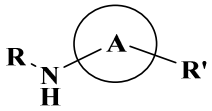
CLAIMS

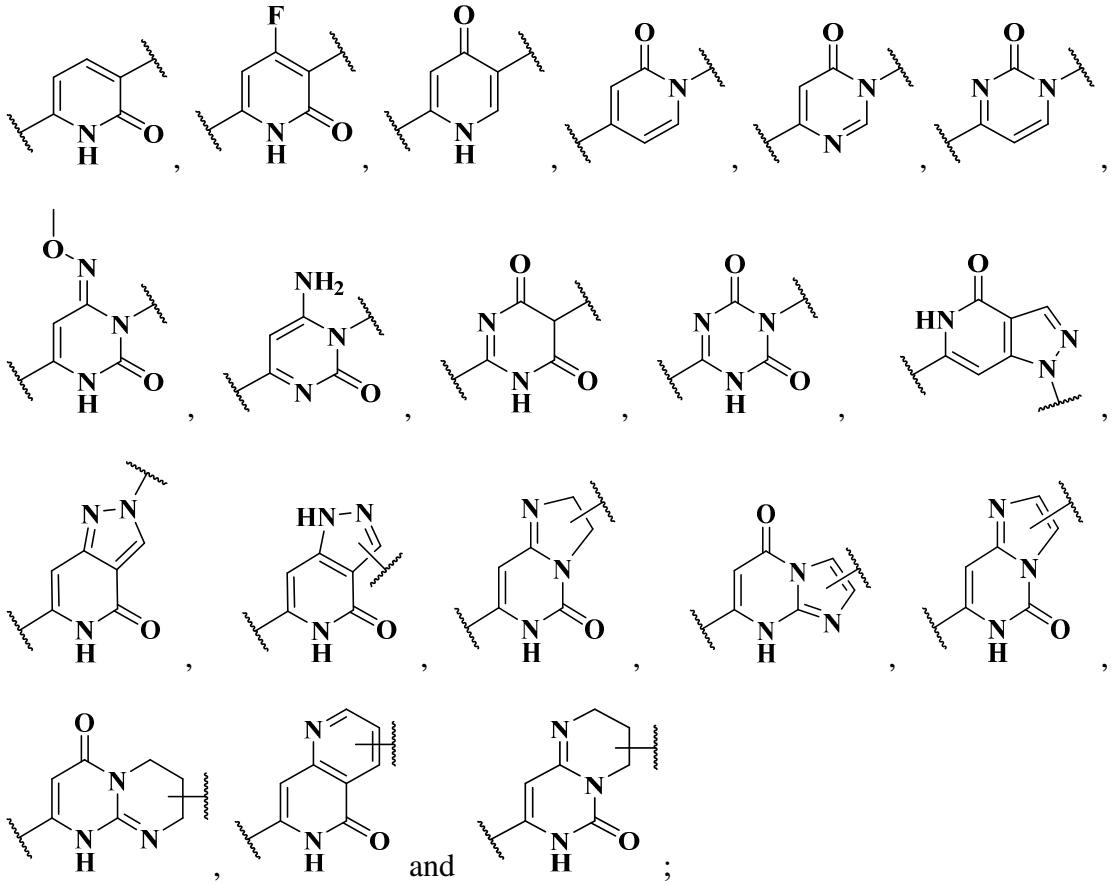
1. A compound of formula (I):



(I)

or a tautomer, cis- or trans-isomer, mesomer, racemate, enantiomer, diastereomer, or mixture thereof, or a pharmaceutically acceptable salt, solvate, or prodrug thereof, wherein:

A is selected from the group consisting of:



R is $-(CR_1R_2)_nR_3$;

R_1 and R_2 are independently selected from the group consisting of hydrogen, deuterium, halogen, amino, cyano, hydroxyl, alkyl, alkoxy, haloalkyl, hydroxyalkyl, cycloalkyl,

heterocyclyl, aryl and heteroaryl;

n is 0, 1, 2, 3 or 4;

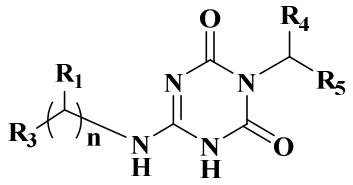
R_3 is selected from the group consisting of hydrogen, deuterium, halogen, amino, cyano, hydroxyl, alkyl, alkoxy, haloalkyl, hydroxyalkyl, cycloalkyl, heterocyclyl, aryl and heteroaryl, wherein each of alkyl, alkoxy, haloalkyl, hydroxyalkyl, cycloalkyl, heterocyclyl, aryl and heteroaryl at each occurrence is independently unsubstituted or substituted with one or more substituents selected from the R^3 group consisting of deuterium, halogen, amino, nitro, oxo, cyano, hydroxy, alkyl, alkoxy, haloalkyl, hydroxyalkyl, $-NR_aR_b$, $-C(O)R_a$, $-C(O)NR_aR_b$, $-C(O)OR_a$, $-OC(O)R_a$, $-S(O)_mR_a$, $-S(O)_mNR_aR_b$, cycloalkyl, heterocyclyl, aryl and heteroaryl, wherein the alkyl, hydroxyalkyl, cycloalkyl, heterocyclyl, aryl, and heteroaryl in said R^3 group of substituents is independently unsubstituted or substituted with one or more substituents selected from alkyl, haloalkyl, cyano, $-C(O)R_a$, halogen, and cycloalkyl;

m is 0, 1 or 2;

R' is selected from the group consisting of alkyl, alkoxy, haloalkyl, hydroxyalkyl, cycloalkyl, heterocyclyl, aryl and heteroaryl, wherein each of alkyl, alkoxy, haloalkyl, hydroxyalkyl, cycloalkyl, heterocyclyl, aryl and heteroaryl at each occurrence is independently unsubstituted or substituted with one or more substituents selected from the group consisting of deuterium, halogen, amino, cyano, hydroxy, alkyl, alkoxy, haloalkyl, hydroxyalkyl, $-NR_cR_d$, $-C(O)R_c$, $-C(O)NR_cR_d$, $-C(O)OR_c$, $-OC(O)R_c$, $-S(O)_mR_c$ and $-S(O)_mNR_cR_d$;

R_a, R_b, R_c, and R_d are independently selected from the group consisting of hydrogen, deuterium, halogen, amino, cyano, hydroxy, alkyl, alkoxy, haloalkyl and hydroxyalkyl.

2. The compound of claim 1, or a tautomer, cis- or trans-isomer, mesomer, racemate, enantiomer, diastereomer, or mixture thereof, or a pharmaceutically acceptable salt, solvate, or prodrug thereof, being a compound of formula (II):



(II)

wherein,

R_1 is selected from the group consisting of hydrogen, deuterium, halogen, amino, cyano, hydroxyl, C_1-C_6 alkyl, C_1-C_6 alkoxy, C_1-C_6 haloalkyl, C_1-C_6 hydroxyalkyl, C_3-C_8 cycloalkyl, 4-8 membered heterocyclyl, C_6-C_{12} aryl and 4-8 membered heteroaryl;

R_3 is selected from the group consisting of hydrogen, deuterium, halogen, amino, cyano, hydroxyl, C_1-C_6 alkyl, C_1-C_6 alkoxy, C_1-C_6 haloalkyl, C_1-C_6 hydroxyalkyl, C_3-C_{10} cycloalkyl, 4-10 membered heterocyclyl comprising one or more of the members of N, O, S and $S(O)_2$, C_6-C_{12} aryl and 4-10 membered heteroaryl comprising one or more of the members of N, O, S and $S(O)_2$, wherein each of the C_1-C_6 alkyl, C_1-C_6 alkoxy, C_1-C_6 haloalkyl, C_1-C_6 hydroxyalkyl, C_3-C_8 cycloalkyl, 4-8 membered heterocyclyl, C_6-C_{12} aryl and 4-8 membered heteroaryl at each occurrence is independently unsubstituted or substituted with one to four substituents selected from the R^3 group consisting of deuterium, halogen, amino, cyano, hydroxyl, C_1-C_6 alkyl, C_2-C_6 alkenyl, C_2-C_6 alkynyl, C_1-C_6 haloalkyl, C_1-C_6 alkoxy, C_1-C_6 haloalkoxy, C_1-C_6 hydroxyalkyl, C_3-C_6 cycloalkyl, 4-6 membered heterocyclyl comprising one or more of the members of N, O, S and $S(O)_2$, phenyl, 4-6 membered heteroaryl comprising one or more of the members of N, O, S and $S(O)_2$, $-NR_aR_b$, $-C(O)R_a$, $-C(O)NR_aR_b$, $-C(O)OR_a$, $-OC(O)R_a$, $-S(O)_mR_a$, $-S(O)_mNR_aR_b$ and $-OSiR_aR_bR_c$, wherein the C_3-C_6 cycloalkyl, 4-6 membered heterocyclyl comprising one or more of the members of N, O, S and $S(O)_2$, phenyl, 4-6 membered heteroaryl comprising one or more of the members of N, O, S and $S(O)_2$, C_1-C_6 alkyl, and C_1-C_6 hydroxyalkyl in said R^3 group of substituents is independently unsubstituted or substituted with one or more substituents selected from C_1-C_6 alkyl, C_1-C_6 haloalkyl, cyano, $-C(O)R_a$, halogen, and C_3-C_6 cycloalkyl;

