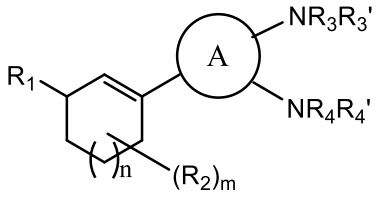
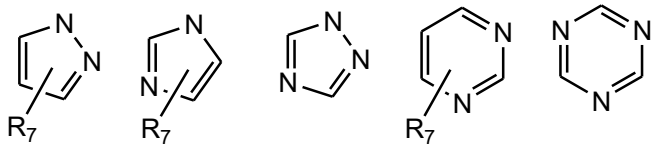
Claims

1. A compound of formula (I):



(I)

and/or a pharmaceutically acceptable salt thereof, and/or solvates, racemic mixtures, enantiomers, diasteromers, and tautomers thereof, wherein

A is chosen from , wherein, R_7 is chosen from H, halo, -CN, -OH, or $–NH_2$;

R_1 is chosen from H, -OH, halo, C_{1-6} alkyl, C_{1-6} alkoxyl, $-NH_2$, $-NH(C_{1-4}$ alkyl), $-N(C_{1-4}$ alkyl)$_2$, oxo, or C_{3-8} cycloalkyl;

each of R_2 is independently chosen from H, deuterium, halo, -OH, $-NH_2$, -CN, -SH, C_{1-6} alkyl, C_{2-6} alkenyl, C_{2-6} alkynyl, C_{1-6} haloalkyl, C_{3-8} cycloalkyl, oxo, $-OR_5$, $-OCOR_5$, $-NHR_5$, $-N(R_5)(C_{1-4}$ alkyl), $-COR_5$, $-NHCOR_5$, or 3-8 membered heterocyclyl containing one or more heteroatoms independently chosen from N, O, and S; in which each of said C_{1-6} alkyl, C_{2-6} alkenyl, C_{2-6} alkynyl, C_{3-8} cycloalkyl or 3-8 membered heterocyclyl containing one or more heteroatoms independently chosen from N, O, and S is optionally substituted with one or more groups chosen from deuterium, halo, -CN, -OH, -SH, $-NH_2$, $-NH(C_{1-4}$ alkyl), $-N(C_{1-4}$ alkyl)$_2$, or C_{1-6} alkoxyl; or two R_2, which attach to the same carbon atom, together with the carbon atom they are attached to form a 3-5 membered cycloalkyl which is optionally substituted with one or more halo or deuterium;

R_3' and R_4' are both H;

R_3 and R_4 are independently chosen from H, C_{1-6} alkyl, C_{2-6} alkenyl, C_{2-6} alkynyl, C_{3-12} cycloalkyl, 3-12 membered heterocyclyl containing one or more heteroatoms independently chosen from N, O, and S, phenyl, 5-12 membered heteroaryl containing one or more heteroatoms independently chosen from N, O, and S, $-C(O)R_5$, $-OR_5$, or

-NHR_5, in which each of said C_{1-6} alkyl, C_{2-6} alkenyl, C_{2-6} alkynyl, C_{3-12} cycloalkyl, 3-12 membered heterocyclyl containing one or more heteroatoms independently chosen from N, O, and S, phenyl, or 5-12 membered heteroaryl containing one or more heteroatoms independently chosen from N, O, and S is optionally substituted with one or more R_6; provided that R_3 and R_4 are not H simultaneously; provided that when one of R_3 and R_4 is optionally substituted phenyl or optionally substituted 5-6 membered heteroaryl containing one or more heteroatoms independently chosen from N, O, and S, the other one is -OR_5 or -NHR_5;

or R_3 and R_3' are independently chosen from H, C_{1-6} alkyl, C_{2-6} alkenyl, C_{2-6} alkynyl, C_{3-12} cycloalkyl, 3-12 membered heterocyclyl containing one or more heteroatoms independently chosen from N, O, and S, phenyl, 5-12 membered heteroaryl containing one or more heteroatoms independently chosen from N, O, and S, -$C(O)R_5$, -OR_5, or -NHR_5, in which each of said C_{1-6} alkyl, C_{2-6} alkenyl, C_{2-6} alkynyl, C_{3-12} cycloalkyl, 3-12 membered heterocyclyl containing one or more heteroatoms independently chosen from N, O, and S, phenyl, or 5-12 membered heteroaryl containing one or more heteroatoms independently chosen from N, O, and S is optionally substituted with one or more R_6; R_4 and R_4' together with the N atom they are attached to form a 3-8 membered heterocyclic ring containing one or more heteroatoms independently chosen from N, O, and S optionally substituted by one or more R_6;

R_5 is chosen from C_{1-6} alkyl or C_{3-8} cycloalkyl, each of which is optionally substituted with one or more groups independently chosen from halo, -CN, -OH, -SH, -NH_2, or C_{1-6} alkoxyl;

each of R_6 is independently chosen from deuterium, halo, -CN, -OH, -SH, -NH_2, C_{1-6} alkoxyl, C_{1-6} alkyl, C_{1-6} haloalkyl, C_{3-8} cycloalkyl, 3-8 membered heterocyclyl containing one or more heteroatoms independently chosen from N, O, and S, phenyl, or 5-6 membered heteroaryl containing one or more heteroatoms independently chosen from N, O, and S, in which each of said C_{1-6} alkoxyl, C_{1-6} alkyl, C_{3-8} cycloalkyl, 3-8 membered heterocyclyl containing one or more heteroatoms independently chosen from N, O, and S, phenyl, or 5-6 membered heteroaryl containing one or more heteroatoms independently chosen from N, O, and S is optionally substituted with one or more groups independently chosen from halo, -CN, -OH, -SH, -NH_2, C_{1-6} alkoxyl, C_{2-6} alkynyl, or C_{1-6} alkyl;

m is 0, 1, 2, 3, 4, 5, or 6;

n is 0, 1, or 2.

2. The compound of formula (I) according to claim 1, or a pharmaceutically acceptable salts thereof, and/or solvates, racemic mixture, enantiomers, diasteromers, and tautomers thereof, wherein, R_1 is chosen from H, -OH or halo.

3. The compound of formula (I) according to claim 2, or a pharmaceutically acceptable salts thereof, and/or solvates, racemic mixture, enantiomers, diasteromers, and tautomers thereof, wherein, R_1 is -OH.

4. The compound of formula (I) according to claim 1, or a pharmaceutically acceptable salts thereof, and/or solvates, racemic mixture, enantiomers, diasteromers, and tautomers thereof, wherein, each of R_2 is independently chosen from H, deuterium, halo, -OH, $-NH_2$, -CN, -SH, C_{1-6} alkyl, C_{2-6} alkenyl, C_{2-6} alkynyl, C_{1-6} haloalkyl, C_{3-8} cycloalkyl, oxo, $-OR_5$, $-OCOR_5$, $-NHR_5$, $-N(R_5)(C_{1-4}$ alkyl), $-NHCOR_5$, or 3-8 membered heterocyclyl containing one or more heteroatoms independently chosen from N, O, and S.

5. The compound of formula (I) according to claim 4, or a pharmaceutically acceptable salts thereof, and/or solvates, racemic mixture, enantiomers, diasteromers, and tautomers thereof, wherein, each of R_2 is independently chosen from H, deuterium, halo, C_{1-6} alkyl, or C_{1-6} haloalkyl.

6. The compound of formula (I) according to claim 1, or a pharmaceutically acceptable salts thereof, and/or solvates, racemic mixture, enantiomers, diasteromers, and tautomers thereof, wherein, R_3 and R_4 are independently chosen from C_{1-6} alkyl, C_{3-12} cycloalkyl, 3-12 membered heterocyclyl containing one or more heteroatoms independently chosen from N, O, and S, phenyl, 5-12 membered heteroaryl containing one or more heteroatoms independently chosen from N, O, and S, $-C(O)R_5$, $-OR_5$, or

-NHR_5, in which each of said C_{1-6} alkyl, C_{3-12} cycloalkyl, 3-12 membered heterocyclyl containing one or more heteroatoms independently chosen from N, O, and S, phenyl, or 5-12 membered heteroaryl containing one or more heteroatoms independently chosen from N, O, and S is optionally substituted with one or more R_6.

7. The compound of formula (I) according to claim 6, or a pharmaceutically acceptable salts thereof, and/or solvates, racemic mixture, enantiomers, diasteromers, and tautomers thereof, wherein, R_3 and R_4 are independently chosen from C_{1-6} alkyl substituted with one or more halo, 5-12 membered heteroaryl containing one or more heteroatoms independently chosen from N, O, and S substituted with C_{1-6} haloalkyl, or -OR_5.

8. The compound of formula (I) according to claim 1, or a pharmaceutically acceptable salts thereof, and/or solvates, racemic mixture, enantiomers, diasteromers, and tautomers thereof, wherein, R_3 and R_4 are independently chosen from C_{1-6} alkyl substituted with one or more halo.

