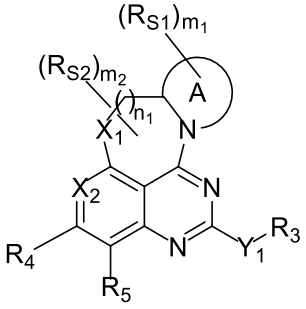
What is claimed is:

1. A compound of formula (I):



Formula (I)

a stereoisomer thereof, a pharmaceutically acceptable salt thereof, a pharmaceutically acceptable salt of the stereoisomer, a prodrug thereof, a deuterated molecule thereof or a PROTAC molecule thereof;

wherein,

X_1 is selected from the group consisting of a bond, $-C(R_{X11})(R_{X12})-$, $-NR_{X13}-$, -O-, -S-, -S(=O)- and $-S(=O)_2-$;

R_{X11} or R_{X12} is independently selected from the group consisting of hydrogen, deuterium, halogen, $-C_{1-6}$alkyl, haloC_{1-6}alkyl, haloC_{1-6}alkoxy, $-C_{2-6}$alkenyl, haloC_{2-6}alkenyl, $-C_{2-6}$alkynyl, haloC_{2-6}alkynyl, $-N(R_A)_2$, $-OR_A$, $-SR_A$, $-S(=O)R_B$, $-S(=O)_2R_B$, $-C(=O)R_B$, $-C(=O)OR_B$, $-C(=O)N(R_B)_2$, $-S(=O)OR_B$, $-S(=O)N(R_B)_2$, $-S(=O)_2OR_B$, $-S(=O)_2N(R_B)_2$, $-P(=O)(R_B)_2$, 3-10 membered cycloalkyl, 3-10 membered cycloalkenyl, 3-10 membered cycloalkynyl, 3-10 membered heterocyclyl, 6-10 membered aryl and 5-10 membered heteroaryl; wherein said $-C_{1-6}$alkyl, haloC_{1-6}alkyl, haloC_{1-6}alkoxy, $-C_{2-6}$alkenyl, $-C_{2-6}$alkynyl, 3-10 membered cycloalkyl, 3-10 membered cycloalkenyl, 3-10 membered cycloalkynyl, 3-10 membered heterocyclyl, 6-10 membered aryl or 5-10 membered heteroaryl is independently unsubstituted or substituted with one or more substituents selected from the group consisting of deuterium, halogen, $-C_{1-6}$alkyl, haloC_{1-6}alkyl, haloC_{1-6}alkoxy, $-C_{2-6}$alkenyl, $-C_{2-6}$alkynyl, -CN, $-NO_2$, $-N_3$, oxo, $-N(R_C)_2$, $-OR_C$, $-SR_C$, $-S(=O)R_D$, $-S(=O)_2R_D$, $-C(=O)R_D$, $-C(=O)OR_C$, $-OC(=O)R_D$, $-C(=O)N(R_C)_2$, $-NR_CC(=O)R_D$, $-OC(=O)OR_C$, $-NR_CC(=O)OR_D$, $-OC(=O)N(R_C)_2$, $-NR_CC(=O)N(R_C)_2$, $-S(=O)OR_C$, $-OS(=O)R_D$, $-S(=O)N(R_C)_2$, $-NR_CS(=O)R_D$, $-S(=O)_2OR_C$, $-OS(=O)_2R_D$, $-S(=O)_2N(R_C)_2$, $-NR_CS(=O)_2R_D$, $-OS(=O)_2OR_C$, $-NR_CS(=O)_2OR_C$, $-OS(=O)_2NR_C$, $-NR_CS(=O)_2N(R_C)_2$, $-P(R_C)_2$, $-P(=O)(R_D)_2$, 3-10 membered cycloalkyl, 3-10 membered cycloalkenyl, 3-10 membered cycloalkynyl, 3-10 membered heterocyclyl, 6-10 membered aryl and 5-10 membered heteroaryl;

optionally, R_{X11} and R_{X12} together with the carbon atom to which they are both attached form , , , a 3-10 membered carbocyclic ring or a 3-10 heterocyclic ring; wherein, said , 3-10 membered carbocyclic ring or 3-10 heterocyclic ring is independently unsubstituted or substituted with one or more R_{SX1};

R_{X13} is selected from the group consisting of hydrogen, deuterium, $-C_{1-6}$alkyl, haloC_{1-6}alkyl, $-C_{2-6}$alkenyl, $-C_{2-6}$alkynyl, $-S(=O)R_B$, $-S(=O)_2R_B$, $-C(=O)R_B$, $-C(=O)OR_B$, $-C(=O)N(R_B)_2$, $-S(=O)OR_B$, $-S(=O)N(R_B)_2$, $-S(=O)_2OR_B$, $-S(=O)_2N(R_B)_2$, $-P(=O)(R_B)_2$, 3-10 membered cycloalkyl, 3-10 membered cycloalkenyl, 3-10 membered cycloalkynyl, 3-10 membered heterocyclyl, 6-10 membered aryl and 5-10 membered heteroaryl; wherein said $-C_{1-6}$alkyl, haloC_{1-6}alkyl, $-C_{2-6}$alkenyl, $-C_{2-6}$alkynyl, 3-10 membered cycloalkyl, 3-10 membered cycloalkenyl, 3-10 membered cycloalkynyl, 3-10 membered heterocyclyl, 6-10 membered aryl or 5-10 membered heteroaryl is independently unsubstituted or substituted with one or more substituents selected from the group consisting of deuterium, halogen, $-C_{1-6}$alkyl, haloC_{1-6}alkyl, haloC_{1-6}alkoxy, $-C_{2-6}$alkenyl, $-C_{2-6}$alkynyl, -CN, $-NO_2$, $-N_3$, oxo, $-N(R_C)_2$, $-OR_C$, $-SR_C$, $-S(=O)R_D$, $-S(=O)_2R_D$, $-C(=O)R_D$, $-C(=O)OR_C$, $-OC(=O)R_D$, $-C(=O)N(R_C)_2$, $-NR_CC(=O)R_D$, $-OC(=O)OR_C$, $-NR_CC(=O)OR_D$, $-OC(=O)N(R_C)_2$, $-NR_CC(=O)N(R_C)_2$, $-S(=O)OR_C$, $-OS(=O)R_D$, $-S(=O)N(R_C)_2$, $-NR_CS(=O)R_D$, $-S(=O)_2OR_C$, $-OS(=O)_2R_D$, $-S(=O)_2N(R_C)_2$, $-NR_CS(=O)_2R_D$, $-OS(=O)_2OR_C$, $-NR_CS(=O)_2OR_C$, $-OS(=O)_2NR_C$, $-NR_CS(=O)_2N(R_C)_2$, $-P(R_C)_2$, $-P(=O)(R_D)_2$, 3-10 membered cycloalkyl, 3-10 membered cycloalkenyl, 3-10 membered cycloalkynyl, 3-10 membered heterocyclyl, 6-10 membered aryl and 5-10 membered heteroaryl;

X_2 is selected from the group consisting of N and CR_1;

R_1 is selected from the group consisting of hydrogen, deuterium, halogen, $-C_{1-6}$alkyl, haloC_{1-6}alkyl, haloC_{1-6}alkoxy, $-C_{2-6}$alkenyl, haloC_{2-6}alkenyl, $-C_{2-6}$alkynyl, haloC_{2-6}alkynyl, -CN, $-NO_2$, $-N_3$, oxo, $-N(R_{1A})_2$, $-OR_{1A}$, $-SR_{1A}$, $-S(=O)R_{1B}$, $-S(=O)_2R_{1B}$, $-C(=O)R_{1B}$, $-C(=O)OR_{1A}$, $-OC(=O)R_{1B}$, $-C(=O)N(R_{1A})_2$, $-NR_{1A}C(=O)R_{1B}$, $-OC(=O)OR_{1A}$, $-NR_{1A}C(=O)OR_{1A}$, $-NR_{1A}C(=S)OR_{1A}$, $-OC(=O)N(R_{1A})_2$, $-NR_{1A}C(=O)N(R_{1A})_2$, $-S(=O)OR_{1A}$, $-OS(=O)R_{1B}$, $-S(=O)N(R_{1A})_2$, $-NR_{1A}S(=O)R_{1B}$, $-S(=O)_2OR_{1A}$, $-OS(=O)_2R_{1B}$, $-S(=O)_2N(R_{1A})_2$, $-NR_{1A}S(=O)_2R_{1B}$, $-OS(=O)_2OR_{1A}$, $-NR_{1A}S(=O)_2OR_{1A}$, $-OS(=O)_2N(R_{1A})_2$, $-NR_{1A}S(=O)_2N(R_{1A})_2$, $-P(R_{1A})_2$, $-P(=O)(R_{1B})_2$, 3-10 membered cycloalkyl, 3-10 membered cycloalkenyl, 3-10 membered cycloalkynyl, 3-10 membered heterocyclyl,

6-10 membered aryl and 5-10 membered heteroaryl; wherein said -C_{1-6}alkyl, haloC_{1-6}alkyl, haloC_{1-6}alkoxy, -C_{2-6}alkenyl, haloC_{2-6}alkenyl, -C_{2-6}alkynyl, haloC_{2-6}alkynyl, 3-10 membered cycloalkyl, 3-10 membered cycloalkenyl, 3-10 membered cycloalkynyl, 3-10 membered heterocyclyl, 6-10 membered aryl or 5-10 membered heteroaryl is independently unsubstituted or substituted with one or more substituents selected from the group consisting of deuterium, halogen, -C_{1-6}alkyl, haloC_{1-6}alkyl, haloC_{1-6}alkoxy, -C_{2-6}alkenyl, haloC_{2-6}alkenyl, -C_{2-6}alkynyl, haloC_{2-6}alkynyl, -CN, -NO_2, -N_3, oxo, -$N(R_{1C})_2$, -OR_{1C}, -SR_{1C}, -$S(=O)R_{1D}$, -$S(=O)_2R_{1D}$, -$C(=O)R_{1D}$, -$C(=O)OR_{1D}$, -$OC(=O)R_{1D}$, -$C(=O)N(R_{1C})_2$, -$NR_{1C}C(=O)R_{1D}$, -$OC(=O)OR_{1C}$, -$NR_{1C}C(=O)OR_{1C}$, -$NR_{1C}C(=S)OR_{1C}$, -$OC(=O)N(R_{1C})_2$, -$NR_{1C}C(=O)N(R_{1C})_2$, -$S(=O)OR_{1C}$, -$OS(=O)R_{1D}$, -$S(=O)N(R_{1C})_2$, -$NR_{1C}S(=O)R_{1D}$, -$S(=O)_2OR_{1C}$, -$OS(=O)_2R_{1D}$, -$S(=O)_2N(R_{1C})_2$, -$NR_{1C}S(=O)_2R_{1D}$, -$OS(=O)_2OR_{1C}$, -$NR_{1C}S(=O)_2OR_{1C}$, -$OS(=O)_2N(R_{1C})_2$, -$NR_{1C}S(=O)_2N(R_{1C})_2$, -$P(R_{1C})_2$, -$P(=O)(R_{1D})_2$, 3-10 membered cycloalkyl, 3-10 membered cycloalkenyl, 3-10 membered cycloalkynyl, 3-10 membered heterocyclyl, 6-10 membered aryl and 5-10 membered heteroaryl;

n_1 is 0, 1, 2, 3, 4, 5, or 6;

ring A is a 3-20 membered heterocyclic ring only comprising the N atom attached to the pyrimidine ring; or

ring A is a 3-20 membered heterocyclic ring comprising one or more additional heteroatoms selected from the group consisting of O, S, S=O and $S(=O)_2$ except the N heteroatom attached to the pyrimidine ring;

R_{S1} at each occurrence is independently selected from the group consisting of hydrogen, deuterium, halogen, -C_{1-6}alkyl, haloC_{1-6}alkyl, haloC_{1-6}alkoxy, -C_{2-6}alkenyl, haloC_{2-6}alkenyl, -C_{2-6}alkynyl, haloC_{2-6}alkynyl, -CN, -NO_2, -N_3, oxo, -$N(R_{S1A})_2$, -OR_{S1A}, -SR_{S1A}, -$S(=O)R_{S1B}$, -$S(=O)_2R_{S1B}$, -$C(=O)R_{S1B}$, -$C(=O)OR_{S1A}$, -$OC(=O)R_{S1B}$, -$C(=O)N(R_{S1A})_2$, -$NR_{S1A}C(=O)R_{S1B}$, -$OC(=O)OR_{S1A}$, -$NR_{S1A}C(=O)OR_{S1A}$, -$NR_{S1A}C(=S)OR_{S1A}$, -$OC(=O)N(R_{S1A})_2$, -$NR_{S1A}C(=O)N(R_{S1A})_2$, -$S(=O)OR_{S1A}$, -$OS(=O)R_{S1B}$, -$S(=O)N(R_{S1A})_2$, -$NR_{S1A}S(=O)R_{S1B}$, -$S(=O)_2OR_{S1A}$, -$OS(=O)_2R_{S1B}$, -$S(=O)_2N(R_{S1A})_2$, -$NR_{S1A}S(=O)_2R_{S1B}$, -$OS(=O)_2OR_{S1A}$, -$NR_{S1A}S(=O)_2OR_{S1A}$, -$OS(=O)_2N(R_{S1A})_2$, -$NR_{S1A}S(=O)_2N(R_{S1A})_2$, -$P(R_{S1A})_2$, -$P(=O)(R_{S1B})_2$, 3-10 membered cycloalkyl, 3-10 membered cycloalkenyl, 3-10 membered cycloalkynyl, 3-10 membered heterocyclyl, 6-10 membered aryl and 5-10 membered heteroaryl; wherein said -C_{1-6}alkyl, haloC_{1-6}alkyl, haloC_{1-6}alkoxy, -C_{2-6}alkenyl, haloC_{2-6}alkenyl, -C_{2-6}alkynyl, haloC_{2-6}alkynyl, 3-10 membered cycloalkyl, 3-10 membered cycloalkenyl, 3-10 membered cycloalkynyl, 3-10 membered heterocyclyl, 6-10 membered aryl or 5-10 membered heteroaryl is independently unsubstituted or substituted with one or more substituents selected from the group consisting of deuterium, halogen, -C_{1-6}alkyl, haloC_{1-6}alkyl, haloC_{1-6}alkoxy, -C_{2-6}alkenyl, haloC_{2-6}alkenyl, -C_{2-6}alkynyl, haloC_{2-6}alkynyl, -CN, -NO_2, -N_3, oxo, -$N(R_{S1C})_2$, -OR_{S1C}, -SR_{S1C}, -$S(=O)R_{S1D}$, -$S(=O)_2R_{S1D}$, -$C(=O)R_{S1D}$, -$C(=O)OR_{S1C}$, -$OC(=O)R_{S1D}$, -$C(=O)N(R_{S1C})_2$, -$NR_{S1C}C(=O)R_{S1D}$, -$OC(=O)OR_{S1C}$, -$NR_{S1C}C(=O)OR_{S1C}$, -$NR_{S1C}C(=S)OR_{S1C}$, -$OC(=O)N(R_{S1C})_2$, -$NR_{S1C}C(=O)N(R_{S1C})_2$, -$S(=O)OR_{S1C}$, -$OS(=O)R_{S1D}$, -$S(=O)N(R_{S1C})_2$, -$NR_{S1C}S(=O)R_{S1D}$, -$S(=O)_2OR_{S1C}$, -$OS(=O)_2R_{S1D}$, -$S(=O)_2N(R_{S1C})_2$, -$NR_{S1C}S(=O)_2R_{S1D}$, -$OS(=O)_2OR_{S1C}$, -$NR_{S1C}S(=O)_2OR_{S1C}$, -$OS(=O)_2N(R_{S1C})_2$, -$NR_{S1C}S(=O)_2N(R_{S1C})_2$, -$P(R_{S1C})_2$, -$P(=O)(R_{S1D})_2$, 3-10 membered cycloalkyl, 3-10 membered cycloalkenyl, 3-10 membered cycloalkynyl, 3-10 membered heterocyclyl, 6-10 membered aryl and 5-10 membered heteroaryl;

optionally, two R_{S1} together with the carbon atom to which they are both attached form , , , a 3-10 membered carbocyclic ring or a 3-10 heterocyclic ring; wherein, said , 3-10 membered carbocyclic ring or 3-10 heterocyclic ring is independently unsubstituted or substituted with one or more R_{S11};

optionally, two adjacent R_{S1} together with the atoms to which they are respectively attached form , a 3-10 membered carbocyclic ring, a 3-10 membered heterocyclic ring, a 6-10 membered aryl ring or a 5-10 membered heteroaryl ring, wherein, each of rings is independently unsubstituted or substituted with one or more R_{S12};

optionally, two nonadjacent R_{S1} are connected together to form a bridge containing 0, 1, 2, 3, 4, 5 or 6 carbon atoms, wherein, each of the carbon atoms in the bridge is independently not replaced or replaced by 1 or 2 heteroatoms selected from the group consisting of O, S, S=O and $S(=O)_2$; the hydrogen on the each of carbon atoms or N atoms is independently unsubstituted or substituted with R_{S13};

m_1 is selected from the group consisting of 0, 1, 2, 3, 4, 5, 6, 7, 8 and 9;

R_{S2} at each occurrence is independently selected from the group consisting of hydrogen, deuterium, halogen, -C_{1-6}alkyl, haloC_{1-6}alkyl, haloC_{1-6}alkoxy, -C_{2-6}alkenyl, haloC_{2-6}alkenyl, -C_{2-6}alkynyl, haloC_{2-6}alkynyl, -CN, -NO_2, -N_3,oxo, -$N(R_{S2A})_2$, -OR_{S2A}, -SR_{S2A}, -$S(=O)R_{S2B}$, -$S(=O)_2R_{S2B}$, -$C(=O)R_{S2B}$, -$C(=O)OR_{S2A}$, -$OC(=O)R_{S2B}$, -$C(=O)N(R_{S2A})_2$, -$NR_{S2A}C(=O)R_{S2B}$, -$OC(=O)OR_{S2A}$, -$NR_{S2A}C(=O)OR_{S2A}$, -$NR_{S2A}C(=S)OR_{S2A}$, -$OC(=O)N(R_{S2A})_2$, -$NR_{S2A}C(=O)N(R_{S2A})_2$, -$S(=O)OR_{S2A}$, -$OS(=O)R_{S2B}$, -$S(=O)N(R_{S2A})_2$, -$NR_{S2A}S(=O)R_{S2B}$, -$S(=O)_2OR_{S2A}$, -$OS(=O)_2R_{S2B}$, -$S(=O)_2N(R_{S2A})_2$, -$NR_{S2A}S(=O)_2R_{S2B}$, -$OS(=O)_2OR_{S2A}$, -$NR_{S2A}S(=O)_2OR_{S2A}$, -$OS(=O)_2N(R_{S2A})_2$, -$NR_{S2A}S(=O)_2N(R_{S2A})_2$, -$P(R_{S2A})_2$, -$P(=O)(R_{S2B})_2$, 3-10 membered cycloalkyl, 3-10

membered cycloalkenyl, 3-10 membered cycloalkynyl, 3-10 membered heterocyclyl, 6-10 membered aryl and 5-10 membered heteroaryl; wherein said -C_{1-6}alkyl, haloC_{1-6}alkyl, haloC_{1-6}alkoxy, -C_{2-6}alkenyl, haloC_{2-6}alkenyl, -C_{2-6}alkynyl, haloC_{2-6}alkynyl, 3-10 membered cycloalkyl, 3-10 membered cycloalkenyl, 3-10 membered cycloalkynyl, 3-10 membered heterocyclyl, 6-10 membered aryl or 5-10 membered heteroaryl is independently unsubstituted or substituted with one or more substituents selected from the group consisting of deuterium, halogen, -C_{1-6}alkyl, haloC_{1-6}alkyl, haloC_{1-6}alkoxy, -C_{2-6}alkenyl, haloC_{2-6}alkenyl, -C_{2-6}alkynyl, haloC_{2-6}alkynyl, -CN, -NO_2, -N_3, oxo, -$N(R_{S2C})_2$, -OR_{S2C}, -SR_{S2C}, -$S(=O)R_{S2D}$, -$S(=O)_2R_{S2D}$, -$C(=O)R_{S2D}$, -$C(=O)OR_{S2D}$, -$OC(=O)R_{S2D}$, -$C(=O)N(R_{S2C})_2$, -$NR_{S2C}C(=O)R_{S2D}$, -$OC(=O)OR_{S2C}$, -$NR_{S2C}C(=O)OR_{S2C}$, -$NR_{S2C}C(=S)OR_{S2C}$, -$OC(=O)N(R_{S2C})_2$, -$NR_{S2C}C(=O)N(R_{S2C})_2$, -$S(=O)OR_{S2C}$, -$OS(=O)R_{S2D}$, -$S(=O)N(R_{S2C})_2$, -$NR_{S2C}S(=O)R_{S2D}$, -$S(=O)_2OR_{S2C}$, -$OS(=O)_2R_{S2D}$, -$S(=O)_2N(R_{S2C})_2$, -$NR_{S2C}S(=O)_2R_{S2D}$, -$OS(=O)_2OR_{S2C}$, -$NR_{S2C}S(=O)_2OR_{S2C}$, -$OS(=O)_2N(R_{S2C})_2$, -$NR_{S2C}S(=O)_2N(R_{S2C})_2$, -$P(R_{S2C})_2$, -$P(=O)(R_{S2D})_2$, 3-10 membered cycloalkyl, 3-10 membered cycloalkenyl, 3-10 membered cycloalkynyl, 3-10 membered heterocyclyl, 6-10 membered aryl and 5-10 membered heteroaryl;

optionally, two R_{S2} together with the carbon atom to which they are both attached form , , a 3-10 membered carbocyclic ring or a 3-10 heterocyclic ring; wherein, said , 3-10 membered carbocyclic ring or 3-10 heterocyclic ring is independently unsubstituted or substituted with one or more R_{S21};

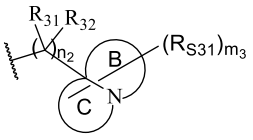
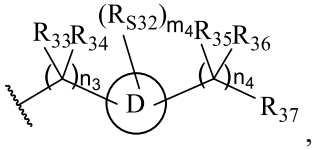
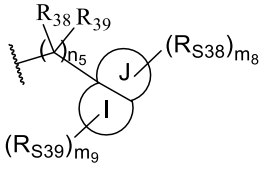
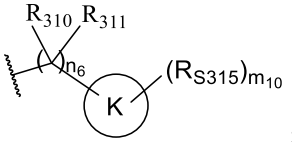
optionally, two adjacent R_{S2} together with the atoms to which they are respectively attached form , a 3-10 membered carbocyclic ring, a 3-10 membered heterocyclic ring, a 6-10 membered aryl ring or a 5-10 membered heteroaryl ring, wherein, each of rings is independently unsubstituted or substituted with one or more R_{S22};

optionally, two nonadjacent R_{S2} are connected together to form a bridge containing 0, 1, 2, 3, 4, 5 or 6 carbon atoms, wherein, each of the carbon atoms in the bridge is independently not replaced or replaced by 1 or 2 heteroatoms selected from the group consisting of N, O, S, S=O and $S(=O)_2$; the hydrogen on the each of carbon atoms or N atoms is independently unsubstituted or substituted with R_{S23};

m_2 is selected from the group consisting of 0, 1, 2, 3, 4 and 5;

Y_1 is selected from the group consisting of a bond, O, S, S(=O), $S(=O)_2$ and NR_{Y11};

R_{Y11} is selected from the group consisting of hydrogen, deuterium, -C_{1-6}alkyl, haloC_{1-6}alkyl, -C_{2-6}alkenyl, -C_{2-6}alkynyl, -$S(=O)R_B$, -$S(=O)_2R_B$, -$C(=O)R_B$, -$C(=O)OR_B$, -$C(=O)N(R_B)_2$, -$S(=O)OR_B$, -$S(=O)N(R_B)_2$, -$S(=O)_2OR_B$, -$S(=O)_2N(R_B)_2$, -$P(=O)(R_B)_2$, 3-10 membered cycloalkyl, 3-10 membered cycloalkenyl, 3-10 membered cycloalkynyl, 3-10 membered heterocyclyl, 6-10 membered aryl and 5-10 membered heteroaryl; wherein said -C_{1-6}alkyl, haloC_{1-6}alkyl, -C_{2-6}alkenyl, -C_{2-6}alkynyl, 3-10 membered cycloalkyl, 3-10 membered cycloalkenyl, 3-10 membered cycloalkynyl, 3-10 membered heterocyclyl, 6-10 membered aryl or 5-10 membered heteroaryl is independently unsubstituted or substituted with one or more substituents selected from the group consisting of deuterium, halogen, -C_{1-6}alkyl, haloC_{1-6}alkyl, haloC_{1-6}alkoxy, -C_{2-6}alkenyl, -C_{2-6}alkynyl, -CN, -NO_2, -N_3, oxo, -$N(R_C)_2$, -OR_C, -SR_C, -$S(=O)R_D$, -$S(=O)_2R_D$, -$C(=O)R_D$, -$C(=O)OR_C$, -$OC(=O)R_D$, -$C(=O)N(R_C)_2$, -$NR_CC(=O)R_D$, -$OC(=O)OR_C$, -$NR_CC(=O)OR_D$, -$OC(=O)N(R_C)_2$, -$NR_CC(=O)N(R_C)_2$, -$S(=O)OR_C$, -$OS(=O)R_D$, -$S(=O)N(R_C)_2$, -$NR_CS(=O)R_D$, -$S(=O)_2OR_C$, -$OS(=O)_2R_D$, -$S(=O)_2N(R_C)_2$, -$NR_CS(=O)_2R_D$, -$OS(=O)_2OR_C$, -$NR_CS(=O)_2OR_C$, -$OS(=O)_2NR_C$, -$NR_CS(=O)_2N(R_C)_2$, -$P(R_C)_2$, -$P(=O)(R_D)_2$, 3-10 membered cycloalkyl, 3-10 membered cycloalkenyl, 3-10 membered cycloalkynyl, 3-10 membered heterocyclyl, 6-10 membered aryl and 5-10 membered heteroaryl;

R_3 is selected from the group consisting of , , ,  and ;

each of R_{31}, R_{32}, R_{33}, R_{34}, R_{35}, R_{36}, R_{38}, R_{39}, R_{310} and R_{311} is independently selected from the group consisting of hydrogen, deuterium, halogen, -C_{1-6}alkyl, haloC_{1-6}alkyl, haloC_{1-6}alkoxy, -C_{2-6}alkenyl, haloC_{2-6}alkenyl, -C_{2-6}alkynyl, haloC_{2-6}alkynyl, -$N(R_A)_2$, -OR_A, -SR_A, -$S(=O)R_B$, -$S(=O)_2R_B$, -$C(=O)R_B$, -$C(=O)OR_A$, -$C(=O)N(R_A)_2$, -$S(=O)OR_A$, -$S(=O)N(R_A)_2$, -$S(=O)_2OR_A$, -$S(=O)_2N(R_A)_2$, -$P(=O)(R_B)_2$, 3-10 membered cycloalkyl, 3-10 membered cycloalkenyl, 3-10 membered cycloalkynyl, 3-10 membered heterocyclyl, 6-10 membered aryl and 5-10 membered heteroaryl; wherein said -C_{1-6}alkyl, haloC_{1-6}alkyl, haloC_{1-6}alkoxy, -C_{2-6}

$_{6}$alkenyl, -C_{2-6}alkynyl, 3-10 membered cycloalkyl, 3-10 membered cycloalkenyl, 3-10 membered cycloalkynyl, 3-10 membered heterocyclyl, 6-10 membered aryl or 5-10 membered heteroaryl is independently unsubstituted or substituted with one or more substituents selected from the group consisting of deuterium, halogen, -C_{1-6}alkyl, haloC_{1-6}alkyl, haloC_{1-6}alkoxy, -C_{2-6}alkenyl, -C_{2-6}alkynyl, -CN, -NO_2, -N_3, oxo, -$N(R_C)_2$, -OR_C, -SR_C, -$S(=O)R_D$, -$S(=O)_2R_D$, -$C(=O)R_D$, -$C(=O)OR_C$, -$OC(=O)R_D$, -$C(=O)N(R_C)_2$, -$NR_CC(=O)R_D$, -$OC(=O)OR_C$, -$NR_CC(=O)OR_D$, -$OC(=O)N(R_C)_2$, -$NR_CC(=O)N(R_C)_2$, -$S(=O)OR_C$, -$OS(=O)R_D$, -$S(=O)N(R_C)_2$, -$NR_CS(=O)R_D$, -$S(=O)_2OR_C$, -$OS(=O)_2R_D$, -$S(=O)_2N(R_C)_2$, -$NR_CS(=O)_2R_D$, -$OS(=O)_2OR_C$, -$NR_CS(=O)_2OR_C$, -$OS(=O)_2NR_C$, -$NR_CS(=O)_2N(R_C)_2$, -$P(R_C)_2$, -$P(=O)(R_D)_2$, 3-10 membered cycloalkyl, 3-10 membered cycloalkenyl, 3-10 membered cycloalkynyl, 3-10 membered heterocyclyl, 6-10 membered aryl and 5-10 membered heteroaryl;

optionally, R_{31} and R_{32} together with the carbon atom to which they are both attached form , , , a 3-10 membered carbocyclic ring or a 3-10 heterocyclic ring; wherein, said , 3-10 membered carbocyclic ring or 3-10 heterocyclic ring is independently unsubstituted or substituted with one or more R_{S33};

optionally, R_{33} and R_{34} together with the carbon atom to which they are both attached form , , , a 3-10 membered carbocyclic ring or a 3-10 heterocyclic ring; wherein, said , 3-10 membered carbocyclic ring or 3-10 heterocyclic ring is independently unsubstituted or substituted with one or more R_{S34};

optionally, R_{35} and R_{36} together with the carbon atom to which they are both attached form , , , a 3-10 membered carbocyclic ring or a 3-10 heterocyclic ring; wherein, said , 3-10 membered carbocyclic ring or 3-10 heterocyclic ring is independently unsubstituted or substituted with one or more R_{S35};

optionally, R_{38} and R_{39} together with the carbon atom to which they are both attached form , , , a 3-10 membered carbocyclic ring or a 3-10 heterocyclic ring; wherein, said , 3-10 membered carbocyclic ring or 3-10 heterocyclic ring is independently unsubstituted or substituted with one or more R_{S310};

optionally, R_{310} and R_{311} together with the carbon atom to which they are both attached form , , , a 3-10 membered carbocyclic ring or a 3-10 heterocyclic ring; wherein, said , 3-10 membered carbocyclic ring or 3-10 heterocyclic ring is independently unsubstituted or substituted with one or more R_{S316};

n_2 is selected from the group consisting of 0, 1, 2, 3, 4, 5 and 6;

n_3 is selected from the group consisting of 0, 1, 2, 3, 4, 5 and 6;

n_4 is selected from the group consisting of 0, 1, 2, 3, 4, 5 and 6;

n_5 is selected from the group consisting of 0, 1, 2, 3, 4, 5 and 6;

n_6 is selected from the group consisting of 0, 1, 2, 3, 4, 5 and 6;

ring B is a 3-10 membered heterocyclic ring optionally further containing 1, 2, or 3 heteroatoms selected from the group consisting of N, O, S, S(=O) and $S(=O)_2$;

ring C is a 3-10 membered heterocyclic ring optionally further containing 1, 2, or 3 heteroatoms selected from the group consisting of N, O, S, S(=O) and $S(=O)_2$;

ring D is a 3-10 membered carbocyclic ring or a 3-10 membered heterocyclic ring;

ring I is a 3-10 membered carbocyclic ring or a 3-10 membered heterocyclic ring containing 1, 2, or 3 heteroatoms selected from the group consisting of N, O, S, S(=O) and $S(=O)_2$;

ring J is a 3-10 membered carbocyclic ring or a 3-10 membered heterocyclic ring containing 1, 2, or 3 heteroatoms selected from the group consisting of N, O, S, S(=O) and $S(=O)_2$;

ring K is 3-10 membered carbocyclic ring or a 3-10 membered heterocyclic ring containing 1, 2, or 3 heteroatoms selected from the group consisting of N, O, S, S(=O) and $S(=O)_2$;