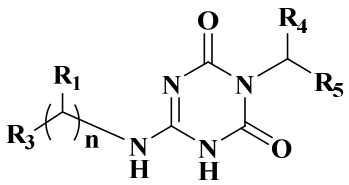
R_4 and R_5 are independently selected from the group consisting of hydrogen, deuterium, halogen, amino, cyano, hydroxyl, C_1-C_6 alkyl, C_1-C_6 alkoxy, C_1-C_6 haloalkyl, C_1-C_6

hydroxyalkyl, C_3-C_8 cycloalkyl, 4-8 membered heterocyclyl comprising one or more of the members of N, O, S and $S(O)_2$, C_6-C_{12} aryl and 4-8 membered heteroaryl comprising one or more of the members of N, O, S and $S(O)_2$, wherein each of the C_1-C_6 alkyl, C_1-C_6 alkoxy, C_1-C_6 haloalkyl, C_1-C_6 hydroxyalkyl, C_3-C_8 cycloalkyl, 4-8 membered heterocyclyl, C_6-C_{12} aryl and 4-8 membered heteroaryl at each occurrence is independently unsubstituted or substituted with one or more substituents selected from the group consisting of deuterium, halogen, amino, cyano, hydroxyl, C_1-C_6 alkyl, C_1-C_6 alkoxy, C_1-C_6 haloalkyl, C_1-C_6 hydroxyalkyl, $-NR_cR_d$, $-C(O)R_c$, $-C(O)NR_cR_d$, $-C(O)OR_c$ and $-OC(O)R_c$;

or, R_4 and R_5 together with the C atom to which they are bound form a cyclic structure selected from the R^{45}Cycle group consisting of C_3-C_8 cycloalkyl, 4-8 membered heterocyclyl comprising one or more of the members of N and O, C_6-C_{12} aryl and 4-8 membered heteroaryl comprising one or more of the members of N and O, wherein each of the cyclic structures in said R^{45}Cycle group is optionally substituted with one to four substituents selected from the group consisting of deuterium, halogen, amino, cyano, hydroxyl, C_1-C_6 alkyl, C_1-C_6 haloalkyl, C_1-C_6 alkoxy, C_1-C_6 hydroxyalkyl, $-NR_cR_d$, $-C(O)R_c$, $-C(O)NR_cR_d$, $-C(O)OR_c$ and $-OC(O)R_c$;

R_a, R_b, R_c, and R_d are independently selected from the group consisting of hydrogen, deuterium, halogen, amino, cyano, hydroxyl, C_1-C_6 alkyl, C_1-C_6 alkoxy, C_1-C_6 haloalkyl and C_1-C_6 hydroxyalkyl.

3. The compound of claim 1, or a tautomer, cis- or trans-isomer, mesomer, racemate, enantiomer, diastereomer, or mixture thereof, or a pharmaceutically acceptable salt, solvate, or prodrug thereof, being a compound of formula (II):



(II)

wherein,

R_1 is selected from the group consisting of hydrogen, deuterium, halogen, amino, cyano, hydroxyl, C_1-C_6 alkyl, C_1-C_6 alkoxy, C_1-C_6 haloalkyl, C_1-C_6 hydroxyalkyl, C_3-C_8 cycloalkyl, 4-8 membered heterocyclyl, C_6-C_{12} aryl and 4-8 membered heteroaryl;

R_3 is selected from the group consisting of hydrogen, deuterium, halogen, amino, cyano, hydroxyl, C_1-C_6 alkyl, C_1-C_6 alkoxy, C_1-C_6 haloalkyl, C_1-C_6 hydroxyalkyl, C_3-C_8 cycloalkyl, 4-8 membered heterocyclyl comprising one or more of the members of N, O, S and $S(O)_2$, C_6-C_{12} aryl and 4-8 membered heteroaryl comprising one or more of the members of N, O, S and $S(O)_2$, wherein the C_1-C_6 alkyl, C_1-C_6 alkoxy, C_1-C_6 haloalkyl, C_1-C_6 hydroxyalkyl, C_3-C_8 cycloalkyl, 4-8 membered heterocyclyl, C_6-C_{12} aryl and 4-8 membered heteroaryl heteroaryl at each occurrence is independently unsubstituted or substituted with one or more substituents selected from the R^3 group consisting of deuterium, halogen, amino, nitro, oxo, cyano, hydroxyl, C_1-C_6 alkyl, C_1-C_6 alkoxy, C_1-C_6 haloalkyl, C_1-C_6 hydroxyalkyl, $-NR_aR_b$, $-C(O)R_a$, $-C(O)NR_aR_b$, $-C(O)OR_a$, $-OC(O)R_a$, $-S(O)_mR_a$ and $-S(O)_mNR_aR_b$, wherein the 4-6 membered heterocyclyl comprising one or more of the members of N, O, S and $S(O)_2$, C_1-C_6alkyl, C_1-C_6 hydroxyalkyl in said R^3 group of substituents is independently unsubstituted or substituted with one or more substituents selected from C_1-C_6 alkyl, C_1-C_6 haloalkyl, cyano, $-C(O)R_a$, halogen, and C_3-C_6cycloalkyl;

R_4 and R_5 are independently selected from the group consisting of hydrogen, deuterium, halogen, amino, cyano, hydroxyl, C_1-C_6 alkyl, C_1-C_6 alkoxy, C_1-C_6 haloalkyl, C_1-C_6 hydroxyalkyl, C_3-C_8 cycloalkyl, 4-8 membered heterocyclyl comprising one or more of the members of N, O, S and $S(O)_2$, C_6-C_{12} aryl and 4-8 membered heteroaryl comprising one or more of the members of N, O, S and $S(O)_2$, wherein the alkyl, alkoxy, haloalkyl, hydroxyalkyl, cycloalkyl, heterocyclyl, aryl and heteroaryl at each occurrence is independently unsubstituted or substituted with one or more substituents selected from the group consisting of deuterium, halogen, amino, cyano, hydroxyl, C_1-C_6 alkyl, C_1-C_6 alkoxy, C_1-C_6 haloalkyl, C_1-C_6 hydroxyalkyl, $-NR_cR_d$, $-C(O)R_c$, $-C(O)NR_cR_d$, $-C(O)OR_c$ and $-OC(O)R_c$;

or, R_4 and R_5 together with the C atom to which they are bound form a cyclic structure selected from the R^{45}Cycle group consisting of C_3-C_8 cycloalkyl, 4-8 membered

heterocyclyl comprising N or O atom, C_6-C_{12} aryl and 4-8 membered heteroaryl comprising N or O atom, wherein each of the cyclic structures in said R^{45}Cycle group is optionally substituted with one to four substituents selected from the group consisting of by deuterium, halogen, amino, cyano, hydroxyl, C_1-C_6 alkyl, C_1-C_6 haloalkyl, C_1-C_6 alkoxy, C_1-C_6 hydroxyalkyl, -NR_cR_d, -$C(O)R_c$, -$C(O)NR_cR_d$, -$C(O)OR_c$ and -$OC(O)R_c$; R_a, R_b, R_c, and R_d are independently selected from the group consisting of hydrogen, deuterium, halogen, amino, cyano, hydroxyl, C_1-C_6 alkyl, C_1-C_6 alkoxy, C_1-C_6 haloalkyl and C_1-C_6 hydroxyalkyl.

4. The compound of any one of claims 1-3, or a tautomer, cis- or trans-isomer, mesomer, racemate, enantiomer, diastereomer, or mixture thereof, or a pharmaceutically acceptable salt, solvate, or prodrug thereof, wherein, R_1 is selected from the group consisting of hydrogen, hydroxyl, C_1-C_3 alkyl, C_1-C_3 haloalkyl, C_1-C_3 alkoxy, and C_1-C_3 hydroxyalkyl.

5. The compound of claim 4, or a tautomer, cis- or trans-isomer, mesomer, racemate, enantiomer, diastereomer, or mixture thereof, or a pharmaceutically acceptable salt, solvate, or prodrug thereof, wherein, R_1 is H, -OH, $–CH_3$, $–CH_2CH_3$, $–CH(CH_3)_2$, $–CH_2OH$, -CF_3, or .