9. The compound of formula (I) according to claim 1, or a pharmaceutically acceptable salts thereof, and/or solvates, racemic mixture, enantiomers, diasteromers, and tautomers thereof, wherein, R_5 is C_{1-6} alkyl optionally substituted with one or more halo.

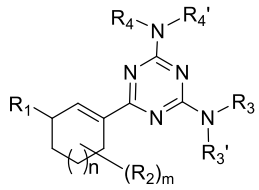
10. The compound of formula (I) according to claim 1, or a pharmaceutically acceptable salts thereof, and/or solvates, racemic mixture, enantiomers, diasteromers, and tautomers thereof, wherein, each of R_6 is independently chosen from deuterium, halo, -CN, -OH, -NH_2, C_{1-6} alkoxyl, C_{1-6} alkyl, C_{1-6} haloalkyl, C_{3-8} cycloalkyl, 3-8 membered heterocyclyl containing one or more heteroatoms independently chosen from N, O, and S, phenyl, or 5-6 membered heteroaryl containing one or more heteroatoms independently chosen from N, O, and S, in which each of said C_{1-6} alkoxyl, C_{1-6} alkyl, C_{3-8} cycloalkyl, 3-8 membered heterocyclyl containing one or more heteroatoms independently chosen from N, O, and S, phenyl, or 5-6 membered heteroaryl containing

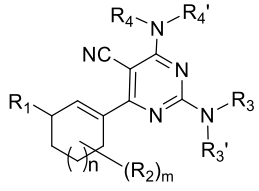
one or more heteroatoms independently chosen from N, O, and S is optionally substituted with one or more halo.

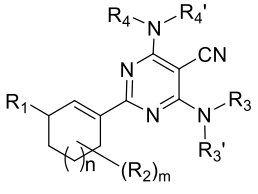
11. The compound of formula (I) according to claim 1, or a pharmaceutically acceptable salts thereof, and/or solvates, racemic mixture, enantiomers, diasteromers, and tautomers thereof, wherein, n is 1.

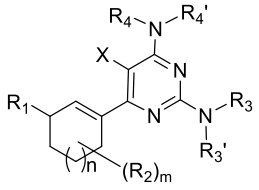
12. The compound of formula (I) according to claim 1, or a pharmaceutically acceptable salts thereof, and/or solvates, racemic mixture, enantiomers, diasteromers, and tautomers thereof, wherein, R_3 is chosen from H, C_{1-6} alkyl optionally substituted by C_{1-6} haloalkyl, or 5-12 membered heteroaryl containing one or more heteroatoms independently chosen from N, O, and S optionally substituted by C_{1-6} haloalkyl; R_3'is H; R_4 and R_4' together with the N atom they are attached to form a 3-8 membered heterocyclic ring containing one or more heteroatoms independently chosen from N, O, and S optionally substituted by one or more groups chosen from halo, -OH, or C_{1-6} haloalkyl.

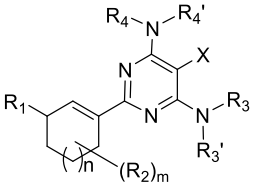
13. The compound of formula (I) according to any one of claims 1-12, or a pharmaceutically acceptable salts thereof, and/or solvates, racemic mixture, enantiomers, diasteromers, and tautomers thereof, wherein, the compound of formula (I) is chosen from


(I-1)


(I-2)

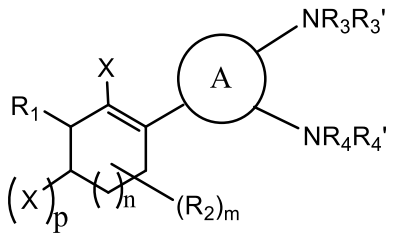

(I-3)


(I-4)


(I-5)

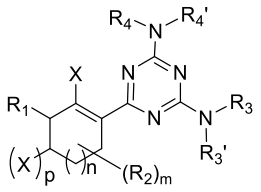
wherein X is halo.

14. The compound of formula (I) according to any one of claims 1-12, or a pharmaceutically acceptable salts thereof, and/or solvates, racemic mixture, enantiomers, diasteromers, and tautomers thereof, wherein, the compound of formula (I) has the structure of formula (II); wherein X is halo; p is 0, 1, or 2; m is 0, 1, or 2;

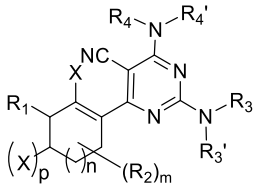


(II).

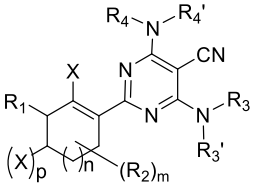
15. The compound of formula (I) according to claim 14, or a pharmaceutically acceptable salts thereof, and/or solvates, racemic mixture, enantiomers, diasteromers, and tautomers thereof, wherein, the compound of formula (I) is chosen from



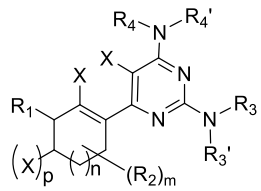
(II-1)



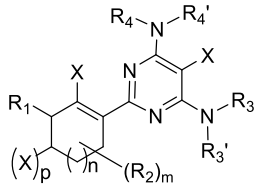
(II-2)



(II-3)



(II-4)

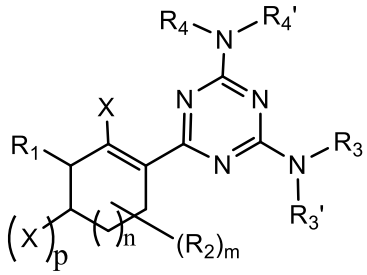


(II-5)

wherein, X is halo; p is 0, 1, or 2; m is 0, 1, or 2.

16. The compound of formula (I) according to claim 15, or a pharmaceutically acceptable salts thereof, and/or solvates, racemic mixture, enantiomers, diasteromers,

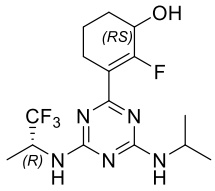
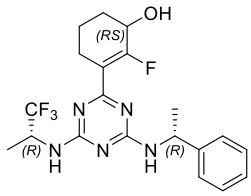
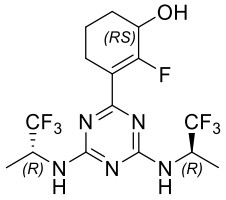
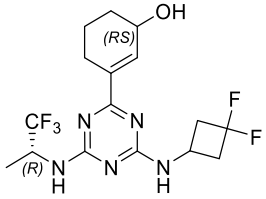
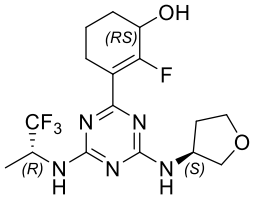
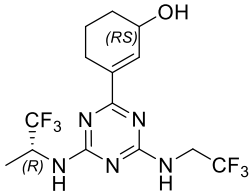
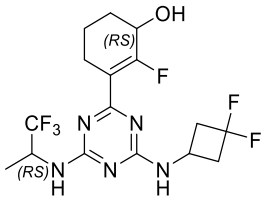
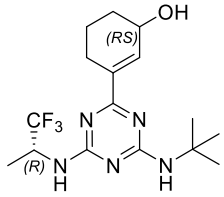
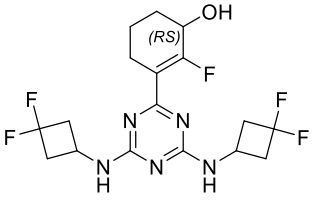
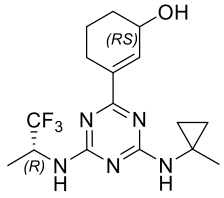
and tautomers thereof, wherein, the compound of formula (I) has the structure of formula (II-1); wherein X is halo; p is 0, 1, or 2; m is 0, 1, or 2;