R_{S31} at each occurrence is independently selected from the group consisting of hydrogen, deuterium, halogen, -C_{1-6}alkyl, haloC_{1-6}alkyl, haloC_{1-6}alkoxy, -C_{2-6}alkenyl, haloC_{2-6}alkenyl, -C_{2-6}alkynyl, haloC_{2-6}alkynyl, -CN, -NO_2, -N_3, oxo, -$N(R_{S31A})_2$, -OR_{S31A}, -SR_{S31A}, -$S(=O)R_{S31B}$, -$S(=O)_2R_{S31B}$, -$C(=O)R_{S31B}$, -$C(=O)OR_{S31A}$, -$OC(=O)R_{S31B}$, -$C(=O)N(R_{S31A})_2$, -$NR_{S31A}C(=O)R_{S31B}$, -$OC(=O)OR_{S31A}$, -$NR_{S31A}C(=O)OR_{S31A}$, -$NR_{S31A}C(=S)OR_{S31A}$, -$OC(=O)N(R_{S31A})_2$, -$NR_{S31A}C(=O)N(R_{S31A})_2$, -$S(=O)OR_{S31A}$, -$OS(=O)R_{S31B}$, -$S(=O)N(R_{S31A})_2$, -$NR_{S31A}S(=O)R_{S31B}$, -$S(=O)_2OR_{S31A}$, -$OS(=O)_2R_{S31B}$, -$S(=O)_2N(R_{S31A})_2$, -$NR_{S31A}S(=O)_2R_{S31B}$, -$OS(=O)_2OR_{S31A}$, -$NR_{S31A}S(=O)_2OR_{S31A}$, -$OS(=O)_2N(R_{S31A})_2$, -$NR_{S31A}S(=O)_2N(R_{S31A})_2$, -$P(R_{S31A})_2$, -$P(=O)(R_{S31B})_2$, 3-10 membered cycloalkyl, 3-10 membered cycloalkenyl, 3-10 membered cycloalkynyl, 3-10 membered heterocyclyl, 6-10 membered aryl and 5-10 membered heteroaryl; wherein said -C_{1-6}alkyl, haloC_{1-6}alkyl, haloC_{1-6}alkoxy, -C_{2-6}alkenyl, haloC_{2-6}alkenyl, -C_{2-6}alkynyl, haloC_{2-6}alkynyl, 3-10 membered cycloalkyl, 3-10 membered cycloalkenyl, 3-10 membered cycloalkynyl, 3-10 membered heterocyclyl, 6-10 membered aryl

or 5-10 membered heteroaryl is independently unsubstituted or substituted with one or more substituents selected from the group consisting of deuterium, halogen, -C_{1-6}alkyl, haloC_{1-6}alkyl, haloC_{1-6}alkoxy, -C_{2-6}alkenyl, haloC_{2-6}alkenyl, -C_{2-6}alkynyl, haloC_{2-6}alkynyl, -CN, -NO_2, -N_3, oxo, -$N(R_{S31C})_2$, -OR_{S31C}, -SR_{S31C}, -$S(=O)R_{S31D}$, -$S(=O)_2R_{S31D}$, -$C(=O)R_{S31D}$, -$C(=O)OR_{S31C}$, -$OC(=O)R_{S31D}$, -$C(=O)N(R_{S31C})_2$, -$NR_{S31C}C(=O)R_{S31D}$, -$OC(=O)OR_{S31C}$, -$NR_{S31C}C(=O)OR_{S31C}$, -$NR_{S31C}C(=S)OR_{S31C}$, -$OC(=O)N(R_{S31C})_2$, -$NR_{S31C}C(=O)N(R_{S31C})_2$, -$S(=O)OR_{S31C}$, -$OS(=O)R_{S31D}$, -$S(=O)N(R_{S31C})_2$, -$NR_{S31C}S(=O)R_{S31D}$, -$S(=O)_2OR_{S31C}$, -$OS(=O)_2R_{S31D}$, -$S(=O)_2N(R_{S31C})_2$, -$NR_{S31C}S(=O)_2R_{S31D}$, -$OS(=O)_2OR_{S31C}$, -$NR_{S31C}S(=O)_2OR_{S31C}$, -$OS(=O)_2N(R_{S31C})_2$, -$NR_{S31C}S(=O)_2N(R_{S31C})_2$, -$P(R_{S31C})_2$, -$P(=O)(R_{S31D})_2$, 3-10 membered cycloalkyl, 3-10 membered cycloalkenyl, 3-10 membered cycloalkynyl, 3-10 membered heterocyclyl, 6-10 membered aryl and 5-10 membered heteroaryl;

optionally, two R_{S31} together with the carbon atom to which they are both attached form , , , a 3-10 membered carbocyclic ring or a 3-10 membered heterocyclic ring; wherein, said , 3-10 membered carbocyclic ring or 3-10 heterocyclic ring is independently unsubstituted or substituted with one or more R_{S311};

optionally, two adjacent R_{S31} together with the carbon atoms to which they are respectively attached form , a 3-10 membered carbocyclic ring, a 3-10 membered heterocyclic ring, a 6-10 membered aryl ring or a 5-10 membered heteroaryl ring, wherein, each of rings is independently unsubstituted or substituted with one or more R_{S312};

optionally, two nonadjacent R_{S31} are connected together to form a bridge containing 0, 1, 2, 3, 4, 5 or 6 carbon atoms, wherein, each of the carbon atoms in the bridge is independently not replaced or replaced by 1 or 2 heteroatoms selected from the group consisting of N, O, S, S=O and $S(=O)_2$; the hydrogen on the each of carbon atoms or N atoms is independently unsubstituted or substituted with R_{S313};

m_3 is selected from the group consisting of 0, 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, and 12;

R_{S32} at each occurrence is independently selected from the group consisting of hydrogen, deuterium, halogen, -C_{1-6}alkyl, haloC_{1-6}alkyl, haloC_{1-6}alkoxy, -C_{2-6}alkenyl, haloC_{2-6}alkenyl, -C_{2-6}alkynyl, haloC_{2-6}alkynyl, -CN, -NO_2, -N_3, oxo, -$N(R_{S32A})_2$, -OR_{S32A}, -SR_{S32A}, -$S(=O)R_{S32B}$, -$S(=O)_2R_{S32B}$, -$C(=O)R_{S32B}$, -$C(=O)OR_{S32A}$, -$OC(=O)R_{S32B}$, -$C(=O)N(R_{S32A})_2$, -$NR_{S32A}C(=O)R_{S32B}$, -$OC(=O)OR_{S32A}$, -$NR_{S32A}C(=O)OR_{S32A}$, -$NR_{S32A}C(=S)OR_{S32A}$, -$OC(=O)N(R_{S32A})_2$, -$NR_{S32A}C(=O)N(R_{S32A})_2$, -$S(=O)OR_{S32A}$, -$OS(=O)R_{S32B}$, -$S(=O)N(R_{S32A})_2$, -$NR_{S32A}S(=O)R_{S32B}$, -$S(=O)_2OR_{S32A}$, -$OS(=O)_2R_{S32B}$, -$S(=O)_2N(R_{S32A})_2$, -$NR_{S32A}S(=O)_2R_{S32B}$, -$OS(=O)_2OR_{S32A}$, -$NR_{S32A}S(=O)_2OR_{S32A}$, -$OS(=O)_2N(R_{S32A})_2$, -$NR_{S32A}S(=O)_2N(R_{S32A})_2$, -$P(R_{S32A})_2$, -$P(=O)(R_{S32B})_2$, 3-10 membered cycloalkyl, 3-10 membered cycloalkenyl, 3-10 membered cycloalkynyl, 3-10 membered heterocyclyl, 6-10 membered aryl and 5-10 membered heteroaryl; wherein said -C_{1-6}alkyl, haloC_{1-6}alkyl, haloC_{1-6}alkoxy, -C_{2-6}alkenyl, haloC_{2-6}alkenyl, -C_{2-6}alkynyl, haloC_{2-6}alkynyl, 3-10 membered cycloalkyl, 3-10 membered cycloalkenyl, 3-10 membered cycloalkynyl, 3-10 membered heterocyclyl, 6-10 membered aryl or 5-10 membered heteroaryl is independently unsubstituted or substituted with one or more substituents selected from the group consisting of deuterium, halogen, -C_{1-6}alkyl, haloC_{1-6}alkyl, haloC_{1-6}alkoxy, -C_{2-6}alkenyl, haloC_{2-6}alkenyl, -C_{2-6}alkynyl, haloC_{2-6}alkynyl, -CN, -NO_2, -N_3, oxo, -$N(R_{S32C})_2$, -OR_{S32C}, -SR_{S32C}, -$S(=O)R_{S32C}$, -$S(=O)_2R_{S32D}$, -$C(=O)R_{S32D}$, -$C(=O)OR_{S32C}$, -$OC(=O)R_{S32D}$, -$C(=O)N(R_{S32C})_2$, -$NR_{S32C}C(=O)R_{S32D}$, -$OC(=O)OR_{S32C}$, -$NR_{S32C}C(=O)OR_{S32C}$, -$NR_{S32C}C(=S)OR_{S32C}$, -$OC(=O)N(R_{S32C})_2$, -$NR_{S32C}C(=O)N(R_{S32C})_2$, -$S(=O)OR_{S32C}$, -$OS(=O)R_{S32C}$, -$S(=O)N(R_{S32C})_2$, -$NR_{S32C}S(=O)R_{S32D}$, -$S(=O)_2OR_{S32C}$, -$OS(=O)_2R_{S32D}$, -$S(=O)_2N(R_{S32C})_2$, -$NR_{S32C}S(=O)_2R_{S32D}$, -$OS(=O)_2OR_{S32C}$, -$NR_{S32C}S(=O)_2OR_{S32C}$, -$OS(=O)_2N(R_{S32C})_2$, -$NR_{S32C}S(=O)_2N(R_{S32C})_2$, -$P(R_{S32C})_2$, -$P(=O)(R_{S32D})_2$, 3-10 membered cycloalkyl, 3-10 membered cycloalkenyl, 3-10 membered cycloalkynyl, 3-10 membered heterocyclyl, 6-10 membered aryl and 5-10 membered heteroaryl;

optionally, two R_{S32} together with the carbon atom to which they are both attached form , , , a 3-10 membered carbocyclic ring or a 3-10 heterocyclic ring; wherein, said , 3-10 membered carbocyclic ring or 3-10 heterocyclic ring is independently unsubstituted or substituted with one or more R_{S321};

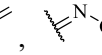
optionally, two adjacent R_{S32} together with the carbon atoms to which they are respectively attached form , a 3-10 membered carbocyclic ring, a 3-10 membered heterocyclic ring, a 6-10 membered aryl ring or a 5-10 membered heteroaryl ring, wherein, each of rings is independently unsubstituted or substituted with one or more R_{S322};

optionally, two nonadjacent R_{S32} are connected together to form a bridge containing 0, 1, 2, 3, 4, 5 or 6 carbon atoms, wherein, each of the carbon atoms in the bridge is independently not replaced or replaced by 1 or 2 heteroatoms selected from the group consisting of N, O, S, S=O and $S(=O)_2$; the hydrogen on the each of carbon atoms or N atoms is independently unsubstituted or substituted with R_{S323};

m_4 is selected from the group consisting of 0, 1, 2, 3, 4, 5 and 6;

R_{37} is selected from the group consisting of $-N(R_{37A})_2$ and 3-10 membered heterocyclyl, wherein said 3-10 membered heterocyclyl is optionally independently substituted with one or more R_{S37};

R_{S38} at each occurrence is independently selected from the group consisting of hydrogen, deuterium, halogen, $-C_{1-6}$alkyl, haloC_{1-6}alkyl, haloC_{1-6}alkoxy, $-C_{2-6}$alkenyl, haloC_{2-6}alkenyl, $-C_{2-6}$alkynyl, haloC_{2-6}alkynyl, -CN, $-NO_2$, $-N_3$, oxo, $-N(R_{S38A})_2$, $-OR_{S38A}$, $-SR_{S38A}$, $-S(=O)R_{S38B}$, $-S(=O)_2R_{S38B}$, $-C(=O)R_{S38B}$, $-C(=O)OR_{S38A}$, $-OC(=O)R_{S38B}$, $-C(=O)N(R_{S38A})_2$, $-NR_{S38A}C(=O)R_{S38B}$, $-OC(=O)OR_{S38A}$, $-NR_{S38A}C(=O)OR_{S38A}$, $-NR_{S38A}C(=S)OR_{S38A}$, $-OC(=O)N(R_{S38A})_2$, $-NR_{S38A}C(=O)N(R_{S38A})_2$, $-S(=O)OR_{S38A}$, $-OS(=O)R_{S38B}$, $-S(=O)N(R_{S38A})_2$, $-NR_{S38A}S(=O)R_{S38B}$, $-S(=O)_2OR_{S38A}$, $-OS(=O)_2R_{S38B}$, $-S(=O)_2N(R_{S38A})_2$, $-NR_{S38A}S(=O)_2R_{S38B}$, $-OS(=O)_2OR_{S38A}$, $-NR_{S38A}S(=O)_2OR_{S38A}$, $-OS(=O)_2N(R_{S38A})_2$, $-NR_{S38A}S(=O)_2N(R_{S38A})_2$, $-P(R_{S38A})_2$, $-P(=O)(R_{S38B})_2$, 3-10 membered cycloalkyl, 3-10 membered cycloalkenyl, 3-10 membered cycloalkynyl, 3-10 membered heterocyclyl, 6-10 membered aryl and 5-10 membered heteroaryl; wherein said $-C_{1-6}$alkyl, haloC_{1-6}alkyl, haloC_{1-6}alkoxy, $-C_{2-6}$alkenyl, haloC_{2-6}alkenyl, $-C_{2-6}$alkynyl, haloC_{2-6}alkynyl, 3-10 membered cycloalkyl, 3-10 membered cycloalkenyl, 3-10 membered cycloalkynyl, 3-10 membered heterocyclyl, 6-10 membered aryl or 5-10 membered heteroaryl is independently unsubstituted or substituted with one or more substituents selected from the group consisting of deuterium, halogen, $-C_{1-6}$alkyl, haloC_{1-6}alkyl, haloC_{1-6}alkoxy, $-C_{2-6}$alkenyl, haloC_{2-6}alkenyl, $-C_{2-6}$alkynyl, haloC_{2-6}alkynyl, -CN, $-NO_2$, $-N_3$, oxo, $-N(R_{S38C})_2$, $-OR_{S38C}$, $-SR_{S38C}$, $-S(=O)R_{S38D}$, $-S(=O)_2R_{S38D}$, $-C(=O)R_{S38D}$, $-C(=O)OR_{S38C}$, $-OC(=O)R_{S38D}$, $-C(=O)N(R_{S38C})_2$, $-NR_{S38C}C(=O)R_{S38D}$, $-OC(=O)OR_{S38C}$, $-NR_{S38C}C(=O)OR_{S38C}$, $-NR_{S38C}C(=S)OR_{S38C}$, $-OC(=O)N(R_{S38C})_2$, $-NR_{S38C}C(=O)N(R_{S38C})_2$, $-S(=O)OR_{S38C}$, $-OS(=O)R_{S38D}$, $-S(=O)N(R_{S38C})_2$, $-NR_{S38C}S(=O)R_{S38D}$, $-S(=O)_2OR_{S38C}$, $-OS(=O)_2R_{S38D}$, $-S(=O)_2N(R_{S38C})_2$, $-NR_{S38C}S(=O)_2R_{S38D}$, $-OS(=O)_2OR_{S38C}$, $-NR_{S38C}S(=O)_2OR_{S38C}$, $-OS(=O)_2N(R_{S38C})_2$, $-NR_{S38C}S(=O)_2N(R_{S38C})_2$, $-P(R_{S38C})_2$, $-P(=O)(R_{S38D})_2$, 3-10 membered cycloalkyl, 3-10 membered cycloalkenyl, 3-10 membered cycloalkynyl, 3-10 membered heterocyclyl, 6-10 membered aryl and 5-10 membered heteroaryl;

optionally, two R_{S38} together with the carbon atom to which they are both attached form , , , a 3-10 membered carbocyclic ring or a 3-10 membered heterocyclic ring; wherein, said , 3-10 membered carbocyclic ring or 3-10 heterocyclic ring is independently unsubstituted or substituted with one or more R_{S381};

optionally, two adjacent R_{S38} together with the carbon atoms to which they are respectively attached form , a 3-10 membered carbocyclic ring, a 3-10 membered heterocyclic ring, a 6-10 membered aryl ring or a 5-10 membered heteroaryl ring, wherein, each of rings is independently unsubstituted or substituted with one or more R_{S382};

optionally, two nonadjacent R_{S38} are connected together to form a bridge containing 0, 1, 2, 3, 4, 5 or 6 carbon atoms, wherein, each of the carbon atoms in the bridge is independently not replaced or replaced by 1 or 2 heteroatoms selected from the group consisting of N, O, S, S=O and $S(=O)_2$; the hydrogen on the each of carbon atoms or N atoms is independently unsubstituted or substituted with R_{S383};

m_8 is selected from the group consisting of 0, 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, and 12;

R_{S39} at each occurrence is independently selected from the group consisting of hydrogen, deuterium, halogen, $-C_{1-6}$alkyl, haloC_{1-6}alkyl, haloC_{1-6}alkoxy, $-C_{2-6}$alkenyl, haloC_{2-6}alkenyl, $-C_{2-6}$alkynyl, haloC_{2-6}alkynyl, -CN, $-NO_2$, $-N_3$, oxo, $-N(R_{S39A})_2$, $-OR_{S39A}$, $-SR_{S39A}$, $-S(=O)R_{S39B}$, $-S(=O)_2R_{S39B}$, $-C(=O)R_{S39B}$, $-C(=O)OR_{S39A}$, $-OC(=O)R_{S39B}$, $-C(=O)N(R_{S39A})_2$, $-NR_{S39A}C(=O)R_{S39B}$, $-OC(=O)OR_{S39A}$, $-NR_{S39A}C(=O)OR_{S39A}$, $-NR_{S39A}C(=S)OR_{S39A}$, $-OC(=O)N(R_{S39A})_2$, $-NR_{S39A}C(=O)N(R_{S39A})_2$, $-S(=O)OR_{S39A}$, $-OS(=O)R_{S39B}$, $-S(=O)N(R_{S39A})_2$, $-NR_{S39A}S(=O)R_{S39B}$, $-S(=O)_2OR_{S39A}$, $-OS(=O)_2R_{S39B}$, $-S(=O)_2N(R_{S39A})_2$, $-NR_{S39A}S(=O)_2R_{S39B}$, $-OS(=O)_2OR_{S39A}$, $-NR_{S39A}S(=O)_2OR_{S39A}$, $-OS(=O)_2N(R_{S39A})_2$, $-NR_{S39A}S(=O)_2N(R_{S39A})_2$, $-P(R_{S39A})_2$, $-P(=O)(R_{S39B})_2$, 3-10 membered cycloalkyl, 3-10 membered cycloalkenyl, 3-10 membered cycloalkynyl, 3-10 membered heterocyclyl, 6-10 membered aryl and 5-10 membered heteroaryl; wherein said $-C_{1-6}$alkyl, haloC_{1-6}alkyl, haloC_{1-6}alkoxy, $-C_{2-6}$alkenyl, haloC_{2-6}alkenyl, $-C_{2-6}$alkynyl, haloC_{2-6}alkynyl, 3-10 membered cycloalkyl, 3-10 membered cycloalkenyl, 3-10 membered cycloalkynyl, 3-10 membered heterocyclyl, 6-10 membered aryl or 5-10 membered heteroaryl is independently unsubstituted or substituted with one or more substituents selected from the group consisting of deuterium, halogen, $-C_{1-6}$alkyl, haloC_{1-6}alkyl, haloC_{1-6}alkoxy, $-C_{2-6}$alkenyl, haloC_{2-6}alkenyl, $-C_{2-6}$alkynyl, haloC_{2-6}alkynyl, -CN, $-NO_2$, $-N_3$, oxo, $-N(R_{S39C})_2$, $-OR_{S39C}$, $-SR_{S39C}$, $-S(=O)R_{S39C}$, $-S(=O)_2R_{S39D}$, $-C(=O)R_{S39D}$, $-C(=O)OR_{S39C}$, $-OC(=O)R_{S39D}$, $-C(=O)N(R_{S39C})_2$, $-NR_{S39C}C(=O)R_{S39D}$, $-OC(=O)OR_{S39C}$, $-NR_{S39C}C(=O)OR_{S39C}$, $-NR_{S39C}C(=S)OR_{S39C}$, $-OC(=O)N(R_{S39C})_2$, $-NR_{S39C}C(=O)N(R_{S39C})_2$, $-S(=O)OR_{S39C}$, $-OS(=O)R_{S39C}$, $-S(=O)N(R_{S39C})_2$, $-NR_{S39C}S(=O)R_{S39D}$, $-S(=O)_2OR_{S39C}$, $-OS(=O)_2R_{S39D}$, $-S(=O)_2N(R_{S39C})_2$, $-NR_{S39C}S(=O)_2R_{S39D}$, $-OS(=O)_2OR_{S39C}$, $-NR_{S39C}S(=O)_2OR_{S39C}$, $-OS(=O)_2N(R_{S39C})_2$, $-NR_{S39C}S(=O)_2N(R_{S39C})_2$, $-P(R_{S39C})_2$, $-P(=O)(R_{S39D})_2$, 3-10 membered cycloalkyl, 3-10 membered cycloalkenyl, 3-10 membered cycloalkynyl, 3-10 membered heterocyclyl, 6-10 membered aryl and 5-10 membered heteroaryl;

optionally, two R_{S39} together with the carbon atom to which they are both attached form , ,

, a 3-10 membered carbocyclic ring or a 3-10 heterocyclic ring; wherein, said , 3-10 membered carbocyclic ring or 3-10 heterocyclic ring is independently unsubstituted or substituted with one or more R_{S391};

optionally, two adjacent R_{S39} together with the carbon atoms to which they are respectively attached form , a 3-10 membered carbocyclic ring, a 3-10 membered heterocyclic ring, a 6-10 membered aryl ring or a 5-10 membered heteroaryl ring, wherein, each of rings is independently unsubstituted or substituted with one or more R_{S392};

optionally, two nonadjacent R_{S39} are connected together to form a bridge containing 0, 1, 2, 3, 4, 5 or 6 carbon atoms, wherein, each of the carbon atoms in the bridge is independently not replaced or replaced by 1 or 2 heteroatoms selected from the group consisting of N, O, S, S=O and $S(=O)_2$; the hydrogen on the each of carbon atoms or N atoms is independently unsubstituted or substituted with R_{S393};

m_9 is selected from the group consisting of 0, 1, 2, 3, 4, 5 and 6;

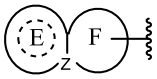
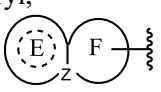
R_{S315} at each occurrence is independently selected from the group consisting of hydrogen, deuterium, halogen, -C_{1-6}alkyl, haloC_{1-6}alkyl, haloC_{1-6}alkoxy, -C_{2-6}alkenyl, haloC_{2-6}alkenyl, -C_{2-6}alkynyl, haloC_{2-6}alkynyl, -CN, -NO_2, -N_3, oxo, -$N(R_{S315A})_2$, -OR_{S315A}, -SR_{S315A}, -$S(=O)R_{S315B}$, -$S(=O)_2R_{S315B}$, -$C(=O)R_{S315B}$, -$C(=O)OR_{S315A}$, -$OC(=O)R_{S315B}$, -$C(=O)N(R_{S315A})_2$, -$NR_{S315A}C(=O)R_{S315B}$, -$OC(=O)OR_{S315A}$, -$NR_{S315A}C(=O)OR_{S315A}$, -$NR_{S315A}C(=S)OR_{S315A}$, -$OC(=O)N(R_{S315A})_2$, -$NR_{S315A}C(=O)N(R_{S315A})_2$, -$S(=O)OR_{S315A}$, -$OS(=O)R_{S315B}$, -$S(=O)N(R_{S315A})_2$, -$NR_{S315A}S(=O)R_{S315B}$, -$S(=O)_2OR_{S315A}$, -$OS(=O)_2R_{S315B}$, -$S(=O)_2N(R_{S315A})_2$, -$NR_{S315A}S(=O)_2R_{S315B}$, -$OS(=O)_2OR_{S315A}$, -$NR_{S315A}S(=O)_2OR_{S315A}$, -$OS(=O)_2N(R_{S315A})_2$, -$NR_{S315A}S(=O)_2N(R_{S315A})_2$, -$P(R_{S315A})_2$, -$P(=O)(R_{S315B})_2$, 3-10 membered cycloalkyl, 3-10 membered cycloalkenyl, 3-10 membered cycloalkynyl, 3-10 membered heterocyclyl, 6-10 membered aryl and 5-10 membered heteroaryl; wherein said -C_{1-6}alkyl, haloC_{1-6}alkyl, haloC_{1-6}alkoxy, -C_{2-6}alkenyl, haloC_{2-6}alkenyl, -C_{2-6}alkynyl, haloC_{2-6}alkynyl, 3-10 membered cycloalkyl, 3-10 membered cycloalkenyl, 3-10 membered cycloalkynyl, 3-10 membered heterocyclyl, 6-10 membered aryl or 5-10 membered heteroaryl is independently unsubstituted or substituted with one or more substituents selected from the group consisting of deuterium, halogen, -C_{1-6}alkyl, haloC_{1-6}alkyl, haloC_{1-6}alkoxy, -C_{2-6}alkenyl, haloC_{2-6}alkenyl, -C_{2-6}alkynyl, haloC_{2-6}alkynyl, -CN, -NO_2, -N_3, oxo, -$N(R_{S315C})_2$, -OR_{S315C}, -SR_{S315C}, -$S(=O)R_{S315C}$, -$S(=O)_2R_{S315D}$, -$C(=O)R_{S315D}$, -$C(=O)OR_{S315C}$, -$OC(=O)R_{S315D}$, -$C(=O)N(R_{S315C})_2$, -$NR_{S315C}C(=O)R_{S315D}$, -$OC(=O)OR_{S315C}$, -$NR_{S315C}C(=O)OR_{S315C}$, -$NR_{S315C}C(=S)OR_{S315C}$, -$OC(=O)N(R_{S315C})_2$, -$NR_{S315C}C(=O)N(R_{S315C})_2$, -$S(=O)OR_{S315C}$, -$OS(=O)R_{S315C}$, -$S(=O)N(R_{S315C})_2$, -$NR_{S315C}S(=O)R_{S315D}$, -$S(=O)_2OR_{S315C}$, -$OS(=O)_2R_{S315D}$, -$S(=O)_2N(R_{S315C})_2$, -$NR_{S315C}S(=O)_2R_{S315D}$, -$OS(=O)_2OR_{S315C}$, -$NR_{S315C}S(=O)_2OR_{S315C}$, -$OS(=O)_2N(R_{S315C})_2$, -$NR_{S315C}S(=O)_2N(R_{S315C})_2$, -$P(R_{S315C})_2$, -$P(=O)(R_{S315D})_2$, 3-10 membered cycloalkyl, 3-10 membered cycloalkenyl, 3-10 membered cycloalkynyl, 3-10 membered heterocyclyl, 6-10 membered aryl and 5-10 membered heteroaryl;

optionally, two R_{S315} together with the carbon atom to which they are both attached form , , , a 3-10 membered carbocyclic ring or a 3-10 heterocyclic ring; wherein, said , 3-10 membered carbocyclic ring or 3-10 heterocyclic ring is independently unsubstituted or substituted with one or more R_{S3151};

optionally, two adjacent R_{S315} together with the carbon atoms to which they are respectively attached form , a 3-10 membered carbocyclic ring, a 3-10 membered heterocyclic ring, a 6-10 membered aryl ring or a 5-10 membered heteroaryl ring, wherein, each of rings is independently unsubstituted or substituted with one or more R_{S3152};

optionally, two nonadjacent R_{S315} are connected together to form a bridge containing 0, 1, 2, 3, 4, 5 or 6 carbon atoms, wherein, each of the carbon atoms in the bridge is independently not replaced or replaced by 1 or 2 heteroatoms selected from the group consisting of N, O, S, S=O and $S(=O)_2$; the hydrogen on the each of carbon atoms or N atoms is independently unsubstituted or substituted with R_{S3153};

m_{10} is selected from the group consisting of 0, 1, 2, 3, 4, 5 and 6;

R_4 is selected from the group consisting of 6-10 membered aryl, 5-10 membered heteroaryl, 
and , wherein said 6-10 membered aryl, 5-10 membered heteroaryl,  or  is independently unsubstituted or substituted with one or more R_{S4};

Z at each occurrence is independently selected from the group consisting of C and N;

ring E at each occurrence is independently selected from the group consisting of a 6 membered aryl ring

and a 5-6 membered heteroaryl ring and ring F at each occurrence is independently selected from the group consisting of a 3-10 membered carbocyclic ring and a 3-10 membered heterocyclic ring when Z is C;

ring E at each occurrence is independently a 5-6 membered heteroaryl ring and ring F at each occurrence is independently a 3-10 membered heterocyclic ring when Z is N;

R_{S4} at each occurrence is independently selected from the group consisting of deuterium, halogen, -C_{1-6}alkyl, haloC_{1-6}alkyl, haloC_{1-6}alkoxy, -C_{2-6}alkenyl, haloC_{2-6}alkenyl, -C_{2-6}alkynyl, haloC_{2-6}alkynyl, -CN, -NO_2, -N_3, oxo, -$N(R_{S4A})_2$, -OR_{S4A}, -SR_{S4A}, -$S(=O)R_{S4B}$, -$S(=O)_2R_{S4B}$, -$C(=O)R_{S4B}$, -$C(=O)OR_{S4A}$, -$OC(=O)R_{S4B}$, -$C(=O)N(R_{S4A})_2$, -$NR_{S4A}C(=O)R_{S4B}$, -$OC(=O)OR_{S4A}$, -$NR_{S4A}C(=O)OR_{S4A}$, -$NR_{S4A}C(=S)OR_{S4A}$, -$OC(=O)N(R_{S4A})_2$, -$NR_{S4A}C(=O)N(R_{S4A})_2$, -$S(=O)OR_{S4A}$, -$OS(=O)R_{S4B}$, -$S(=O)N(R_{S4A})_2$, -$NR_{S4A}S(=O)R_{S4B}$, -$S(=O)_2OR_{S4A}$, -$OS(=O)_2R_{S4B}$, -$S(=O)_2N(R_{S4A})_2$, -$NR_{S4A}S(=O)_2R_{S4B}$, -$OS(=O)_2OR_{S4A}$, -$NR_{S4A}S(=O)_2OR_{S4A}$, -$OS(=O)_2N(R_{S4A})_2$, -$NR_{S4A}S(=O)_2N(R_{S4A})_2$, -$P(R_{S4A})_2$, -$P(=O)(R_{S4B})_2$, 3-10 membered cycloalkyl, 3-10 membered cycloalkenyl, 3-10 membered cycloalkynyl, 3-10 membered heterocyclyl, 6-10 membered aryl and 5-10 membered heteroaryl; wherein said -C_{1-6}alkyl, haloC_{1-6}alkyl, haloC_{1-6}alkoxy, -C_{2-6}alkenyl, haloC_{2-6}alkenyl, -C_{2-6}alkynyl, haloC_{2-6}alkynyl, 3-10 membered cycloalkyl, 3-10 membered cycloalkenyl, 3-10 membered cycloalkynyl, 3-10 membered heterocyclyl, 6-10 membered aryl or 5-10 membered heteroaryl is independently unsubstituted or substituted with one or more substituents selected from the group consisting of deuterium, halogen, -C_{1-6}alkyl, haloC_{1-6}alkyl, haloC_{1-6}alkoxy, -C_{2-6}alkenyl, haloC_{2-6}alkenyl, -C_{2-6}alkynyl, haloC_{2-6}alkynyl, -CN, -NO_2, -N_3, oxo, -$N(R_{S4C})_2$, -OR_{S4C}, -SR_{S4C}, -$S(=O)R_{S4D}$, -$S(=O)_2R_{S4D}$, -$C(=O)R_{S4D}$, -$C(=O)OR_{S4D}$, -$OC(=O)R_{S4D}$, -$C(=O)N(R_{S4C})_2$, -$NR_{S4C}C(=O)R_{S4D}$, -$OC(=O)OR_{S4C}$, -$NR_{S4C}C(=O)OR_{S4C}$, -$NR_{S4C}C(=S)OR_{S4C}$, -$OC(=O)N(R_{S4C})_2$, -$NR_{S4C}C(=O)N(R_{S4C})_2$, -$S(=O)OR_{S4C}$, -$OS(=O)R_{S4D}$, -$S(=O)N(R_{S4C})_2$, -$NR_{S4C}S(=O)R_{S4D}$, -$S(=O)_2OR_{S4C}$, -$OS(=O)_2R_{S4D}$, -$S(=O)_2N(R_{S4C})_2$, -$NR_{S4C}S(=O)_2R_{S4D}$, -$OS(=O)_2OR_{S4C}$, -$NR_{S4C}S(=O)_2OR_{S4C}$, -$OS(=O)_2N(R_{S4C})_2$, -$NR_{S4C}S(=O)_2N(R_{S4C})_2$, -$P(R_{S4C})_2$, -$P(=O)(R_{S4D})_2$, 3-10 membered cycloalkyl, 3-10 membered cycloalkenyl, 3-10 membered cycloalkynyl, 3-10 membered heterocyclyl, 6-10 membered aryl and 5-10 membered heteroaryl;

