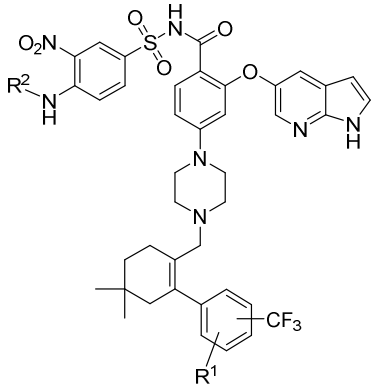
CLAIMS

1. A compound of formula I, a stereoisomer thereof or a pharmaceutically acceptable salt thereof,



I

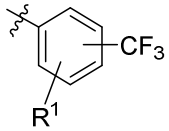
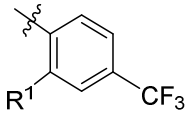
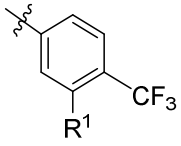
wherein,

R^1 is selected from halogen;

R^2 is selected from -C_{0-6} alkylene-R^3;

R^3 is selected from 5-6 membered heterocycloalkyl, wherein the 5-6 membered heterocycloalkyl is optionally substituted with one or two groups selected from the group consisting of 3-6 membered heterocycloalkyl, C_{3-6} cycloalkyl, -COR^a, -SO_2R^b, -$COOC_{1-6}$ alkyl, and C_{1-6} alkyl optionally substituted with halogen; and

R^a or R^b is each independently selected from the group consisting of H, 3-6 membered heterocycloalkyl, C_{3-6} cycloalkyl and C_{1-6} alkyl, wherein the C_{1-6} alkyl is optionally substituted with halogen, -CN, -$N(C_{1-6}$ alkyl$)_2$, -NHC_{1-6} alkyl or -OC_{1-6} alkyl.

2. The compound of formula I, the stereoisomer thereof or the pharmaceutically acceptable salt thereof according to claim 1, wherein the structural fragment  is selected from the group consisting of  and .

3. The compound of formula I, the stereoisomer thereof or the pharmaceutically acceptable salt thereof according to claim 1 or 2, wherein R^1 is selected from the group consisting of fluorine and chlorine.

4. The compound of formula I, the stereoisomer thereof or the pharmaceutically acceptable salt thereof according to any one of claims 1 to 3, wherein R^2 is selected from -$(CH_2)_n$-R^3, wherein n is 0, 1, 2, 3 or 4.

5. The compound of formula I, the stereoisomer thereof or the pharmaceutically acceptable salt thereof according to any one of claims 1 to 4, wherein R^3 is selected from 5-6 membered heterocycloalkyl, wherein the 5-6 membered heterocycloalkyl is optionally substituted with one or two groups at ring N atom.

6. The compound of formula I, the stereoisomer thereof or the pharmaceutically acceptable salt thereof according to any one of claims 1 to 5, wherein R^3 is selected from 5-6 membered heterocycloalkyl, wherein the 5-6 membered heterocycloalkyl is optionally substituted with one or two groups selected from the group consisting of 3-6 membered heterocycloalkyl, -COR^a, -SO_2R^b, -$COOC_{1-4}$ alkyl, and C_{1-6} alkyl optionally substituted with halogen.

7. The compound of formula I, the stereoisomer thereof or the pharmaceutically acceptable salt thereof according to any one of claims 1 to 6, wherein R^a or R^b is each independently selected from the group consisting of H, 3-6 membered heterocycloalkyl, C_{3-6} cycloalkyl and C_{1-4} alkyl, wherein the C_{1-4} alkyl is optionally substituted with halogen, -CN, -$N(C_{1-4}$ alkyl$)_2$, -NHC_{1-4} alkyl or -OC_{1-4} alkyl.

8. The compound of formula I, the stereoisomer thereof or the pharmaceutically acceptable salt thereof according to claim 7, wherein R^a or R^b is each independently selected from the group consisting of H, methyl, ethyl, isopropyl, *tert*-butyl, cyclopropyl, cyclobutyl and monooxacyclobutyl, wherein the methyl or ethyl is optionally substituted with fluorine, -CN, -OCH_3 or -$N(CH_3)_2$.

9. The compound of formula I, the stereoisomer thereof or the pharmaceutically acceptable salt thereof according to claim 8, wherein R^a or R^b is each independently selected from the group consisting of H, methyl, ethyl, isopropyl, *tert*-butyl, trifluoromethyl, pentafluoroethyl, $-CH_2OCH_3$, $-CH_2CN$ and $-CH_2N(CH_3)_2$, cyclopropyl, cyclobutyl and monooxacyclobutyl.

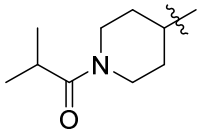
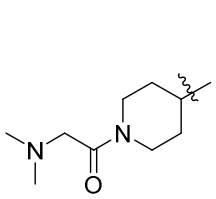
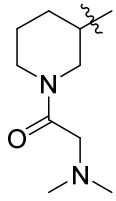
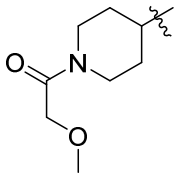
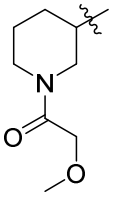
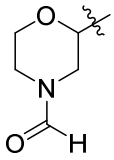
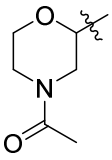
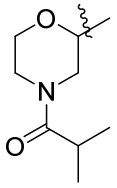
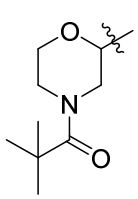
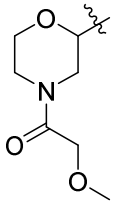
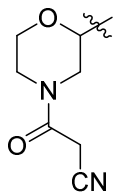
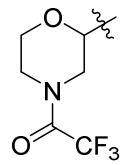
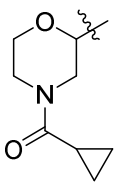
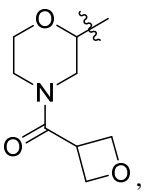
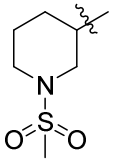
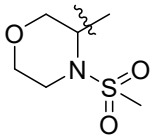
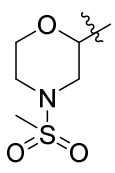
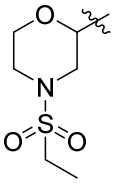
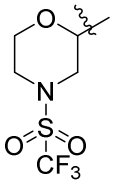
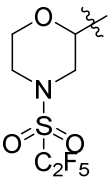
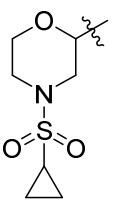
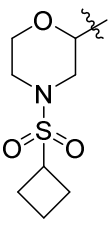
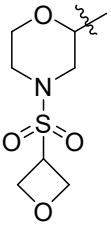
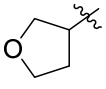
10. The compound of formula I, the stereoisomer thereof or the pharmaceutically acceptable salt thereof according to claim 7, wherein R^a or R^b is each independently selected from C_{1-4} alkyl optionally substituted with $-OC_{1-4}$ alkyl.

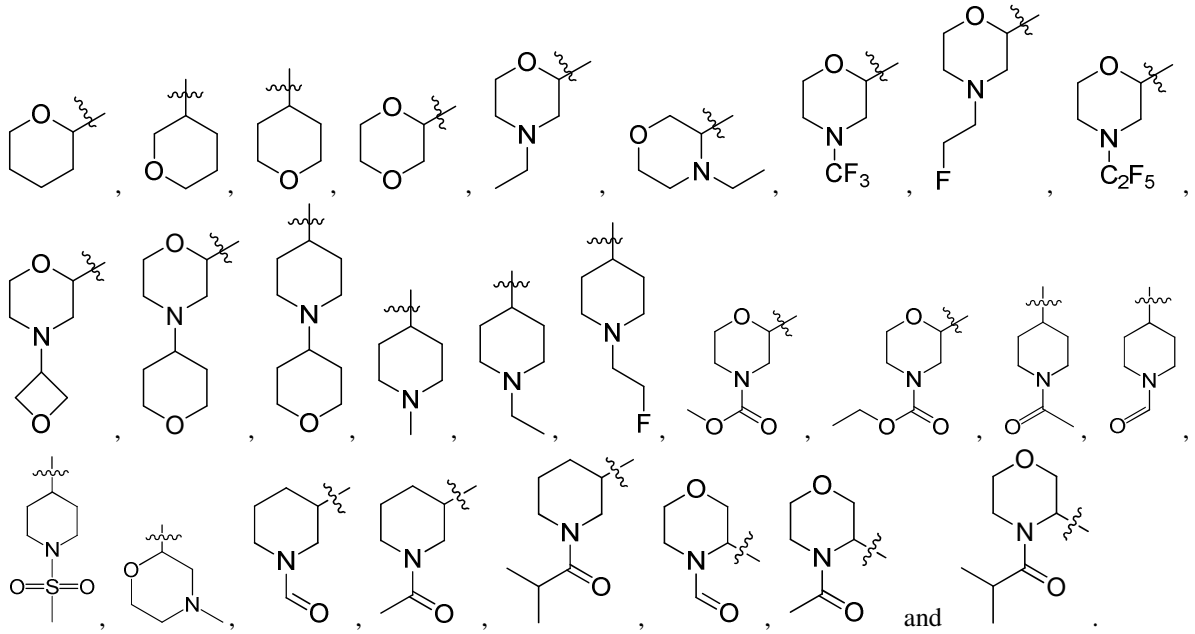
11. The compound of formula I, the stereoisomer thereof or the pharmaceutically acceptable salt thereof according to claim 10, wherein R^a or R^b is each independently selected from the group consisting of methyl, isopropyl, and $-CH_2OCH_3$.