6. The compound of any one of claims 1-3, or a tautomer, cis- or trans-isomer, mesomer, racemate, enantiomer, diastereomer, or mixture thereof, or a pharmaceutically acceptable salt, solvate, or prodrug thereof, wherein, R_3 is selected from the group consisting of C_1-C_3 alkyl, C_1-C_3 haloalkyl, C_1-C_3 alkoxy, C_1-C_3 hydroxyalkyl, C_3-C_6 cycloalkyl, phenyl, 5-6 membered heterocyclyl comprising 1-2 of the members of N, O, S and $S(O)_2$ atom and 5-6 membered heteroaryl comprising 1-2 of the members of N, O, S and $S(O)_2$ atom, optionally the R_3 is substituted with one to two substituents selected from the R^3 group consisting of deuterium, halogen, amino, nitro, oxo, cyano,

hydroxyl, C_1-C_3 alkyl, C_1-C_3 alkoxy, C_1-C_3 haloalkyl, C_1-C_3 hydroxyalkyl, 4-6 membered heterocyclyl comprising one or more of the members of N, O, S and $S(O)_2$, -$C(O)R_a$, -$C(O)NR_aR_b$, -$S(O)_2R_a$ and -$S(O)_2NR_aR_b$, wherein the C_1-C_3 alkyl, C_1-C_3 hydroxyalkyl and 4-6 membered heterocyclyl comprising one or more of the members of N, O, S and $S(O)_2$, in said R^3 group of substituents is independently unsubstituted or substituted with one or more substituents selected from C_1-C_3 alkyl, C_1-C_3 haloalkyl, cyano, -$C(O)R_a$, halogen, and C_3-C_6 cycloalkyl;

R_a and R_b are independently selected from the group consisting of hydrogen, deuterium, halogen, amino, cyano, hydroxyl, C_1-C_3 alkyl, C_1-C_3 alkoxy, C_1-C_3 haloalkyl and C_1-C_3 hydroxyalkyl.

7. The compound of claim 2 or 3, or a tautomer, cis- or trans-isomer, mesomer, racemate, enantiomer, diastereomer, or mixture thereof, or a pharmaceutically acceptable salt, solvate, or prodrug thereof, wherein, R_4 and R_5 are independently selected from the group consisting of hydrogen, deuterium, halogen, amino, cyano, hydroxyl, C_1-C_3 alkyl, C_1-C_3 alkoxy, C_1-C_3 haloalkyl, C_1-C_3 hydroxyalkyl, C_3-C_6 cycloalkyl, 5-6 membered heterocyclyl comprising 1-2 of the members of N, O, S and $S(O)_2$ atom, C_6-C_{12} aryl and 5-6 membered heteroaryl comprising 1-2 of the members of N, O, S and $S(O)_2$ atom, wherein each of C_1-C_3 alkyl, C_1-C_3 alkoxy, C_1-C_3 haloalkyl, C_1-C_3 hydroxyalkyl, C_3-C_6 cycloalkyl, 5-6 membered heterocyclyl, C_6-C_{12} aryl and 5-6 membered heteroaryl at each occurrence is independently unsubstituted or substituted with one or more substituents selected from the group consisting of deuterium, halogen, amino, cyano, hydroxyl, C_1-C_3 alkyl, C_1-C_3 alkoxy, C_1-C_3 haloalkyl, C_1-C_3 hydroxyalkyl, -NR_cR_d, -$C(O)R_c$, -$C(O)NR_cR_d$, -$C(O)OR_c$ and -$OC(O)R_c$;

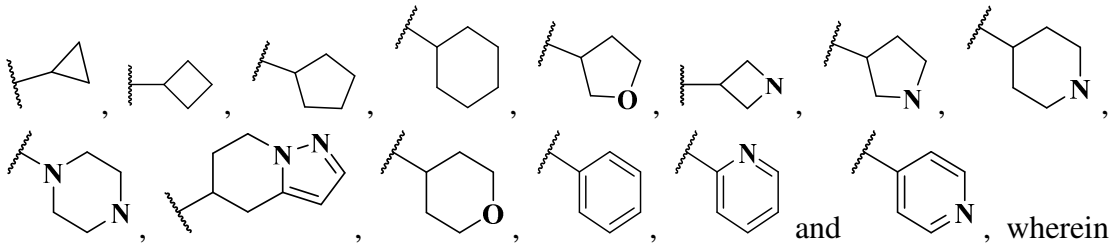
or, R_4 and R_5 together with the C atom to which they are bound form a a cyclic structure selected from the C^{45}Cycle(II) group consisting of C_3-C_6 cycloalkyl, 5-6membered heterocyclyl comprising 1-2 of the members of N and O atom, phenyl and 5-6 membered heteroaryl comprising 1-2 of the members of N and O atom, wherein each of the cyclic structures in said C^{45}Cycle(II) group is optionally substituted with one to two substituents selected from the group consisting of by deuterium, halogen, amino,

cyano, hydroxyl, C_1-C_3 alkyl, C_1-C_3 haloalkyl, C_1-C_3 alkoxy, C_1-C_3 hydroxyalkyl, -NR_cR_d, -$C(O)R_c$, -$C(O)NR_cR_d$, -$C(O)OR_c$ and -$OC(O)R_c$;

R_c and R_d are independently selected from the group consisting of hydrogen, deuterium, halogen, amino, cyano, hydroxyl, C_1-C_3 alkyl, C_1-C_3 alkoxy, C_1-C_3 haloalkyl and C_1-C_3 hydroxyalkyl.

8. The compound of claim 2 or 3, or a tautomer, cis- or trans-isomer, mesomer, racemate, enantiomer, diastereomer, or mixture thereof, or a pharmaceutically acceptable salt, solvate, or prodrug thereof, wherein, R_4 and R_5 are independently selected from the group consisting of $–CH_3$ and $–CF_3$;

or, R_4 and R_5 together with the C atom to which they are bound form a cyclic structure selected from the RCycle group consisting of:



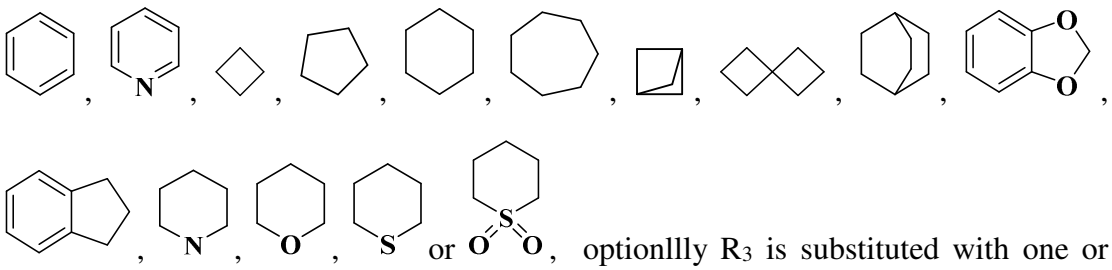
and , wherein each of the cyclic structures in said RCycle group is optionally substituted with one or two substituents selected from the group consisting of oxo, H, –F, -Cl, -Br, -OH, $-CH_3$, $-CH_2CH_3$, $-CH(CH_3)_2$, $-OCH_3$, $-CH_2CH_3OCH_3$, $-CH_2OCH_3$, $–CF_3$, $-CH_2CF_3$, $-C(O)CH_3$, $-C(O)CH(CH_3)_2$, $-C(O)OCH_3$, $-C(O)OC(CH_3)_3$, $-NHC(O)OC(CH_3)_3$, and



.

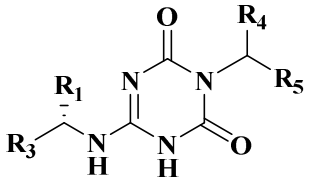
9. The compound of one of claims 1-3, or a tautomer, cis- or trans-isomer, mesomer, racemate, enantiomer, diastereomer, or mixture thereof, or a pharmaceutically acceptable salt, solvate, or prodrug thereof, wherein, n is 0, 1 or 2.

10. The compound of claim 2 or 3, or a tautomer, cis- or trans-isomer, mesomer, racemate, enantiomer, diastereomer, or mixture thereof, or a pharmaceutically acceptable salt, solvate, or prodrug thereof, wherein R_3 is



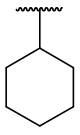
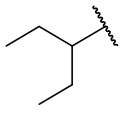
optionllly R_3 is substituted with one or more substituents selected from the group consisting of deuterium, halogen, amino, nitro, oxo, cyano, hydroxyl, C_1-C_6 alkyl, C_1-C_6 alkoxy, C_1-C_6 haloalkyl, C_1-C_6 hydroxyalkyl, $-NR_aR_b$, $-C(O)R_a$, $-C(O)NR_aR_b$, $-C(O)OR_a$, $-OC(O)R_a$, $-S(O)_mR_a$ and $-S(O)_mNR_aR_b$.

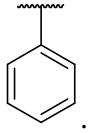
11. The compound of claim 2 or 3, or a tautomer, cis- or trans-isomer, mesomer, racemate, enantiomer, diastereomer, or mixture thereof, or a pharmaceutically acceptable salt, solvate, or prodrug thereof, being a compound of formula (III):



(III) .

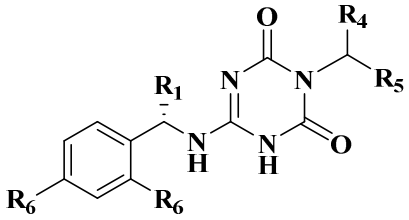
12. The compound of claim 2 or 3, or a tautomer, cis- or trans-isomer, mesomer, racemate, enantiomer, diastereomer, or mixture thereof, or a pharmaceutically acceptable salt, solvate, or prodrug thereof, wherein,

when each of R_4 and R_5 is methyl, n is 0, R_3 is not  nor  ;

when each of R_1, R_4 and R_5 is methyl, n is 1, R_3 is not  .