R_5 is selected from the group consisting of hydrogen, deuterium, halogen, -C_{1-6}alkyl, haloC_{1-6}alkyl, haloC_{1-6}alkoxy, -C_{2-6}alkenyl, haloC_{2-6}alkenyl, -C_{2-6}alkynyl, haloC_{2-6}alkynyl, -CN, -NO_2, -N_3, oxo, -$N(R_{5A})_2$, -OR_{5A}, -SR_{5A}, -$S(=O)R_{5B}$, -$S(=O)_2R_{5B}$, -$C(=O)R_{5B}$, -$C(=O)OR_{5A}$, -$OC(=O)R_{5B}$, -$C(=O)N(R_{5A})_2$, -$NR_{5A}C(=O)R_{5B}$, -$OC(=O)OR_{5A}$, -$NR_{5A}C(=O)OR_{5A}$, -$NR_{5A}C(=S)OR_{5A}$, -$OC(=O)N(R_{5A})_2$, -$NR_{5A}C(=O)N(R_{5A})_2$, -$S(=O)OR_{5A}$, -$OS(=O)R_{5B}$, -$S(=O)N(R_{5A})_2$, -$NR_{5A}S(=O)R_{5B}$, -$S(=O)_2OR_{5A}$, -$OS(=O)_2R_{5B}$, -$S(=O)_2N(R_{5A})_2$, -$NR_{5A}S(=O)_2R_{5B}$, -$OS(=O)_2OR_{5A}$, -$NR_{5A}S(=O)_2OR_{5A}$, -$OS(=O)_2N(R_{5A})_2$, -$NR_{5A}S(=O)_2N(R_{5A})_2$, -$P(R_{5A})_2$, -$P(=O)(R_{5B})_2$, 3-10 membered cycloalkyl, 3-10 membered cycloalkenyl, 3-10 membered cycloalkynyl, 3-10 membered heterocyclyl, 6-10 membered aryl and 5-10 membered heteroaryl; wherein said -C_{1-6}alkyl, haloC_{1-6}alkyl, haloC_{1-6}alkoxy, -C_{2-6}alkenyl, haloC_{2-6}alkenyl, -C_{2-6}alkynyl, haloC_{2-6}alkynyl, 3-10 membered cycloalkyl, 3-10 membered cycloalkenyl, 3-10 membered cycloalkynyl, 3-10 membered heterocyclyl, 6-10 membered aryl or 5-10 membered heteroaryl is independently unsubstituted or substituted with one or more substituents selected from the group consisting of deuterium, halogen, -C_{1-6}alkyl, haloC_{1-6}alkyl, haloC_{1-6}alkoxy, -C_{2-6}alkenyl, haloC_{2-6}alkenyl, -C_{2-6}alkynyl, haloC_{2-6}alkynyl, -CN, -NO_2, -N_3, oxo, -$N(R_{5C})_2$, -OR_{5C}, -SR_{5C}, -$S(=O)R_{5D}$, -$S(=O)_2R_{5D}$, -$C(=O)R_{5D}$, -$C(=O)OR_{5D}$, -$OC(=O)R_{5D}$, -$C(=O)N(R_{5C})_2$, -$NR_{5C}C(=O)R_{5D}$, -$OC(=O)OR_{5C}$, -$NR_{5C}C(=O)OR_{5C}$, -$NR_{5C}C(=S)OR_{5C}$, -$OC(=O)N(R_{5C})_2$, -$NR_{5C}C(=O)N(R_{5C})_2$, -$S(=O)OR_{5C}$, -$OS(=O)R_{5D}$, -$S(=O)N(R_{5C})_2$, -$NR_{5C}S(=O)R_{5D}$, -$S(=O)_2OR_{5C}$, -$OS(=O)_2R_{5D}$, -$S(=O)_2N(R_{5C})_2$, -$NR_{5C}S(=O)_2R_{5D}$, -$OS(=O)_2OR_{5C}$, -$NR_{5C}S(=O)_2OR_{5C}$, -$OS(=O)_2N(R_{5C})_2$, -$NR_{5C}S(=O)_2N(R_{5C})_2$, -$P(R_{5C})_2$, -$P(=O)(R_{5D})_2$, 3-10 membered cycloalkyl, 3-10 membered cycloalkenyl, 3-10 membered cycloalkynyl, 3-10 membered heterocyclyl, 6-10 membered aryl and 5-10 membered heteroaryl;

each of R_{1A}, R_{1C}, R_{S1A}, R_{S1C}, R_{S2A}, R_{S2C}, R_{S31A}, R_{S31C}, R_{S32A}, R_{S32C}, R_{37A}, R_{S38A}, R_{S38C}, R_{S39A}, R_{S39C}, R_{S315A}, R_{S315C}, R_{S4A}, R_{S4C}, R_{5A}, R_{5C}, R_a, R_b, R_c, R_d, R_e, R_f, R_g, R_h, R_i, R_j, R_k and R_l is independently selected from the group consisting of hydrogen, deuterium, -C_{1-6}alkyl, haloC_{1-6}alkyl, -C_{2-6}alkenyl, -C_{2-6}alkynyl, -$S(=O)R_B$, -$S(=O)_2R_B$, -$C(=O)R_B$, -$C(=O)OR_B$, -$C(=O)N(R_B)_2$, -$S(=O)OR_B$, -$S(=O)N(R_B)_2$, -$S(=O)_2OR_B$, -$S(=O)_2N(R_B)_2$, -$P(=O)(R_B)_2$, 3-10 membered cycloalkyl, 3-10 membered cycloalkenyl, 3-10 membered cycloalkynyl, 3-10 membered heterocyclyl, 6-10 membered aryl and 5-10 membered heteroaryl; wherein said -C_{1-6}alkyl, haloC_{1-6}alkyl, -C_{2-6}alkenyl, -C_{2-6}alkynyl, 3-10 membered cycloalkyl, 3-10 membered cycloalkenyl, 3-10 membered cycloalkynyl, 3-10 membered heterocyclyl, 6-10 membered aryl or 5-10 membered heteroaryl is independently unsubstituted or substituted with one or more substituents selected from the group consisting of deuterium, halogen, -C_{1-6}alkyl, haloC_{1-6}alkyl, haloC_{1-6}alkoxy, -C_{2-6}alkenyl, -C_{2-6}alkynyl, -CN, -NO_2, -N_3, oxo, -$N(R_C)_2$, -OR_C, -SR_C, -$S(=O)R_D$, -$S(=O)_2R_D$, -$C(=O)R_D$, -$C(=O)OR_C$, -$OC(=O)R_D$, -$C(=O)N(R_C)_2$, -$NR_CC(=O)R_D$, -$OC(=O)OR_C$, -$NR_CC(=O)OR_D$, -$OC(=O)N(R_C)_2$, -$NR_CC(=O)N(R_C)_2$, -$S(=O)OR_C$, -$OS(=O)R_D$, -$S(=O)N(R_C)_2$, -$NR_CS(=O)R_D$, -$S(=O)_2OR_C$, -$OS(=O)_2R_D$, -$S(=O)_2N(R_C)_2$, -$NR_CS(=O)_2R_D$, -$OS(=O)_2OR_C$, -$NR_CS(=O)_2OR_C$, -$OS(=O)_2NR_C$, -$NR_CS(=O)_2N(R_C)_2$, -$P(R_C)_2$, -$P(=O)(R_D)_2$, 3-10 membered cycloalkyl, 3-10 membered cycloalkenyl, 3-10 membered cycloalkynyl, 3-10 membered heterocyclyl, 6-10 membered aryl and 5-10 membered heteroaryl;

optionally, (two R_{1A}, two R_{1C}, two R_{S1A}, two R_{S1C}, two R_{S2A}, two R_{S2C}, two R_{S31A}, two R_{S31C}, two R_{S32A}, two R_{S32C}, two R_{37A}, two R_{S38A}, two R_{S38C}, two R_{S39A}, two R_{S39C}, two R_{S315A}, two R_{S315C}, two R_{S4A}, two R_{S4C}, two R_{5A} or two R_{5C}) together with the nitrogen atom to which they are both attached form a 3-10 membered heterocyclic ring or a 5-10 membered heteroaryl ring, wherein, said 3-10 membered heterocyclic ring or 5-10 membered heteroaryl ring is independently unsubstituted or substituted with one or more R_{SS};

each of R_{1B}, R_{1D}, R_{S1B}, R_{S1D}, R_{S2B}, R_{S2D}, R_{S31B}, R_{S31D}, R_{S32B}, R_{S32D}, R_{S38B}, R_{S38D}, R_{S39B}, R_{S315B}, R_{S315D}, R_{S39D}, R_{S4B}, R_{S4D}, R_{5B} and R_{5D} is independently selected from the group consisting of hydrogen, deuterium, -C_{1-6}alkyl, haloC_{1-6}alkyl, haloC_{1-6}alkoxy, -C_{2-6}alkenyl, haloC_{2-6}alkenyl, -C_{2-6}alkynyl, haloC_{2-6}alkynyl, -$N(R_A)_2$, -OR_A, -SR_A, 3-10 membered cycloalkyl, 3-10 membered cycloalkenyl, 3-10 membered cycloalkynyl, 3-10 membered heterocyclyl, 6-10 membered aryl and 5-10 membered heteroaryl; wherein said -C_{1-6}alkyl, haloC_{1-6}alkyl, haloC_{1-6}alkoxy, -C_{2-6}alkenyl, -C_{2-6}alkynyl, 3-10 membered cycloalkyl, 3-10 membered cycloalkenyl, 3-10 membered cycloalkynyl, 3-10 membered heterocyclyl, 6-10 membered aryl or 5-10 membered heteroaryl is independently unsubstituted or substituted with one or more substituents selected from the group consisting of deuterium, halogen, -C_{1-6}alkyl, haloC_{1-6}alkyl, haloC_{1-6}alkoxy, -C_{2-6}alkenyl, -C_{2-6}alkynyl, -CN, -NO_2, -N_3, oxo, -$N(R_C)_2$, -OR_C, -SR_C, -$S(=O)R_D$, -$S(=O)_2R_D$, -$C(=O)R_D$, -$C(=O)OR_C$, -$OC(=O)R_D$, -$C(=O)N(R_C)_2$, -$NR_CC(=O)R_D$, -$OC(=O)OR_C$, -$NR_CC(=O)OR_D$, -$OC(=O)N(R_C)_2$, -$NR_CC(=O)N(R_C)_2$, -$S(=O)OR_C$, -$OS(=O)R_D$, -$S(=O)N(R_C)_2$, -$NR_CS(=O)R_D$, -$S(=O)_2OR_C$, -$OS(=O)_2R_D$, -$S(=O)_2N(R_C)_2$, -$NR_CS(=O)_2R_D$, -$OS(=O)_2OR_C$, -$NR_CS(=O)_2OR_C$, -$OS(=O)_2NR_C$, -$NR_CS(=O)_2N(R_C)_2$, -$P(R_C)_2$, -$P(=O)(R_D)_2$, 3-10 membered cycloalkyl, 3-10 membered cycloalkenyl, 3-10 membered cycloalkynyl, 3-10 membered heterocyclyl, 6-10 membered aryl and 5-10 membered heteroaryl;

each of (R_A, R_B, R_C and R_D) is independently selected from the group consisting of hydrogen, deuterium, -C_{1-6}alkyl, haloC_{1-6}alkyl, haloC_{1-6}alkoxy, -C_{2-6}alkenyl, -C_{2-6}alkynyl, 3-10 membered cycloalkyl, 3-10 membered cycloalkenyl, 3-10 membered cycloalkynyl, 3-10 membered heterocyclyl, 6-10 membered aryl and 5-10 membered heteroaryl; wherein said -C_{1-6}alkyl, haloC_{1-6}alkyl, haloC_{1-6}alkoxy, -C_{2-6}alkenyl, -C_{2-6}alkynyl, 3-10 membered cycloalkyl, 3-10 membered cycloalkenyl, 3-10 membered cycloalkynyl, 3-10 membered heterocyclyl, 6-10 membered aryl or 5-10 membered heteroaryl is independently unsubstituted or substituted with one or more R_{SA};

each of R_{SX1}, R_{S11}, R_{S12}, R_{S13}, R_{S21}, R_{S22}, R_{S23}, R_{S33}, R_{S34}, R_{S35}, R_{S37}, R_{S310}, R_{S316}, R_{S311}, R_{S312}, R_{S313}, R_{S321}, R_{S322}, R_{S323}, R_{S381}, R_{S382}, R_{S383}, R_{S391}, R_{S392}, R_{S393}, R_{S3151}, R_{S3152}, R_{S3153}, R_{SS} and R_{SA} is independently selected from the group consisting of deuterium, halogen, -C_{1-6}alkyl, haloC_{1-6}alkyl, haloC_{1-6}alkoxy, -C_{2-6}alkenyl, -C_{2-6}alkynyl, -CN, -NO_2, -N_3, oxo, -NH_2, -$NH(C_{1-6}$alkyl), -$N(C_{1-6}$alkyl)$_2$, -OH, -$O(C_{1-6}$alkyl), -SH, -$S(C_{1-6}$alkyl), -$S(=O)(C_{1-6}$alkyl), -$S(=O)_2(C_{1-6}$alkyl), -$C(=O)(C_{1-6}$alkyl), -C(=O)OH, -$C(=O)(OC_{1-6}$alkyl), -$OC(=O)(C_{1-6}$alkyl), -$C(=O)NH_2$, -$C(=O)NH(C_{1-6}$alkyl), -$C(=O)N(C_{1-6}$alkyl)$_2$, -$NHC(=O)(C_{1-6}$alkyl), -$N(C_{1-6}$alkyl)$C(=O)(C_{1-6}$alkyl), -$OC(=O)O(C_{1-6}$alkyl), -$NHC(=O)(OC_{1-6}$alkyl), -$N(C_{1-6}$alkyl)$C(=O)(OC_{1-6}$alkyl), -$OC(=O)NH(C_{1-6}$alkyl), -$OC(=O)N(C_{1-6}$alkyl)$_2$, -$NHC(=O)NH_2$, -$NHC(=O)NH(C_{1-6}$alkyl), -$NHC(=O)N(C_{1-6}$alkyl)$_2$, -$N(C_{1-6}$alkyl)$C(=O)NH_2$, -$N(C_{1-6}$alkyl)$C(=O)NH(C_{1-6}$alkyl), -$N(C_{1-6}$alkyl)$C(=O)N(C_{1-6}$alkyl)$_2$, -$S(=O)(OC_{1-6}$alkyl), -$OS(=O)(C_{1-6}$alkyl), -$S(=O)NH_2$, -$S(=O)NH(C_{1-6}$alkyl), -$S(=O)N(C_{1-6}$alkyl)$_2$, -$NHS(=O)(C_{1-6}$alkyl), -$N(C_{1-6}$alkyl)$S(=O)(C_{1-6}$alkyl), -$S(=O)_2(OC_{1-6}$alkyl), -$OS(=O)_2(C_{1-6}$alkyl), -$S(=O)_2NH_2$, -$S(=O)_2NH(C_{1-6}$alkyl), -$S(=O)_2N(C_{1-6}$alkyl)$_2$, -$NHS(=O)_2(C_{1-6}$alkyl), -$N(C_{1-6}$alkyl)$S(=O)_2(C_{1-6}$alkyl), -$OS(=O)_2O(C_{1-6}$alkyl), -$NHS(=O)_2O(C_{1-6}$alkyl), -$N(C_{1-6}$alkyl)$S(=O)_2O(C_{1-6}$alkyl), -$OS(=O)_2NH_2$, -$OS(=O)_2NH(C_{1-6}$alkyl), -$OS(=O)_2N(C_{1-6}$alkyl)$_2$, -$NHS(=O)_2NH_2$, -$NHS(=O)_2NH(C_{1-6}$alkyl), -$NHS(=O)_2N(C_{1-6}$alkyl)$_2$, -$N(C_{1-6}$alkyl)$S(=O)_2NH_2$, -$N(C_{1-6}$alkyl)$S(=O)_2NH(C_{1-6}$alkyl), -$N(C_{1-6}$alkyl)$S(=O)_2N(C_{1-6}$alkyl)$_2$, -$PH(C_{1-6}$alkyl), -$P(C_{1-6}$alkyl)$_2$, -$P(=O)H(C_{1-6}$alkyl), -$P(=O)(C_{1-6}$alkyl)$_2$, 3-10 membered cycloalkyl, 3-10 membered cycloalkenyl, 3-10 membered cycloalkynyl, 3-10 membered heterocyclyl, 6-10 membered aryl and 5-10 membered heteroaryl; wherein, said -C_{1-6}alkyl, haloC_{1-6}alkyl, haloC_{1-6}alkoxy, -C_{2-6}alkenyl, -C_{2-6}alkynyl, 3-10 membered cycloalkyl, 3-10 membered cycloalkenyl, 3-10 membered cycloalkynyl, 3-10 membered heterocyclyl, 6-10 membered aryl or 5-10 membered heteroaryl is independently unsubstituted or substituted with one or more substituents selected from the group consisting of deuterium, halogen, -C_{1-3}alkyl, haloC_{1-3}alkyl, haloC_{1-3}alkoxy, -C_{2-3}alkenyl, -C_{2-3}alkynyl, -CN, -NO_2, -N_3, oxo, -NH_2, -$NH(C_{1-3}$alkyl), -$N(C_{1-3}$alkyl)$_2$, -OH, -$O(C_{1-3}$alkyl), -SH, -$S(C_{1-3}$alkyl), -$S(=O)(C_{1-3}$alkyl), -$S(=O)_2(C_{1-3}$alkyl), -$C(=O)(C_{1-3}$alkyl), -C(=O)OH, -$C(=O)(OC_{1-3}$alkyl), -$OC(=O)(C_{1-3}$alkyl), -$C(=O)NH_2$, -$C(=O)NH(C_{1-3}$alkyl), -$C(=O)N(C_{1-3}$alkyl)$_2$, -$NHC(=O)(C_{1-3}$alkyl), -$N(C_{1-3}$alkyl)$C(=O)(C_{1-3}$alkyl), -$OC(=O)O(C_{1-3}$alkyl), -$NHC(=O)(OC_{1-3}$alkyl), -$N(C_{1-3}$alkyl)$C(=O)(OC_{1-3}$alkyl), -$OC(=O)NH(C_{1-3}$alkyl), -$OC(=O)N(C_{1-3}$alkyl)$_2$, -$NHC(=O)NH_2$, -$NHC(=O)NH(C_{1-3}$alkyl), -$NHC(=O)N(C_{1-3}$alkyl)$_2$, -$N(C_{1-3}$alkyl)$C(=O)NH_2$, -$N(C_{1-3}$alkyl)$C(=O)NH(C_{1-3}$alkyl), -$N(C_{1-3}$alkyl)$C(=O)N(C_{1-3}$alkyl)$_2$, -$S(=O)(OC_{1-3}$alkyl), -$OS(=O)(C_{1-3}$alkyl), -$S(=O)NH_2$, -$S(=O)NH(C_{1-3}$alkyl), -$S(=O)N(C_{1-3}$alkyl)$_2$, -$NHS(=O)(C_{1-3}$alkyl), -$N(C_{1-3}$alkyl)$S(=O)(C_{1-3}$alkyl), -$S(=O)_2(OC_{1-3}$alkyl), -$OS(=O)_2(C_{1-3}$alkyl), -$S(=O)_2NH_2$, -$S(=O)_2NH(C_{1-3}$alkyl), -$S(=O)_2N(C_{1-3}$alkyl)$_2$, -$NHS(=O)_2(C_{1-3}$alkyl), -$N(C_{1-3}$alkyl)$S(=O)_2(C_{1-3}$alkyl), -$OS(=O)_2O(C_{1-3}$alkyl), -$NHS(=O)_2O(C_{1-3}$alkyl), -$N(C_{1-3}$alkyl)$S(=O)_2O(C_{1-3}$alkyl), -$OS(=O)_2NH_2$, -$OS(=O)_2NH(C_{1-3}$alkyl), -$OS(=O)_2N(C_{1-3}$alkyl)$_2$, -$NHS(=O)_2NH_2$, -$NHS(=O)_2NH(C_{1-3}$alkyl), -$NHS(=O)_2N(C_{1-3}$alkyl)$_2$, -$N(C_{1-}$

$_3$alkyl)S(=O)$_2$NH$_2$, -N(C$_{1-3}$alkyl)S(=O)$_2$NH(C$_{1-3}$alkyl), -N(C$_{1-3}$alkyl)S(=O)$_2$N(C$_{1-3}$alkyl)$_2$, -PH(C$_{1-3}$alkyl), -P(C$_{1-3}$alkyl)$_2$, -P(=O)H(C$_{1-3}$alkyl), -P(=O)(C$_{1-3}$alkyl)$_2$, 3-10 membered cycloalkyl, 3-10 membered cycloalkenyl, 3-10 membered cycloalkynyl, 3-10 membered heterocyclyl, 6-10 membered aryl and 5-10 membered heteroaryl;

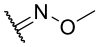
each of heterocyclyl or heterocyclic at each occurrence independently contains 1, 2, 3 or 4 heteroatoms selected from the group consisting of N, O, S, S(=O) and S(=O)$_2$;

each of heteroaryl at each occurrence independently contains 1, 2, 3 or 4 heteroatoms selected from the group consisting of N, O, and S.

2. The compound of claim 1, wherein, R_{S1} is deuterium, halogen, -C$_{1-6}$alkyl, -C$_{2-6}$alkenyl, -C$_{2-6}$alkynyl, haloC$_{1-6}$alkyl, haloC$_{1-6}$alkoxy, -CN, -NH$_2$, -NH(C$_{1-6}$alkyl), -N(C$_{1-6}$alkyl)$_2$, -OH, -OC$_{1-6}$alkyl or 3-6 membered cycloalkyl; wherein said -C$_{1-6}$alkyl, -C$_{2-6}$alkenyl, -C$_{2-6}$alkynyl or 3-6 membered cycloalkyl is independently unsubstituted or substituted with 1, 2, or 3 substituents selected from the group consisting of deuterium, halogen, haloC$_{1-6}$alkyl, haloC$_{1-6}$alkoxy, -CN, -NH$_2$, -NH(C$_{1-6}$alkyl), -N(C$_{1-6}$alkyl)$_2$, -OH and -OC$_{1-6}$alkyl;

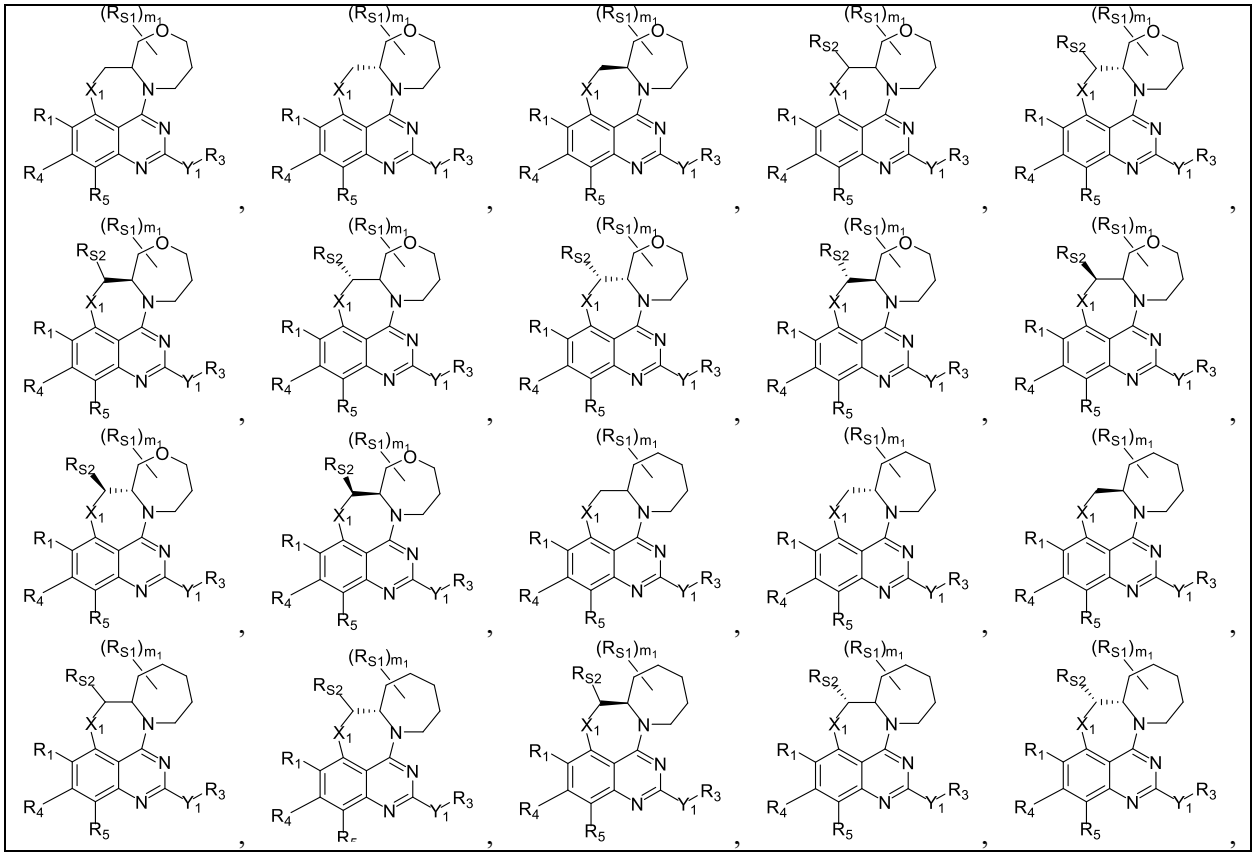
optionally, two R_{S1} together with the carbon atom to which they are both attached form , , , or a 3-6 membered carbocyclic ring; wherein, said , 3-6 membered carbocyclic ring is independently unsubstituted or substituted with 1, 2, or 3 substituents selected from the group consisting of deuterium, halogen, haloC$_{1-6}$alkyl, haloC$_{1-6}$alkoxy, -CN, -NH$_2$, -NH(C$_{1-6}$alkyl), -N(C$_{1-6}$alkyl)$_2$, -OH and -OC$_{1-6}$alkyl; R_b is -C$_{1-6}$alkyl;

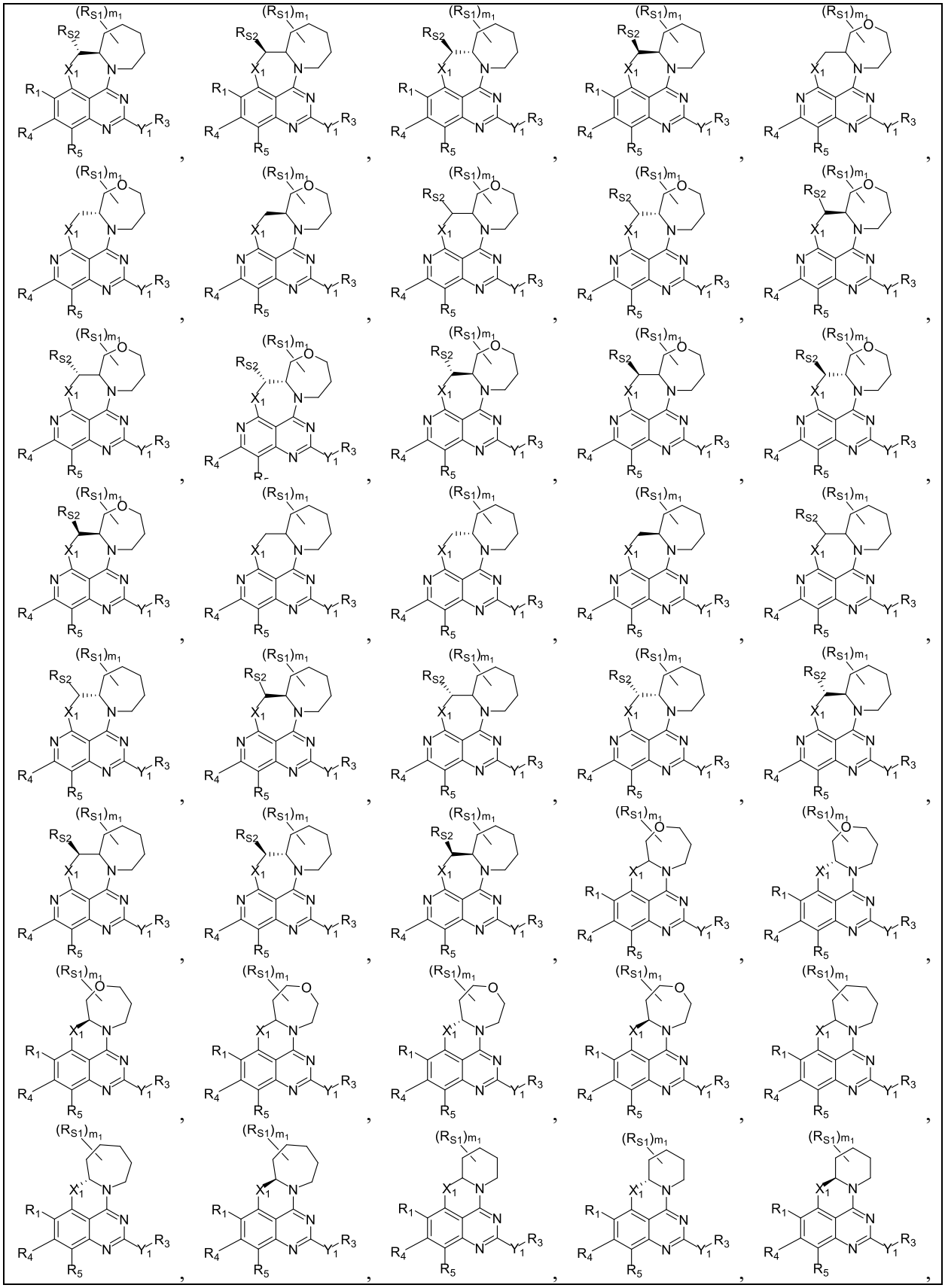
optionally, two adjacent R_{S1} together with the atoms to which they are respectively attached form , a 3-6 membered carbocyclic ring; wherein, said 3-6 membered carbocyclic ring is independently unsubstituted or substituted with 1, 2, or 3 substituents selected from the group consisting of deuterium, halogen, haloC$_{1-6}$alkyl, haloC$_{1-6}$alkoxy, -CN, -NH$_2$, -NH(C$_{1-6}$alkyl), -N(C$_{1-6}$alkyl)$_2$, -OH and -OC$_{1-6}$alkyl.