12. The compound of formula I, the stereoisomer thereof or the pharmaceutically acceptable salt thereof according to any one of claims 1 to 6, wherein R^3 is selected from 5-6 membered heterocycloalkyl, wherein the 5-6 membered heterocycloalkyl is optionally substituted with -C(O)H, $-COCH_3$, $-COCH(CH_3)_2$, $-COC(CH_3)_3$, $-COCF_3$, $-COCH_2CN$, $-COCH_2OCH_3$, $-COCH_2N(CH_3)_2$, $-SO_2CH_3$, $-SO_2CH_2CH_3$, $-SO_2CF_3$, $-SO_2C_2F_5$, methyl, ethyl, $-CF_3$, $-CH_2CH_2F$, $-C_2F_5$, tetrahydropyran, monooxacyclobutane, $-SO_2$-cyclopropane, -CO-cyclopropane, -CO-monooxacyclobutane, $-SO_2$-monooxacyclobutane, $-SO_2$-cyclobutane, $-COOCH_2CH_3$ or $-COOCH_3$.

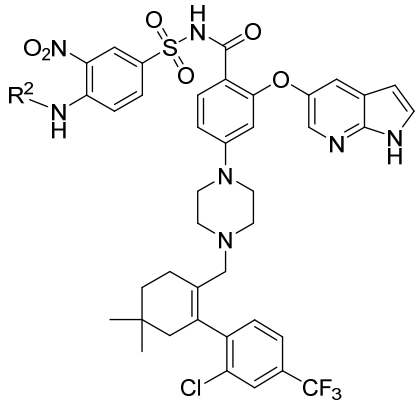
13. The compound of formula I, the stereoisomer thereof or the pharmaceutically acceptable salt thereof according to claim 12, wherein R^3 is selected from the group consisting of tetrahydropyran, piperidine, morpholine and dioxane, wherein the tetrahydropyran, piperidine, morpholine or dioxane is optionally substituted with $-COCH_3$, $-COCH(CH_3)_2$, $-COCH_2OCH_3$, $-SO_2CH_3$, $-SO_2CH_2CH_3$, -CO-cyclopropane, $-COCH_2CN$, $-COCF_3$, $-COCH_2N(CH_3)_2$, methyl, ethyl, $-CH_2CH_2F$, $-COOCH_2CH_3$ or $-COOCH_3$.

14. The compound of formula I, the stereoisomer thereof or the pharmaceutically acceptable salt thereof according to claim 13, wherein R^3 is selected from the group consisting of tetrahydropyran, piperidine, morpholine and dioxane, wherein the tetrahydropyran, piperidine, morpholine or dioxane is optionally substituted with $-COCH_3$, $-COCH(CH_3)_2$, $-COCH_2OCH_3$, $-SO_2CH_3$, methyl, ethyl, $-CH_2CH_2F$, $-COOCH_2CH_3$ or $-COOCH_3$.

15. The compound of formula I, the stereoisomer thereof or the pharmaceutically acceptable salt thereof according to claim 1, wherein R^3 is selected from the group consisting of , , , , , , , , , , , , , , , , , , , , , , , , .



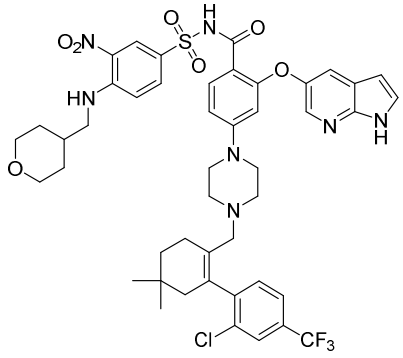
16. The compound of formula I, the stereoisomer thereof or the pharmaceutically acceptable salt thereof according to claim 1, selected from a compound of formula II, a stereoisomer thereof or a pharmaceutically acceptable salt thereof:

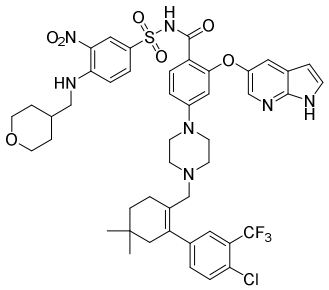


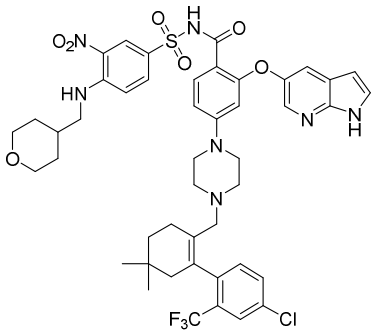
II

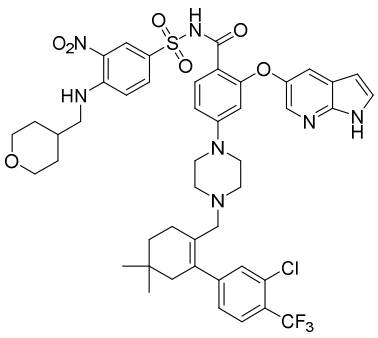
, wherein R^2 is defined as in claim 1.

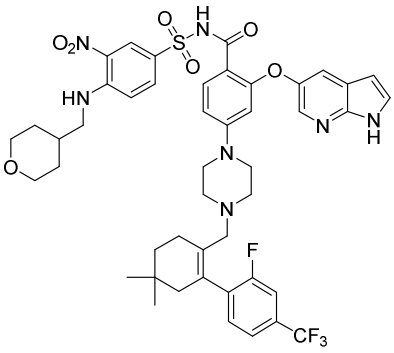
17. A compound of the followingformulae, a stereoisomer thereof or a pharmaceutically acceptable salt thereof:

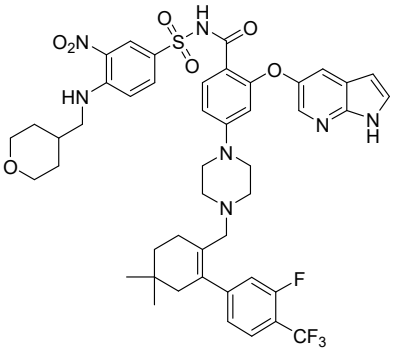


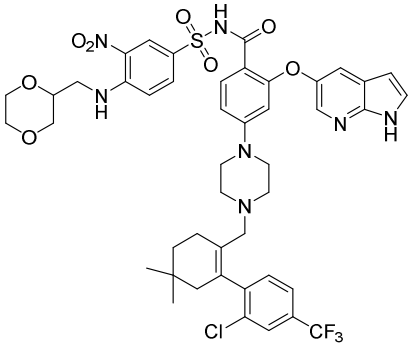


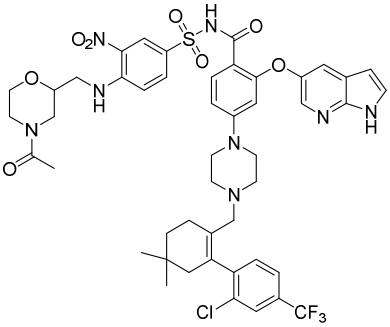


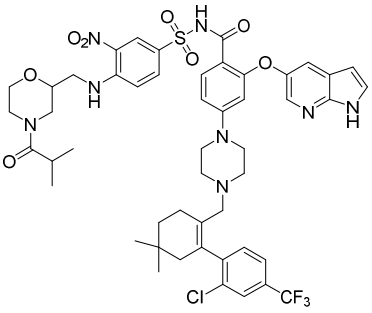


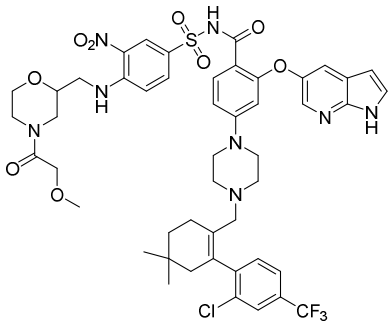


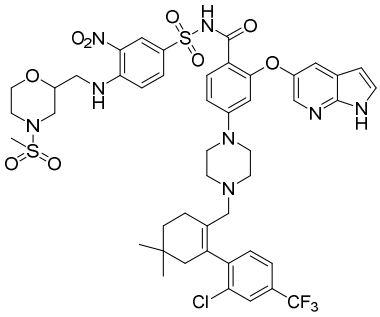


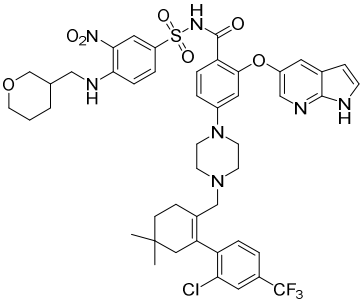


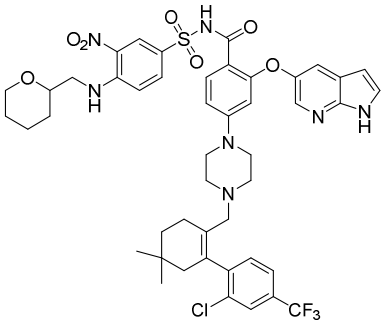


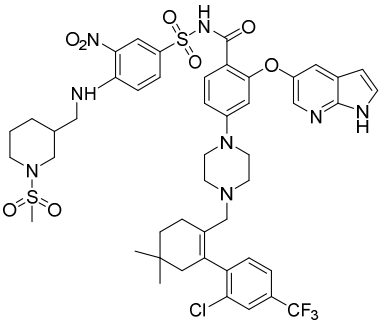


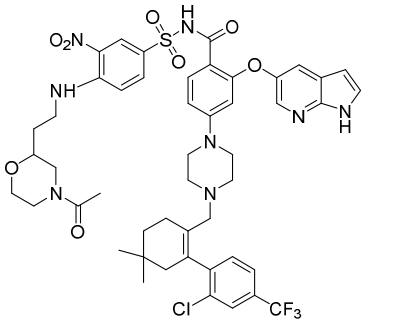


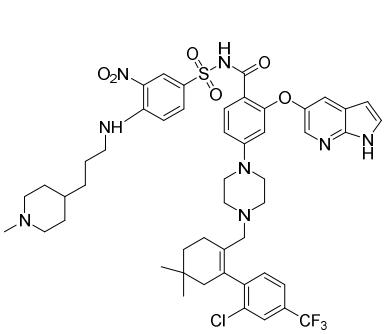


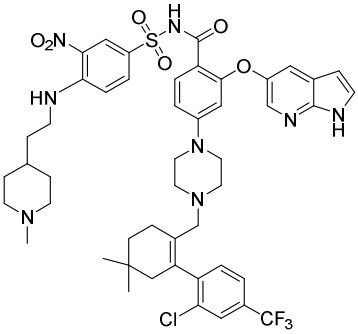


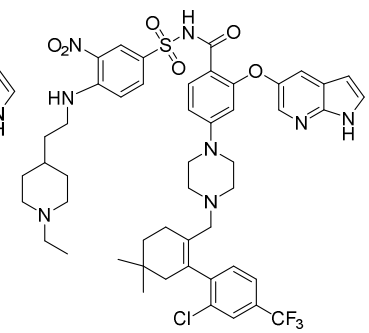


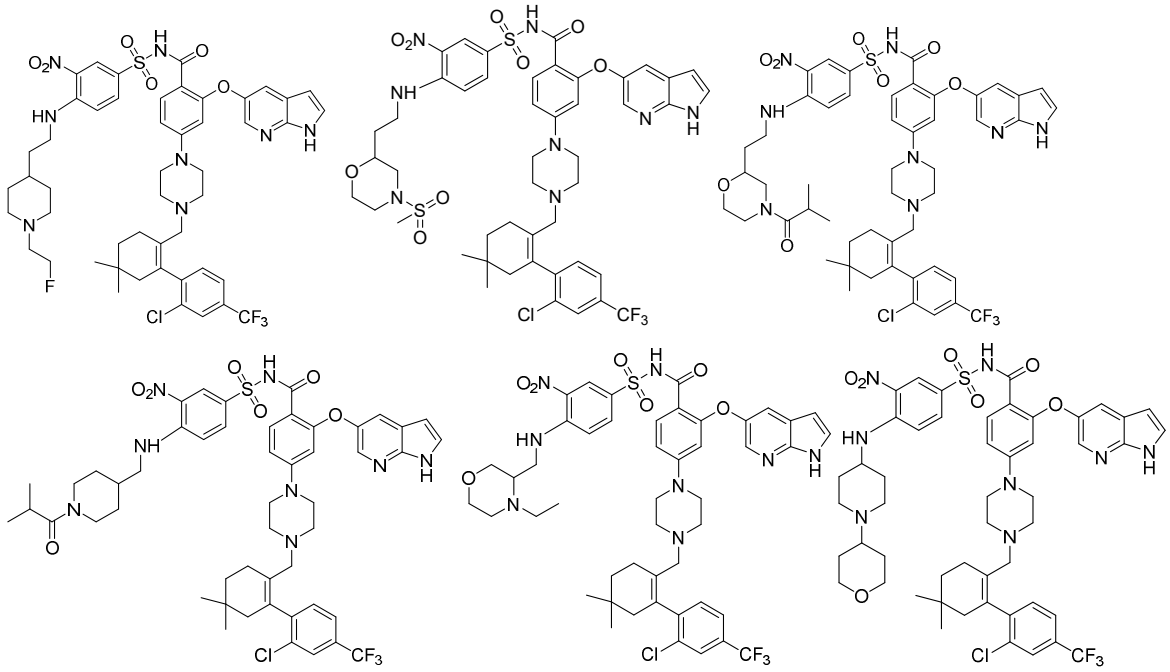




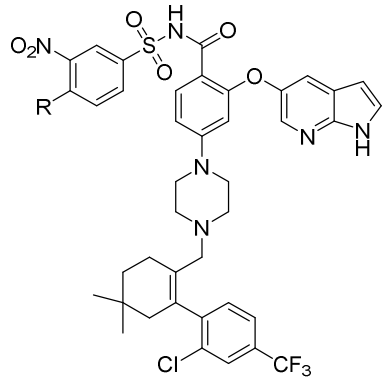




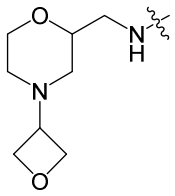
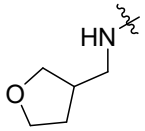
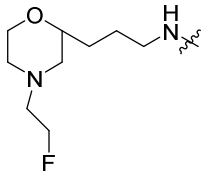
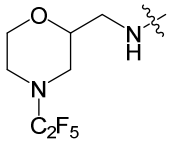
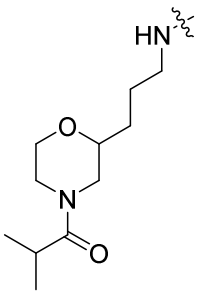
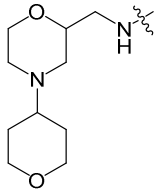
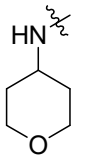
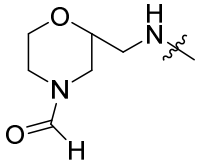
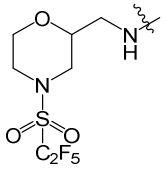
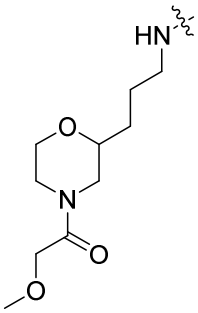