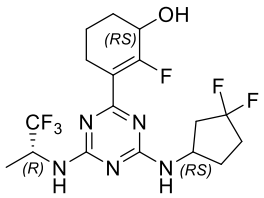
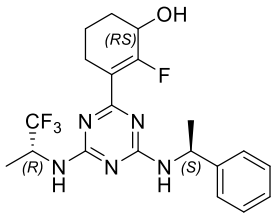
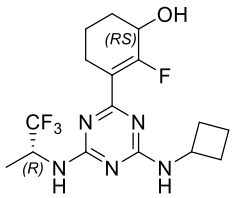
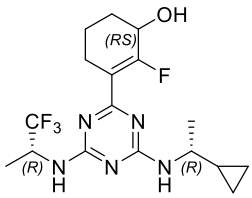
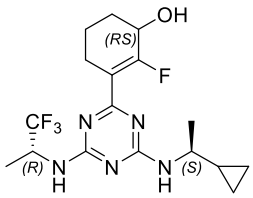
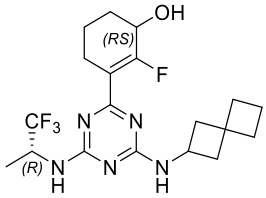
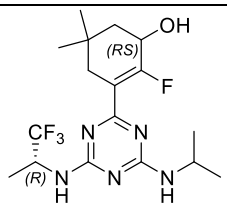
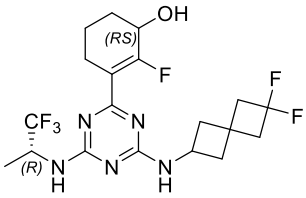
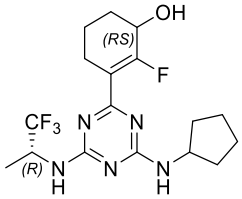
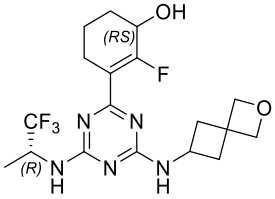
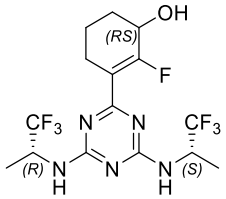
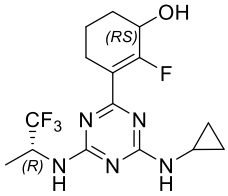
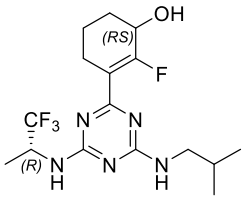
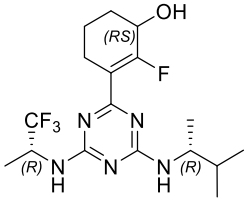