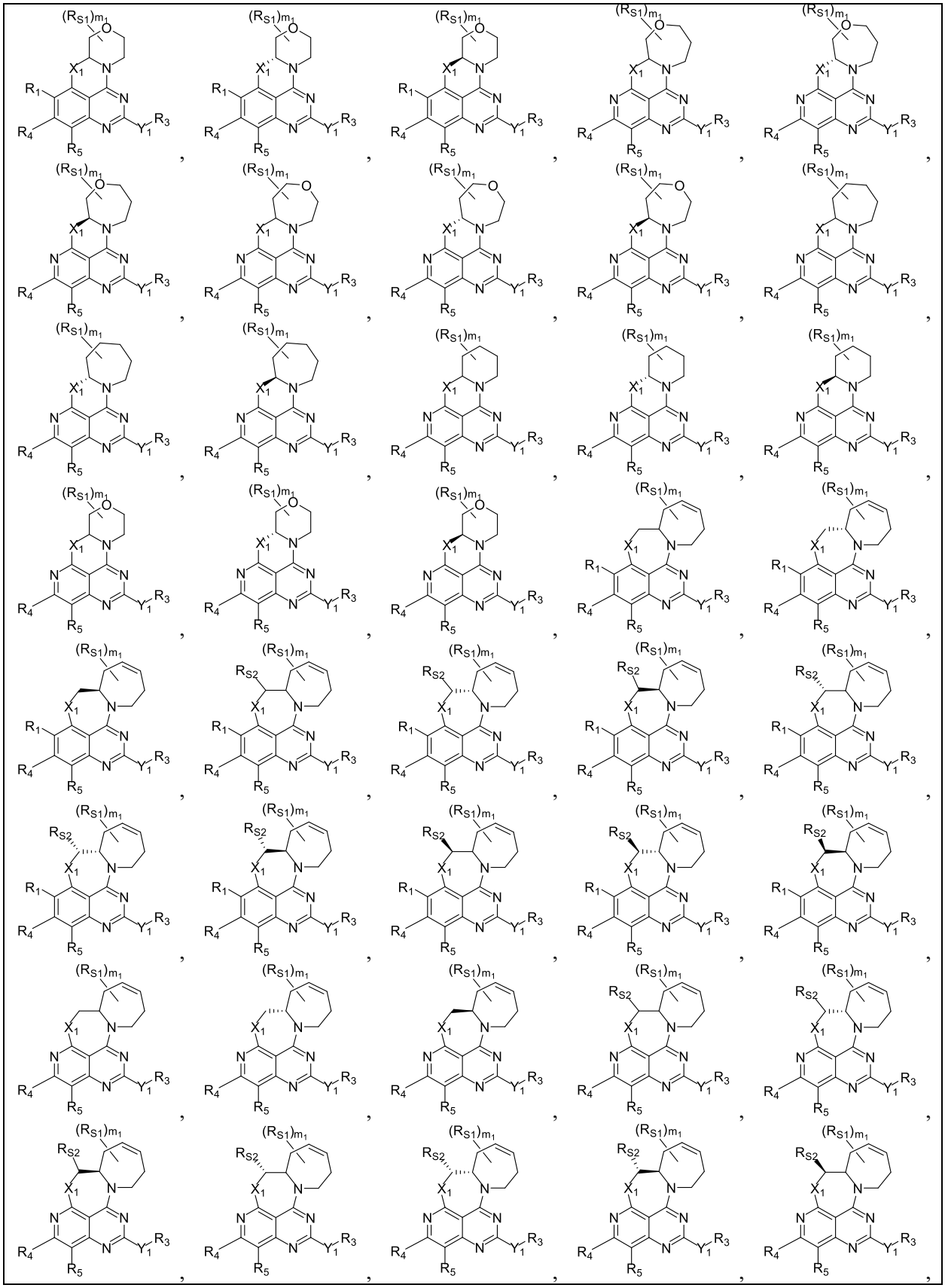
3. The compound of claim 2, wherein, R_{S1} is -F, -OH, -OCH$_3$, -CN, -CH$_2$F, -CF$_3$, -CH$_2$OCH$_3$, -CH$_2$CN, -CHF$_2$, -CD$_3$, -NH$_2$ or -CH$_3$; or two R_{S1} together with the carbon atom to which they are both attached form , ,  or a cyclopropyl ring; or two adjacent R_{S1} together with the atoms to which they are respectively attached form a cyclopropyl ring.

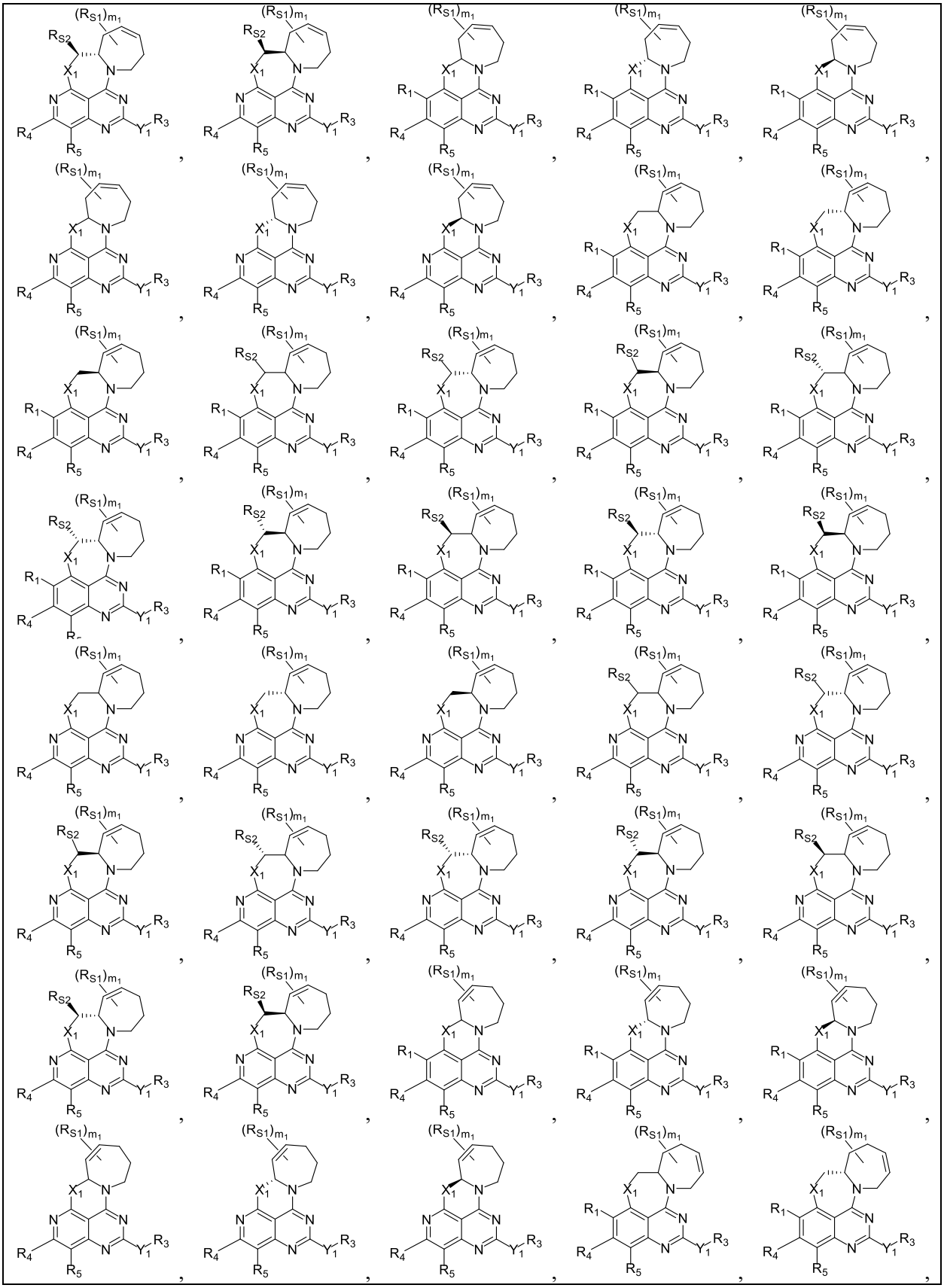
4. The compound of claim 1, wherein, the compound is selected from the group consisting of any one of the following formulas in **Table A**:

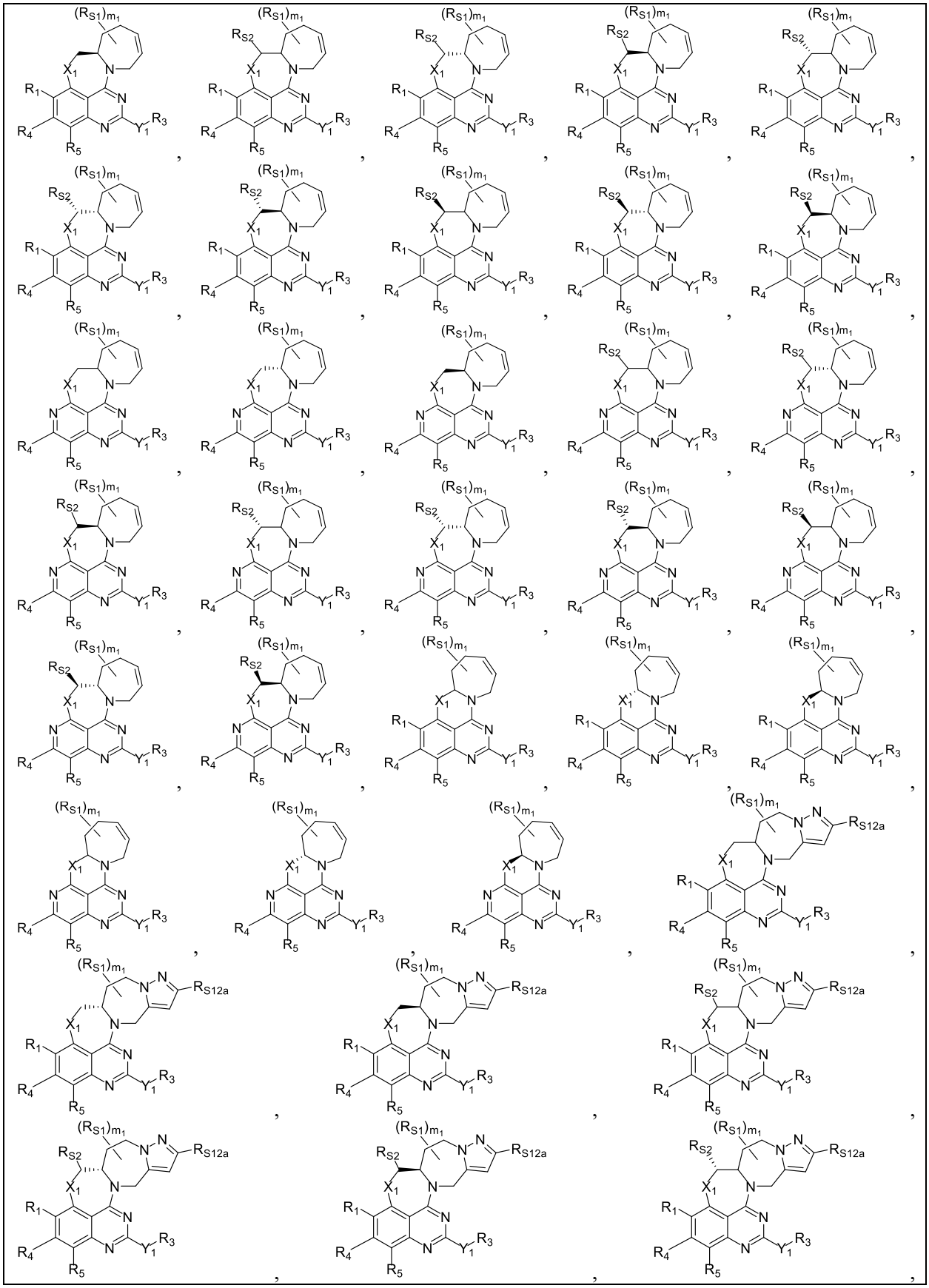
Table A

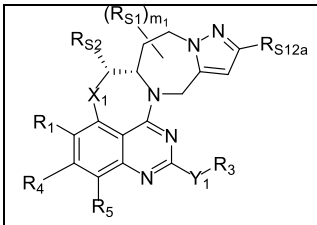
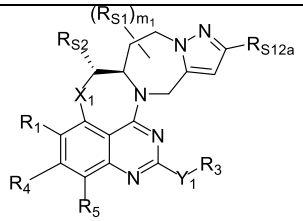
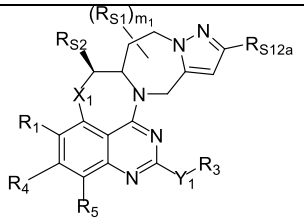
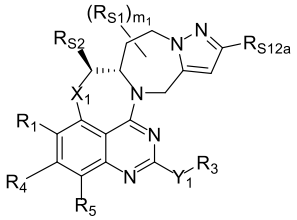
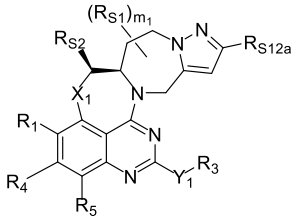
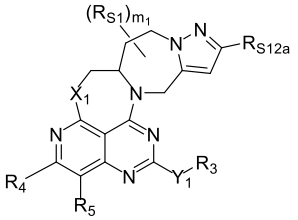
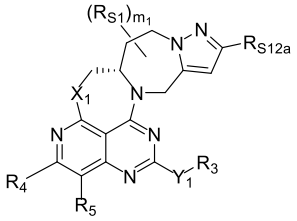
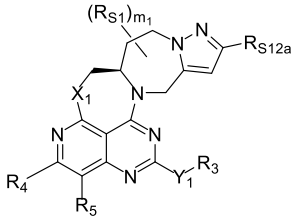
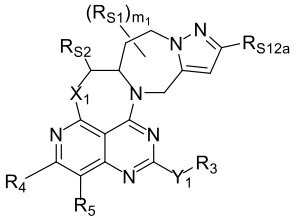
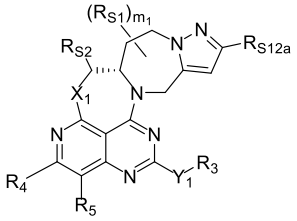
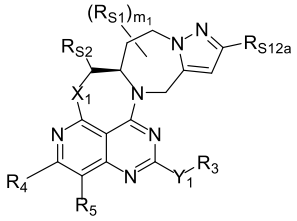
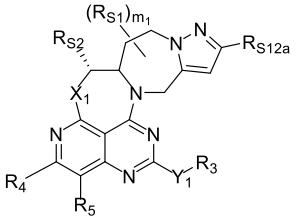
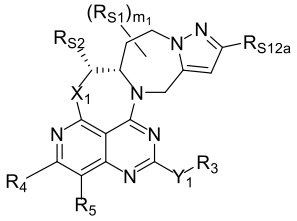
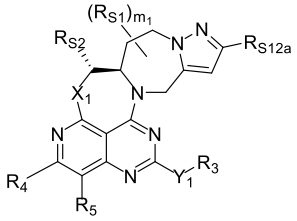
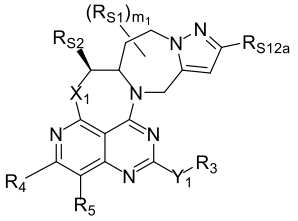
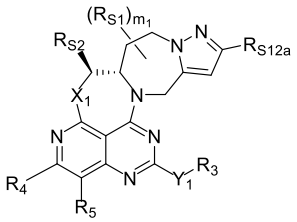
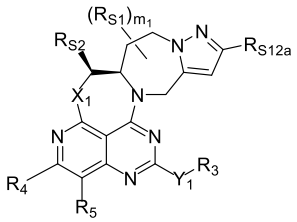
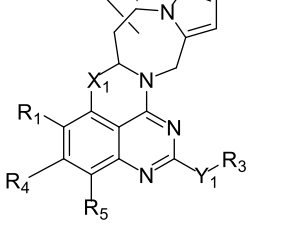
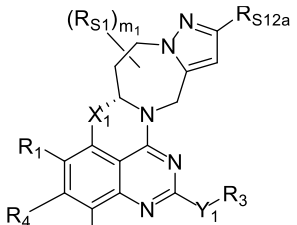
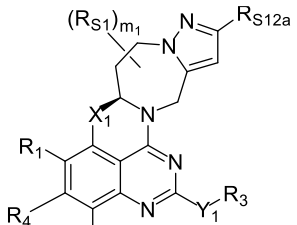
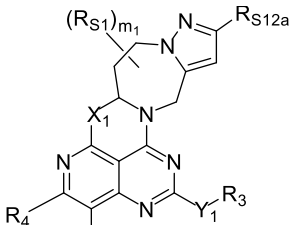
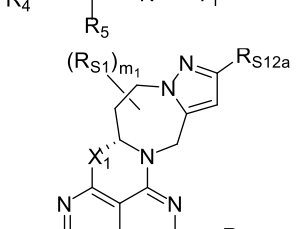
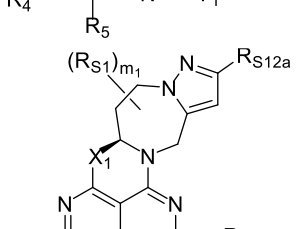
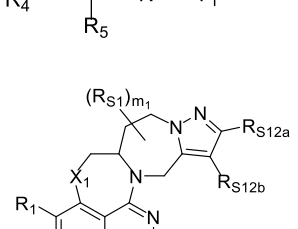
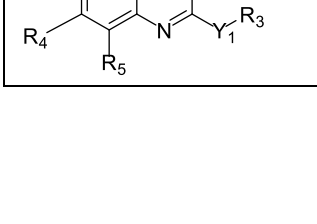
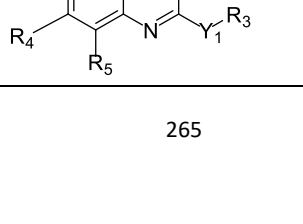
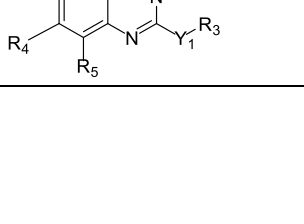


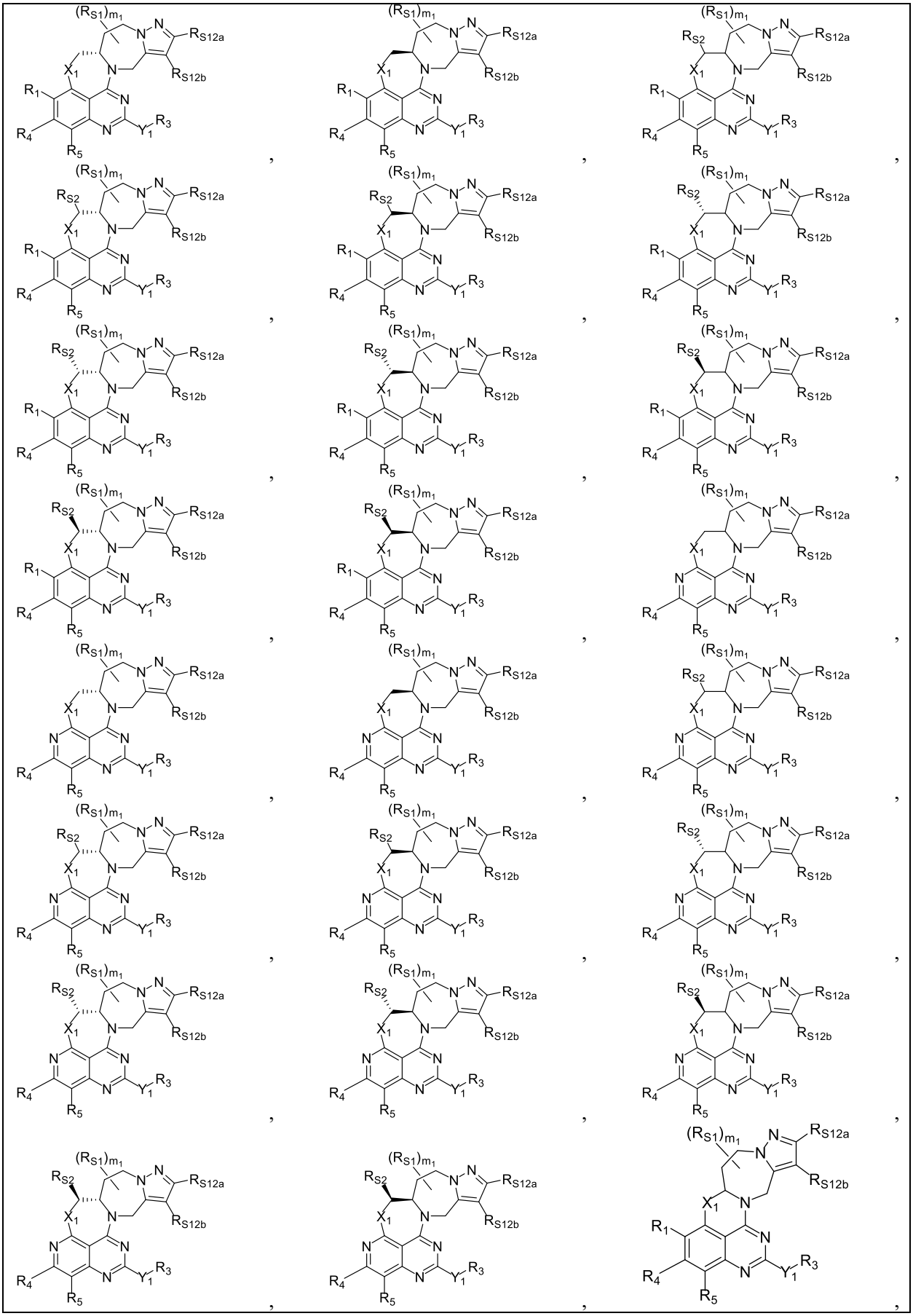


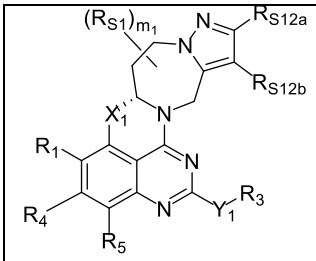
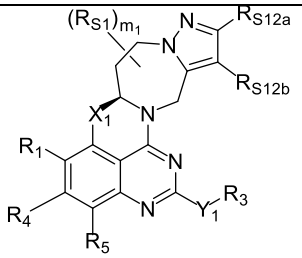
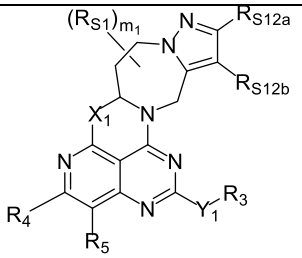
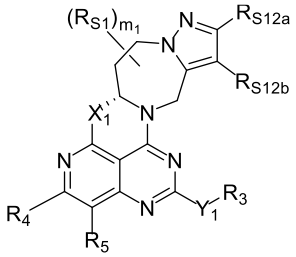
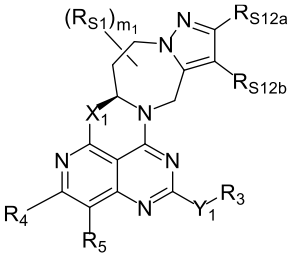
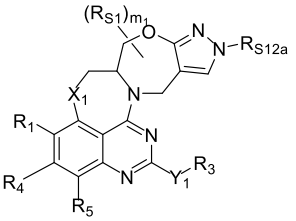
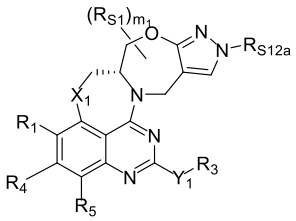
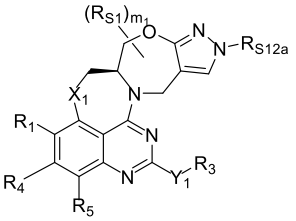
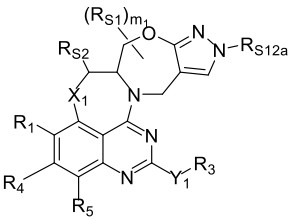
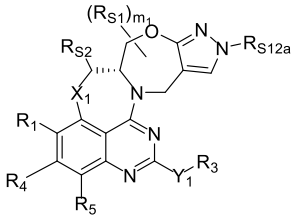
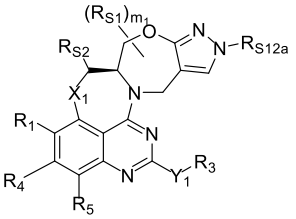
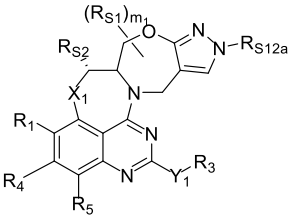
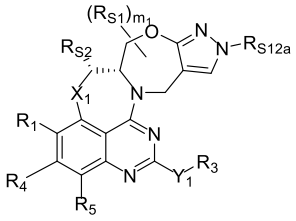
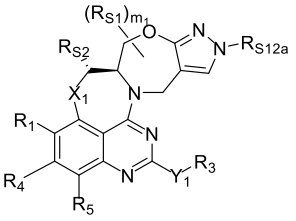
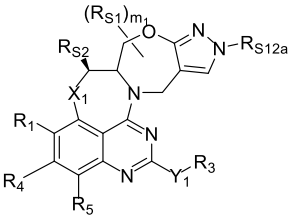
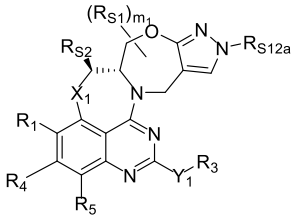
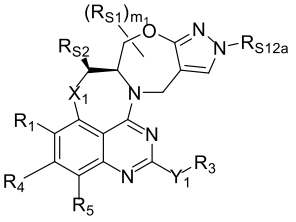
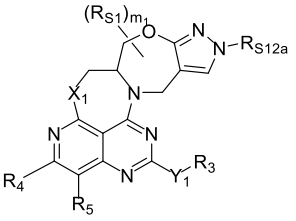
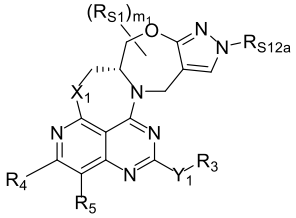
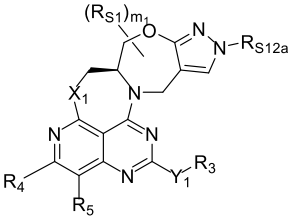
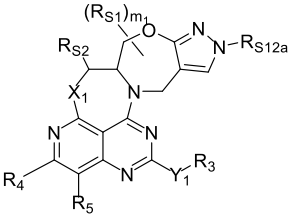
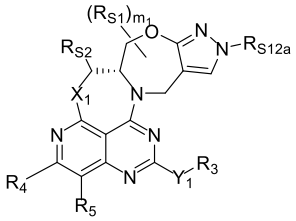
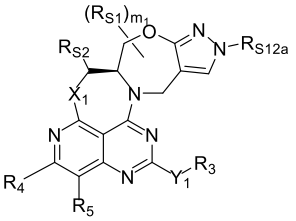
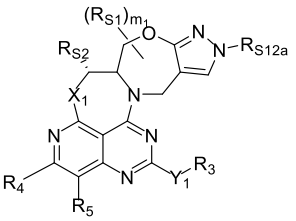


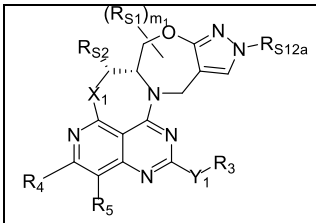
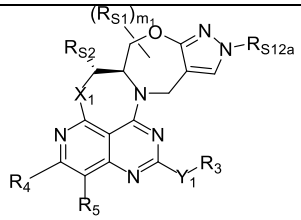
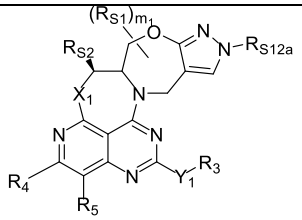
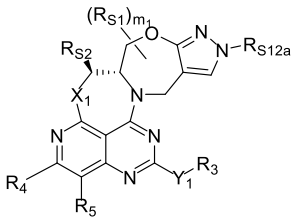
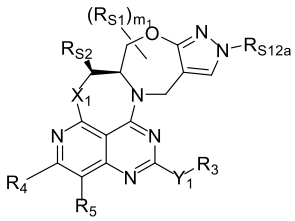
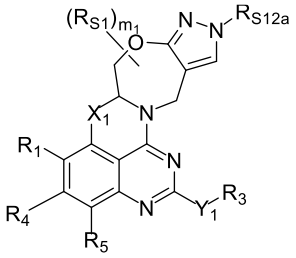
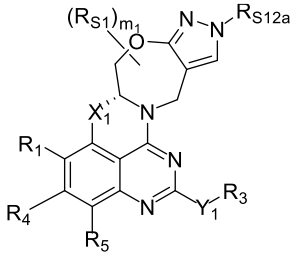
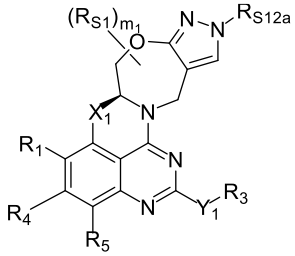
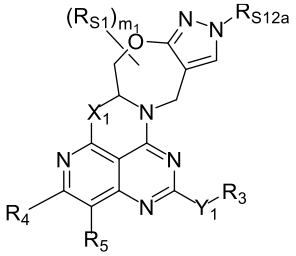
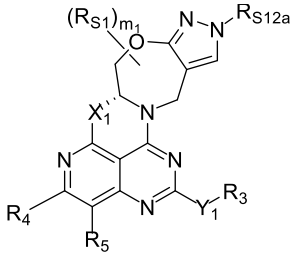
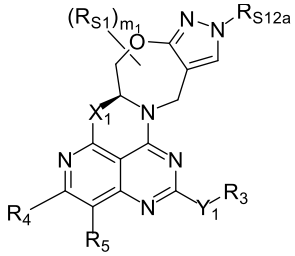
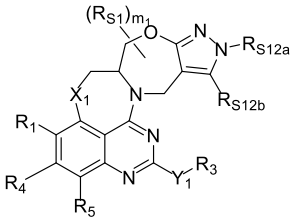
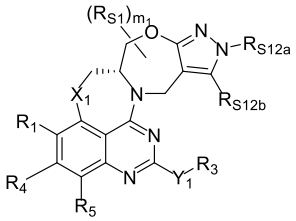
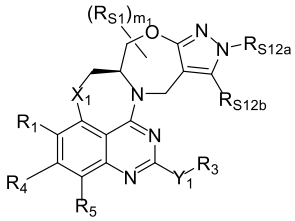
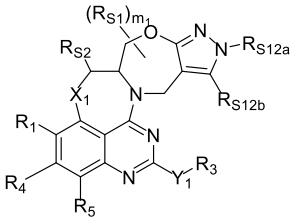
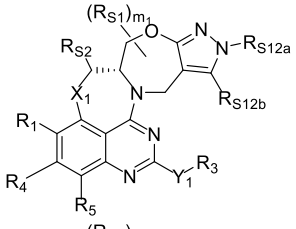
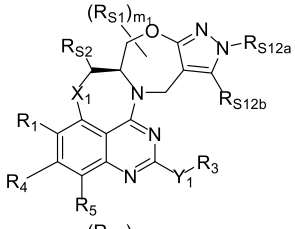
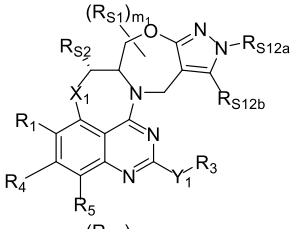
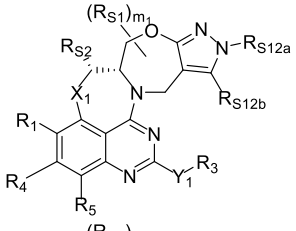
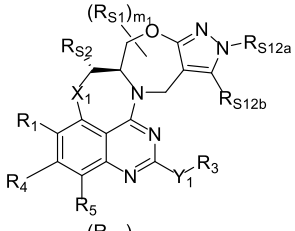
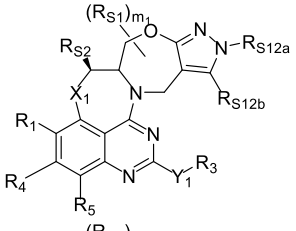
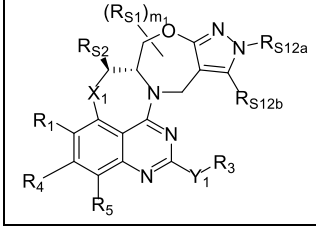
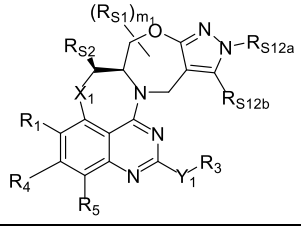
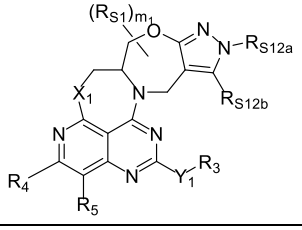