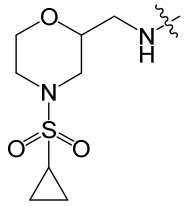
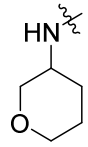
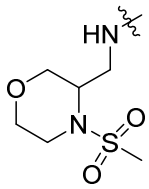
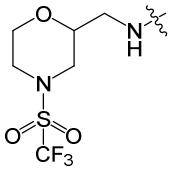
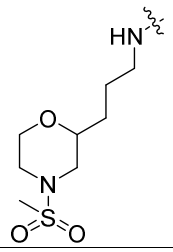
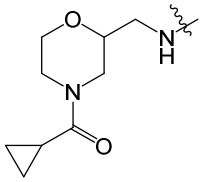
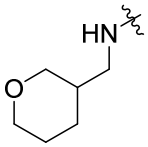
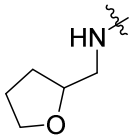
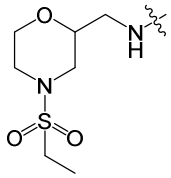
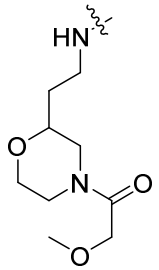
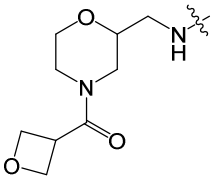
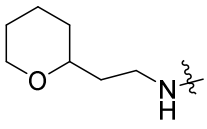
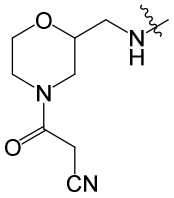
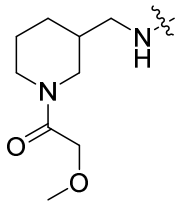
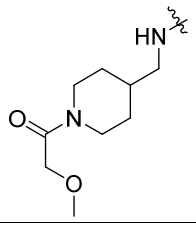
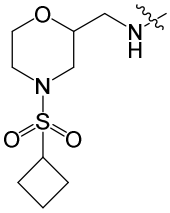
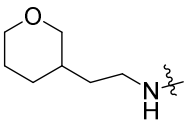
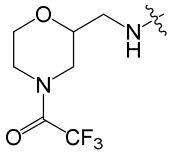
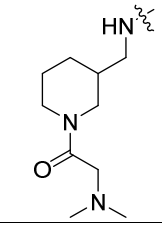
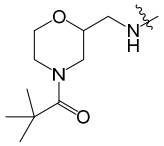
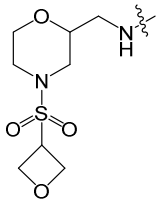
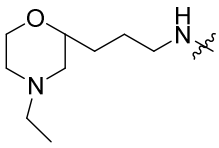
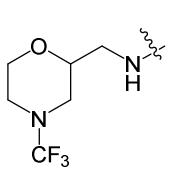
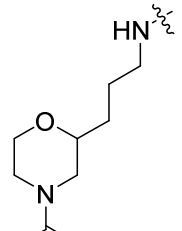
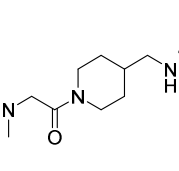
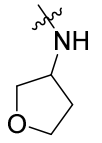
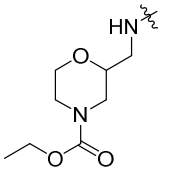
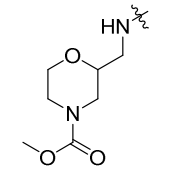
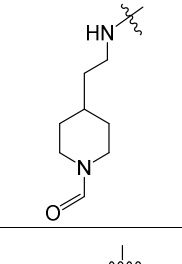
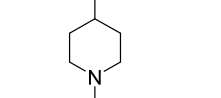
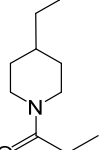
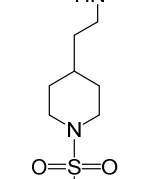
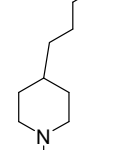
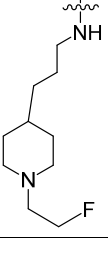
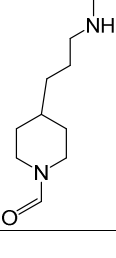


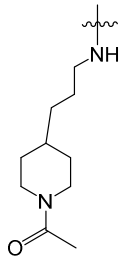
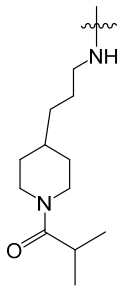
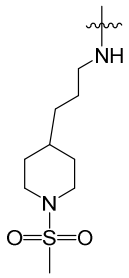
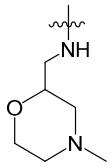
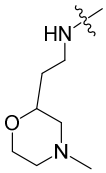
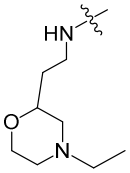
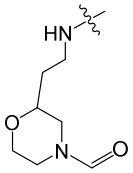
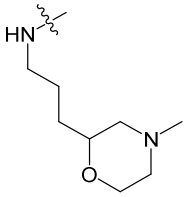
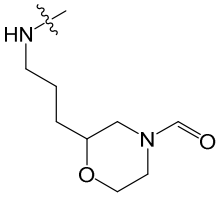
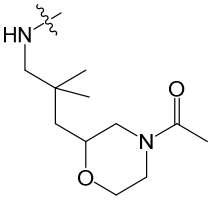
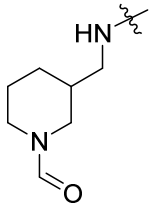
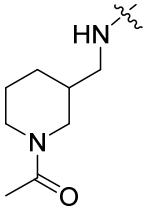
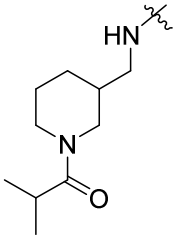
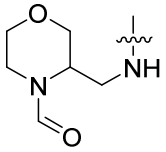
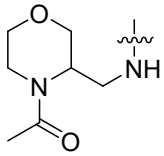
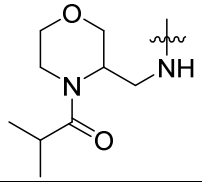
; or a compound of the following formula:



, wherein R is independently selected from the group consisting of:

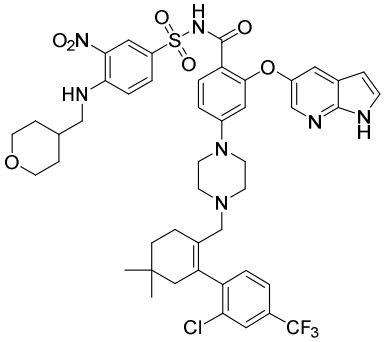
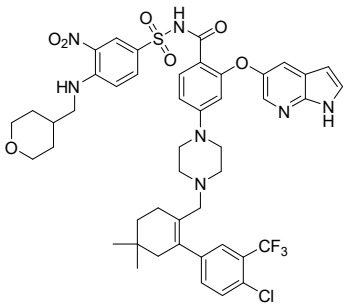
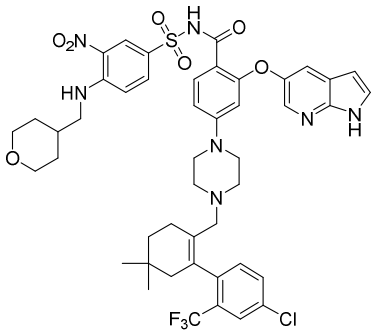
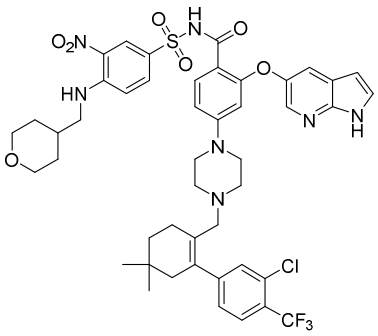
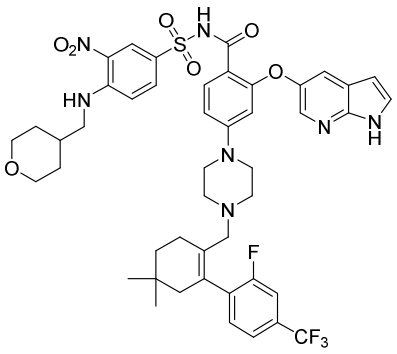
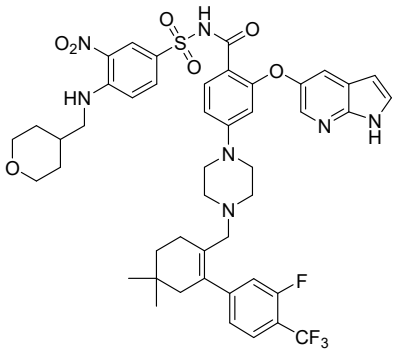
				
				

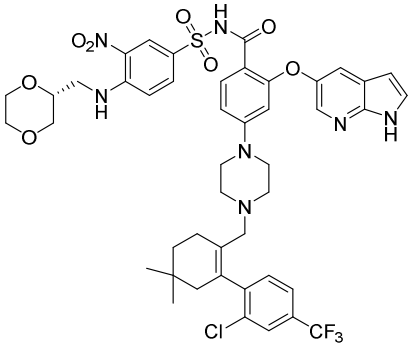
				
				
				
				
				
				
				

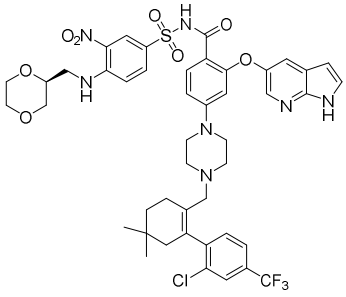
				
				
				
				

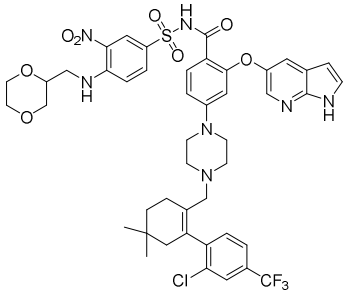
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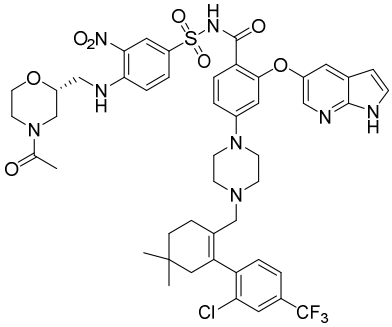
18. A compound of the following formulae or a pharmaceutically acceptable salt thereof:

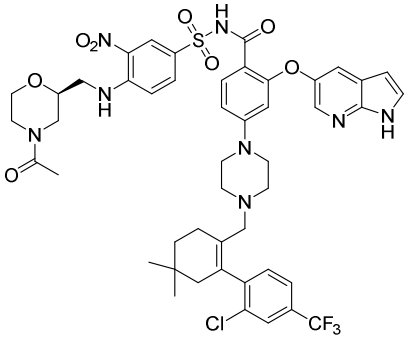







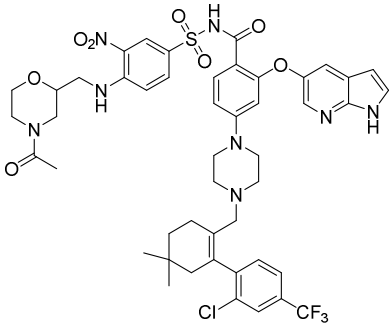


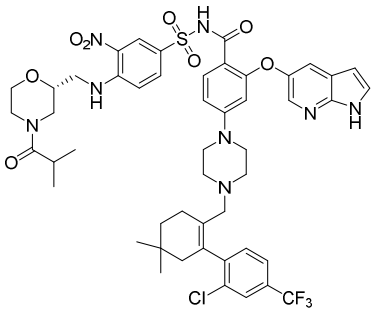


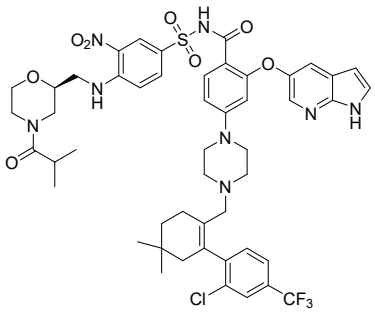


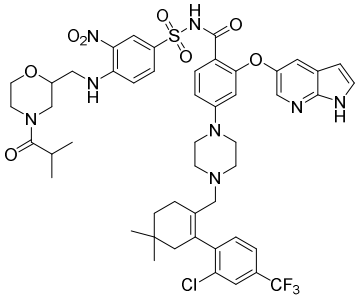


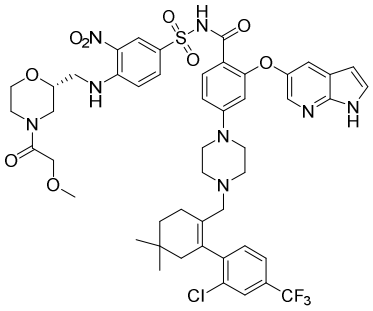


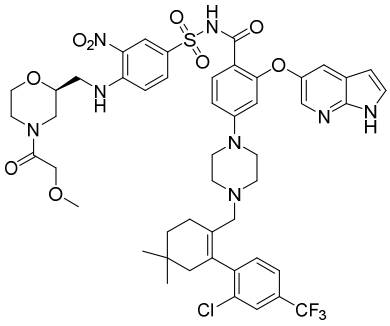


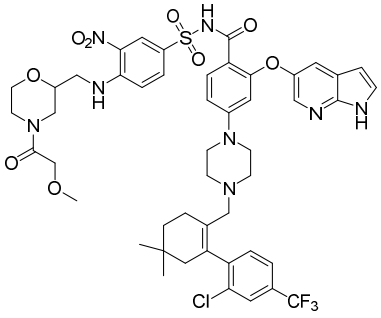


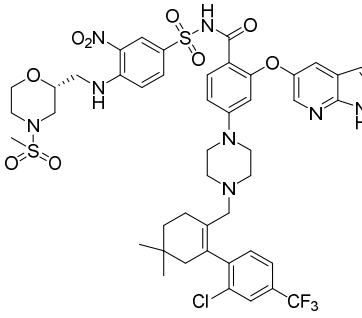


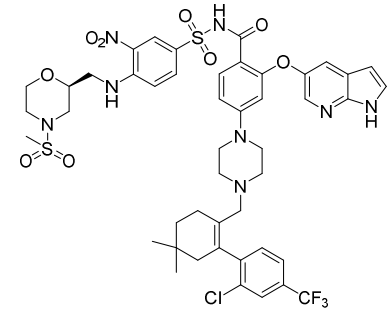


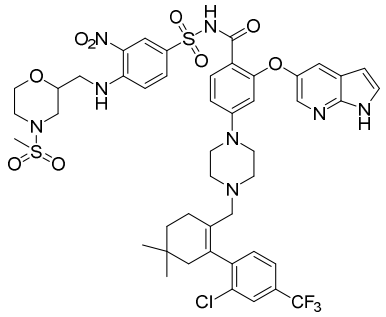


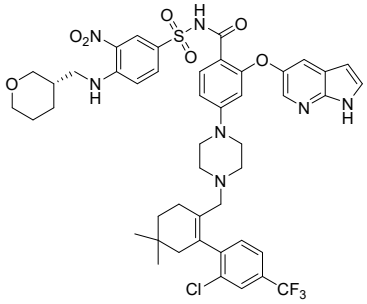


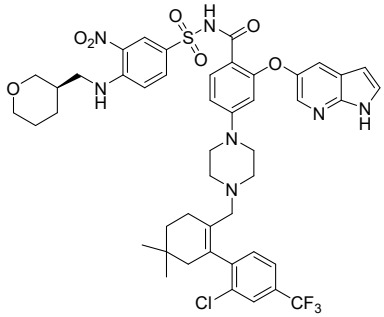


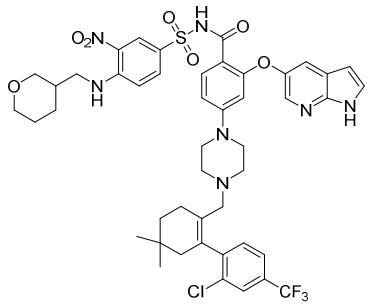


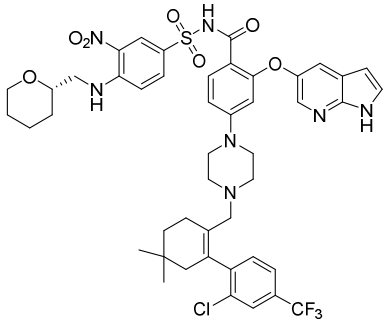


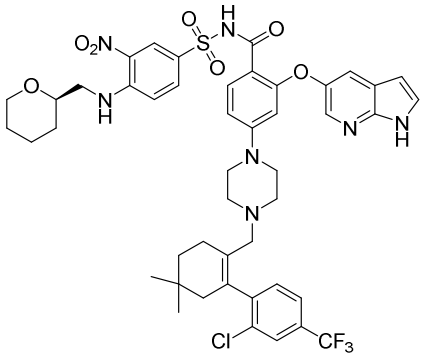


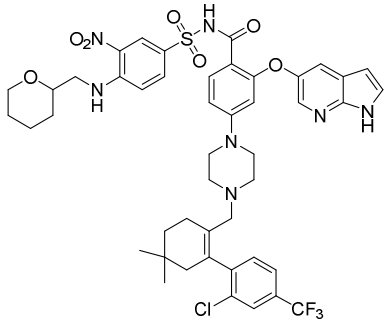


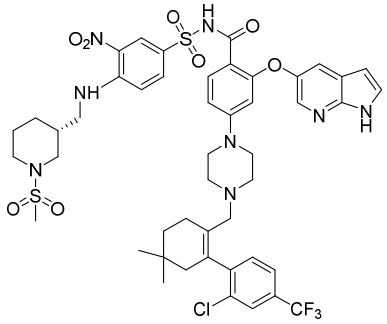


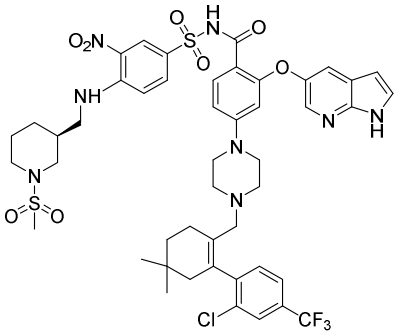


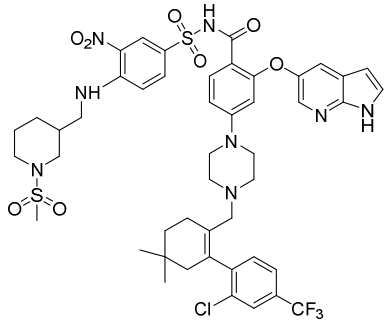


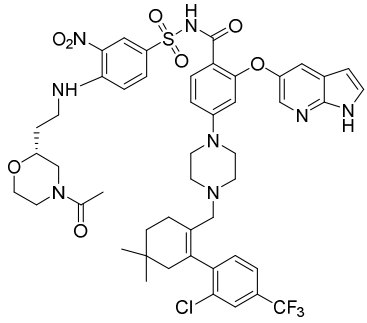


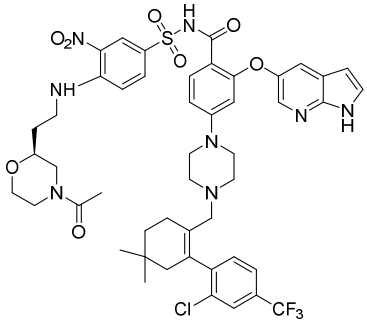


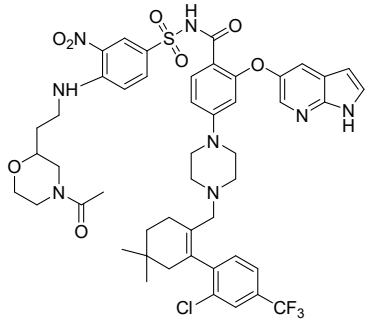


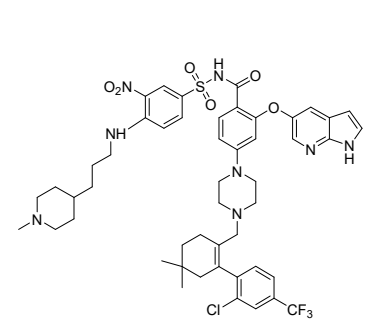


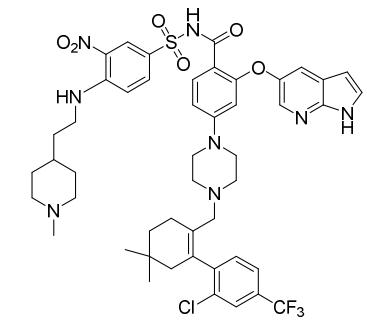