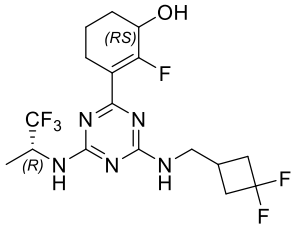
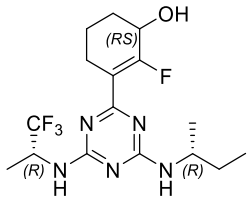
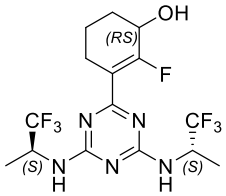
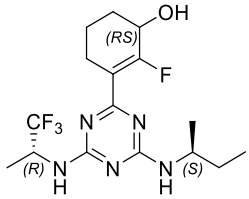
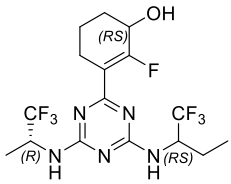
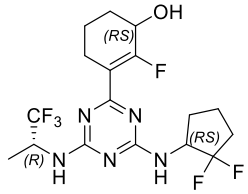
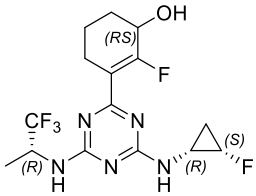
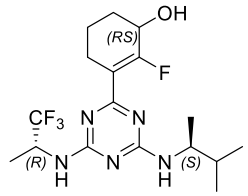
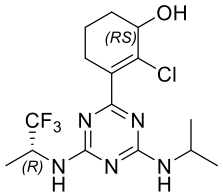
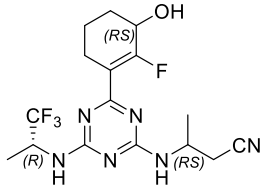
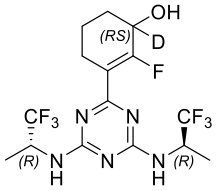
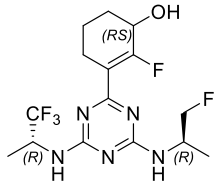
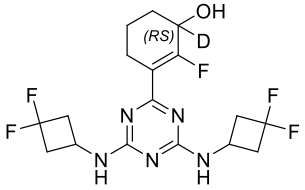
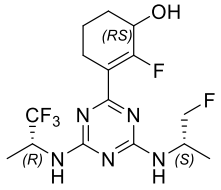
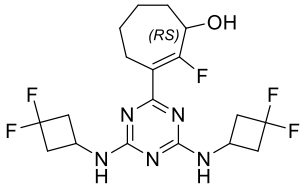
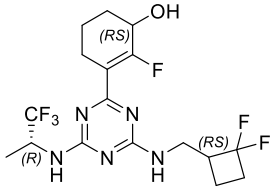
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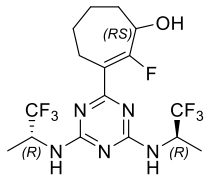
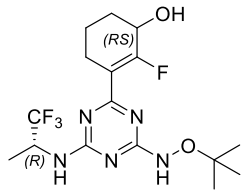
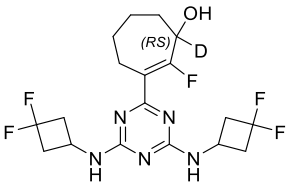
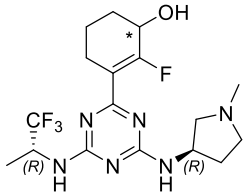
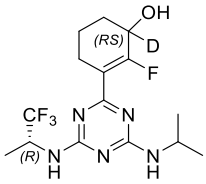
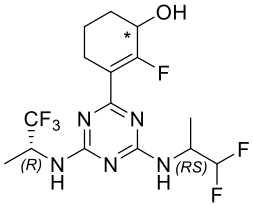
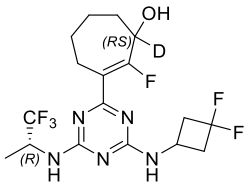
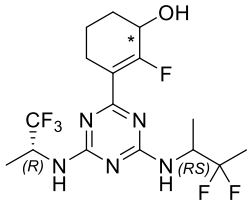
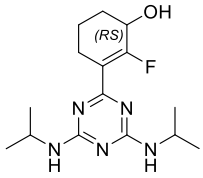
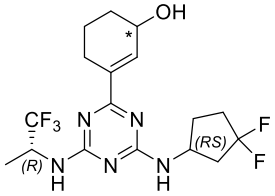
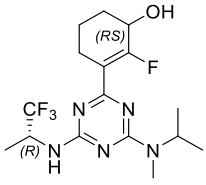
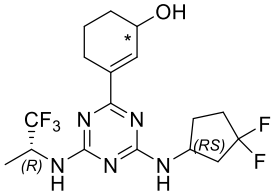
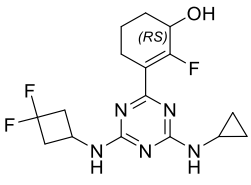
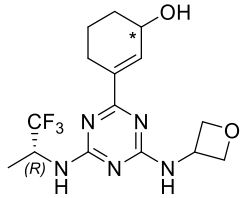
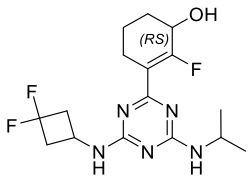
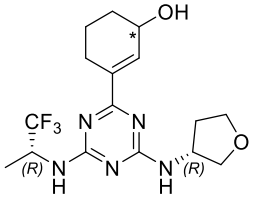
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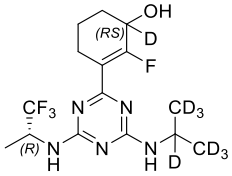
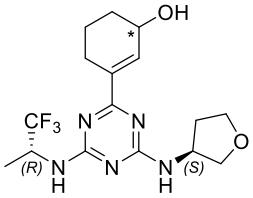
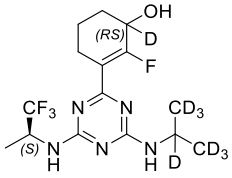
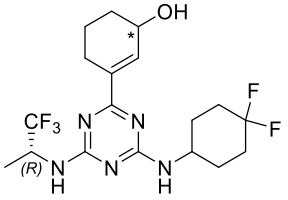
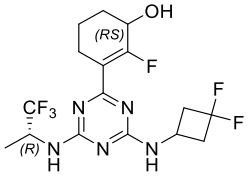
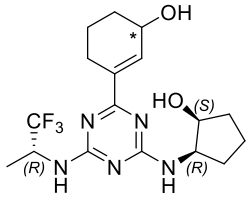
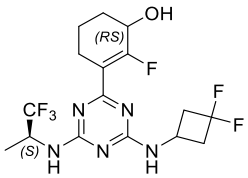
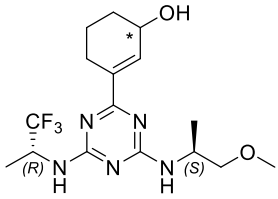
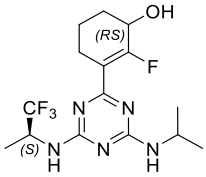
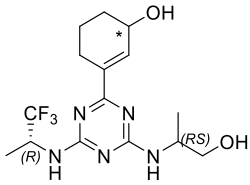
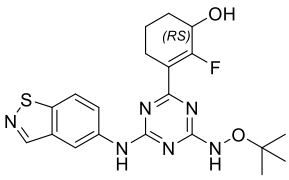
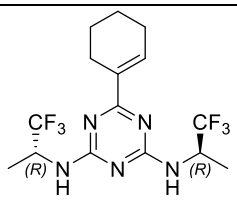
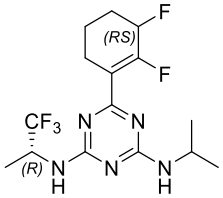
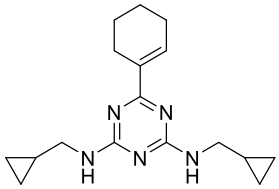
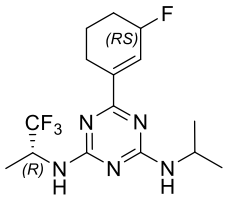
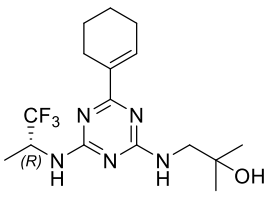
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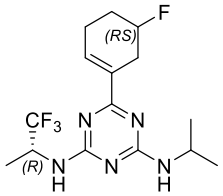
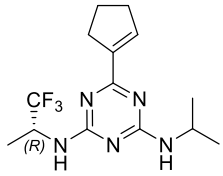
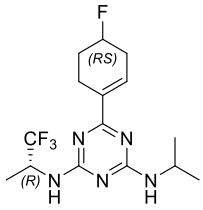
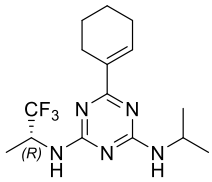
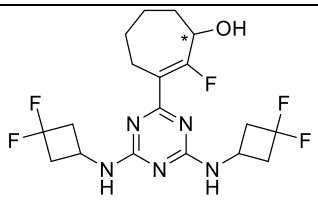
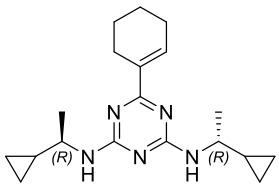
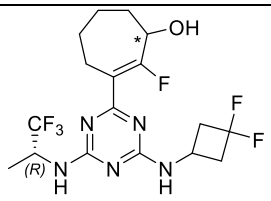
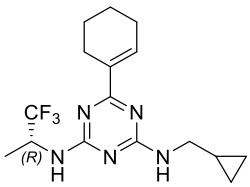
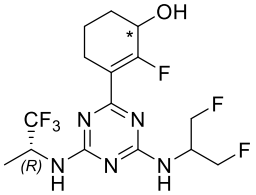
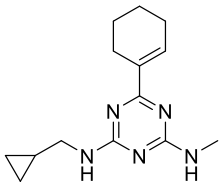
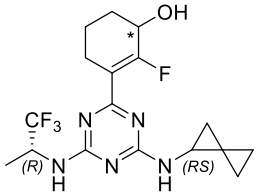
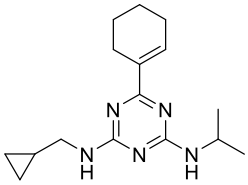