13. The compound of claim 11, or a tautomer, cis- or trans-isomer, mesomer, racemate, enantiomer, diastereomer, or mixture thereof, or a pharmaceutically acceptable salt,

solvate, or prodrug thereof, being a compound of formula (IV):



(IV)

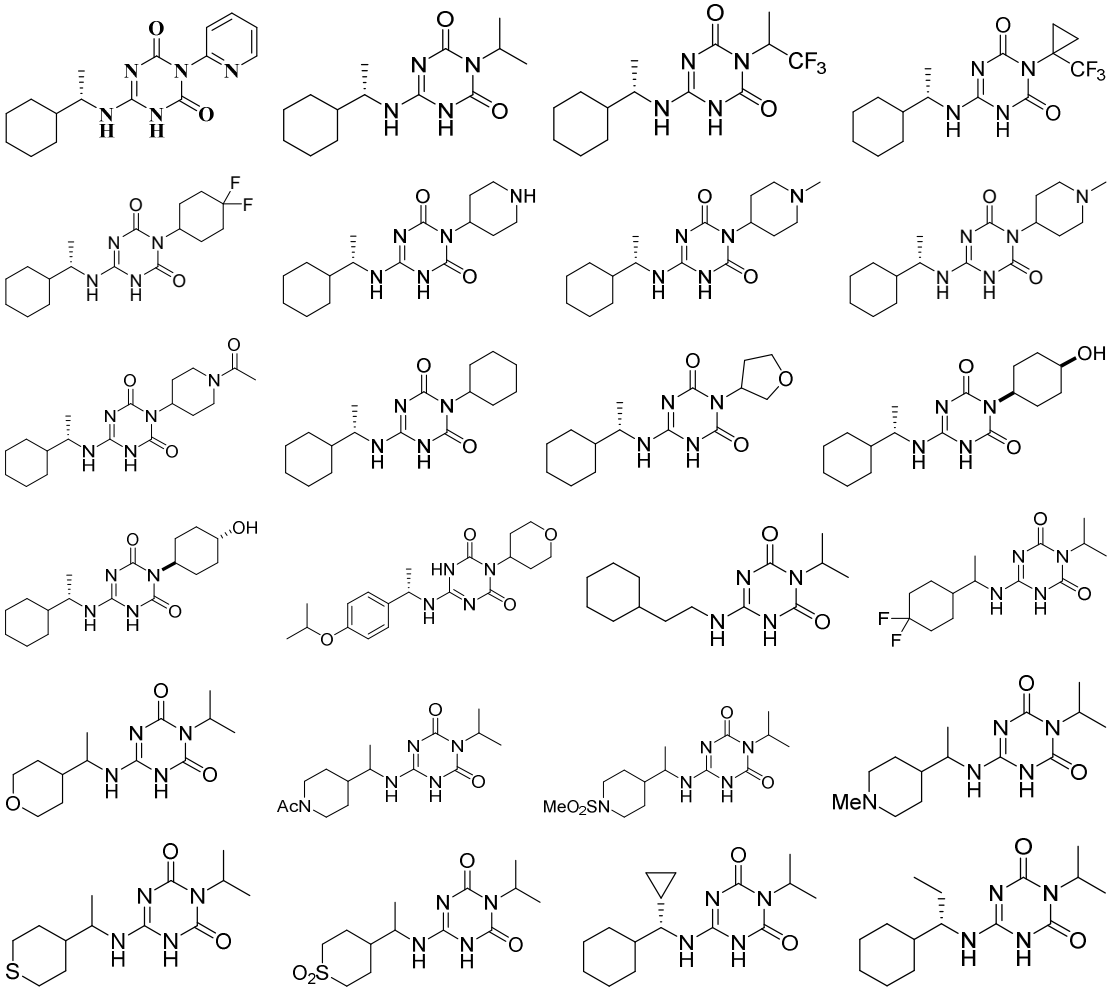
wherein,

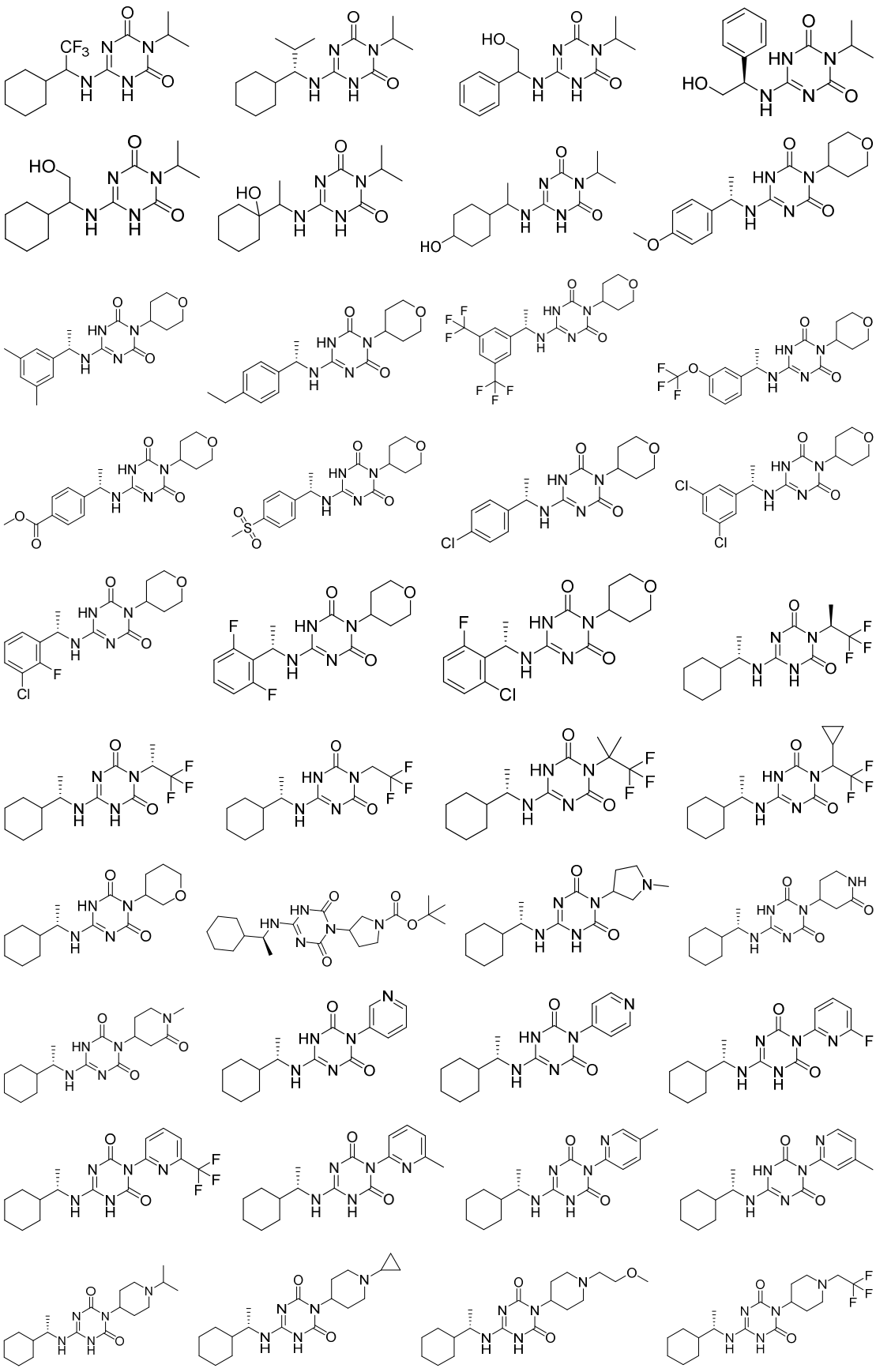
R_1 is C_1-C_3 alkyl, C_1-C_3 haloalkyl or C_1-C_3 alkoxy;