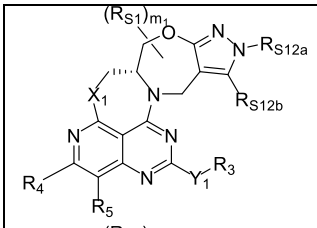
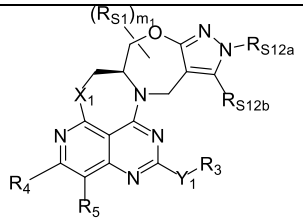
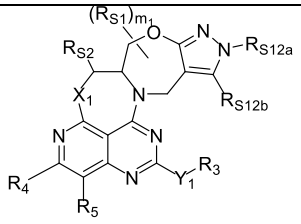
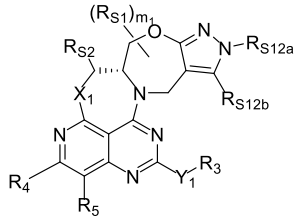
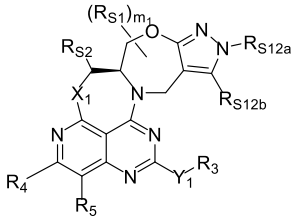
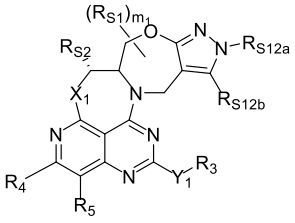
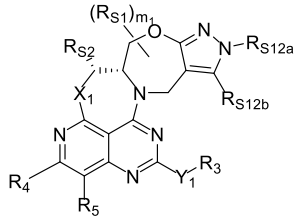
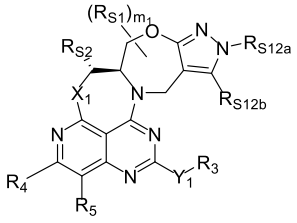
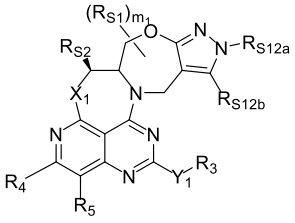
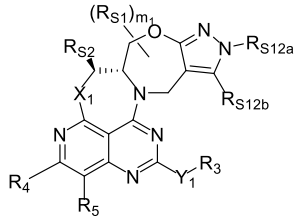
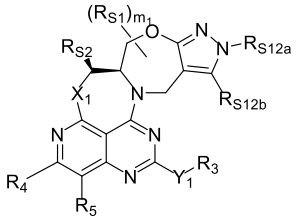
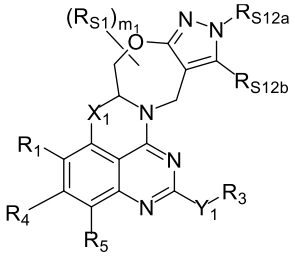
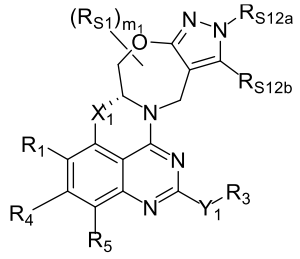
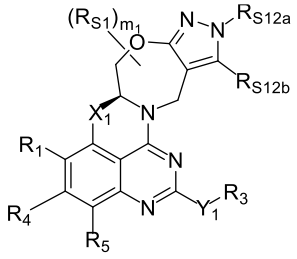
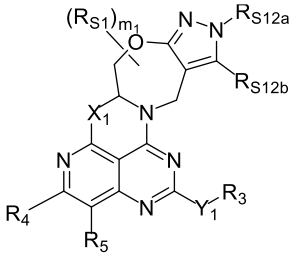
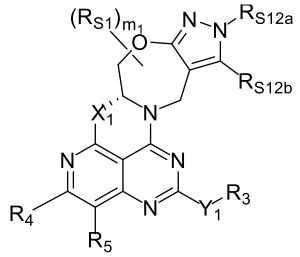
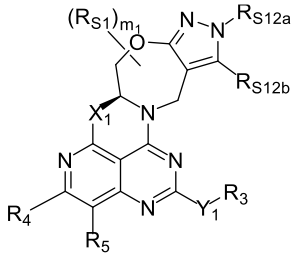
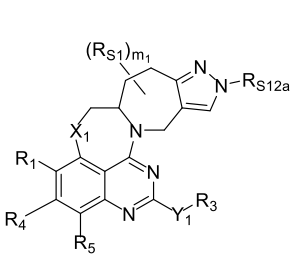
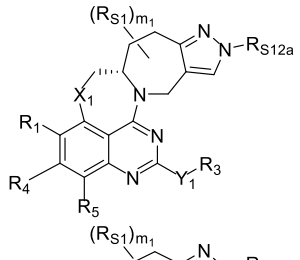
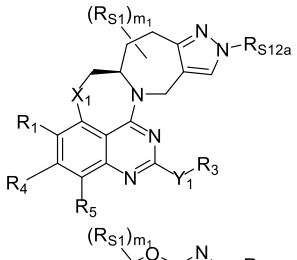
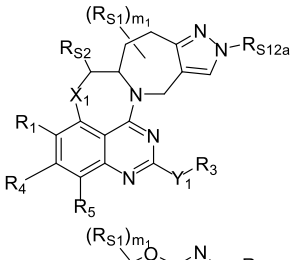
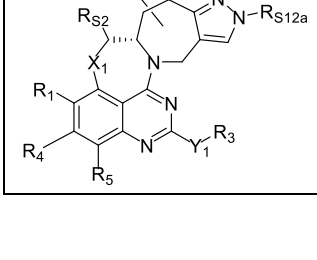
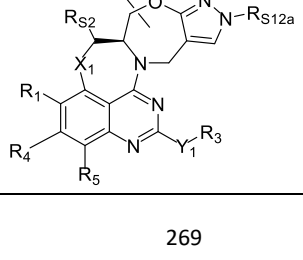
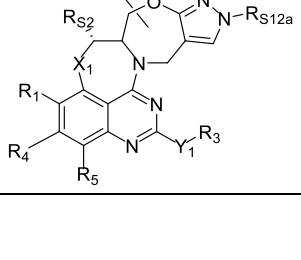



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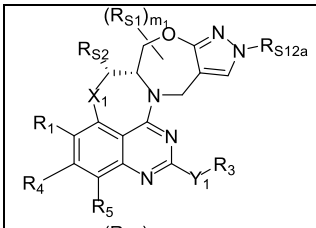
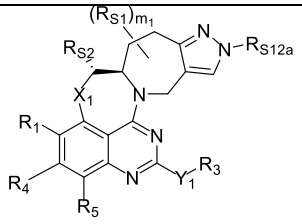
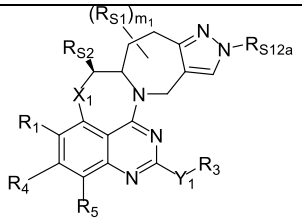
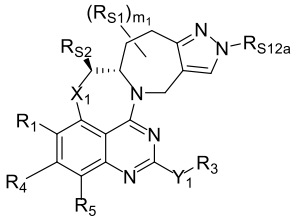
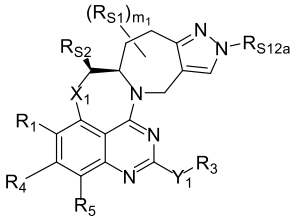
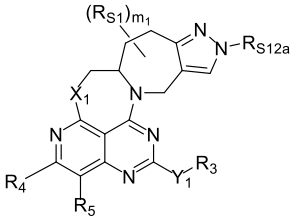
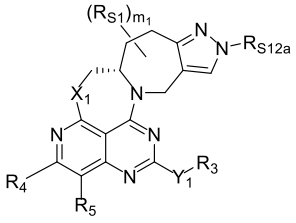
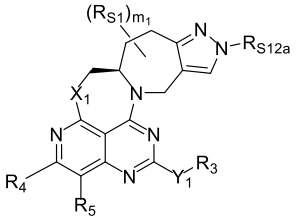
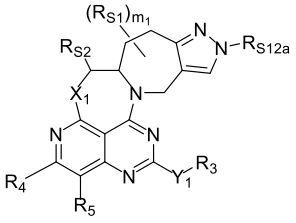
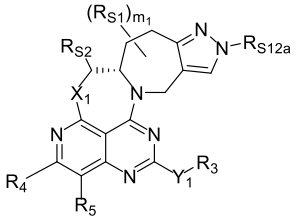
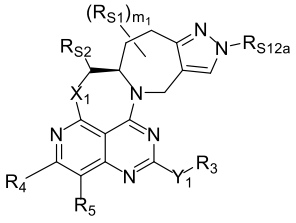
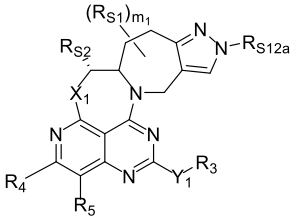
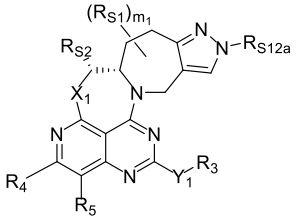
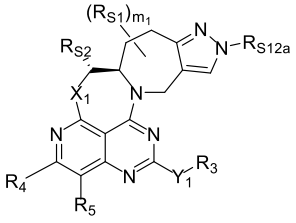
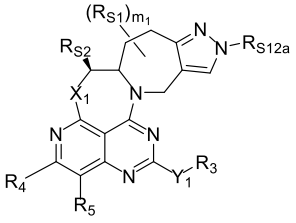
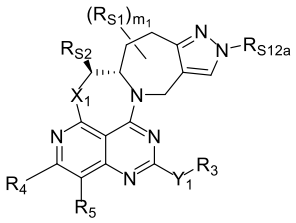
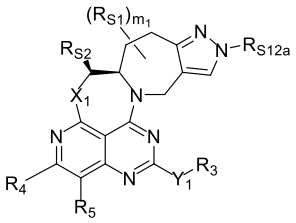
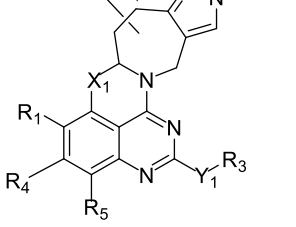
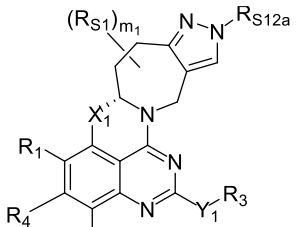
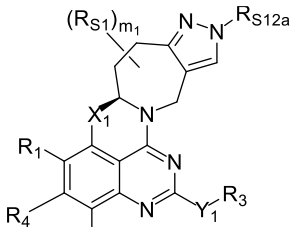
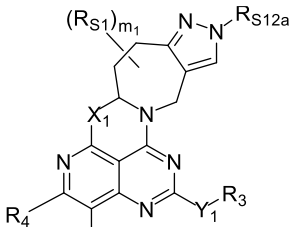
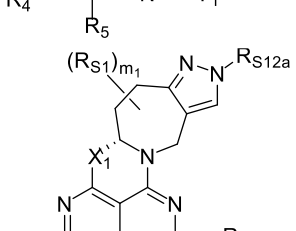
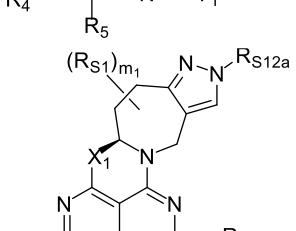
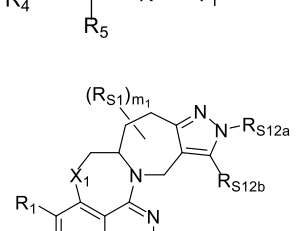
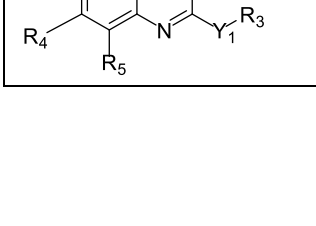
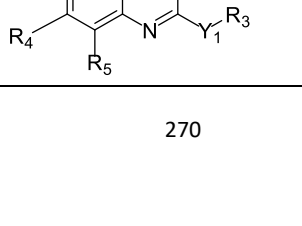
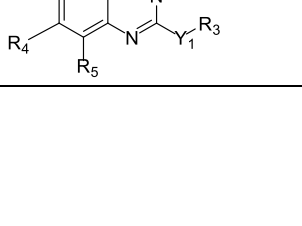

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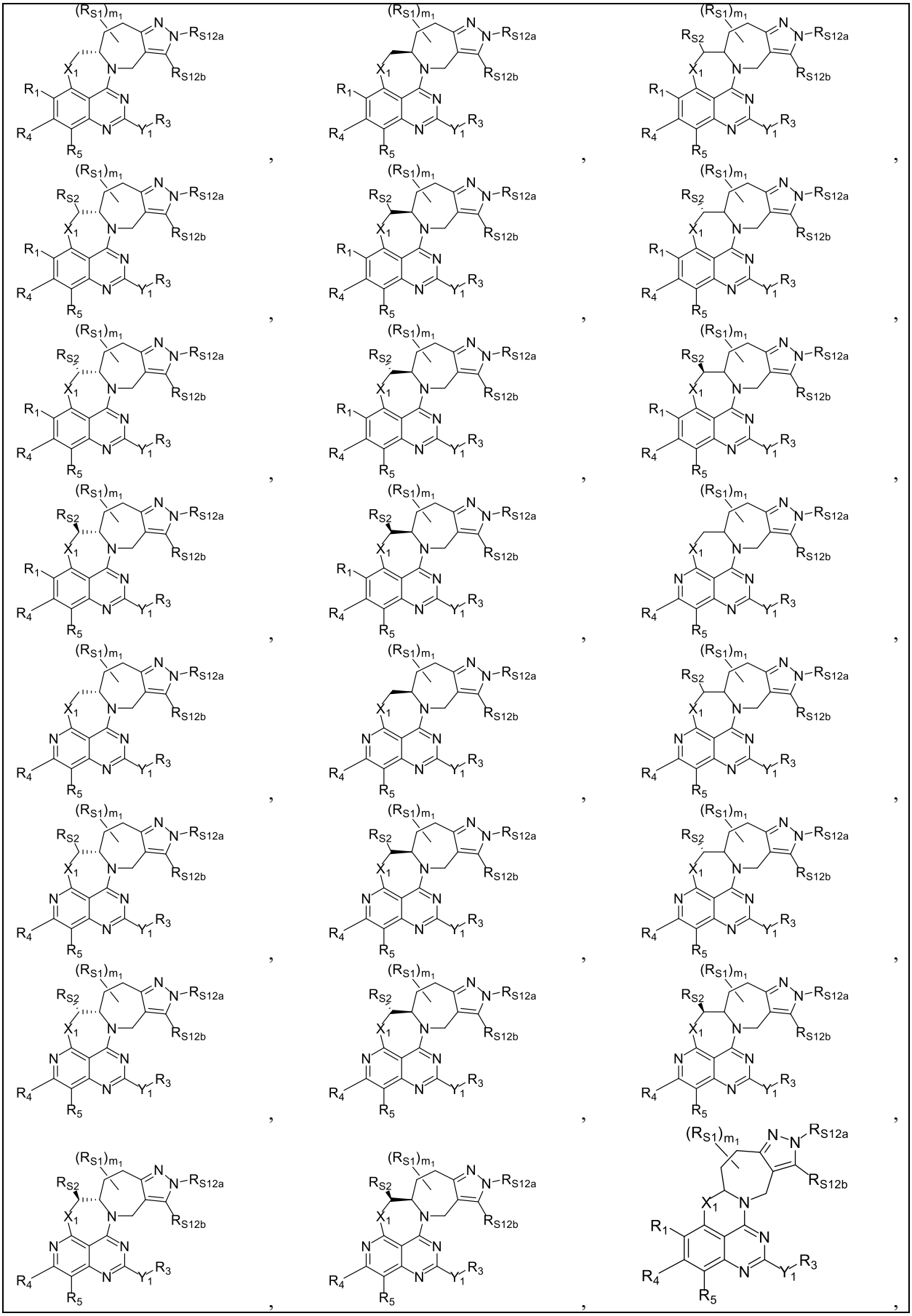

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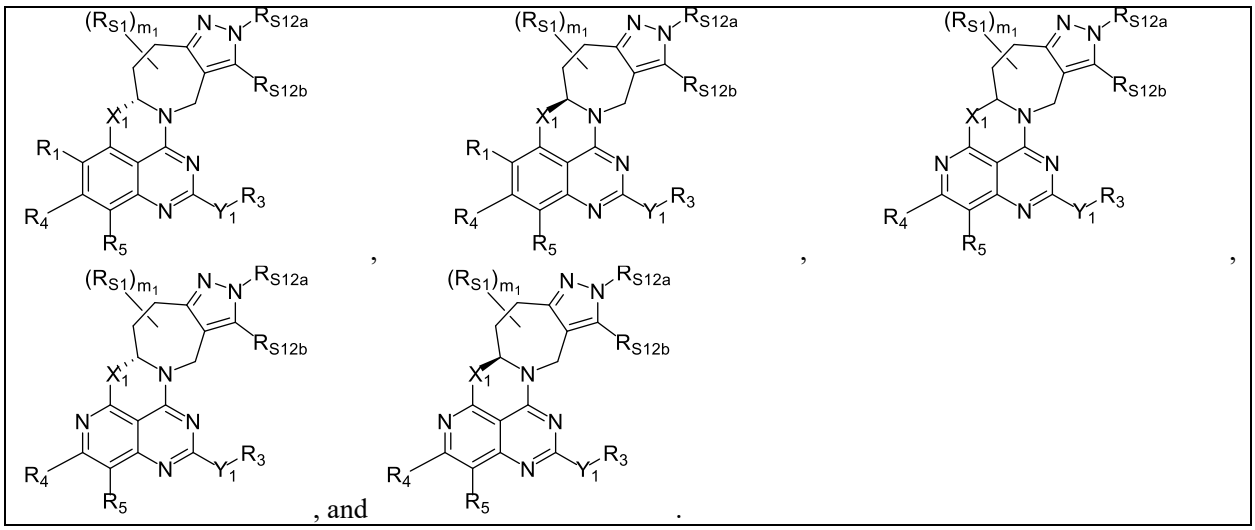
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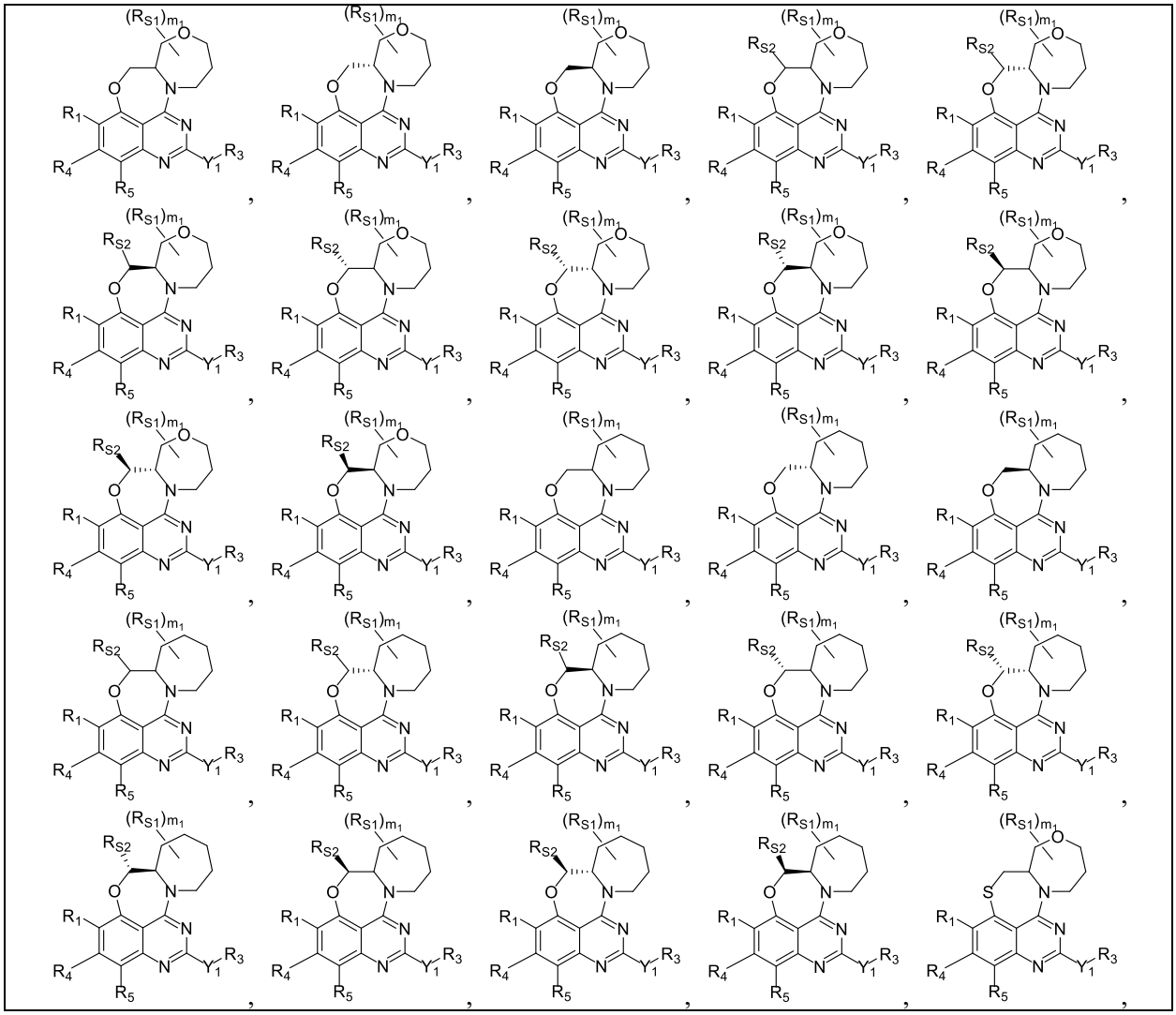

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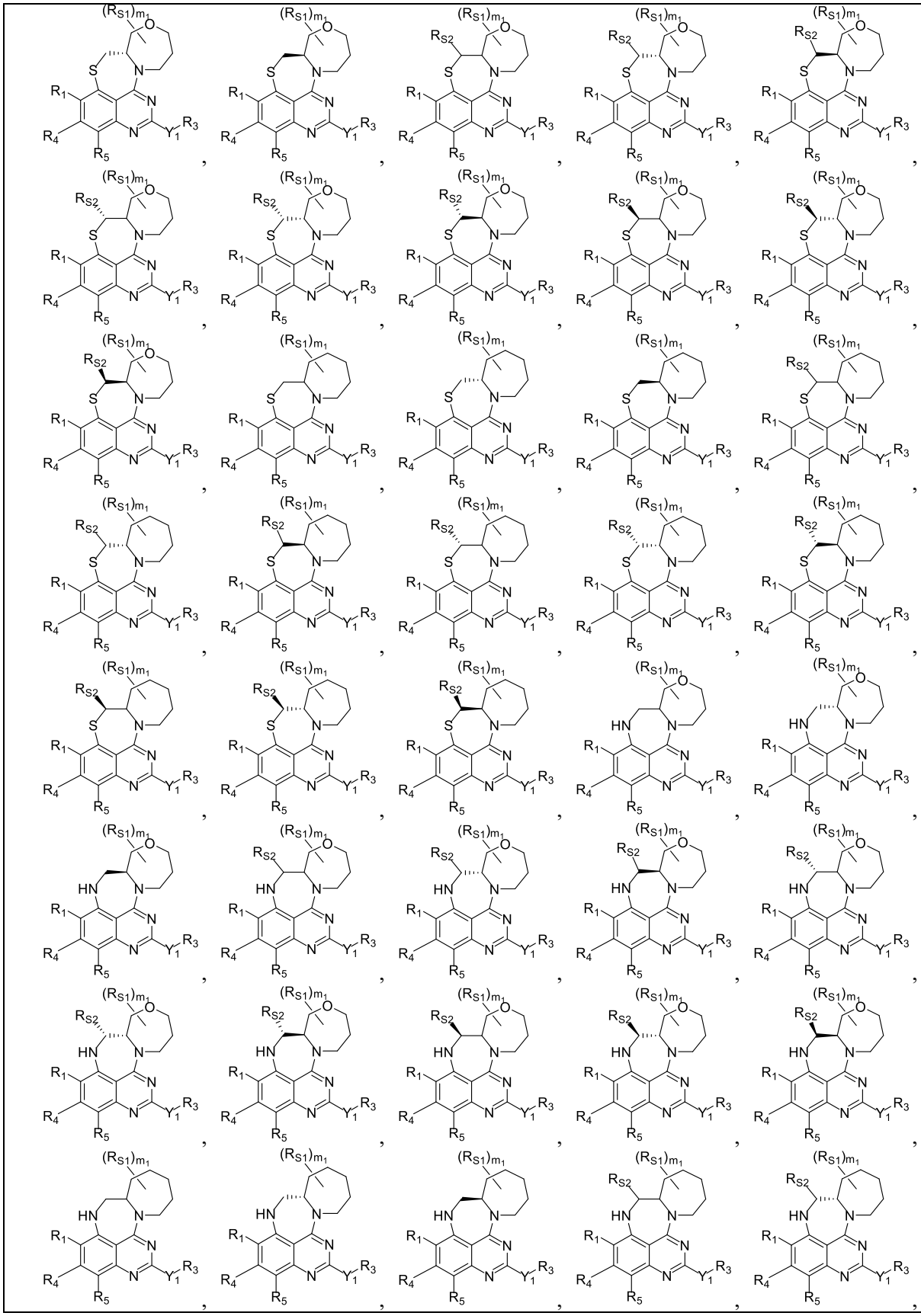


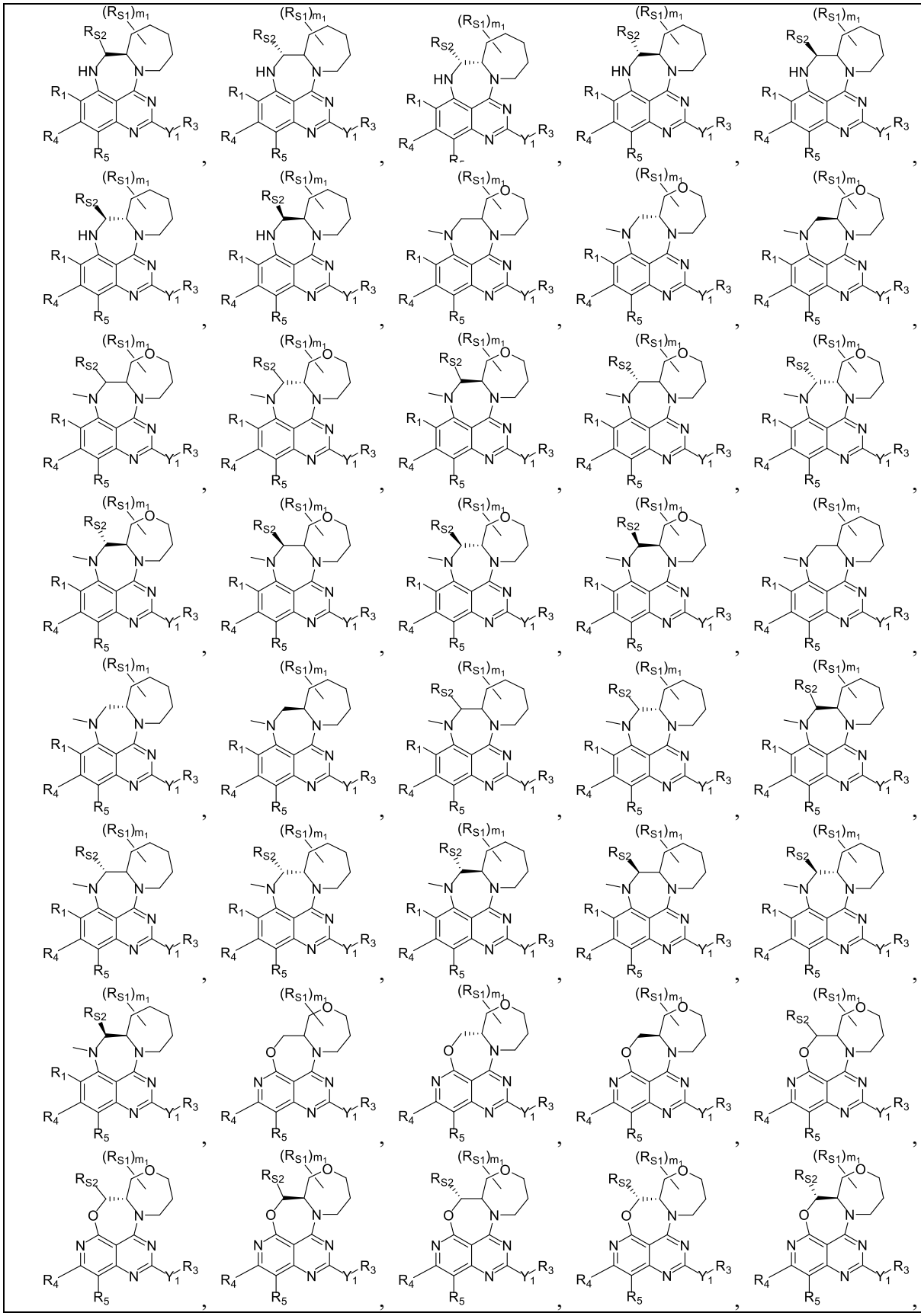


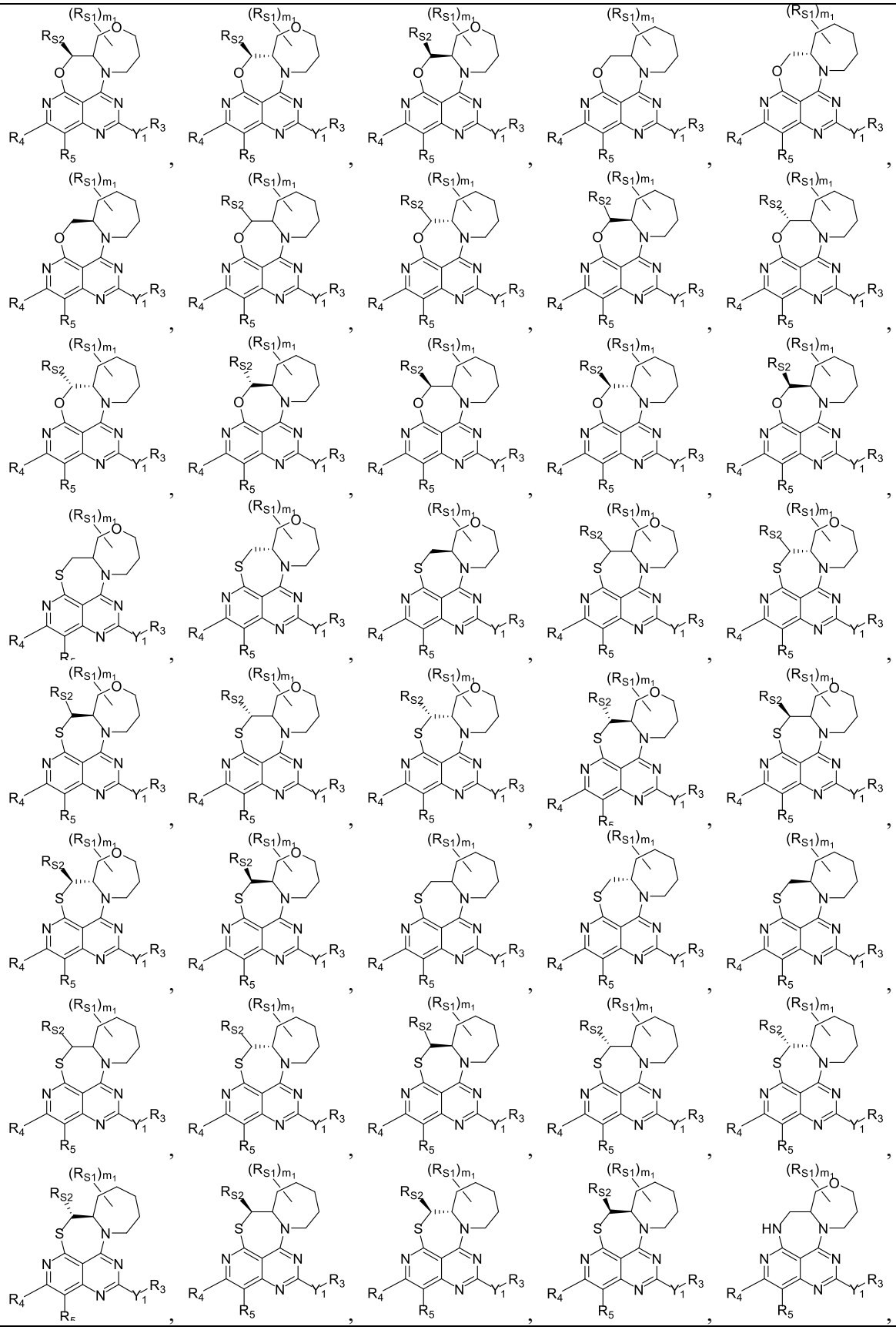
5. The compound of claim 1, wherein, the compound is selected from the group consisting of any one of the following formulas in **Table B**:

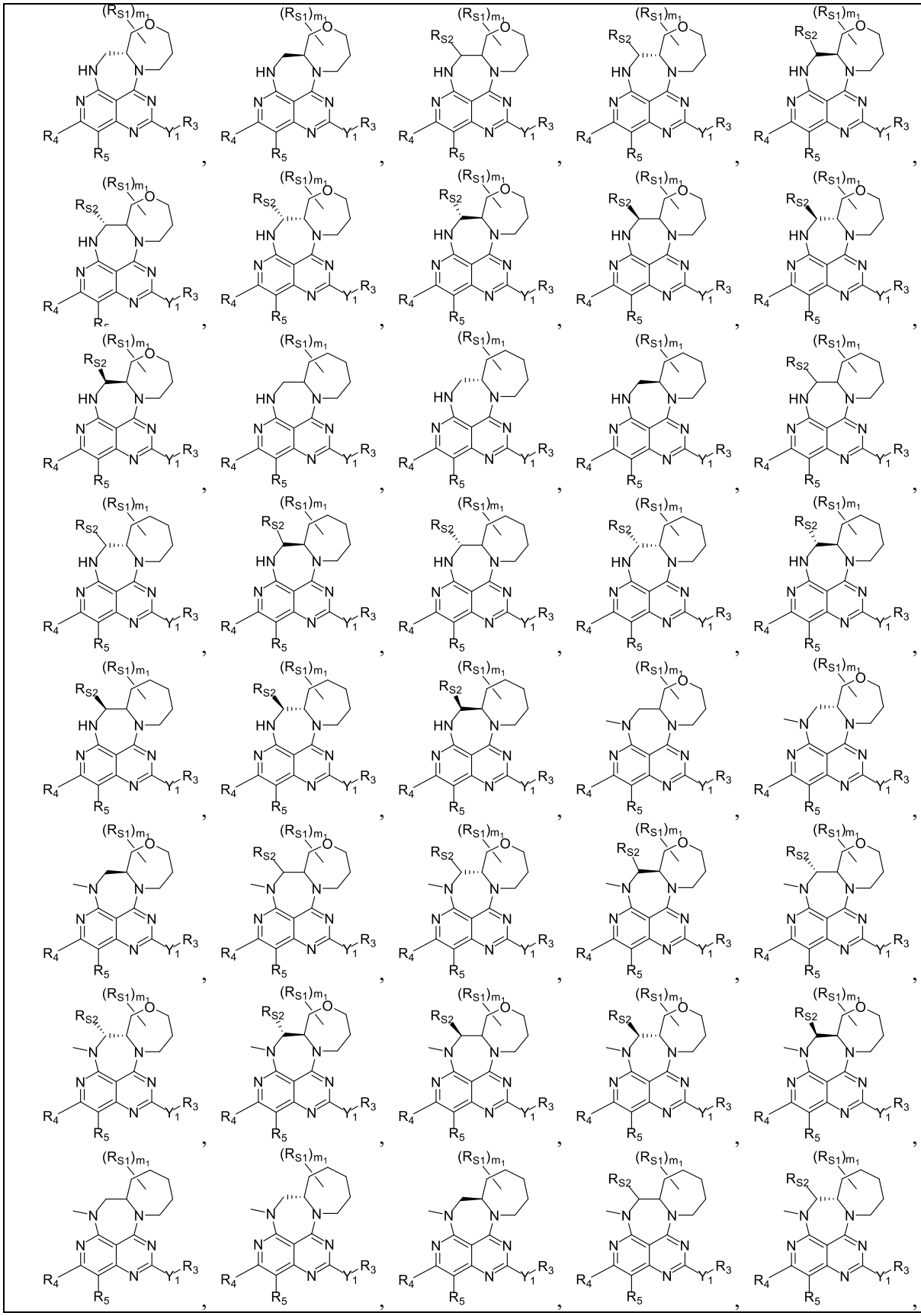
Table B

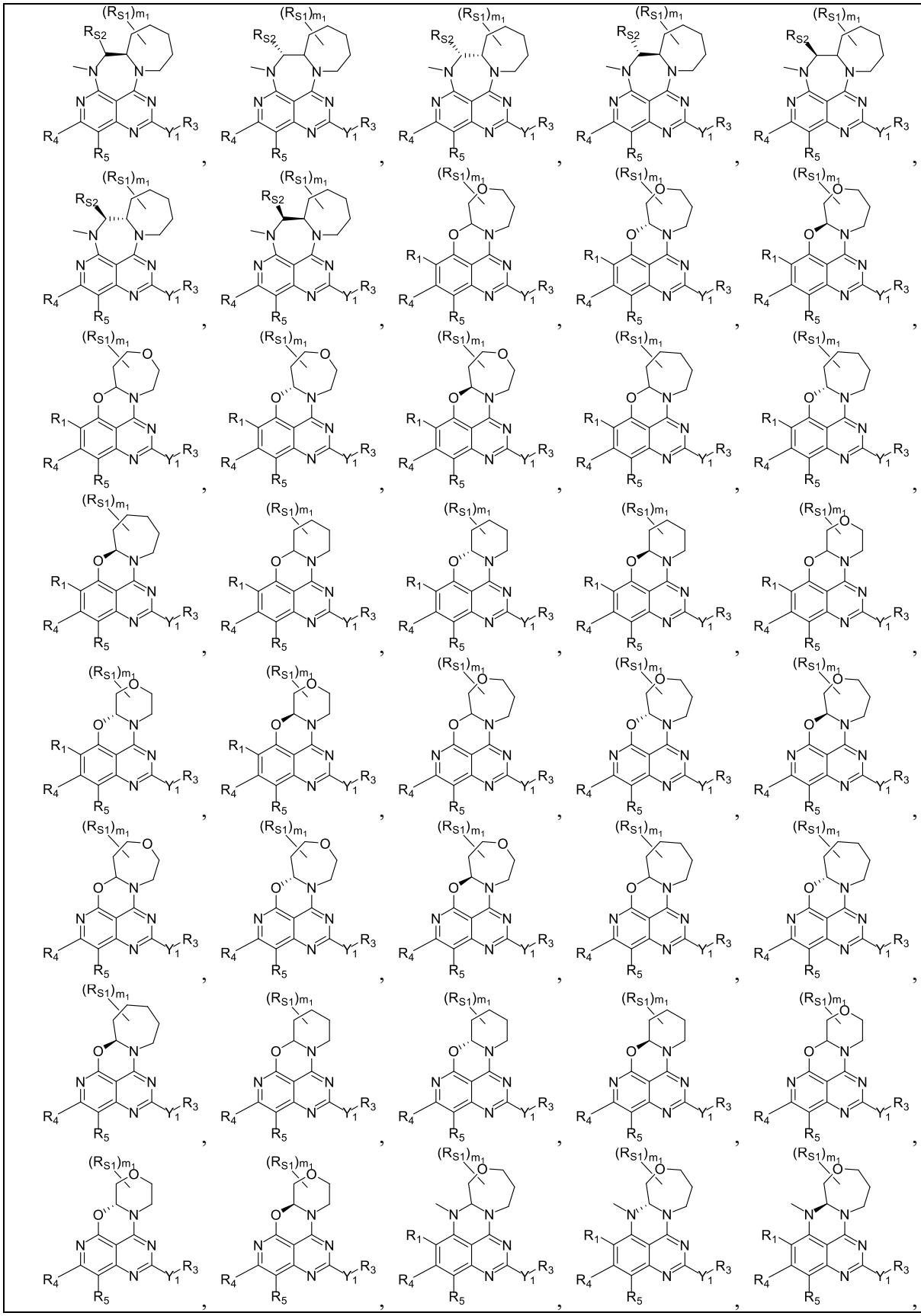


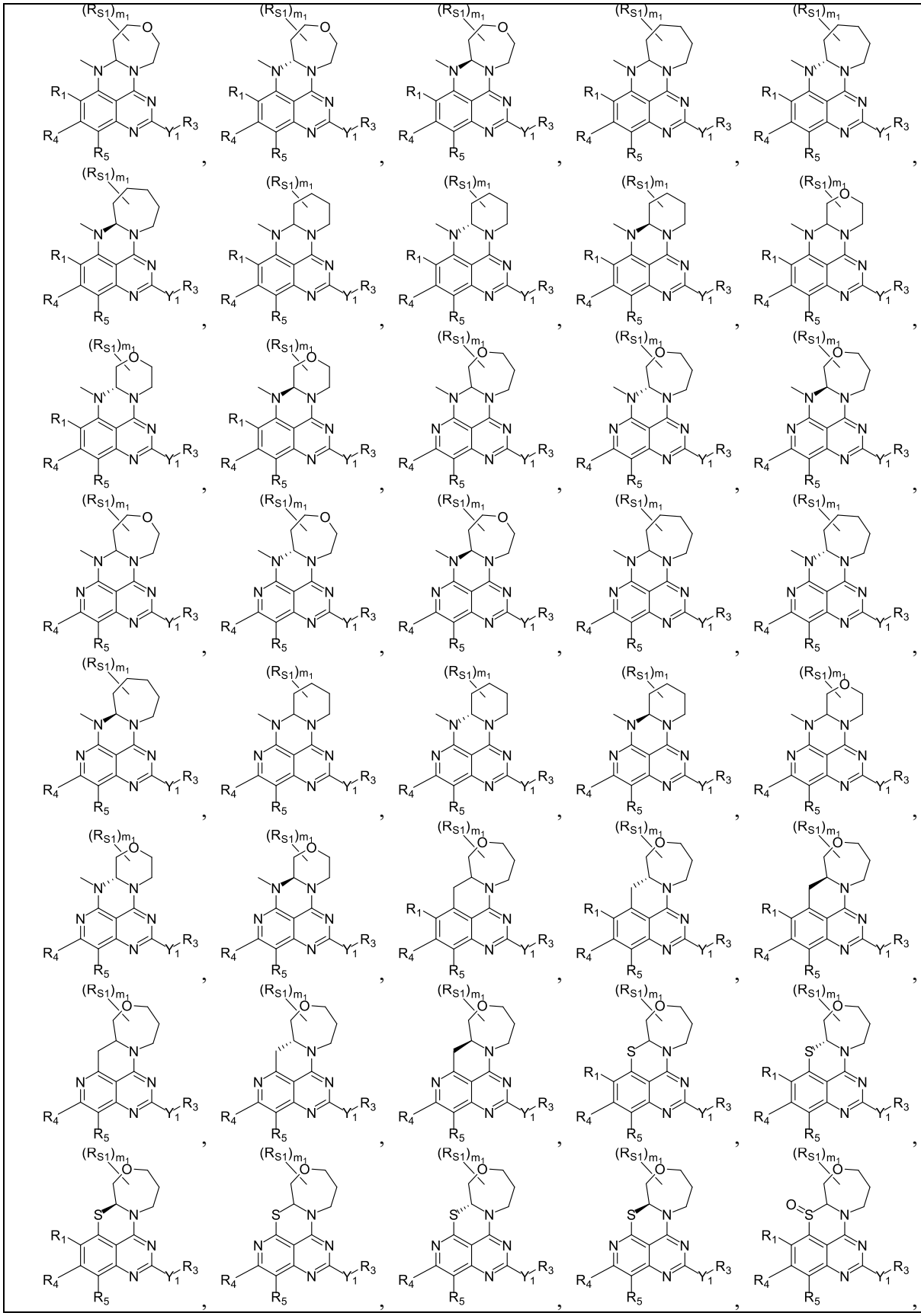


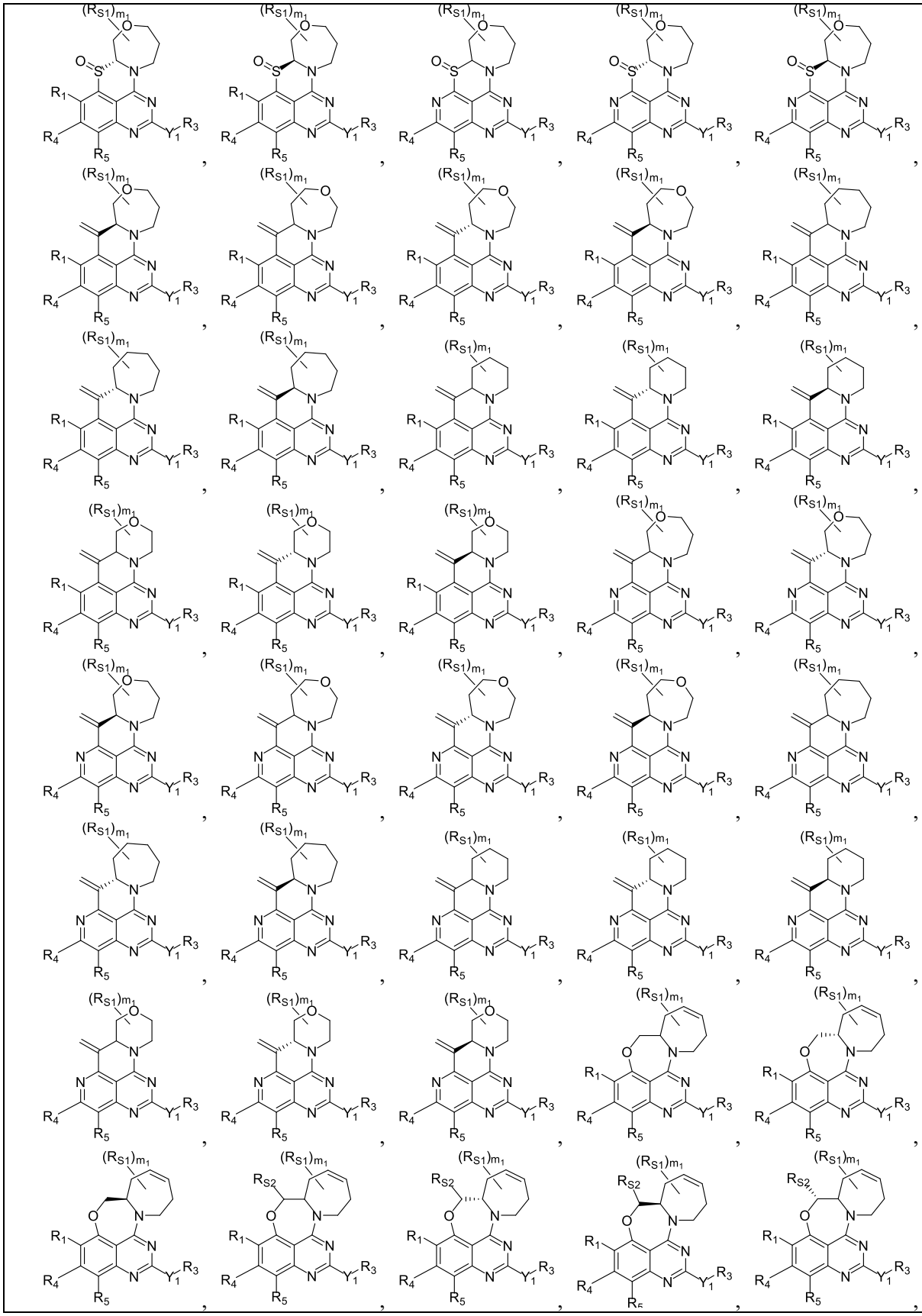


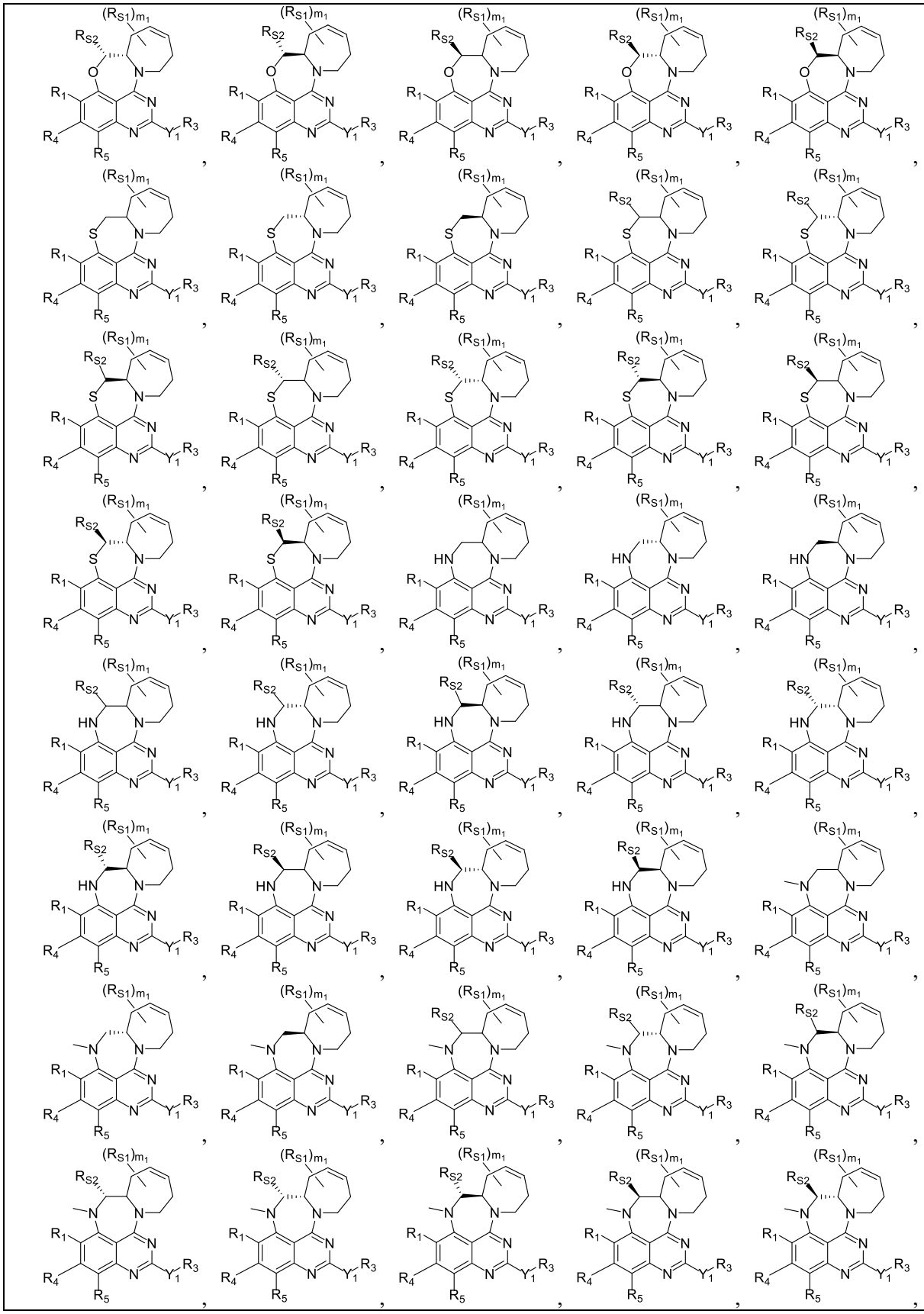


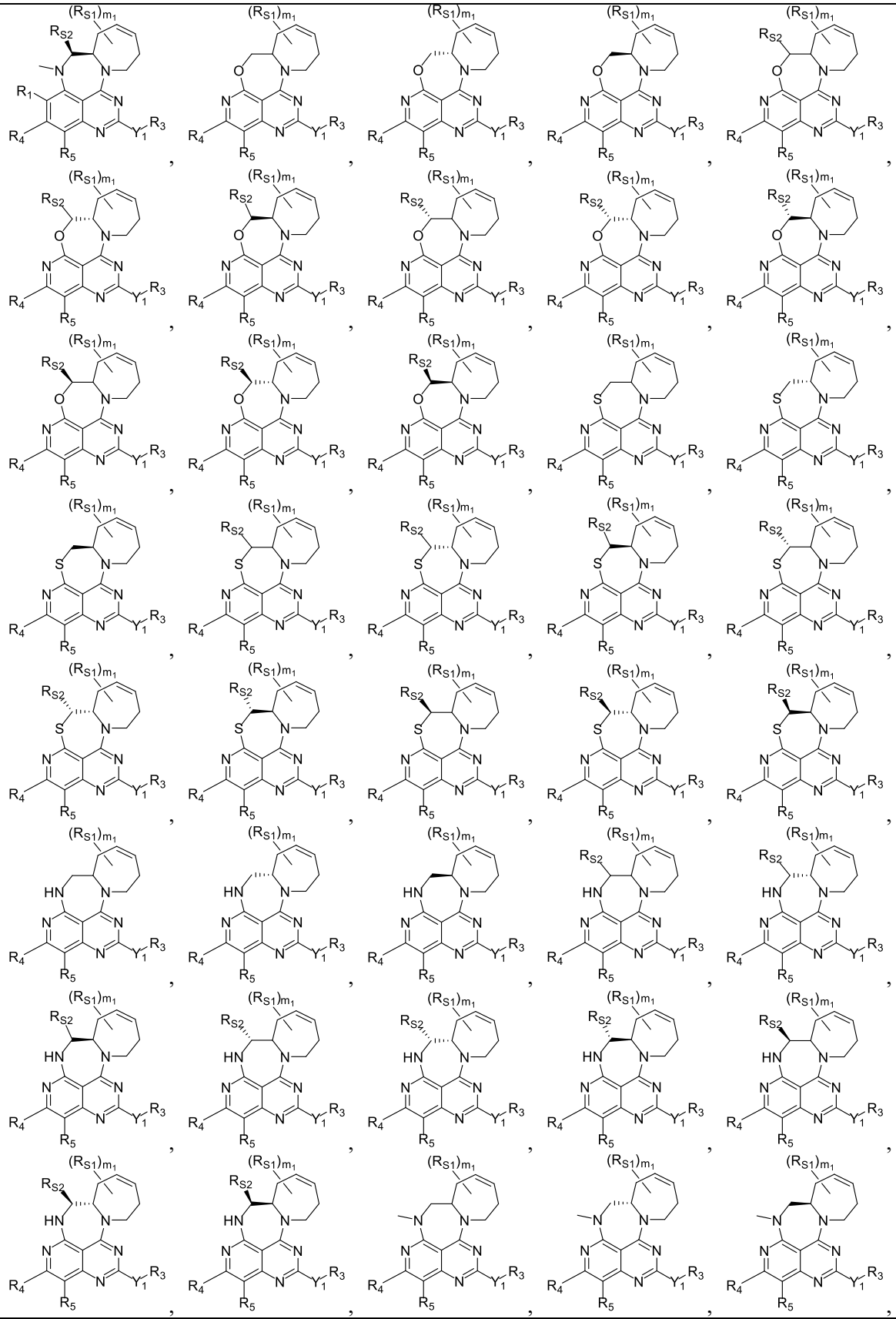


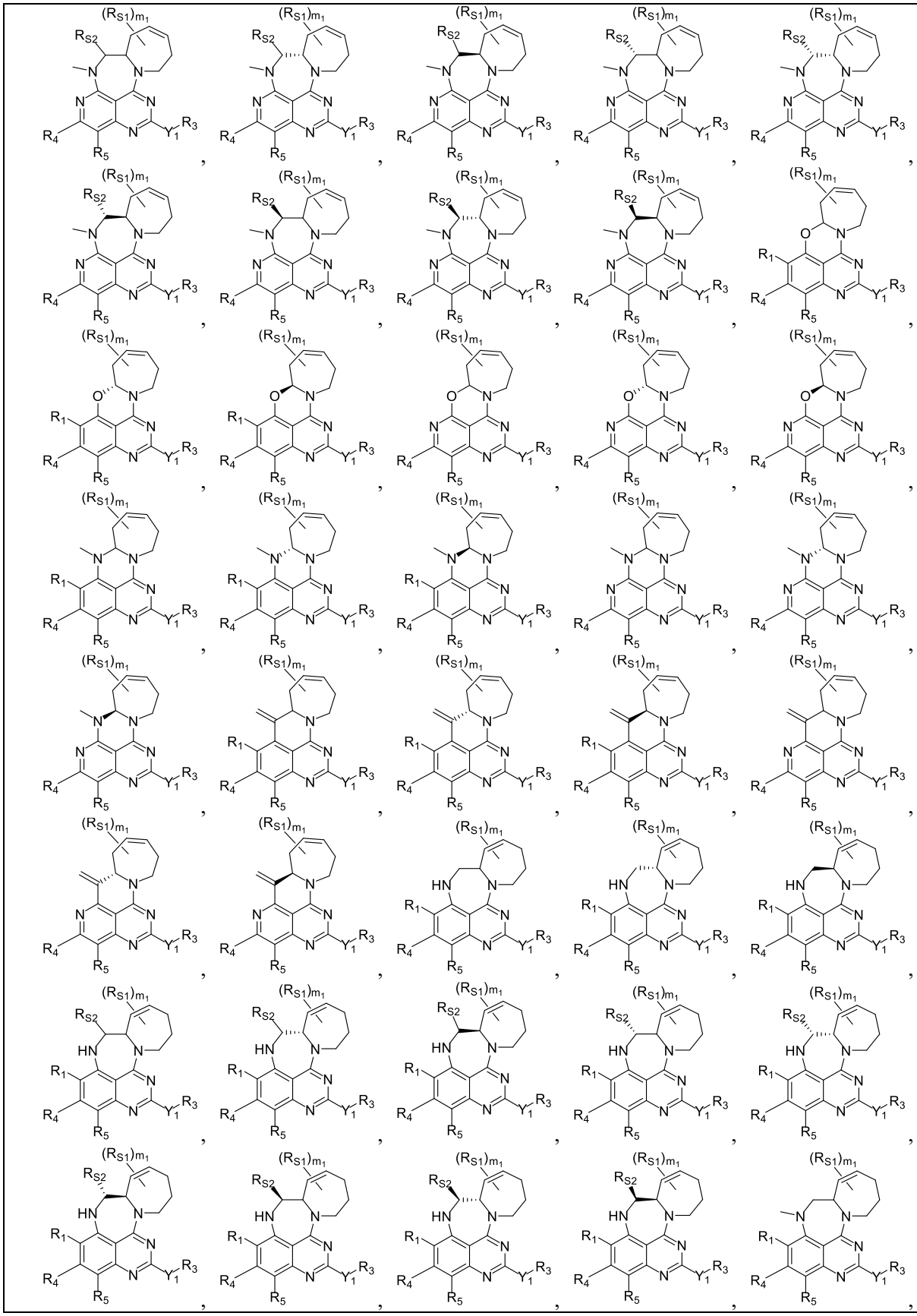


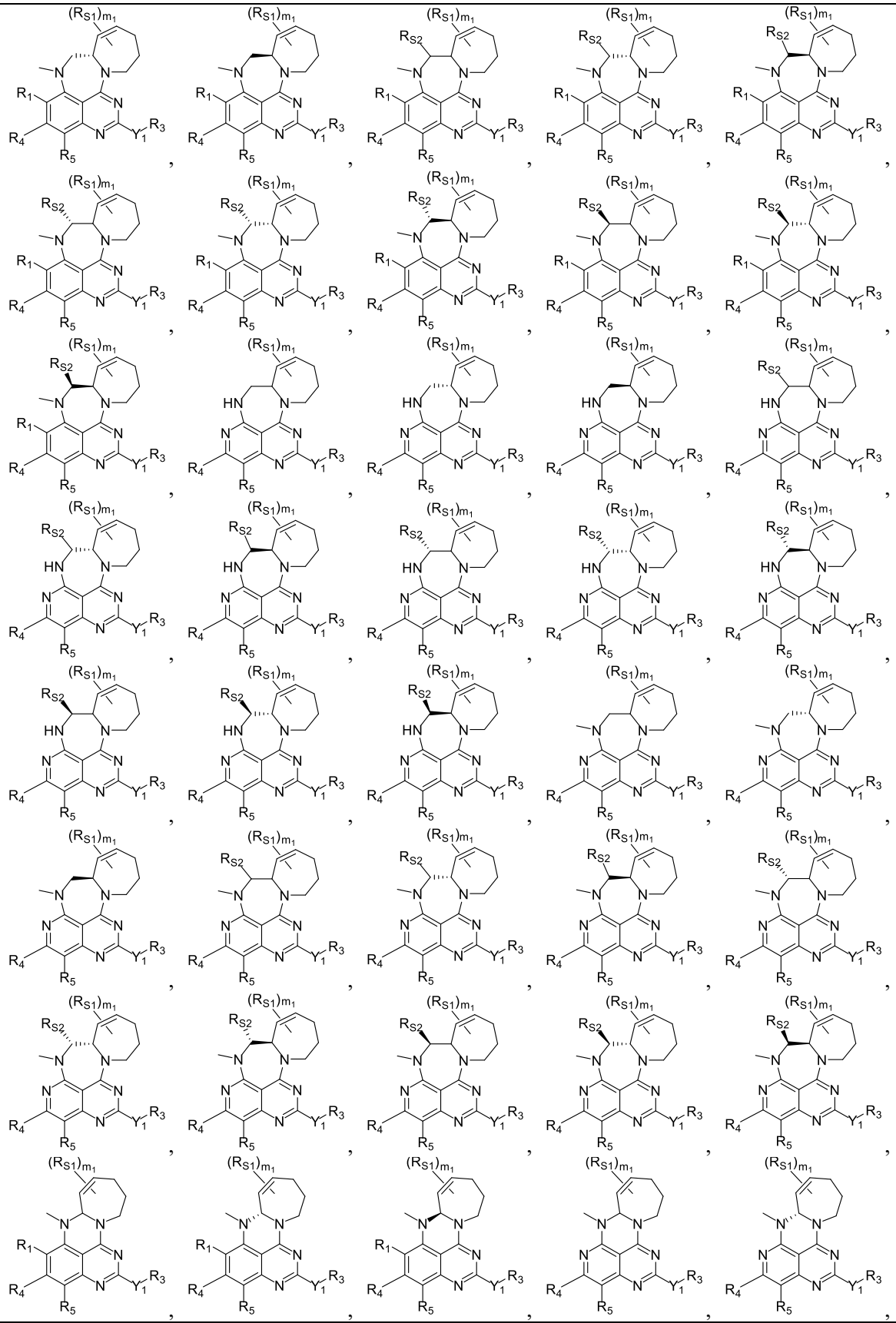


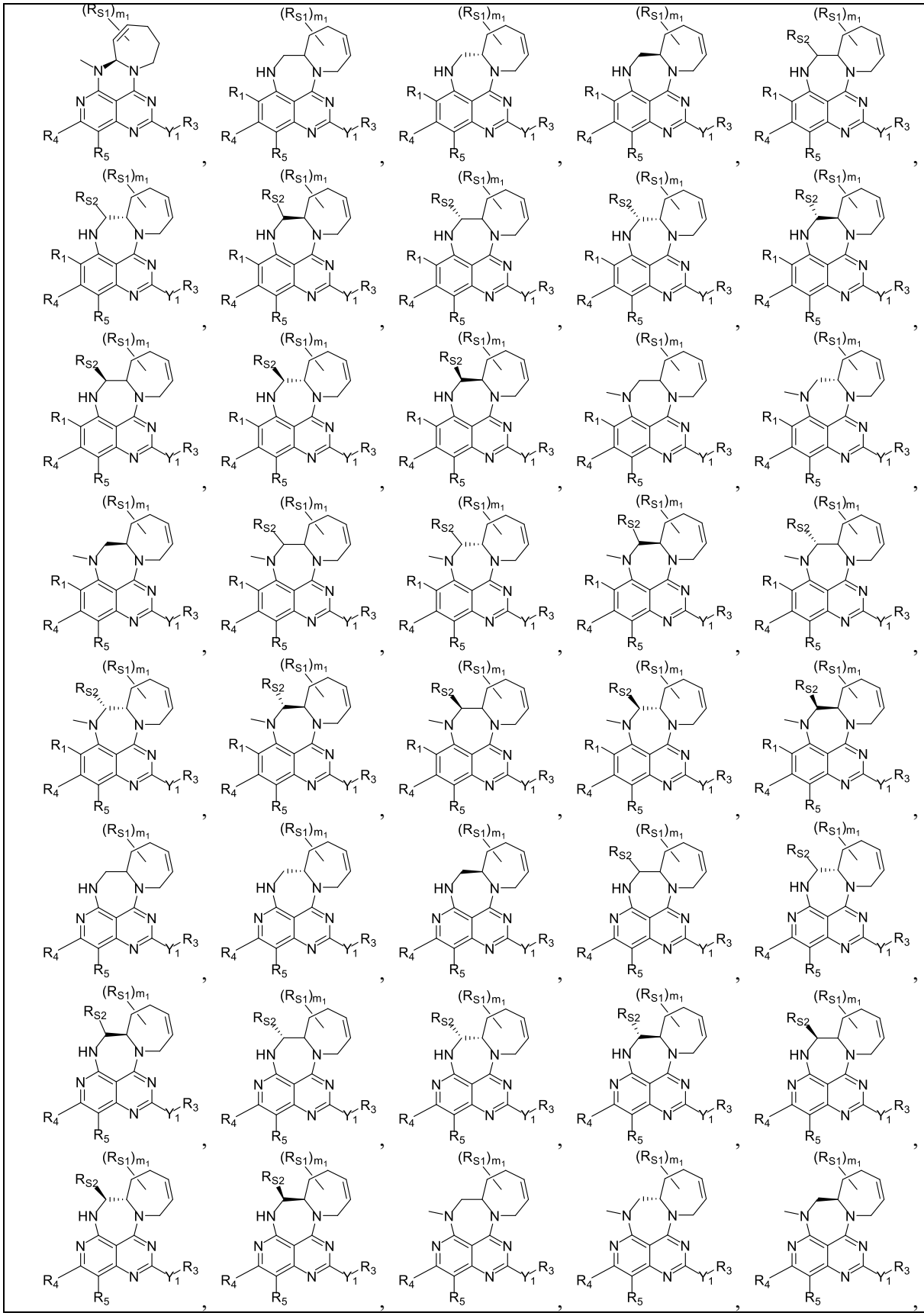


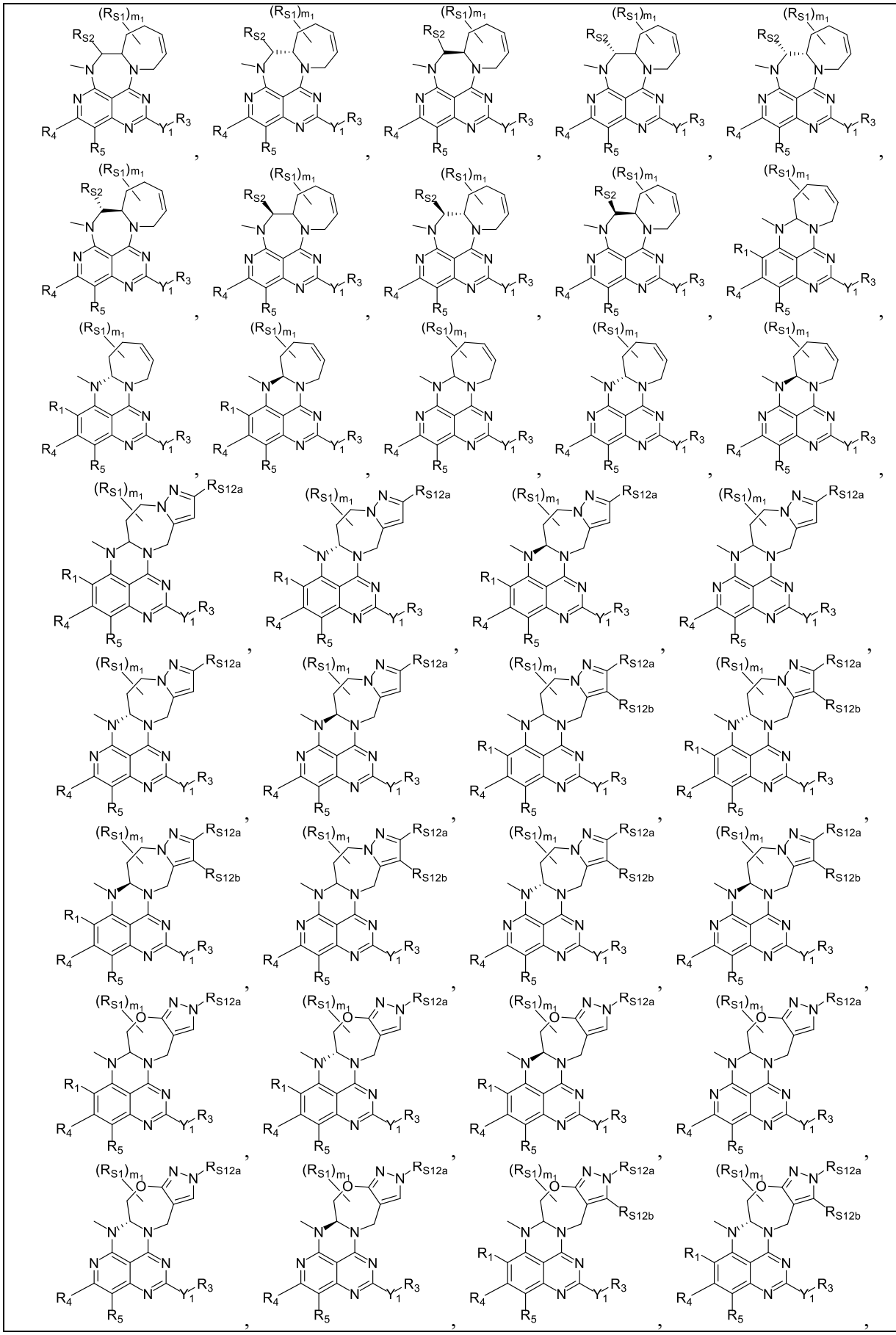


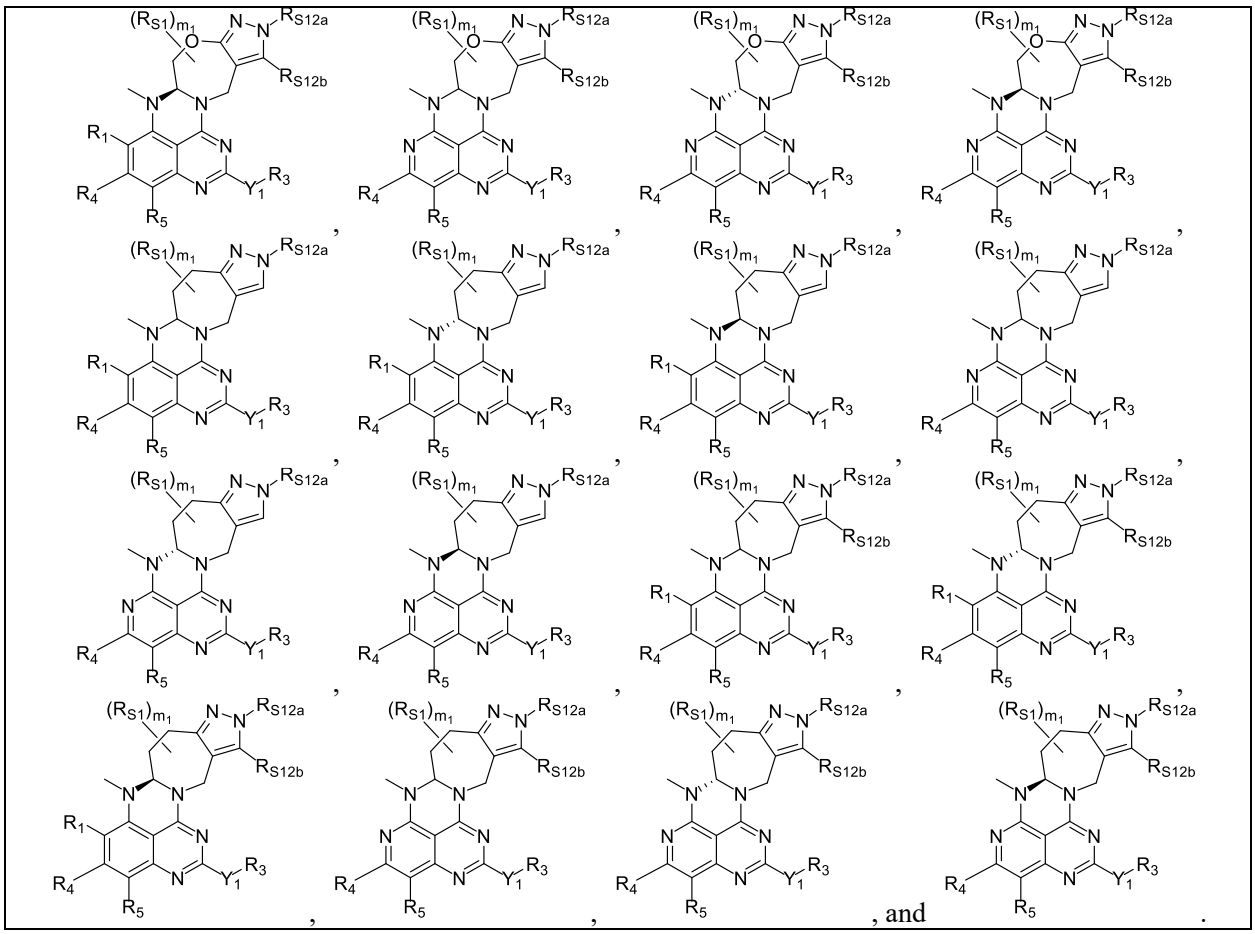




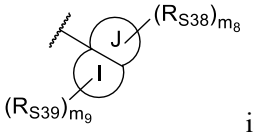
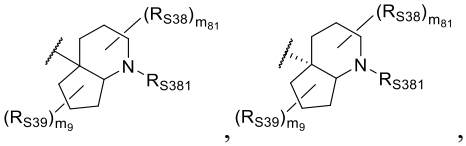


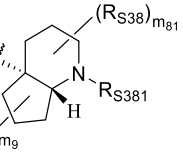
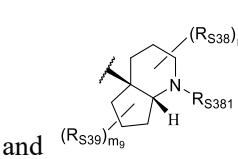


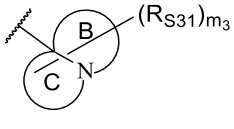
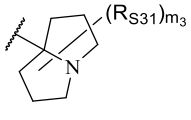
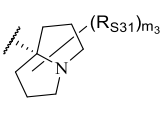
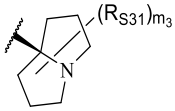




6. The compound of claim 1, wherein:

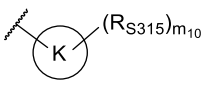
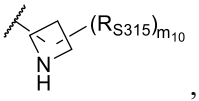
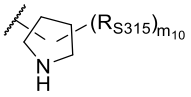
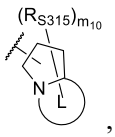
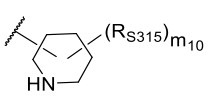
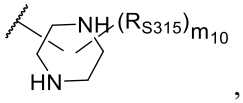
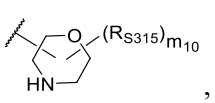
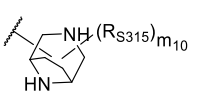
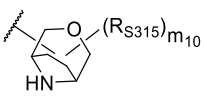
 is selected from the group consisting of ;

, , , , , , , and ;

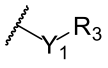
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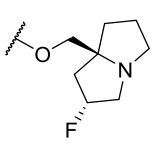
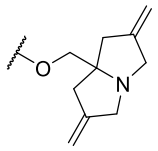
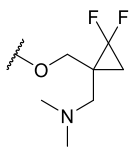
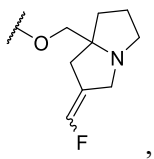
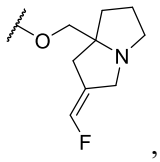
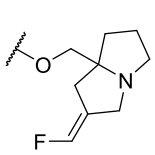
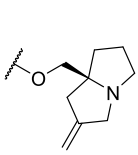
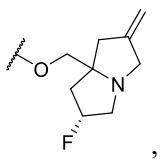
R_{S381} is hydrogen or R_{S38};

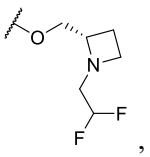
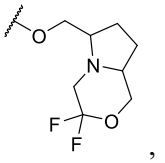
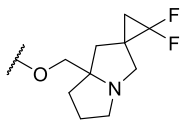
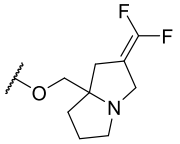
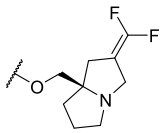
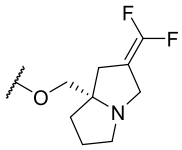
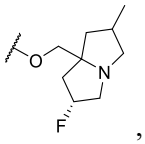
m_{81} is selected from the group consisting of 0, 1, 2, 3, 4, 5, 6, 7, and 8;

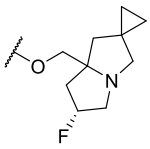
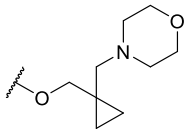
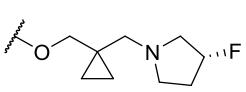
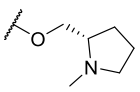
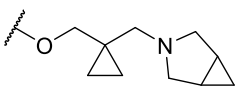
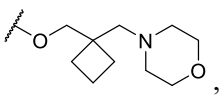

is selected from the group consisting of , , , , , , , and ;

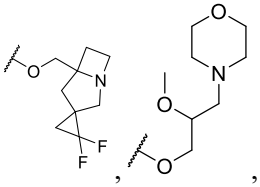
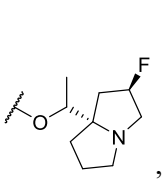
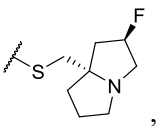
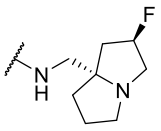
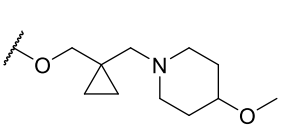
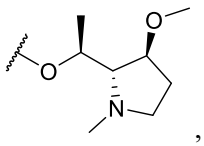
wherein, ring L is a 4-6 membered heterocyclic ring optionally further containing 1 or 2 heteroatoms selected from the group consisting of N and O.

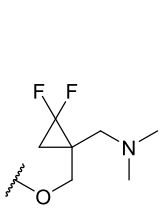
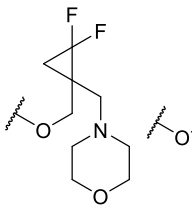
7. The compound of claim 1, wherein,  is selected from the group consisting of:

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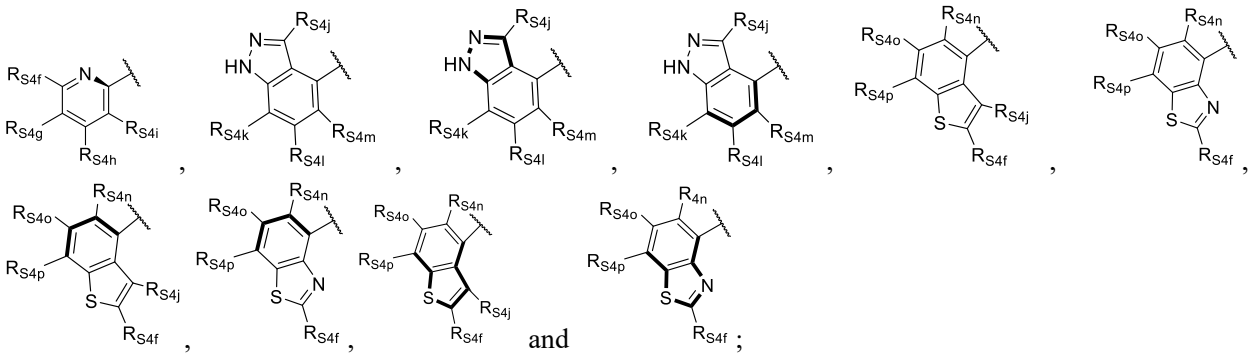
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8. The compound of claim 1, wherein, R_4 is selected from the group consisting of ,

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and ;

m_7 is selected from the group consisting of 0, 1, 2, and 3;

R_{S4a} at each occurrence is independently selected from the group consisting of -OH and -NH_2;

R_{S4b} at each occurrence is independently selected from the group consisting of hydrogen, deuterium, and halogen;

R_{S4c} at each occurrence is independently selected from the group consisting of hydrogen, deuterium, -C_{1-3}alkyl, -C_{2-3}alkenyl and -C_{2-3}alkynyl;

R_{S4d} at each occurrence is independently selected from the group consisting of hydrogen, deuterium and halogen;

R_{S4e} at each occurrence is independently selected from the group consisting of hydrogen, deuterium, halogen, -C_{1-3}alkyl and haloC_{1-3}alkyl;

R_{S4f} at each occurrence is independently selected from the group consisting of -OH and -NH_2;

R_{S4g} at each occurrence is independently selected from the group consisting of hydrogen, deuterium, halogen, -C_{1-3}alkyl and haloC_{1-3}alkyl;

R_{S4h} at each occurrence is independently selected from the group consisting of hydrogen, deuterium, halogen, -C_{1-3}alkyl and haloC_{1-3}alkyl;

R_{S4i} at each occurrence is independently selected from the group consisting of hydrogen, deuterium, halogen, -C_{1-3}alkyl and haloC_{1-3}alkyl;

R_{S4j} at each occurrence is independently selected from the group consisting of hydrogen, deuterium, halogen, -CN, -C_{1-3}alkyl, haloC_{1-3}alkyl and -OhaloC_{1-3}alkyl;

R_{S4k} at each occurrence is independently selected from the group consisting of hydrogen, deuterium, halogen, -CN, -C_{1-3}alkyl, haloC_{1-3}alkyl and -OhaloC_{1-3}alkyl;

R_{S4l} at each occurrence is independently selected from the group consisting of hydrogen, deuterium, halogen, -CN, -C_{1-3}alkyl, haloC_{1-3}alkyl and -OhaloC_{1-3}alkyl;

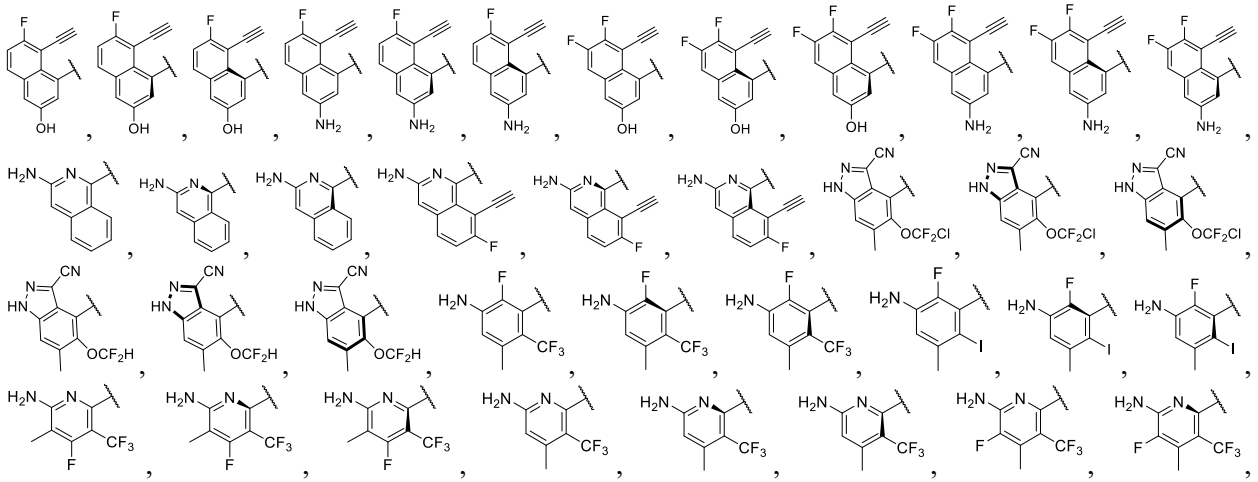
R_{S4m} at each occurrence is independently selected from the group consisting of hydrogen, deuterium, halogen, -CN, -C_{1-3}alkyl, haloC_{1-3}alkyl and -OhaloC_{1-3}alkyl;

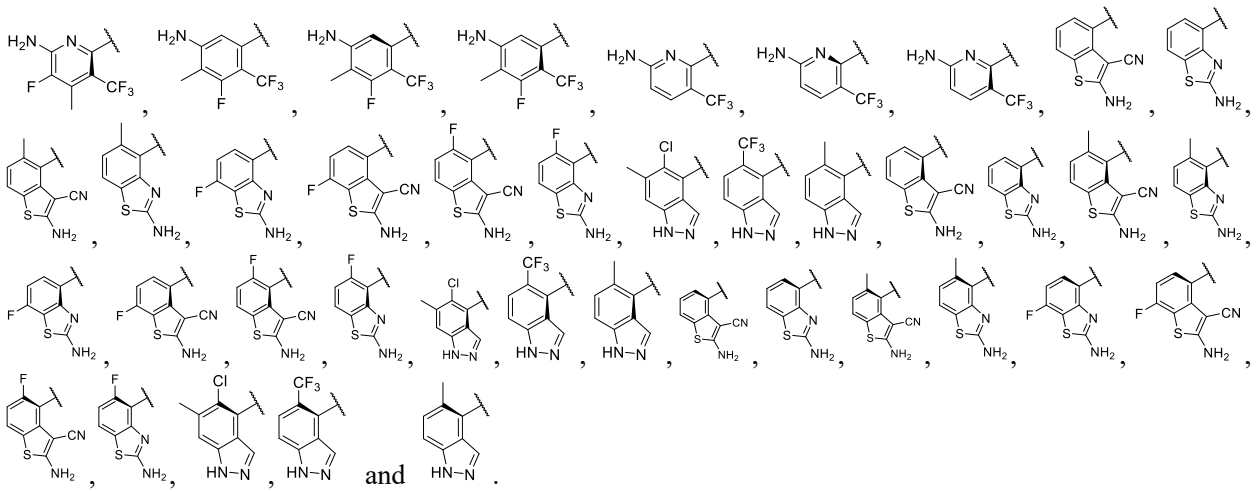
R_{S4n} at each occurrence is independently selected from the group consisting of hydrogen, deuterium, halogen, -C_{1-3}alkyl and haloC_{1-3}alkyl;

R_{S4o} at each occurrence is independently selected from the group consisting of hydrogen, deuterium, halogen, -C_{1-3}alkyl and haloC_{1-3}alkyl;

R_{S4p} at each occurrence is independently selected from the group consisting of hydrogen, deuterium, halogen, -C_{1-3}alkyl and haloC_{1-3}alkyl.

9. The compound of claim 8, wherein, R_4 is selected from the group consisting of:

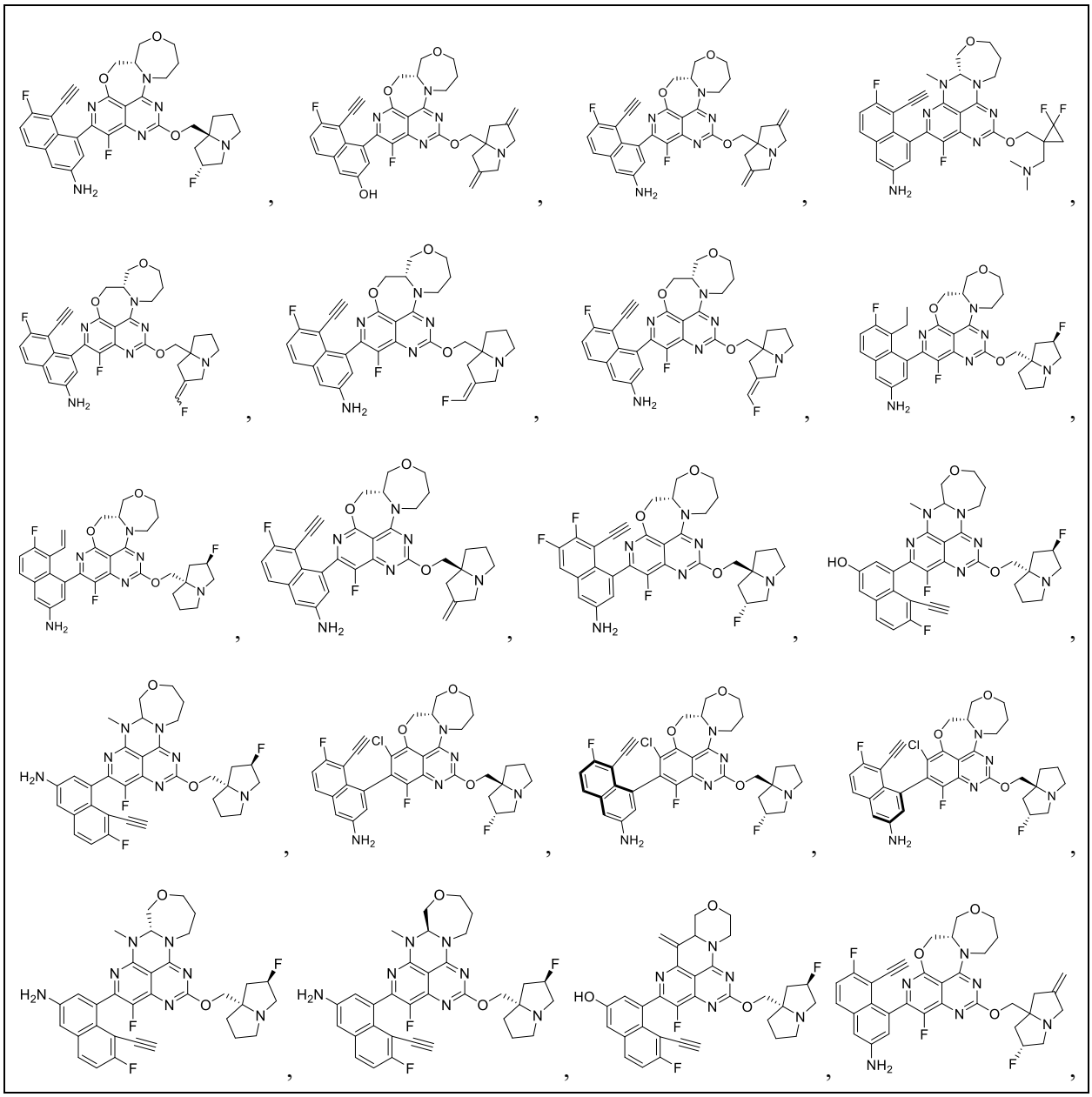


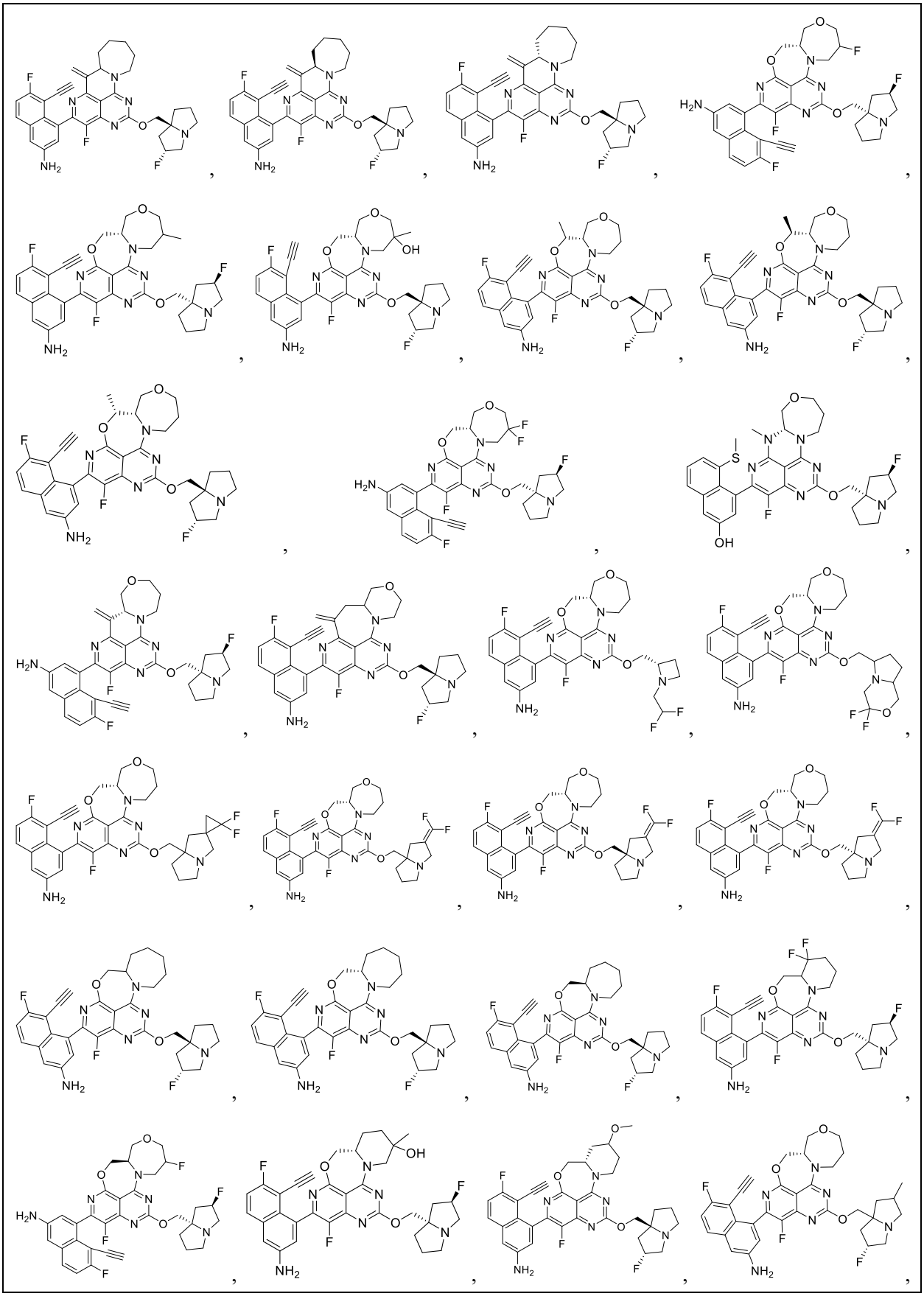


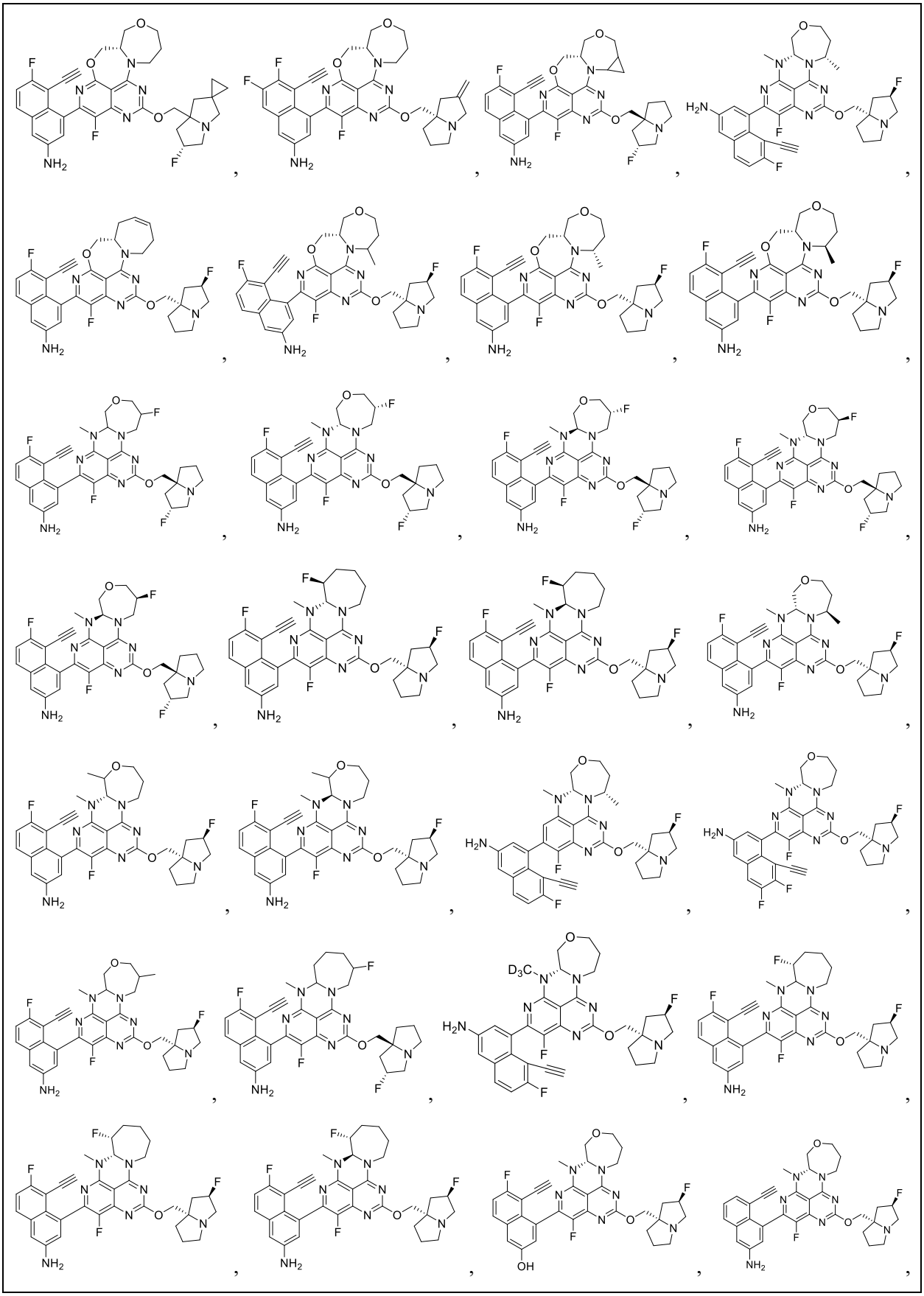
10. The compound of claim 1, wherein, R_5 is -F.