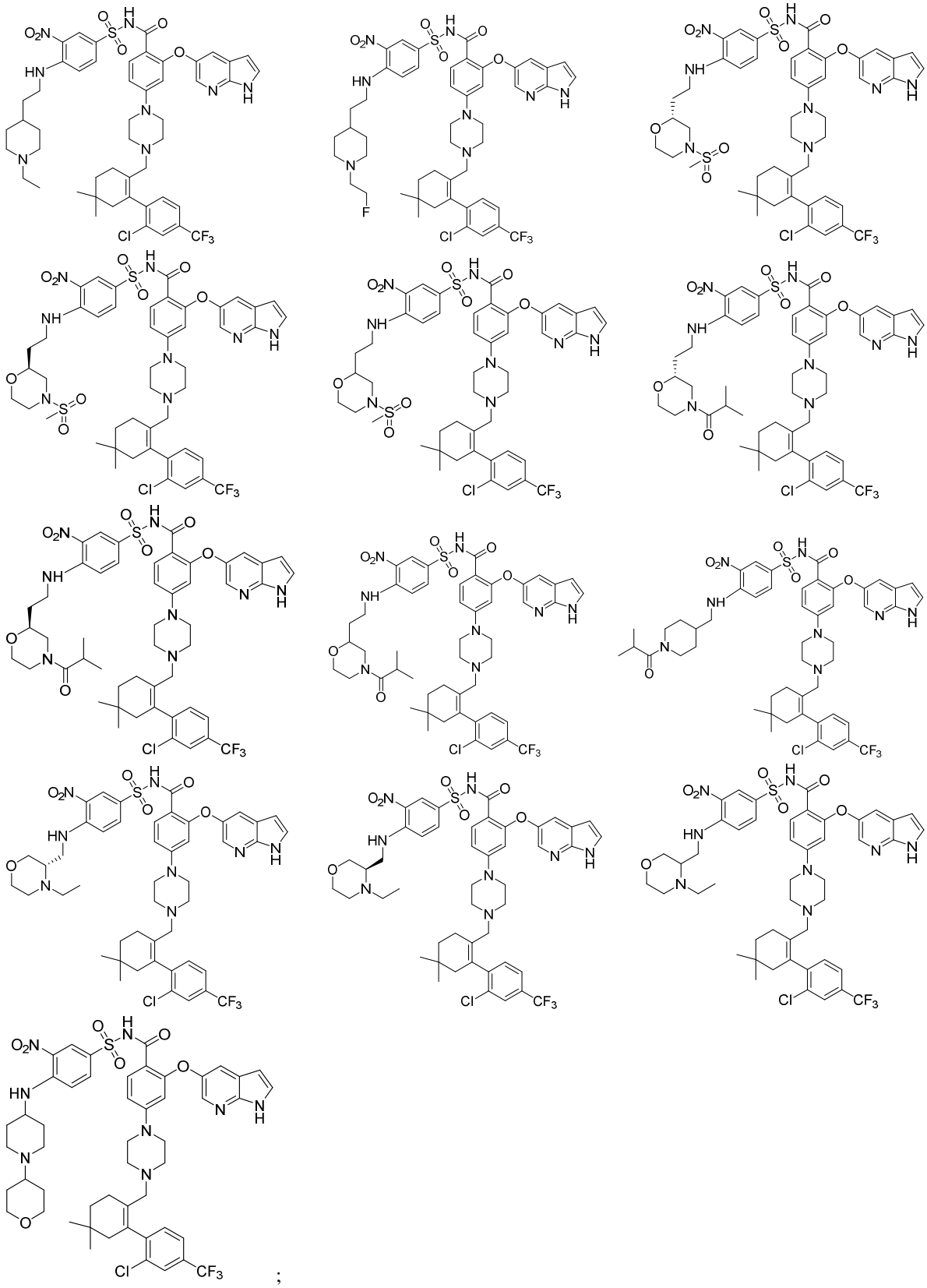






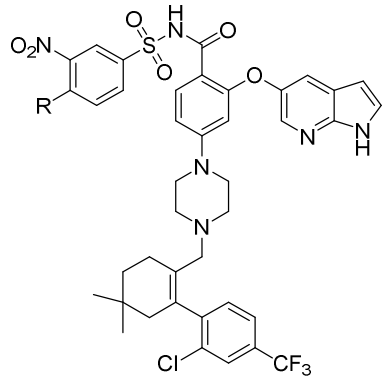




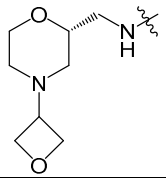
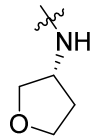
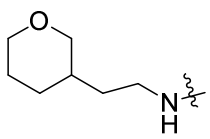
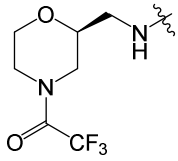
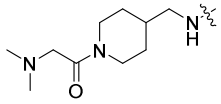
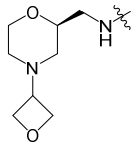
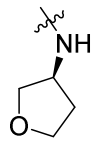
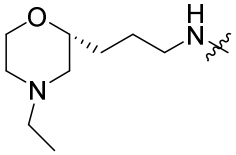
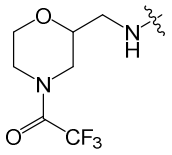
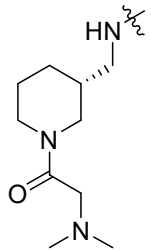
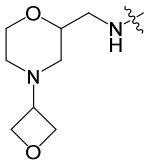
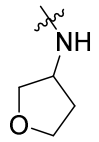
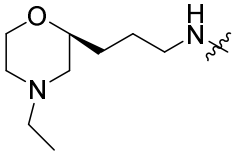
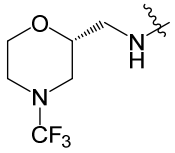
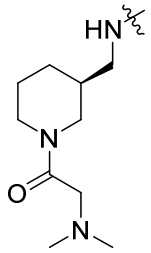
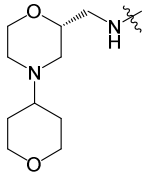
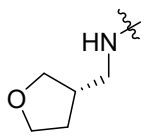
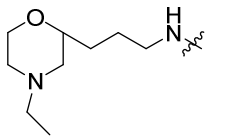
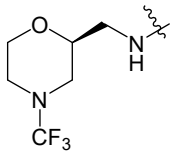
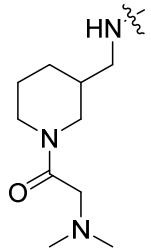
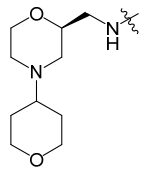
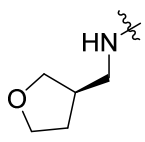
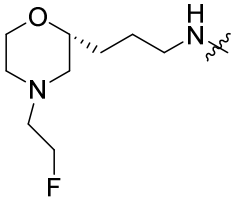
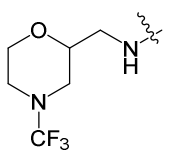
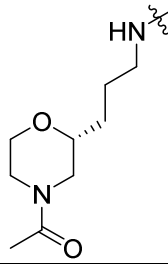