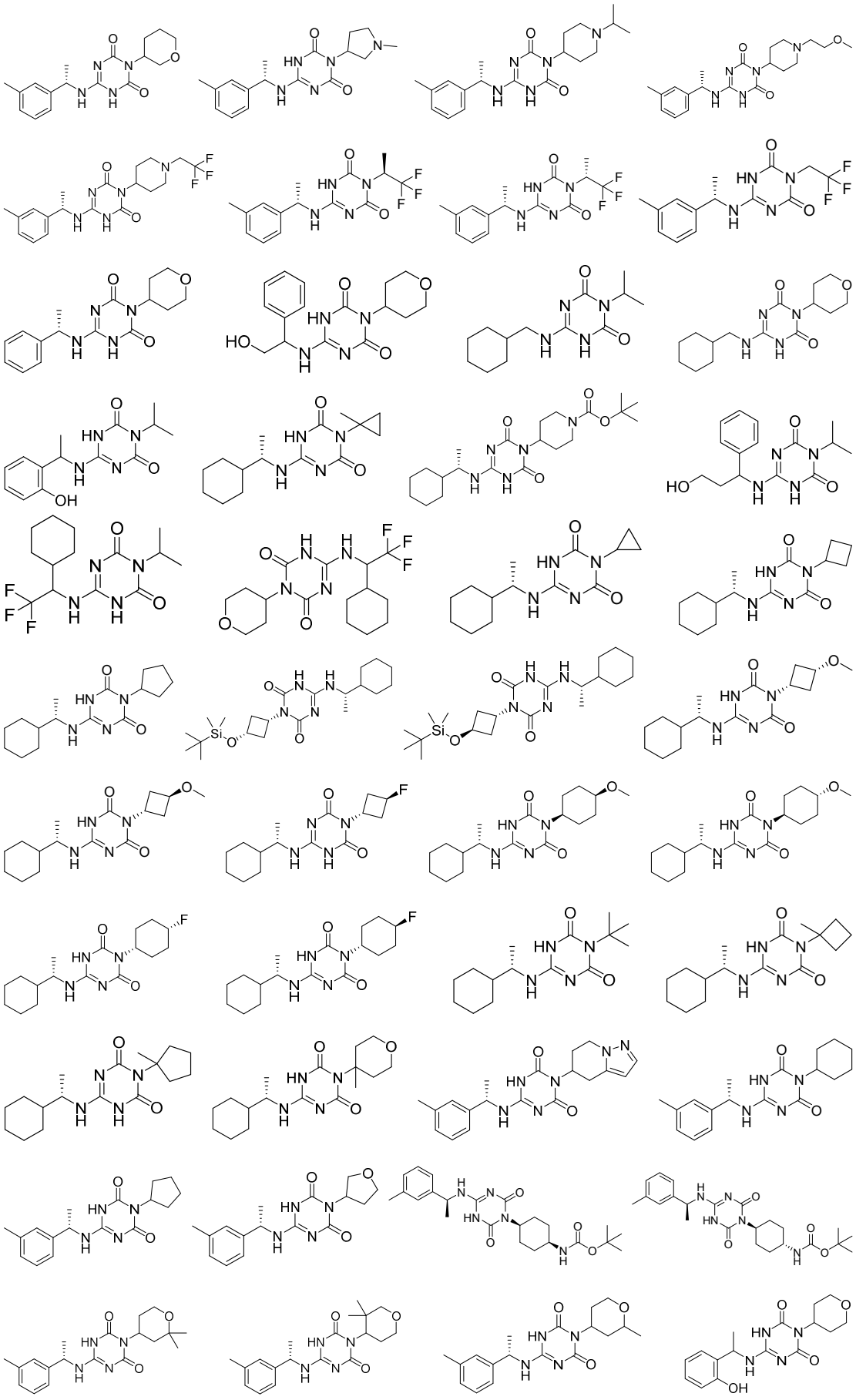
R_4 and R_5 together with the C atom to which they are bound form a 5-6 membered heterocyclyl comprising 1-2 of of the members N and O;

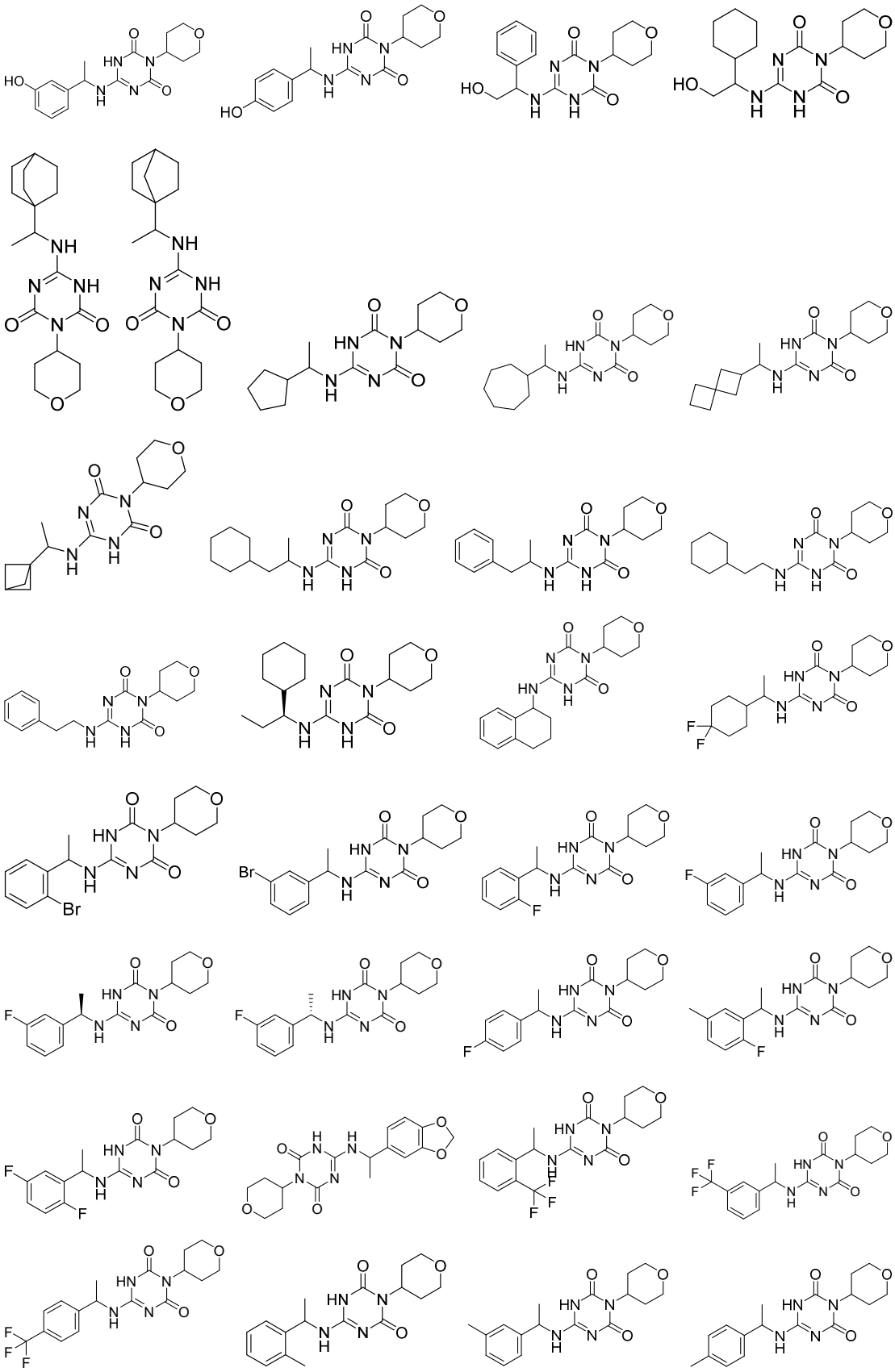
R_6 is independently selected from the group consisting of halogen, C_1-C_3 alkyl, C_1-C_3 alkoxy, and C_1-C_3 haloalkyl.

