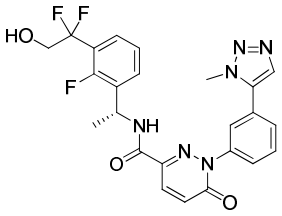
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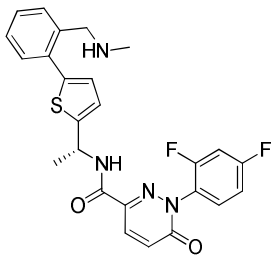
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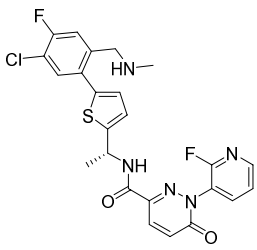
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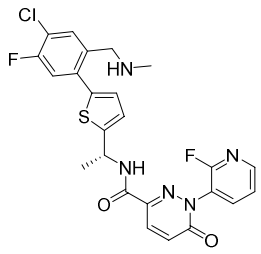
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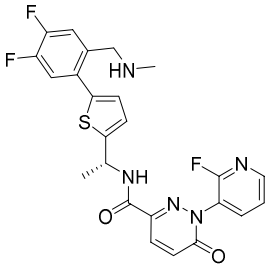
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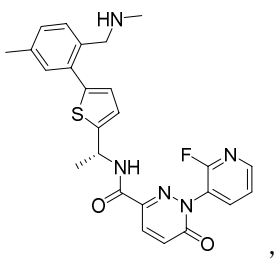
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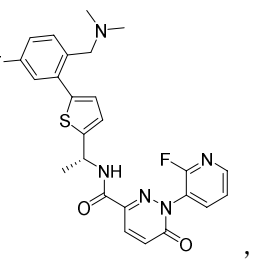
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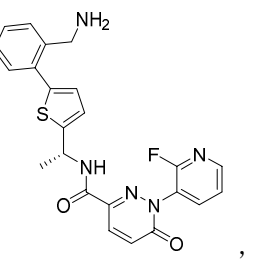
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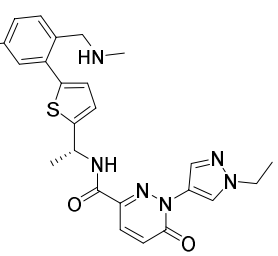
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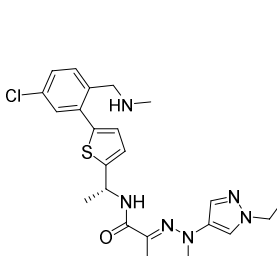
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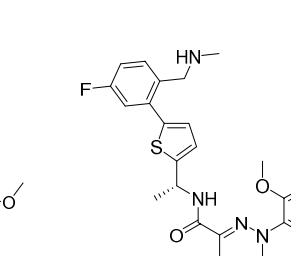
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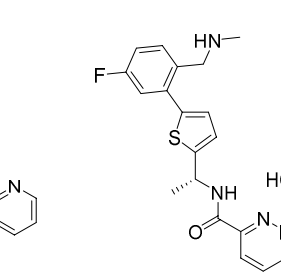
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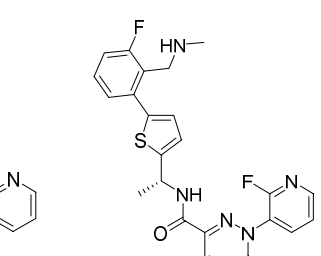
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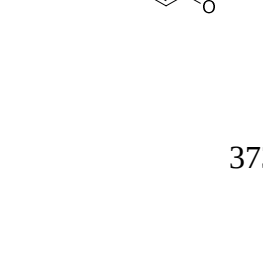
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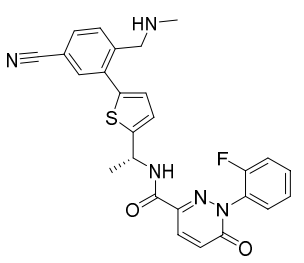
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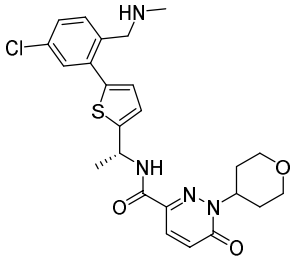
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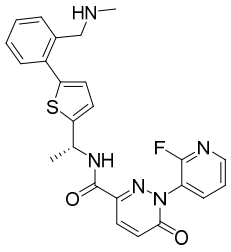
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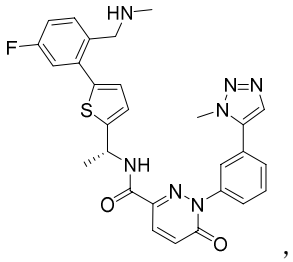
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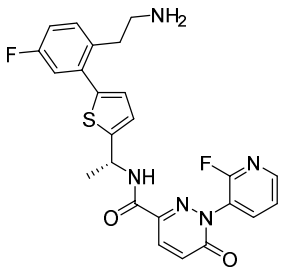
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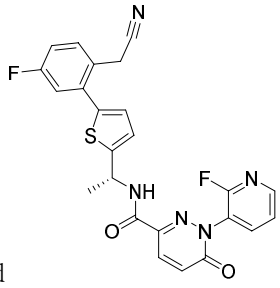
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[Claim 23]

A pharmaceutical composition comprising the compound, or solvate, stereoisomer or pharmaceutically acceptable salt thereof according to any one of claims 1 to 22 as an active ingredient.

[Claim 24]

The pharmaceutical composition according to claim 23, characterized in that the pharmaceutical composition is for use in the prevention or treatment of a SOS1 mediated disease.

[Claim 25]

The pharmaceutical composition according to claim 24, characterized in that the SOS1 mediated disease is cancer or RASopathy.

[Claim 26]

The compound, or solvate, stereoisomer or pharmaceutically acceptable salt thereof according to any one of claims 1 to 22 for use in the prevention or treatment of a SOS1 mediated disease.

[Claim 27]

Use of the compound, or solvate, stereoisomer or pharmaceutically acceptable salt thereof according to any one of claims 1 to 22 in the manufacture of a medicament for the prevention or treatment of a SOS1 mediated disease.