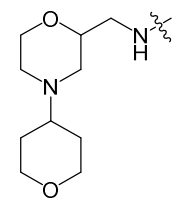
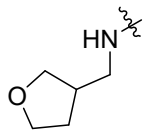
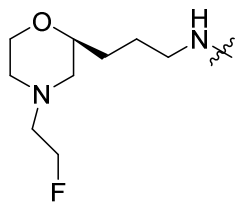
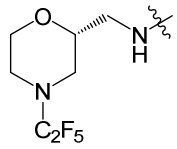
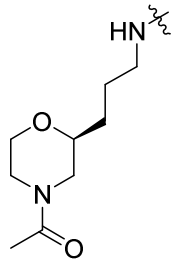
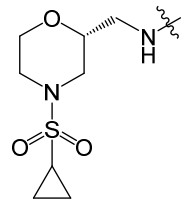
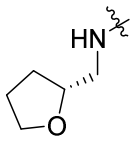
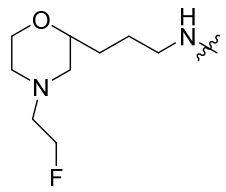
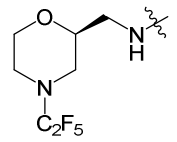
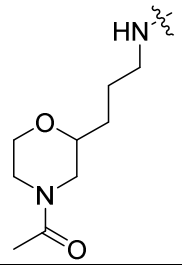
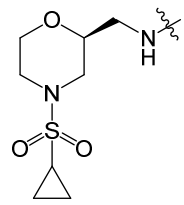
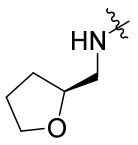
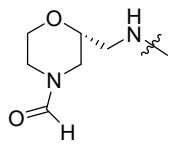
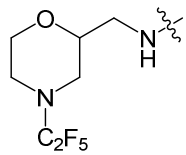
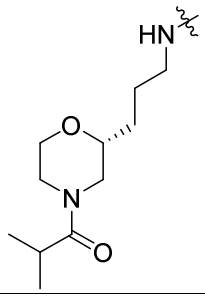
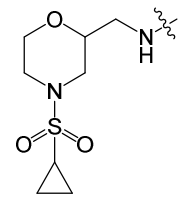
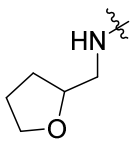
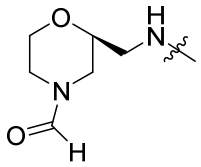
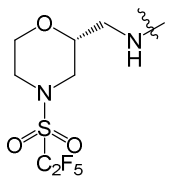
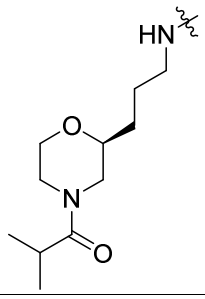
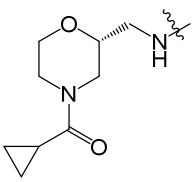
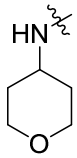
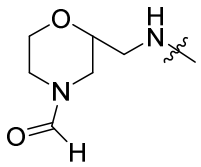
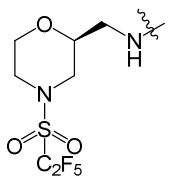
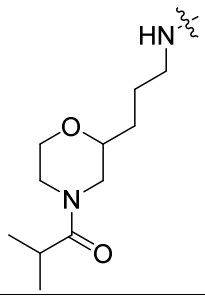
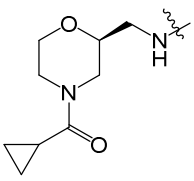
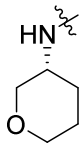
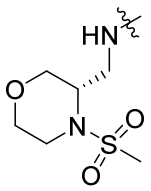
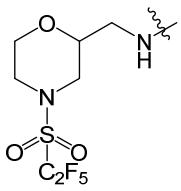
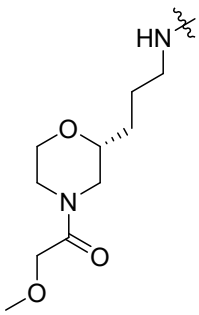
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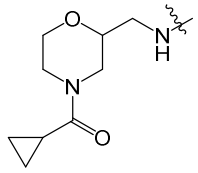
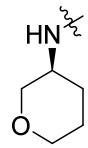
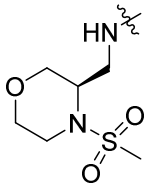
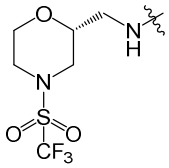
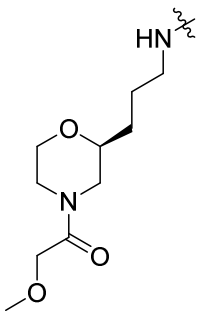
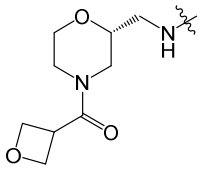
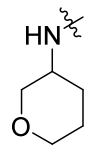
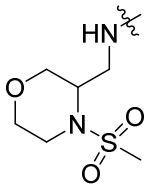
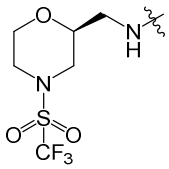
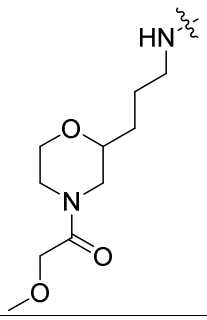
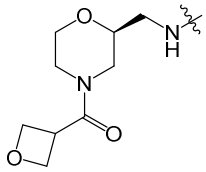
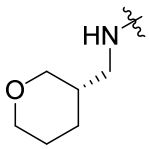
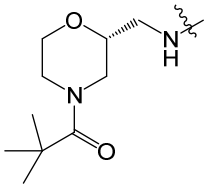
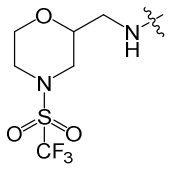
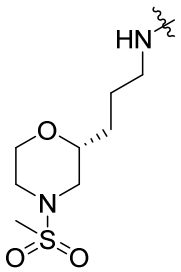
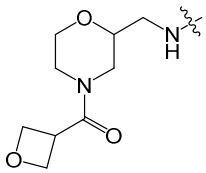
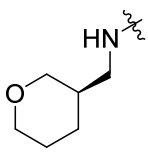
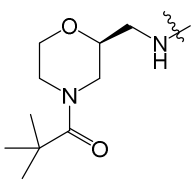
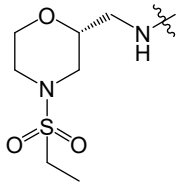
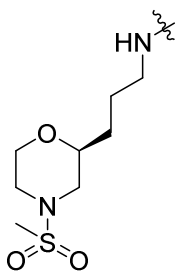
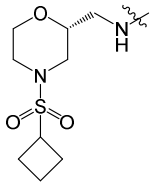
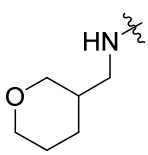
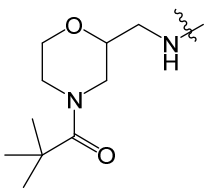
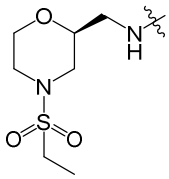
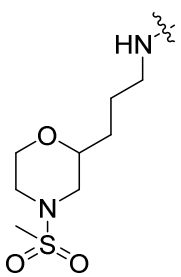
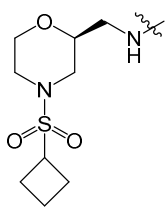
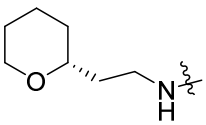
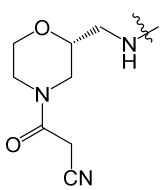
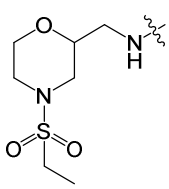
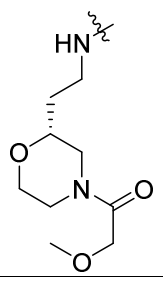
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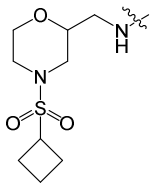
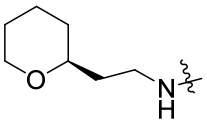
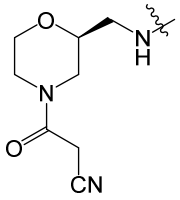
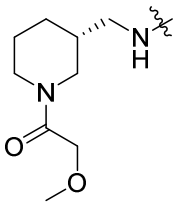
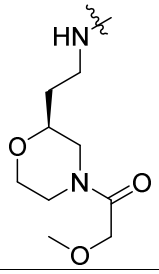
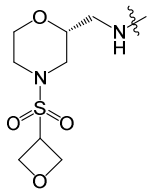
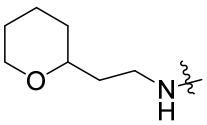
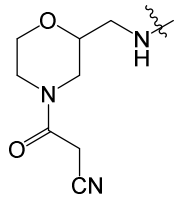
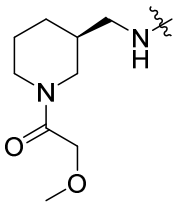
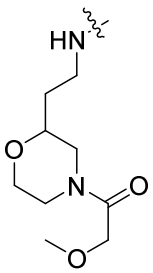
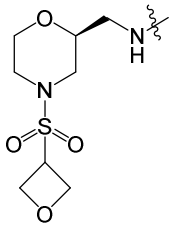
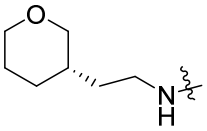
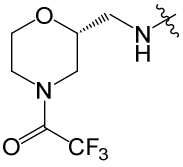
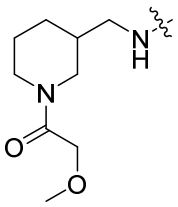
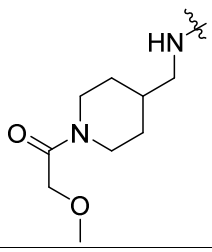
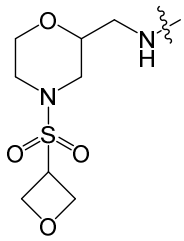
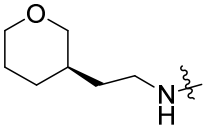
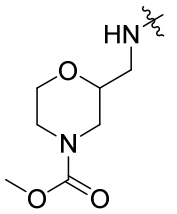
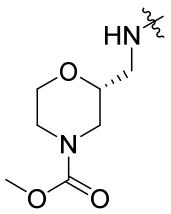
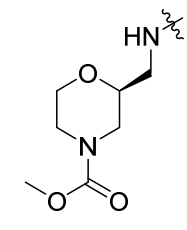
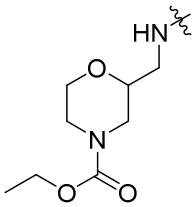
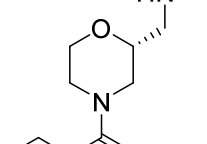
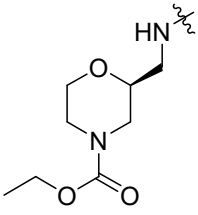
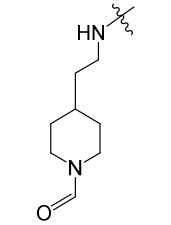
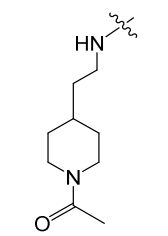
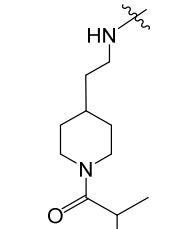
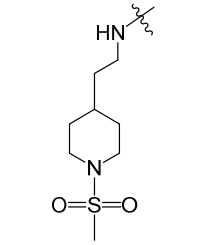
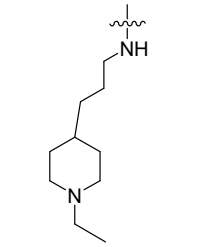
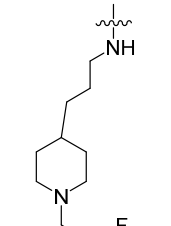
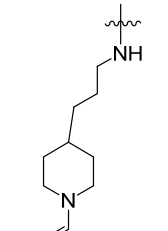