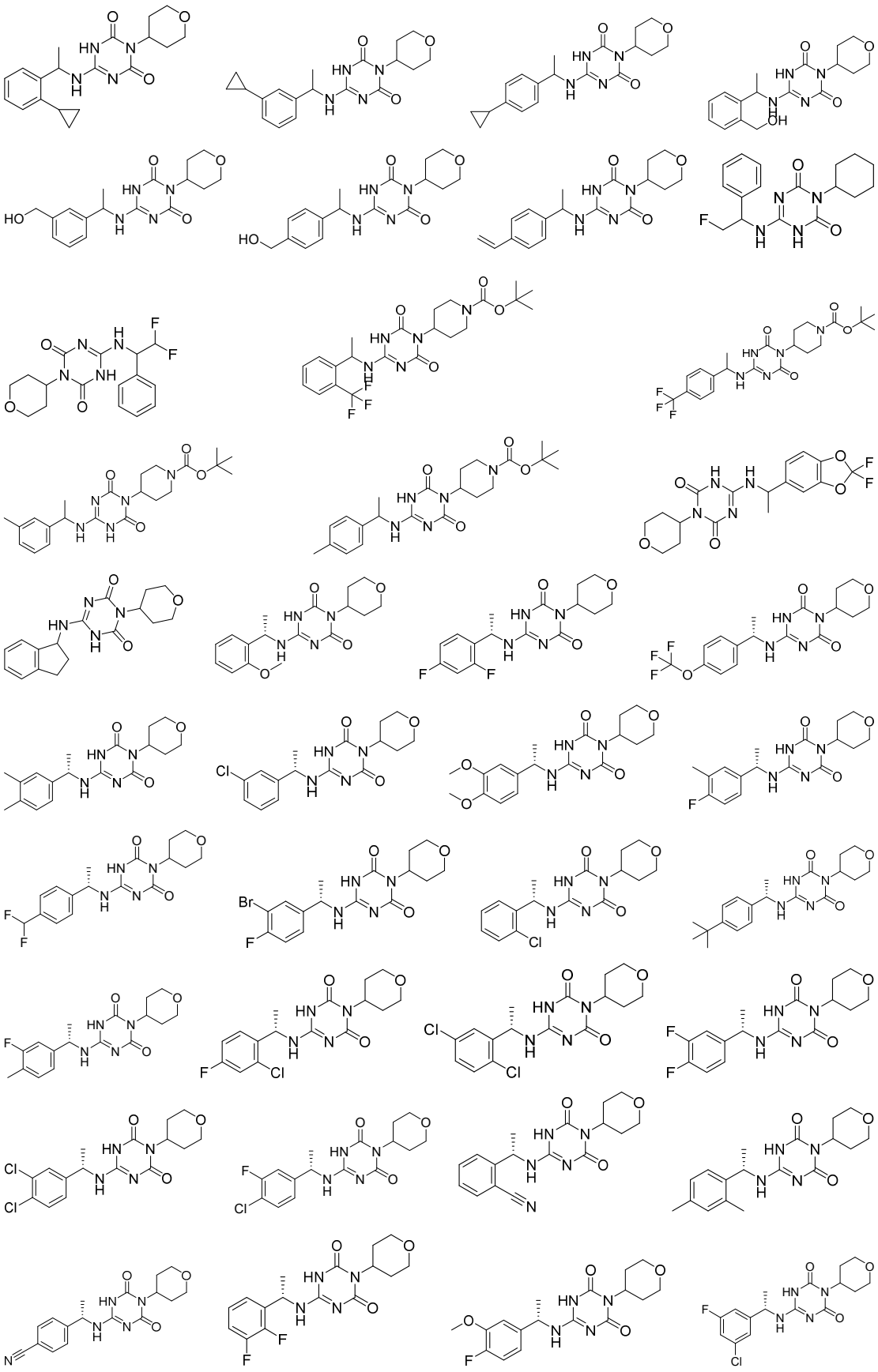
14. A compound selected from the group consisting of:

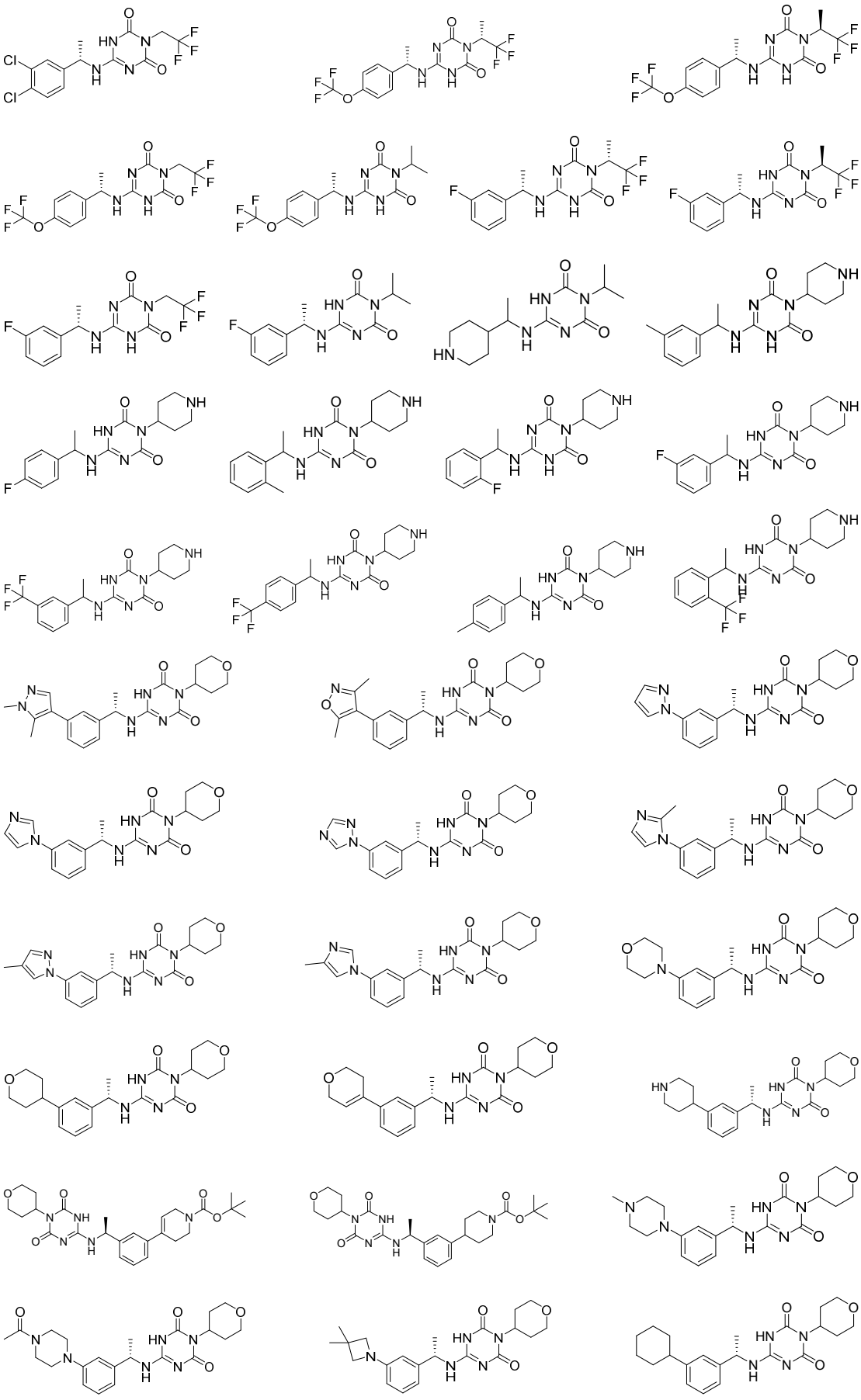


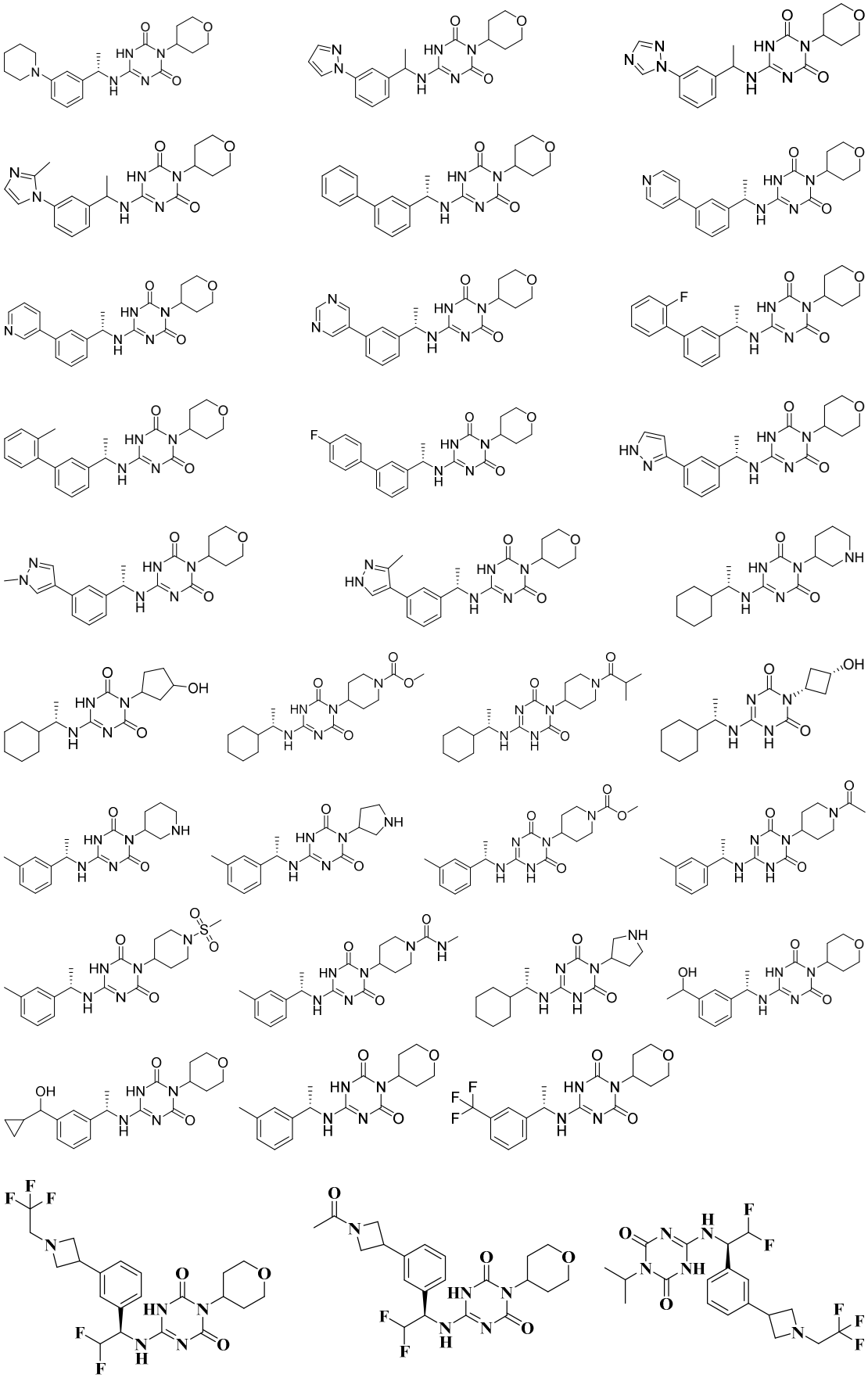


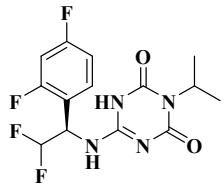
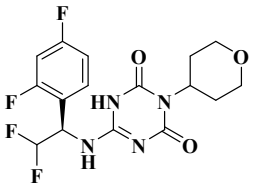
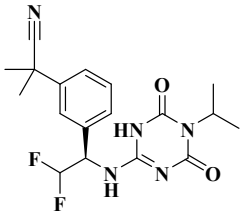
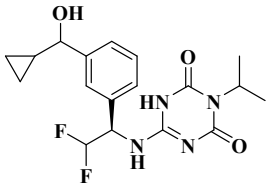
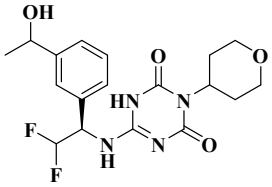
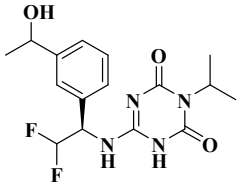
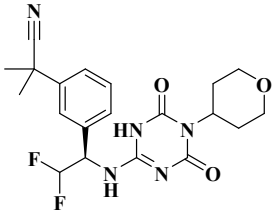
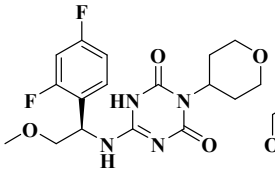
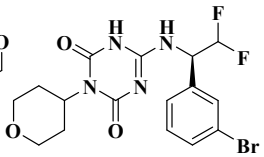
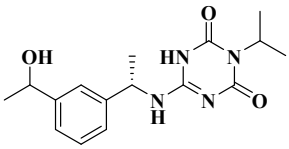
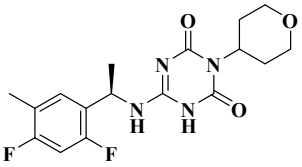
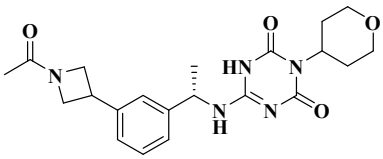
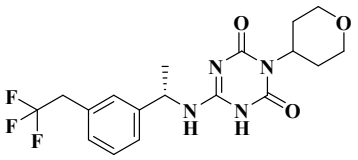
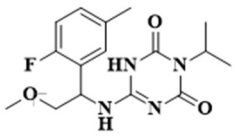
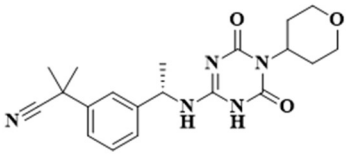
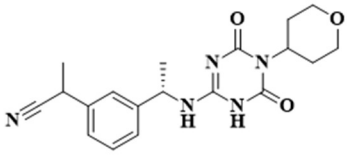
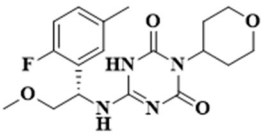
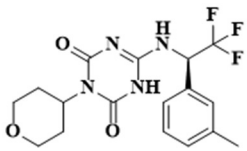
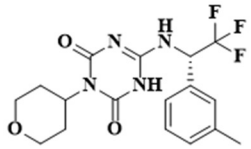
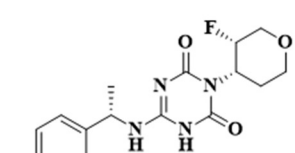
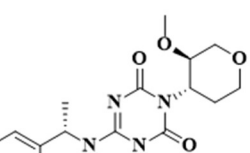
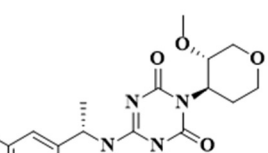
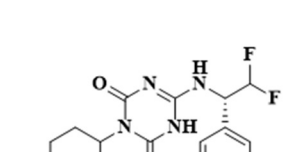
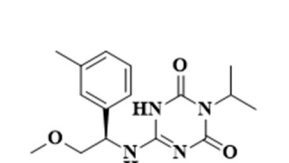
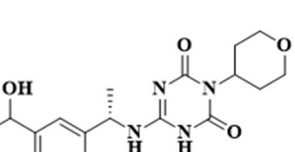