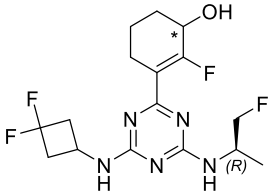
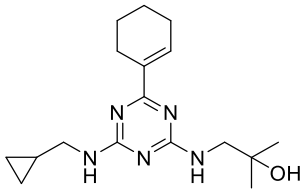
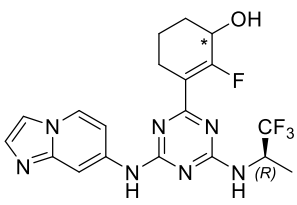
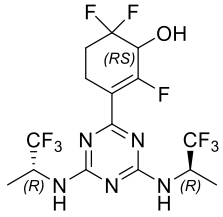
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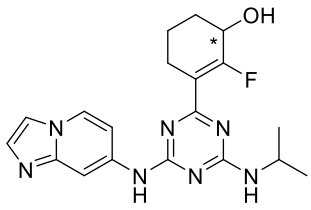
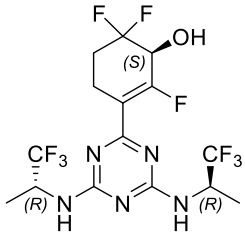
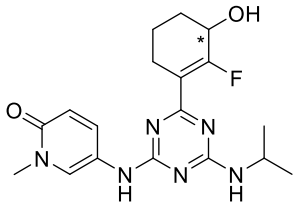
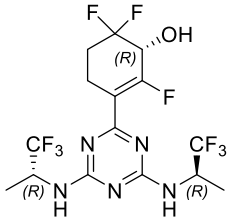
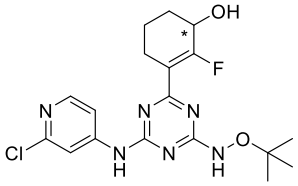
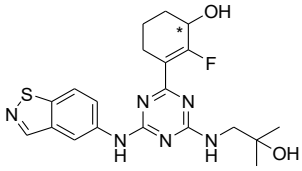
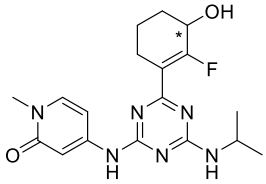
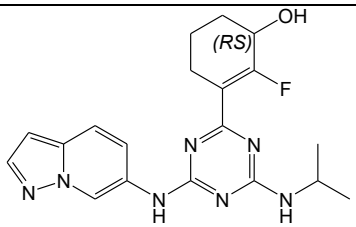
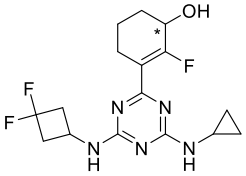
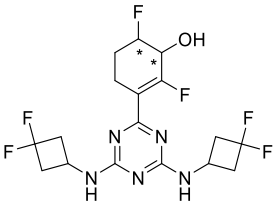
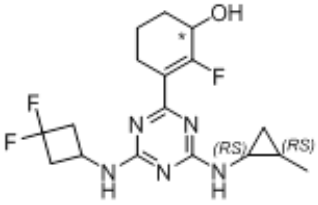
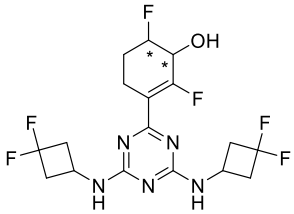
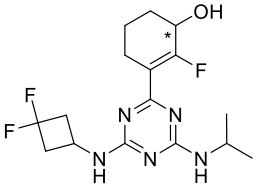
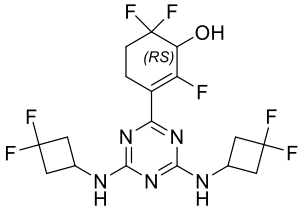
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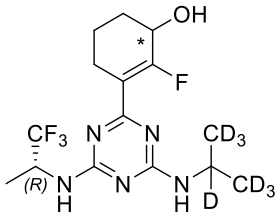
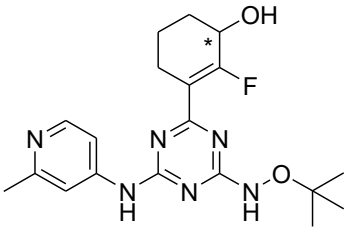
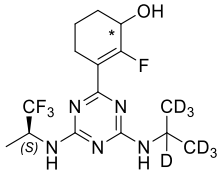
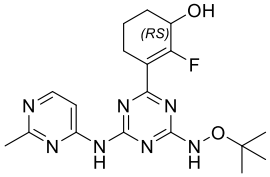
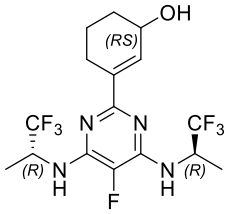
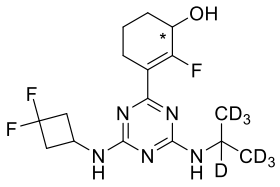
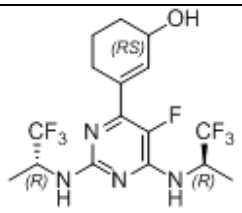
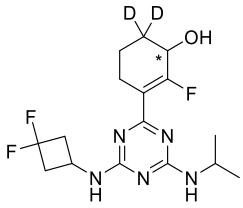
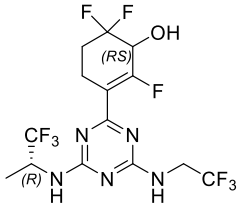
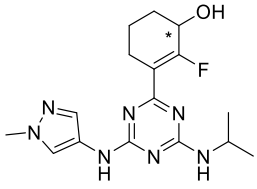
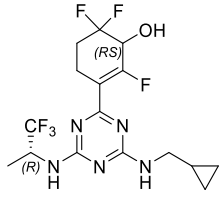
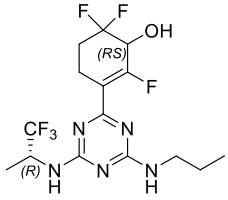
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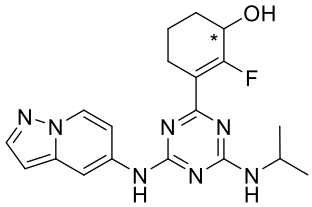
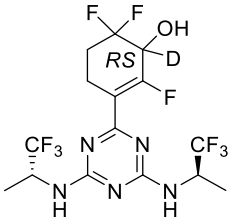
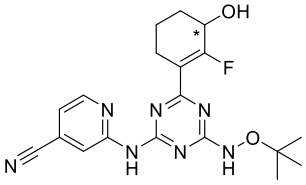
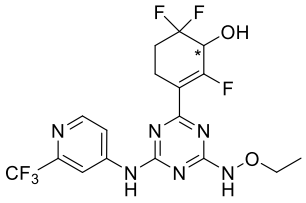
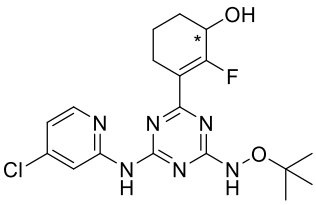
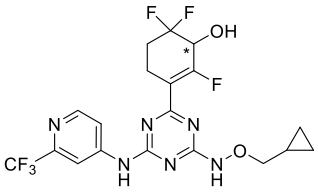
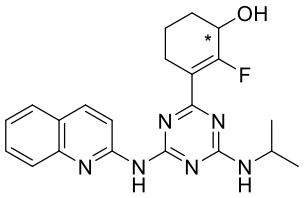
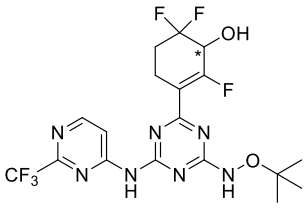
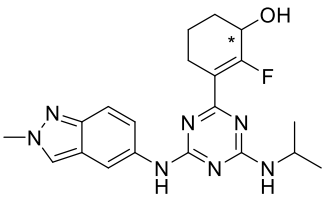
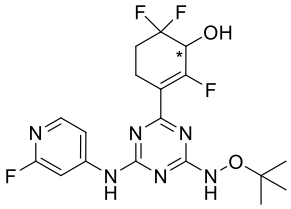
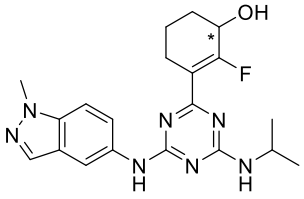
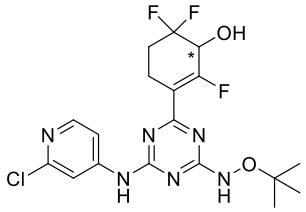
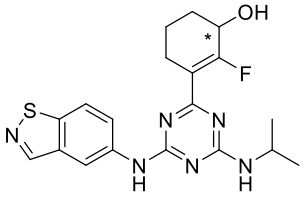
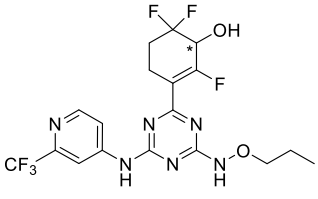
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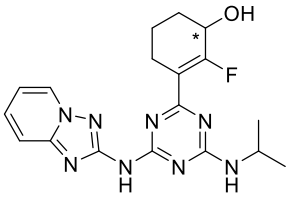
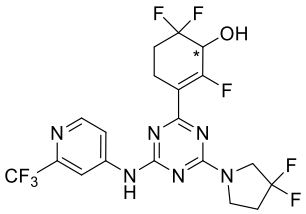
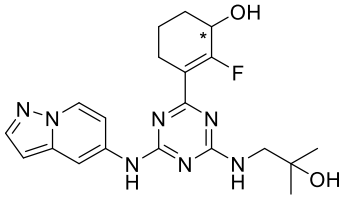
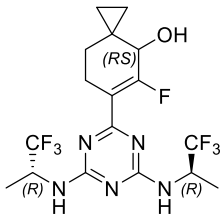
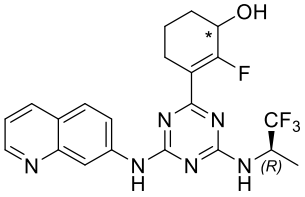
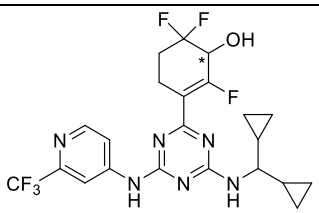
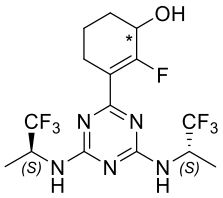
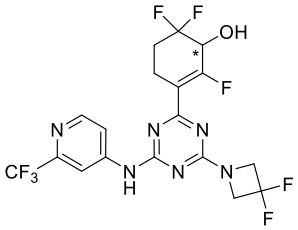
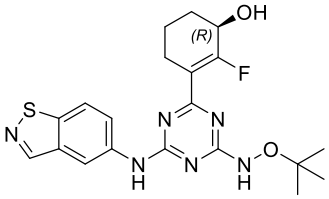
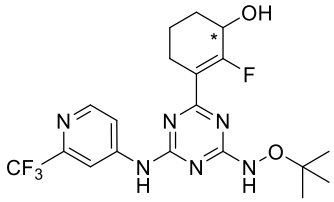
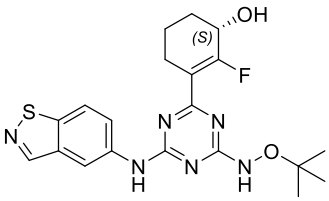
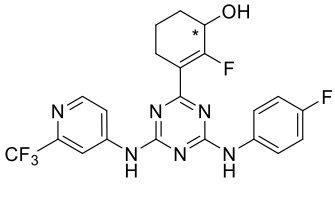
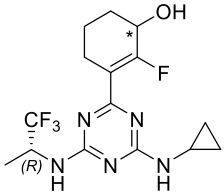
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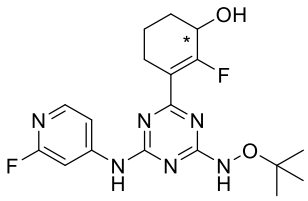