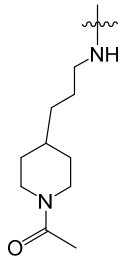
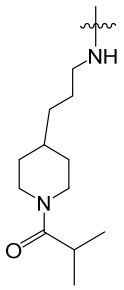
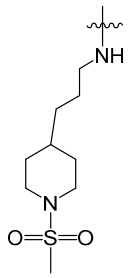
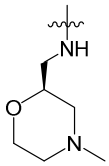
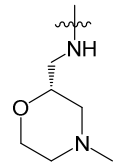
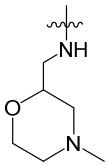
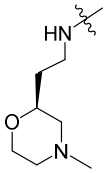
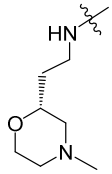
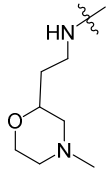
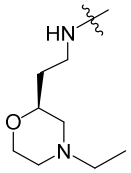
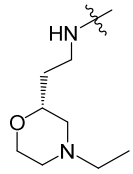
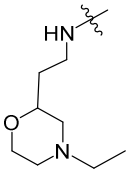
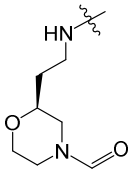
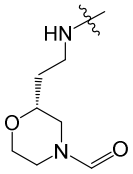
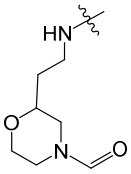
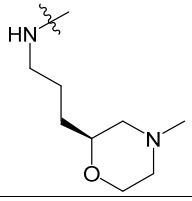
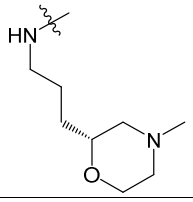
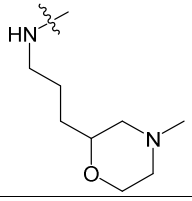
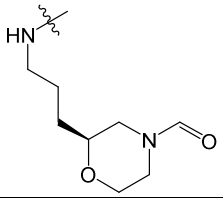
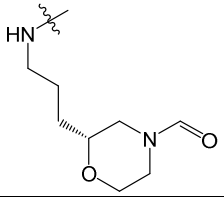
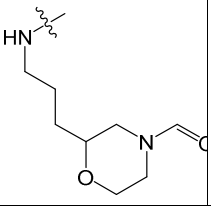
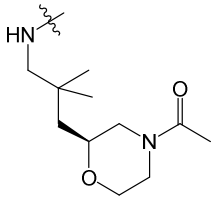
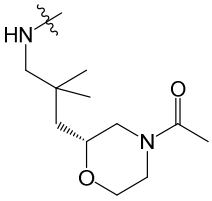
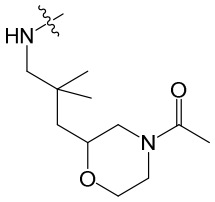
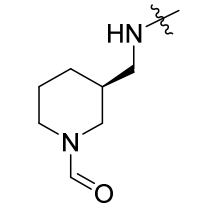
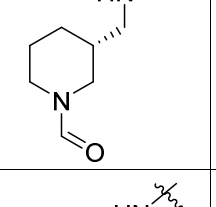
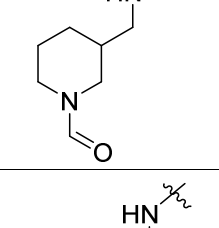
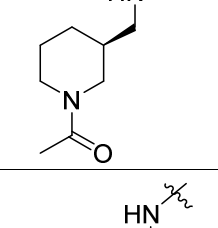
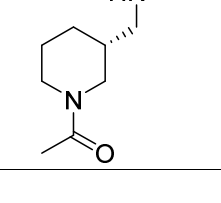
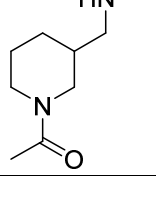
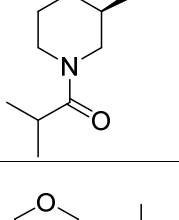
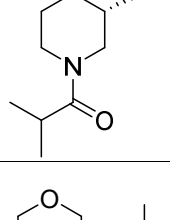
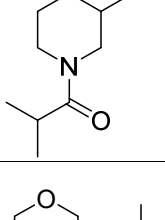
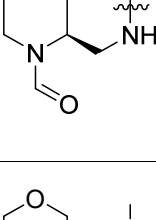
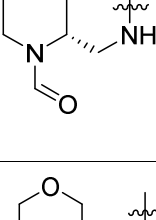
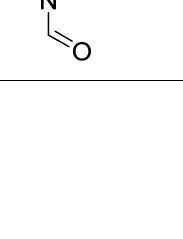
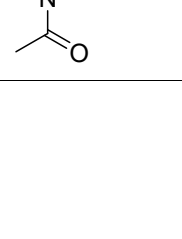
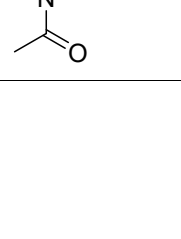
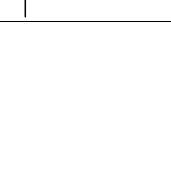
, wherein R is independently selected from the group consisting of:

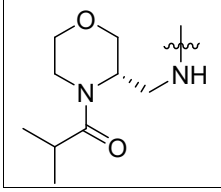
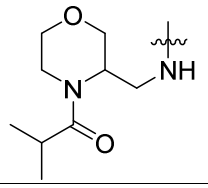
				
				
				
				
				

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19. A pharmaceutical composition comprising the compound, the stereoisomer thereof or the pharmaceutically acceptable salt thereof according to any one of claims 1 to 18.

20. Use of the compound, the stereoisomer thereof or the pharmaceutically acceptable salt thereof according to any one of claims 1 to 18, or the pharmaceutical composition according to claim 19 in preparing a medicament for preventing or treating an anti-apoptotic protein BCL-2-related disease.