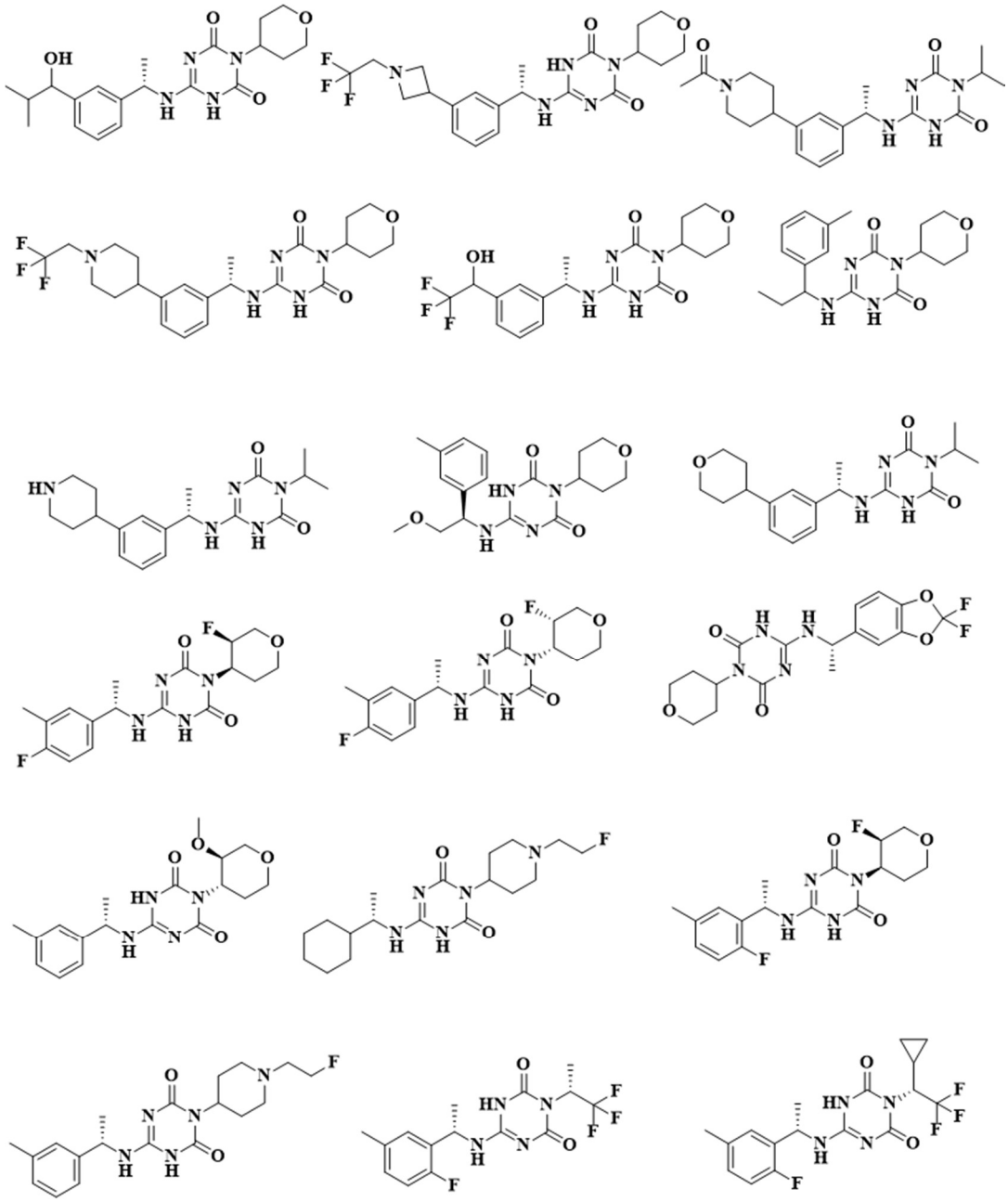


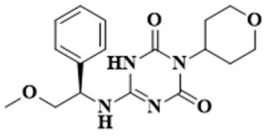
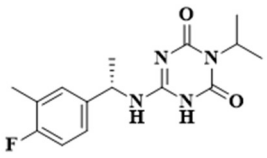
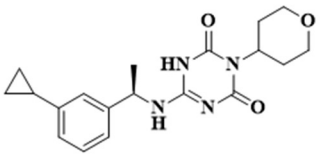
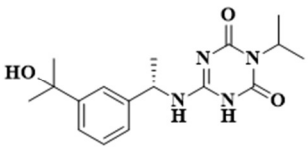
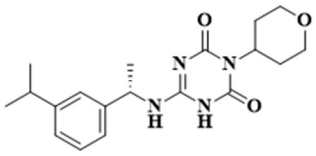
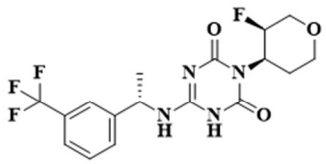
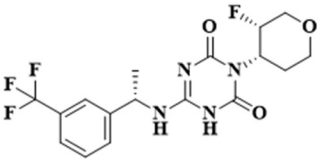
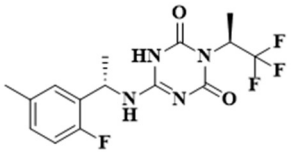
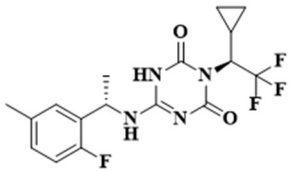
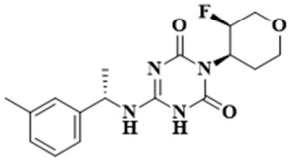
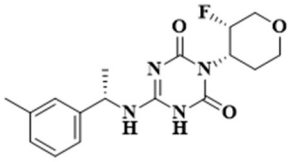
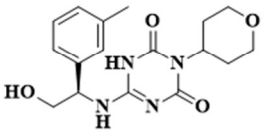
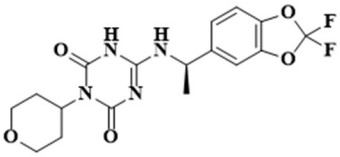
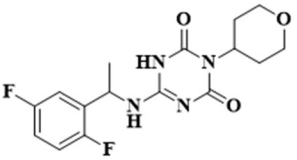
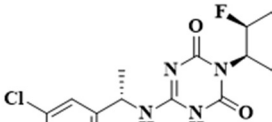
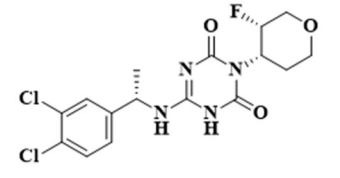


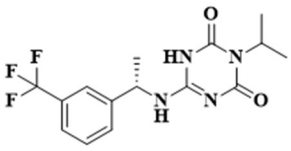
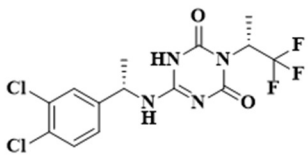
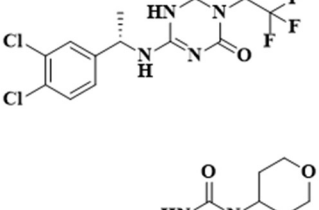
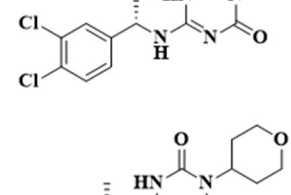
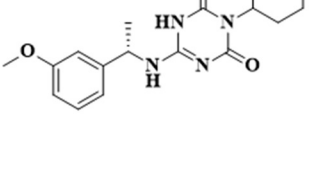
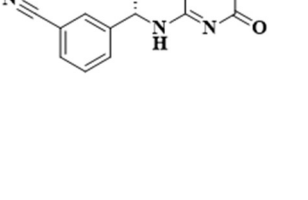
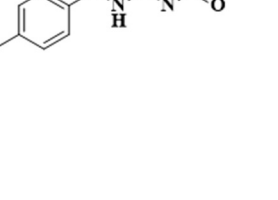
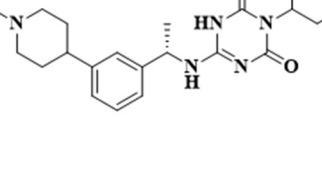


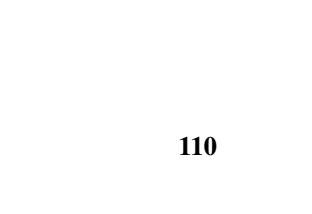


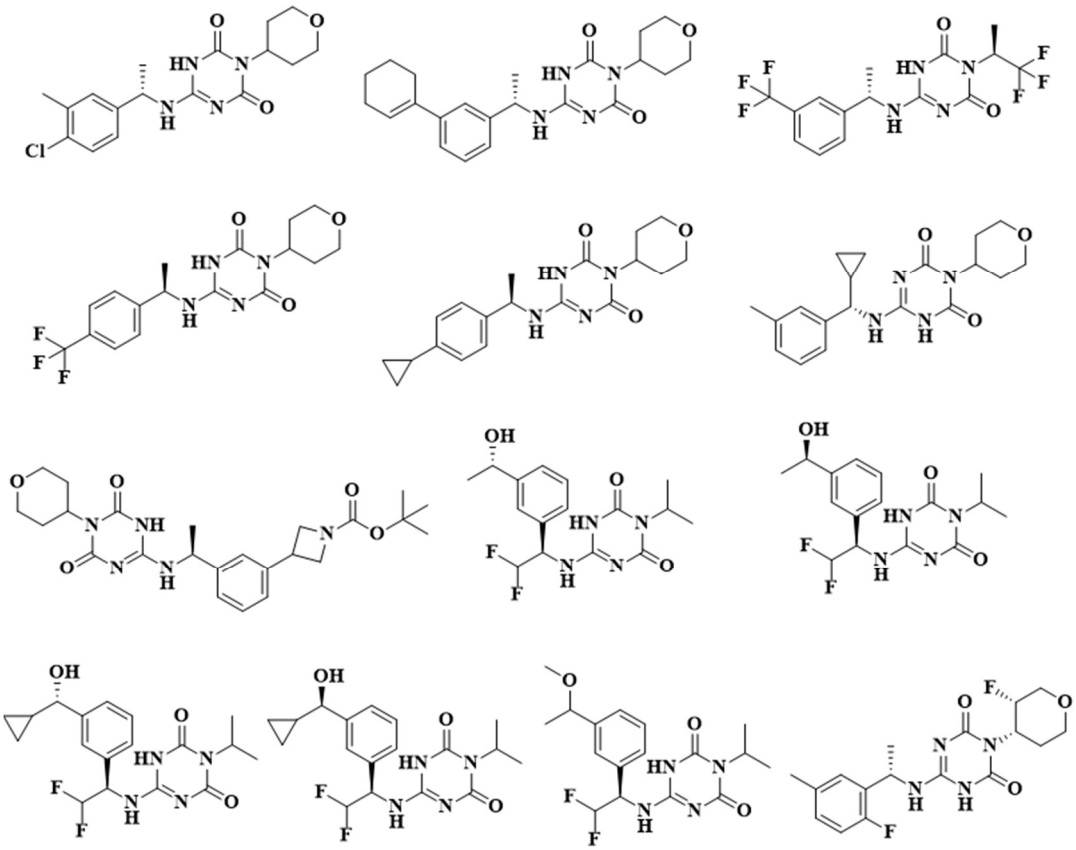
































or a tautomer, cis- or trans-isomer, mesomer, racemate, enantiomer, diastereomer, or mixture thereof, or a pharmaceutically acceptable salt, solvate, or prodrug thereof.

15. A pharmaceutical composition comprising a therapeutically effective amount of the compound of any one of claims 1 to 14, or a tautomer, cis- or trans-isomer, mesomer, racemate, enantiomer, diastereomer, or mixture thereof, or a pharmaceutically acceptable salt solvate, or prodrug thereof, and a pharmaceutically acceptable carrier.

16. Use of the compound of any one of claims 1-14, or a tautomer, cis- or trans-isomer, mesomer, racemate, enantiomer, diastereomer, or mixture thereof, or a pharmaceutically acceptable salt solvate, or prodrug thereof, or the pharmaceutical composition of claim 15 in the manufacture of a medicament for treating hypertrophic cardiomyopathy (HCM) or a cardiac disorder having a pathophysiological feature of HCM in a subject in need.

17. The use of claim 16, wherein the HCM is obstructive or nonobstructive or is caused by sarcomeric and/or non-sarcomeric mutations.

18. Use of the compound of any one of claims 1-14, or a tautomer, cis- or trans-isomer, mesomer, racemate, enantiomer, diastereomer, or mixture thereof, or a pharmaceutically acceptable salt solvate, or prodrug thereof, or the pharmaceutical composition of claim 15 in the manufacture of a medicament for treating a disease or disorder in a subject in need thereof, wherein the disease or disorder is selected from the group consisting of heart failure with preserved ejection fraction, ischemic heart disease, angina pectoris, and restrictive cardiomyopathy.