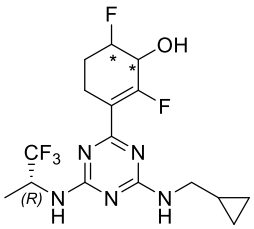
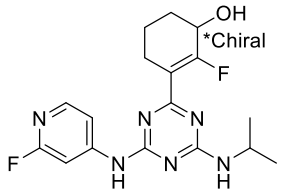
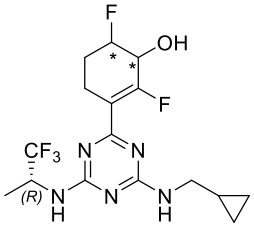
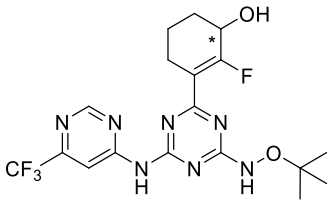
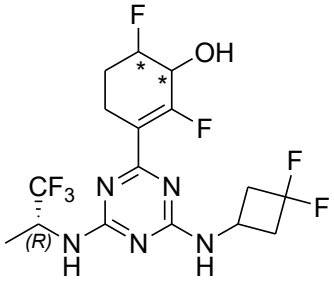
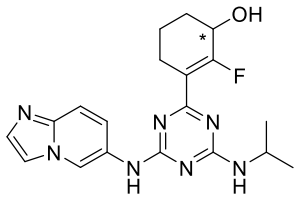
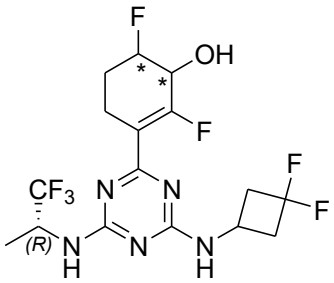
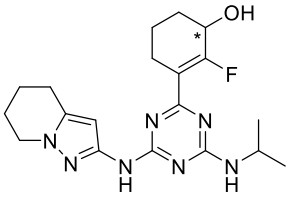
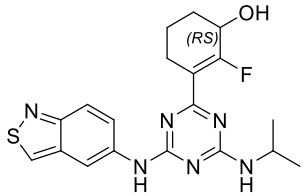
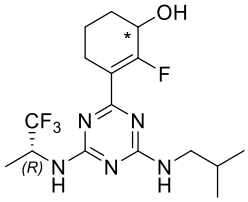
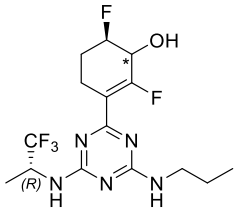
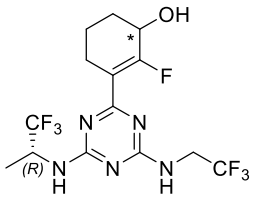
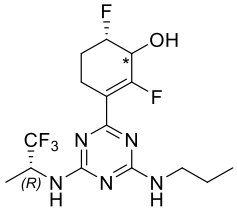
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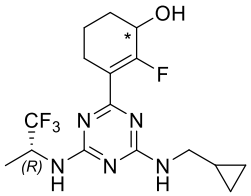
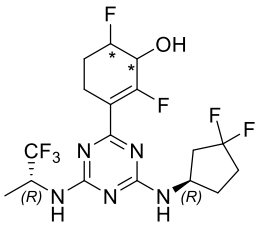
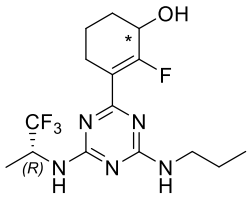
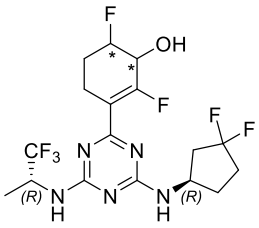
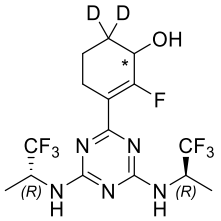
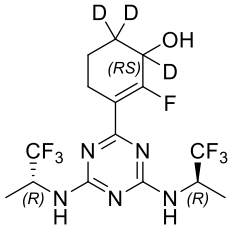
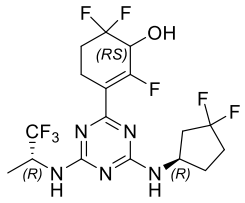
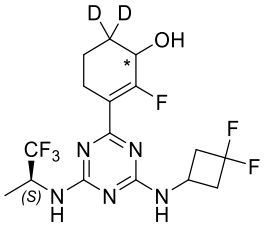
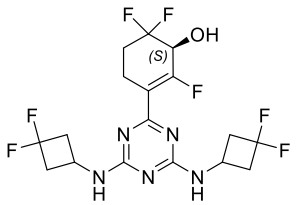
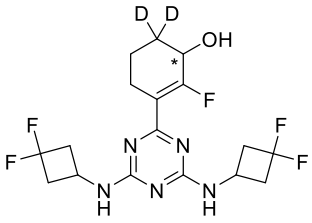
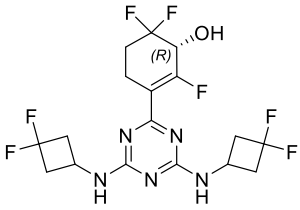
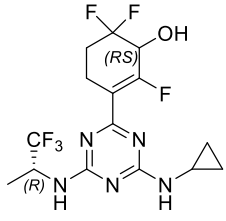
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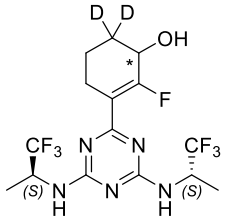
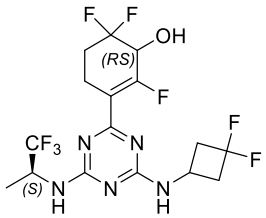
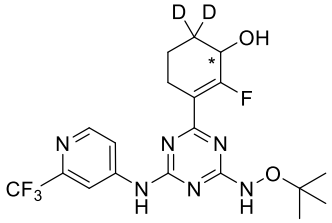
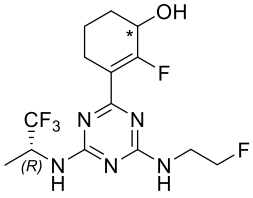
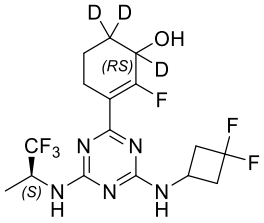
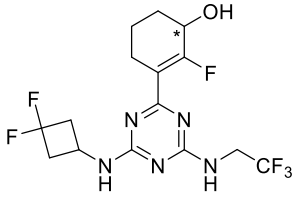
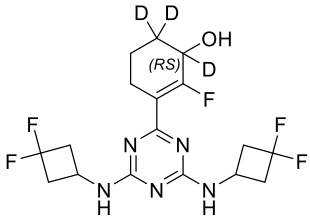
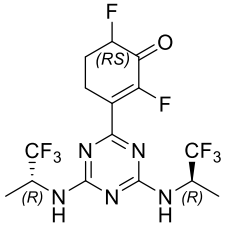
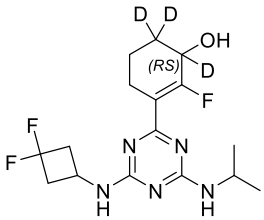
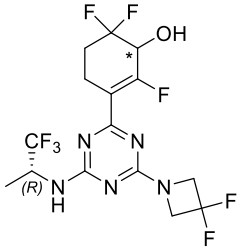
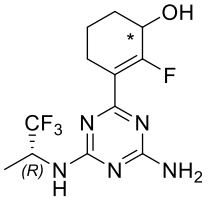
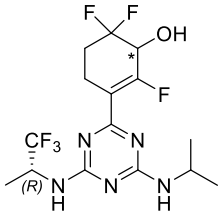
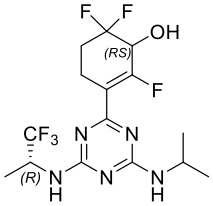
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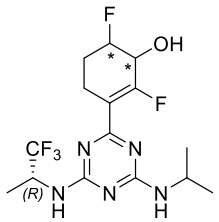
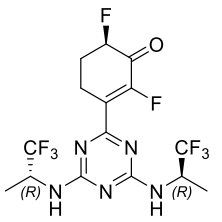
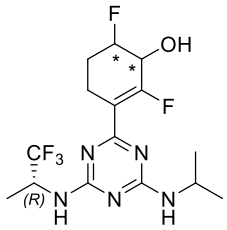
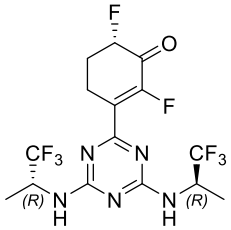
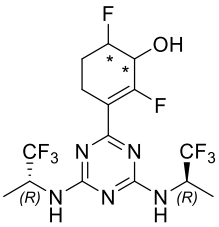
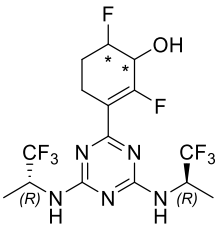
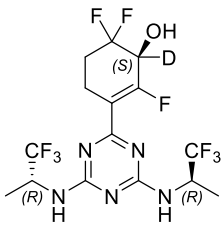
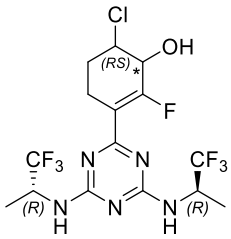
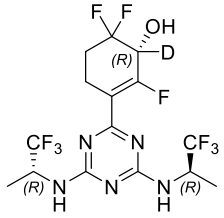
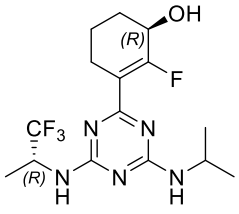
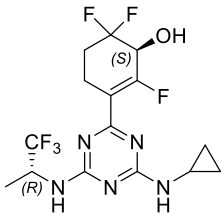
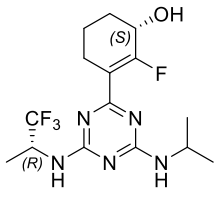
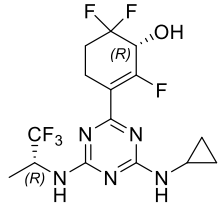
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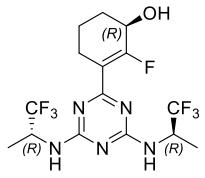
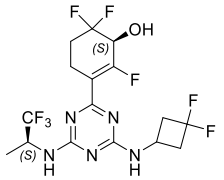
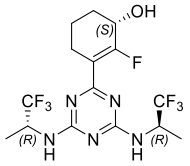
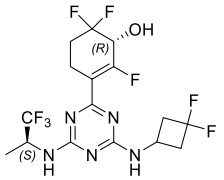
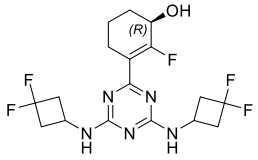
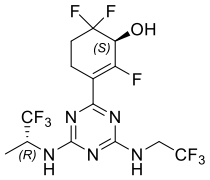
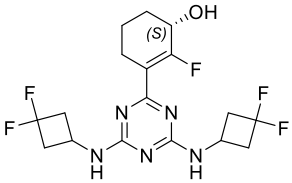
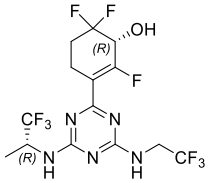
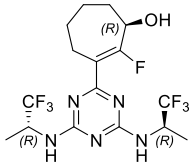
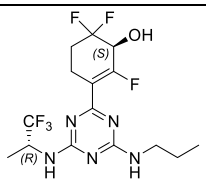
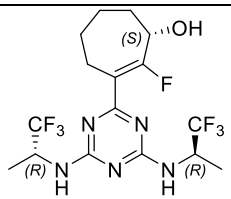
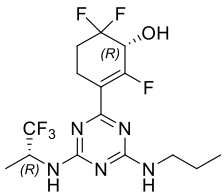
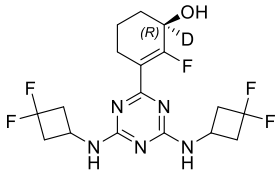
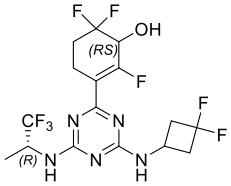
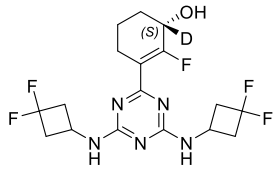
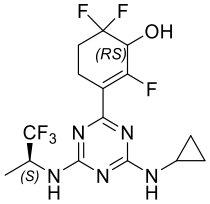
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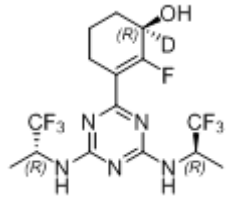
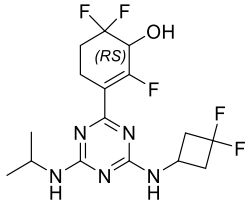
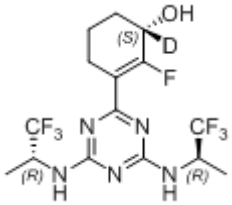
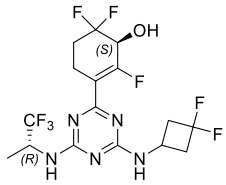
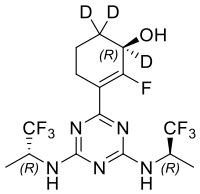
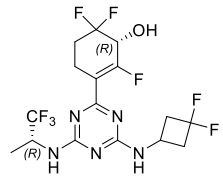
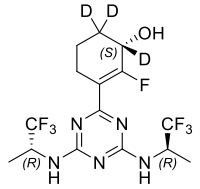
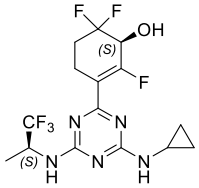
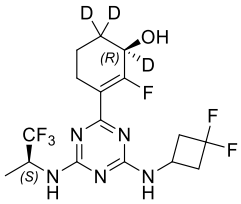
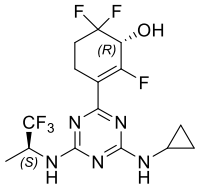
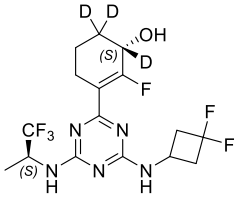
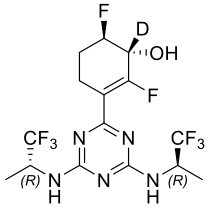
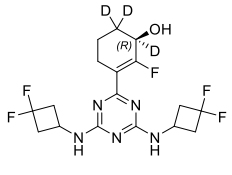
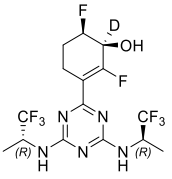
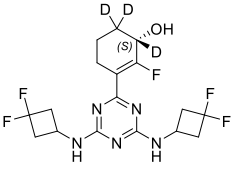
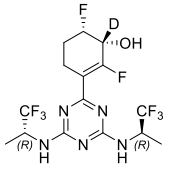
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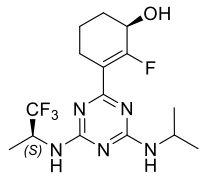
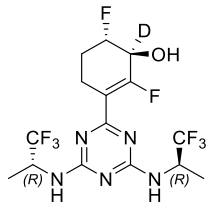
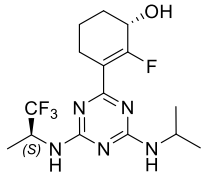
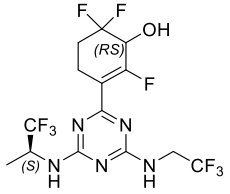
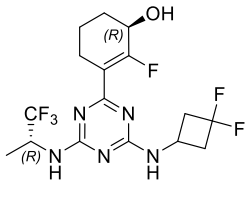
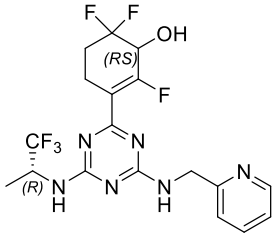
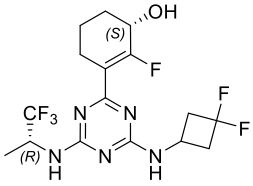
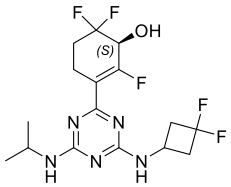
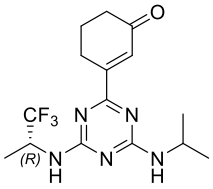
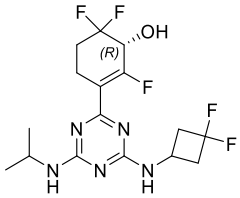
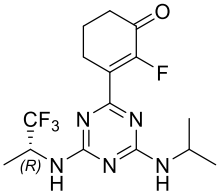
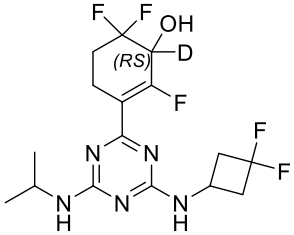
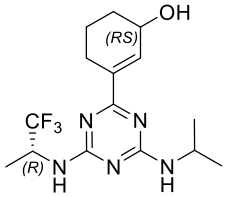
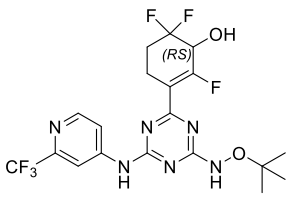
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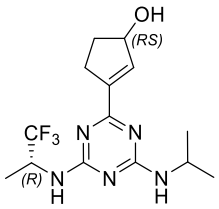
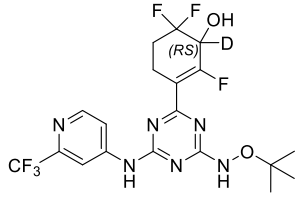
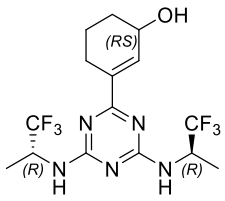
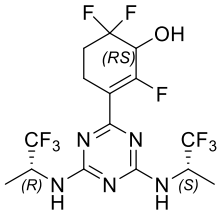
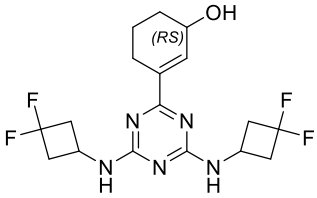
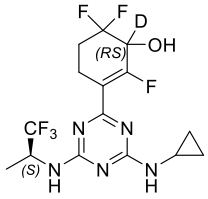
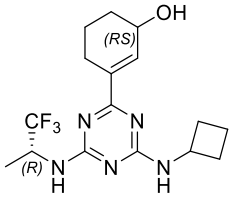
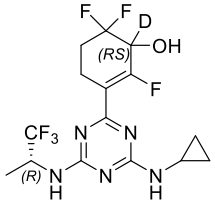
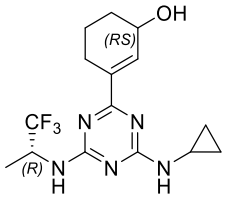
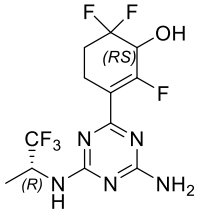
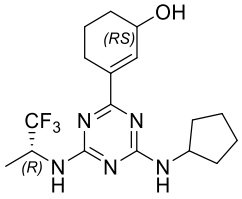
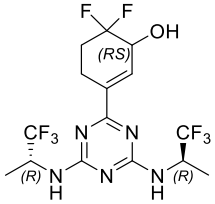
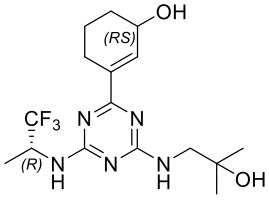
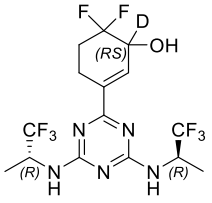
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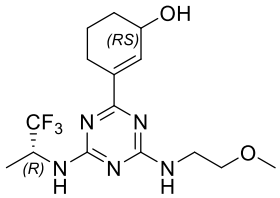
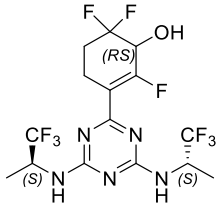
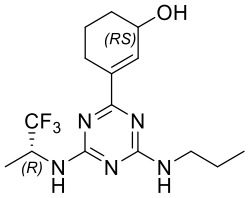
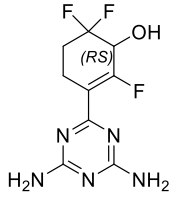
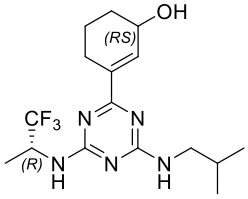
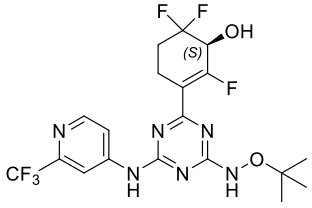
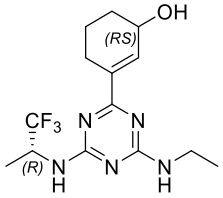
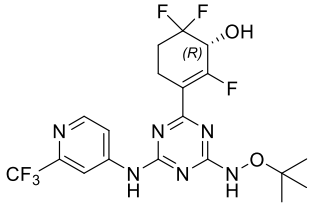
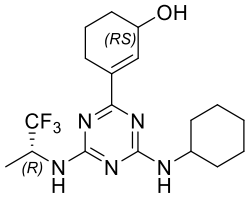
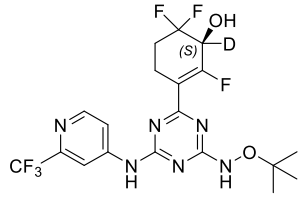
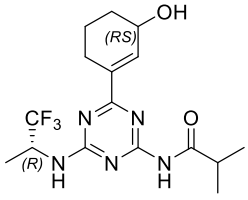
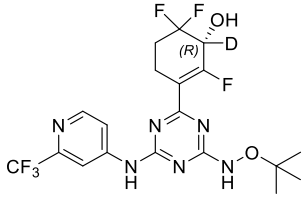
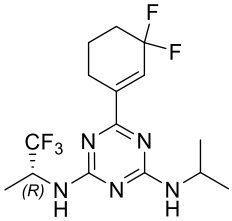
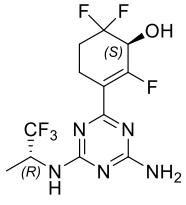
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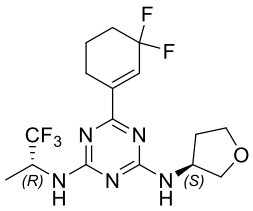
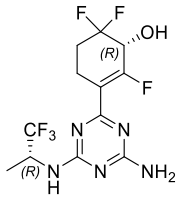
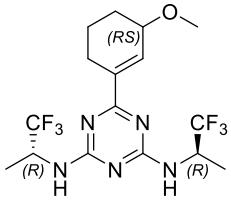
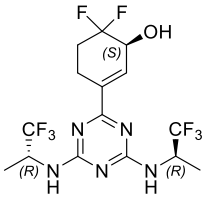
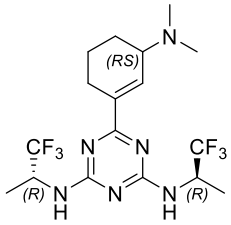
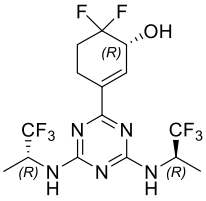
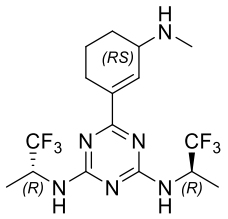
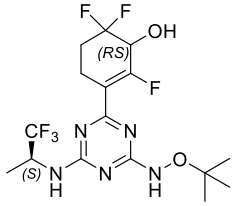
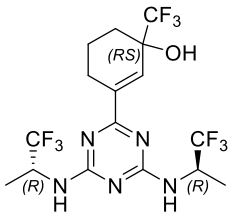
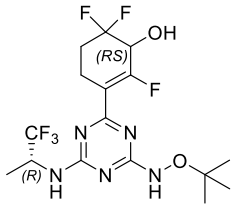
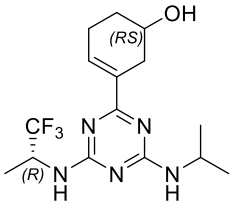
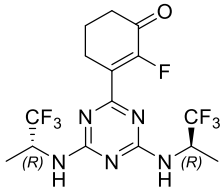
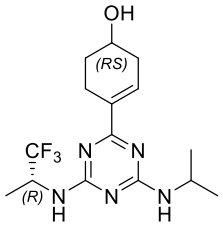
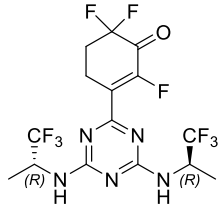
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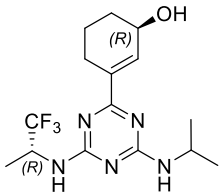
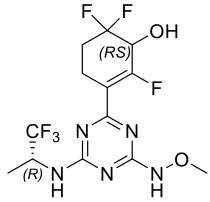
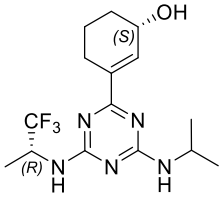
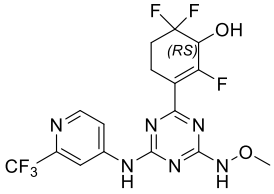
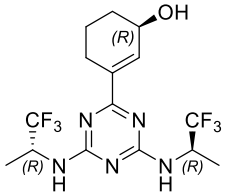
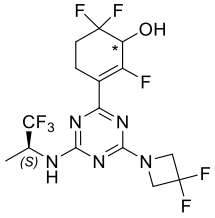
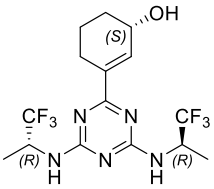
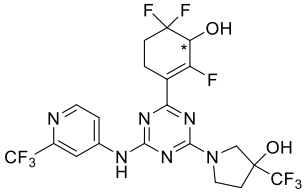
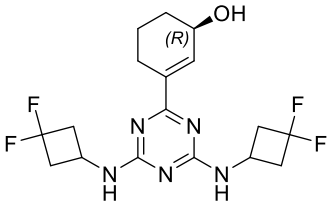
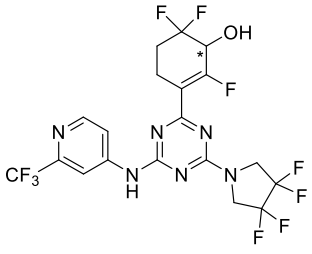
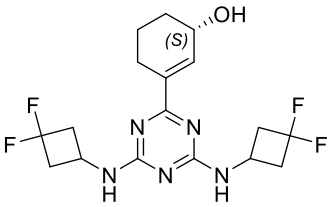
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or a pharmaceutically acceptable salt thereof.

18. A pharmaceutical composition comprising the compound of any one of claims 1-17, or a pharmaceutically acceptable salt thereof, and optionally comprising at least one pharmaceutically acceptable excipient.

19. A use of a compound of any one of claims 1-17 or a pharmaceutically acceptable salt thereof in the manufacture of a medicament for treating a disease induced by IDH mutation in a subject wherein, the disease induced by IDH mutation is cancer, which is chosen from solid tumors, neurogliocytoma, or hematological malignant tumor.

20. The use of claim 19, wherein the cancer is chosen from leukemia, lymphoma, or myeloma.

21. The use of claim 19, wherein, the cancer is chosen from acute myeloid leukemia (AML), acute promyelocytic leukemia (APL), glioblastoma (GBM), myelodysplastic syndrome (MDS), myeloproliterative neoplasms (MPN), cholangiocarcinoma, chondrosarcoma, giant cell tumor, intestinal cancer, melanoma, lung cancer, or non-Hodgkin's lymphoma (NHL).

22. The use of claim 21, wherein the cancer is intrahepatic cholangiocarcinoma (IHCC).