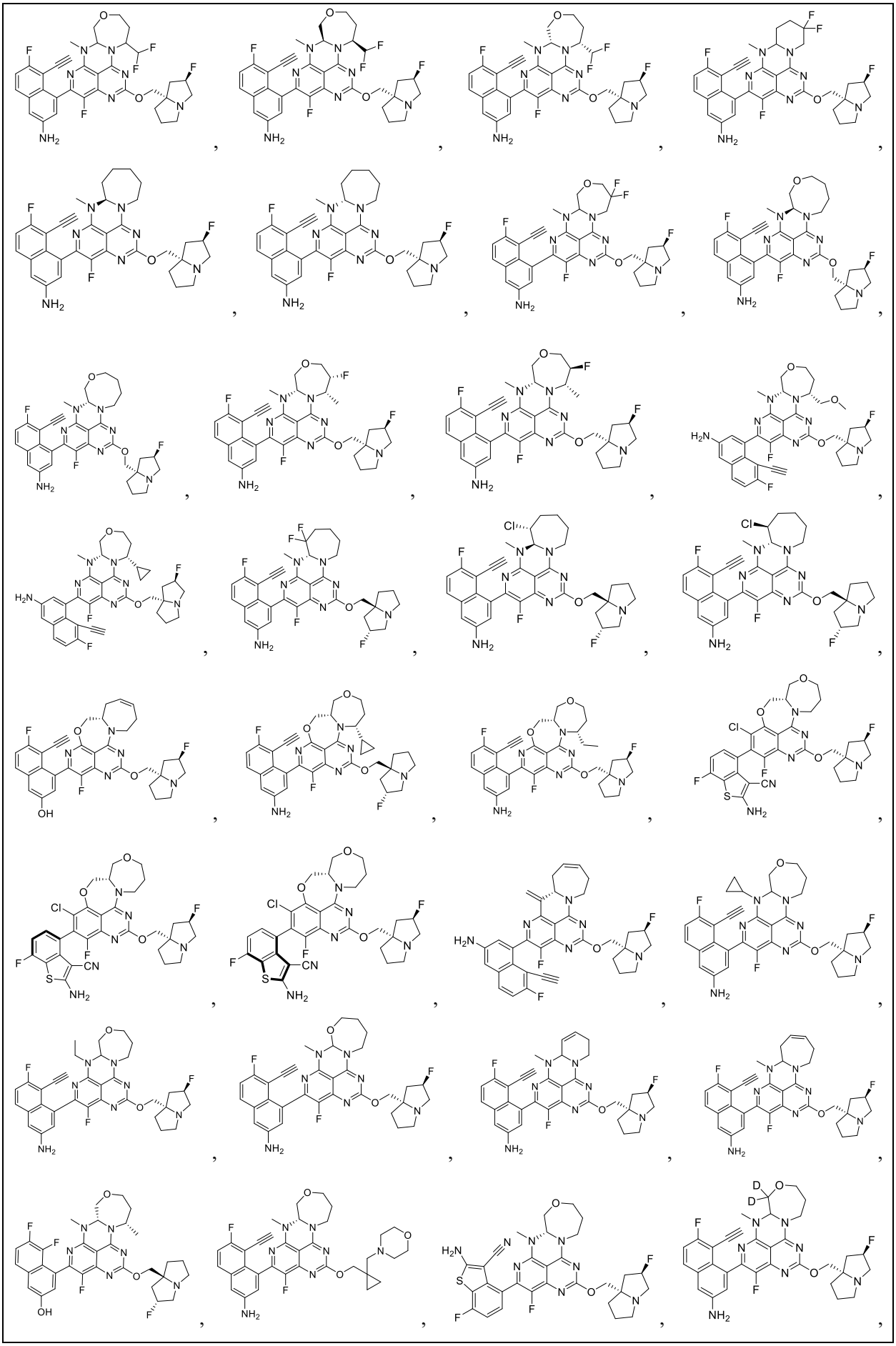
11. The compound of claim 1, wherein, the compound is selected from the group consisting of any one of compounds in **Table C**:

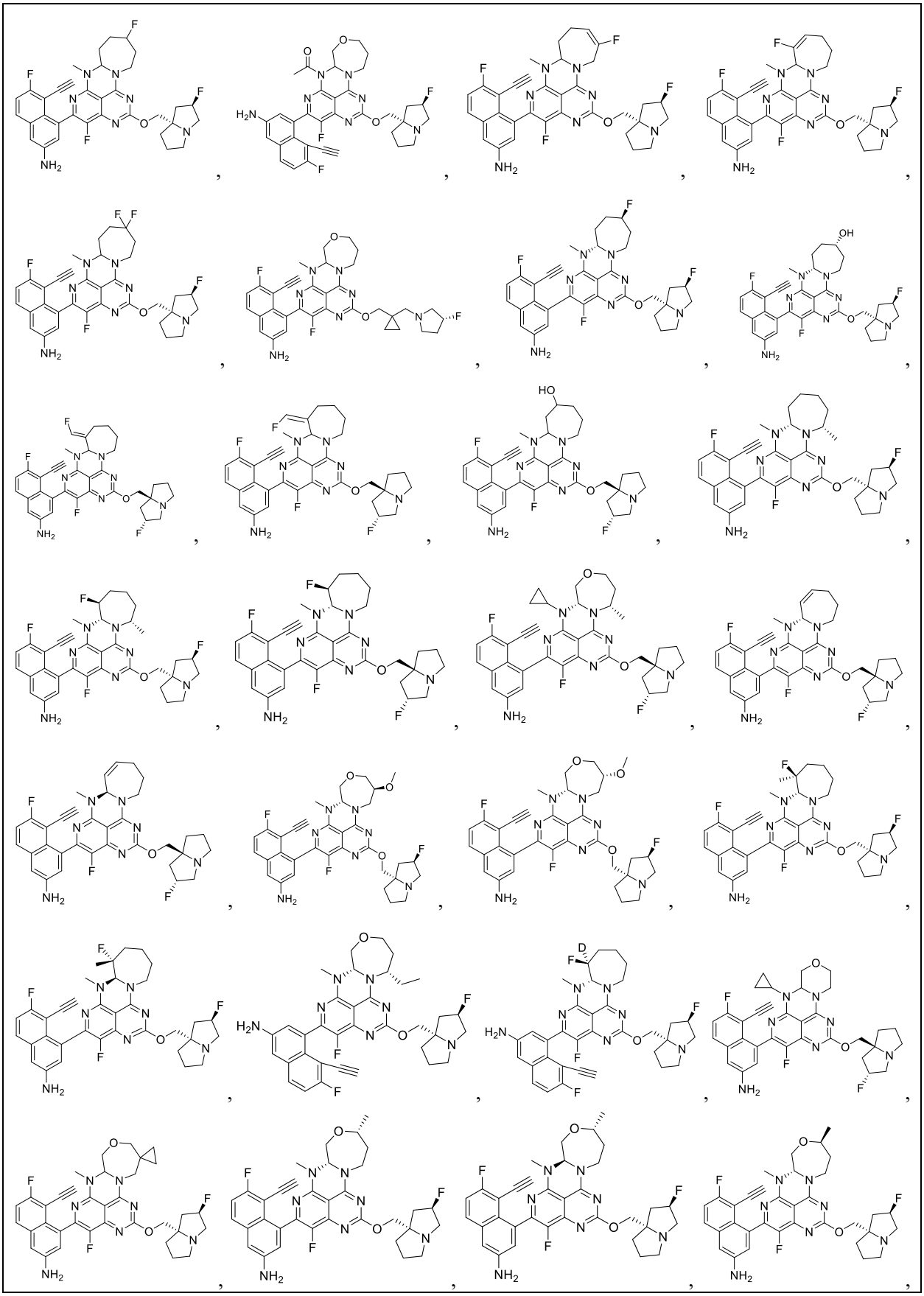
Table C

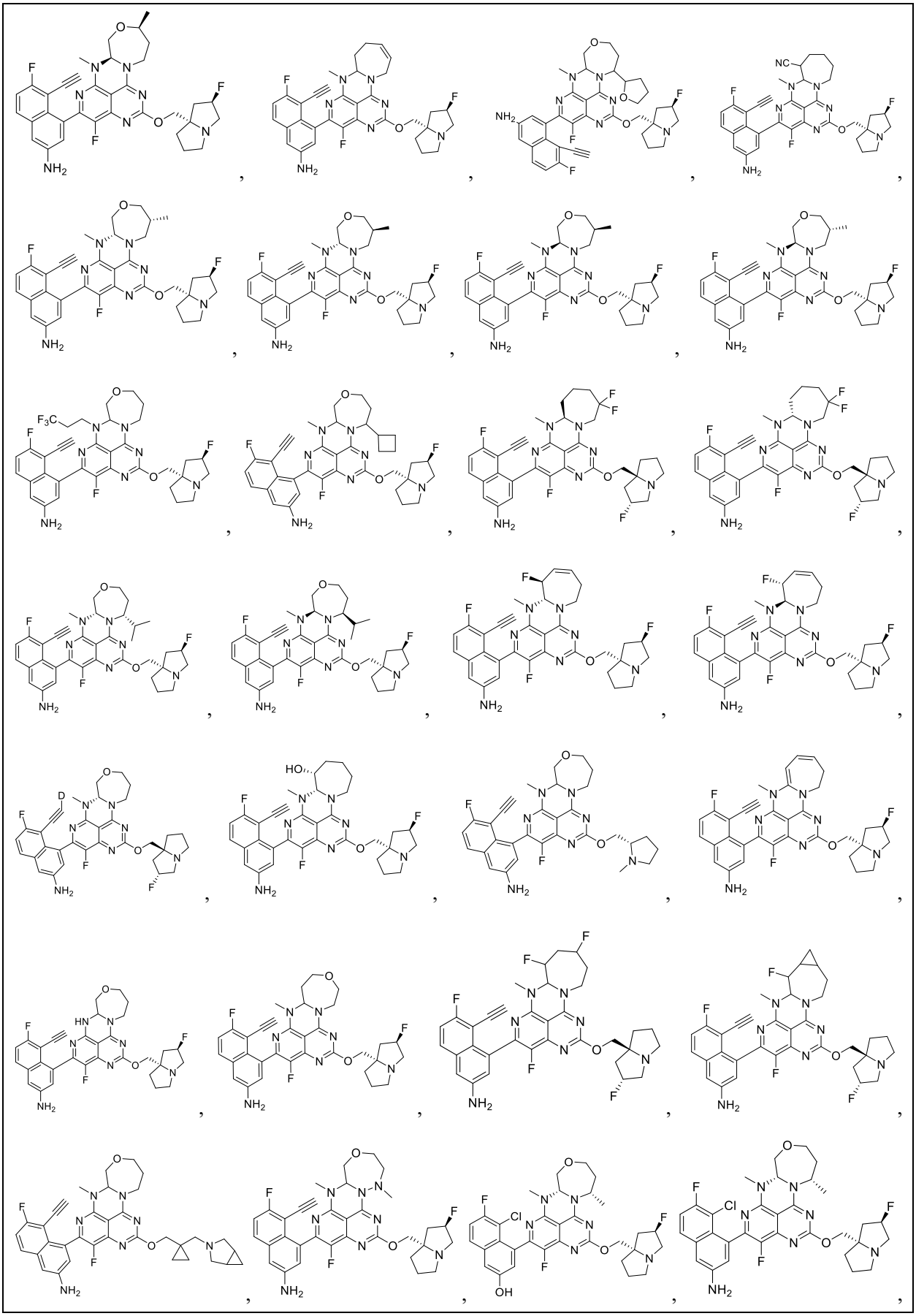


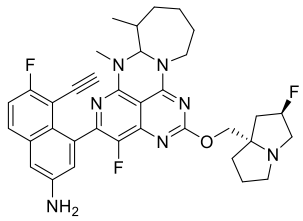
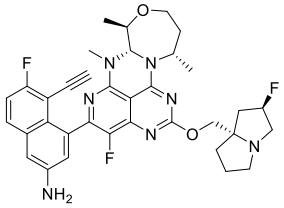
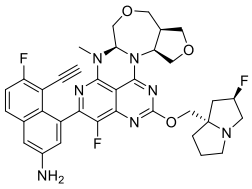
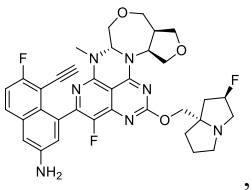
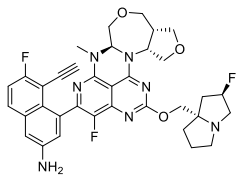
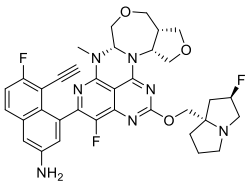
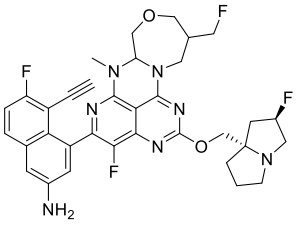
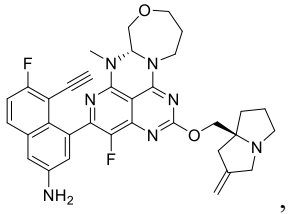
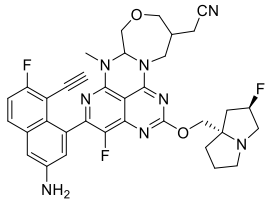
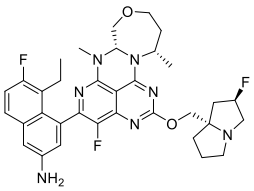
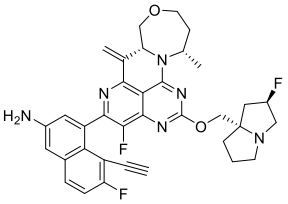
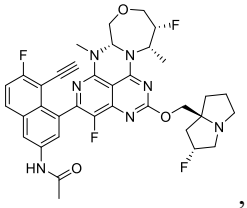
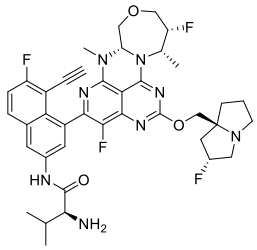
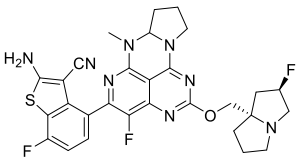
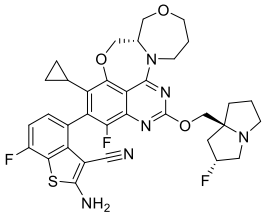
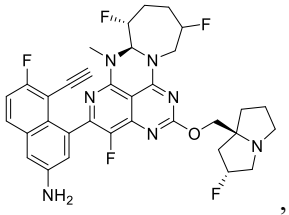
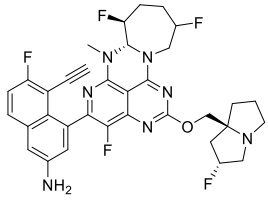
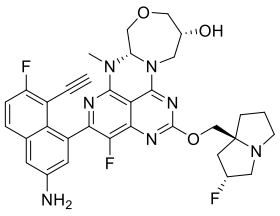











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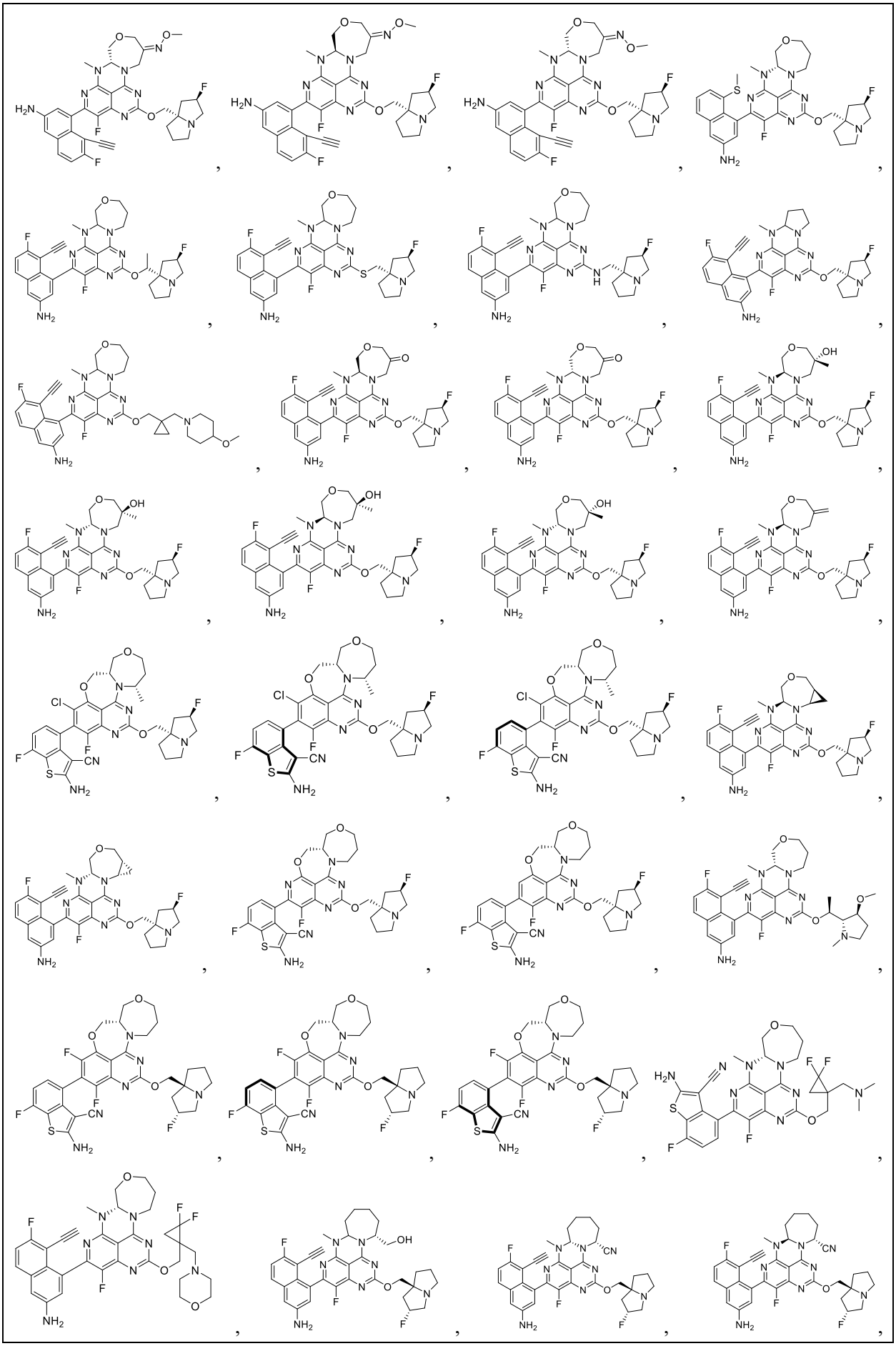
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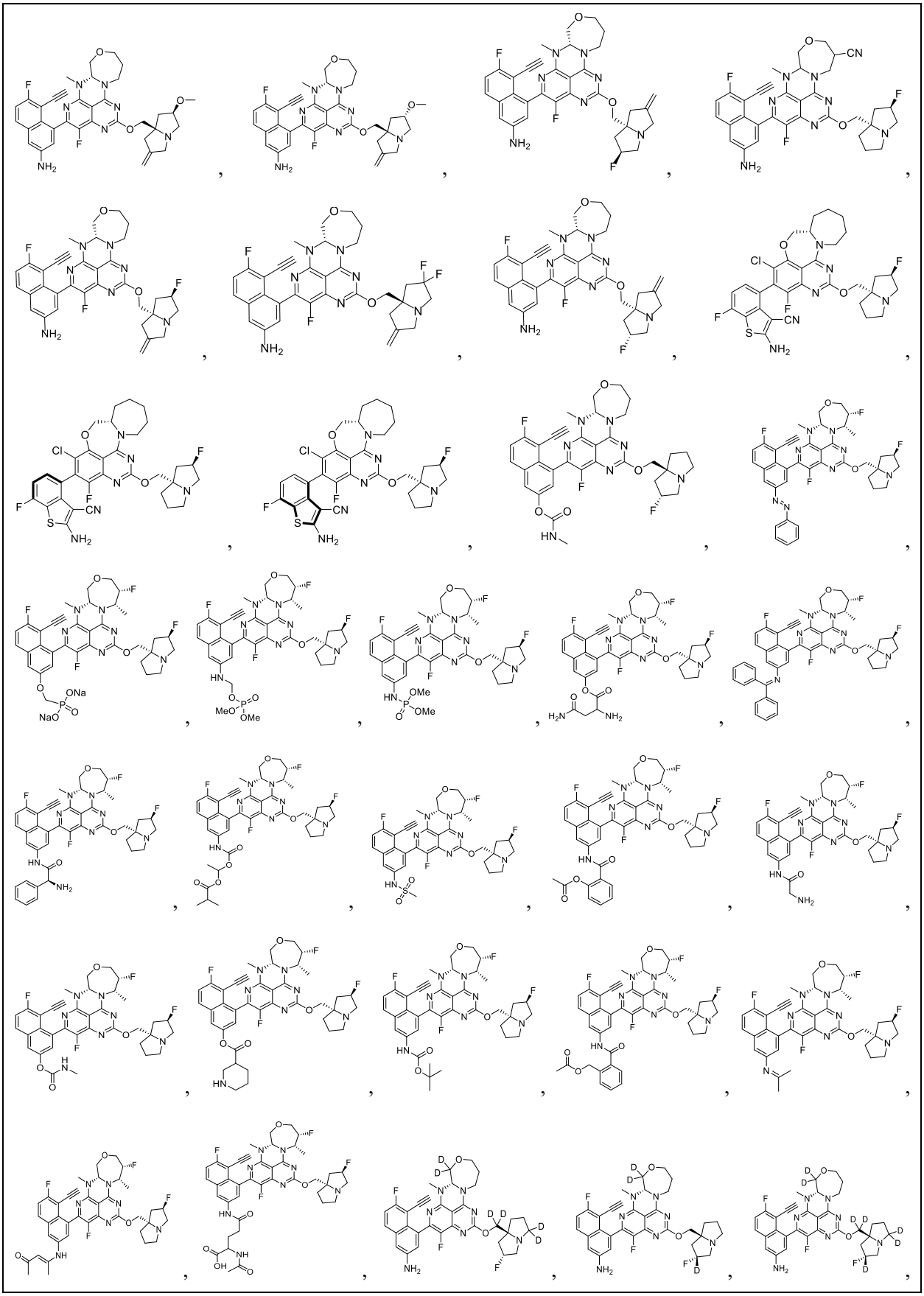
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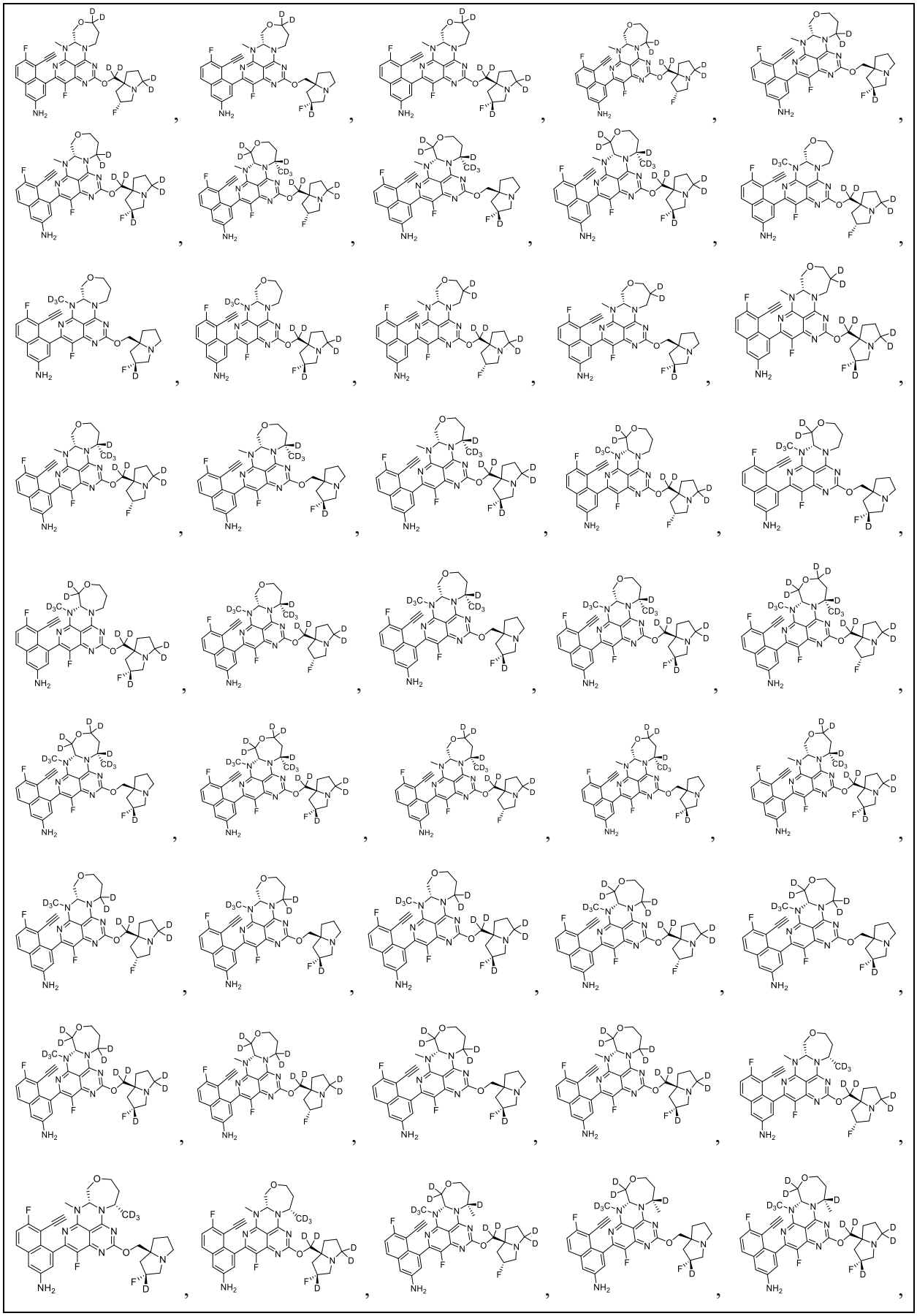
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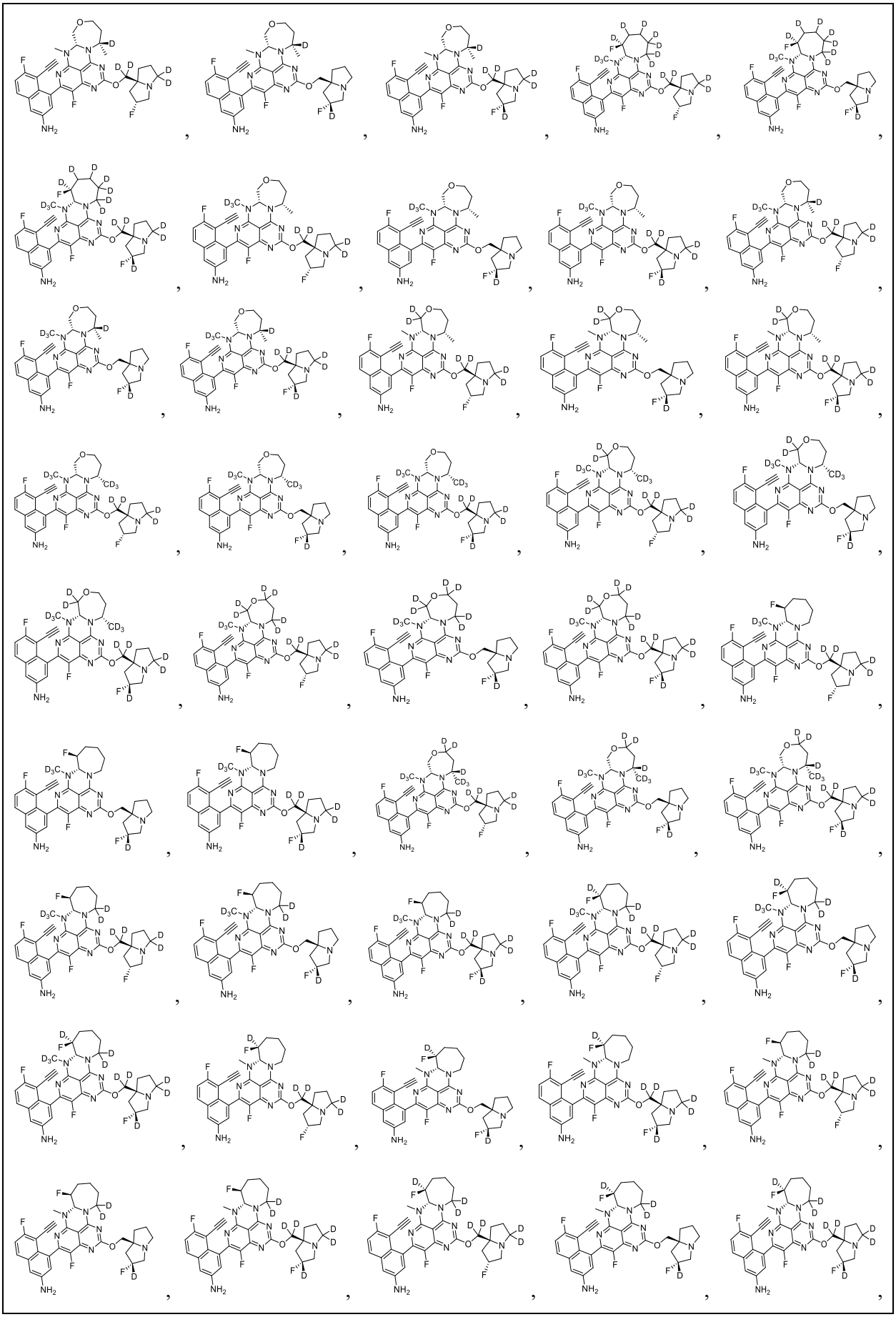
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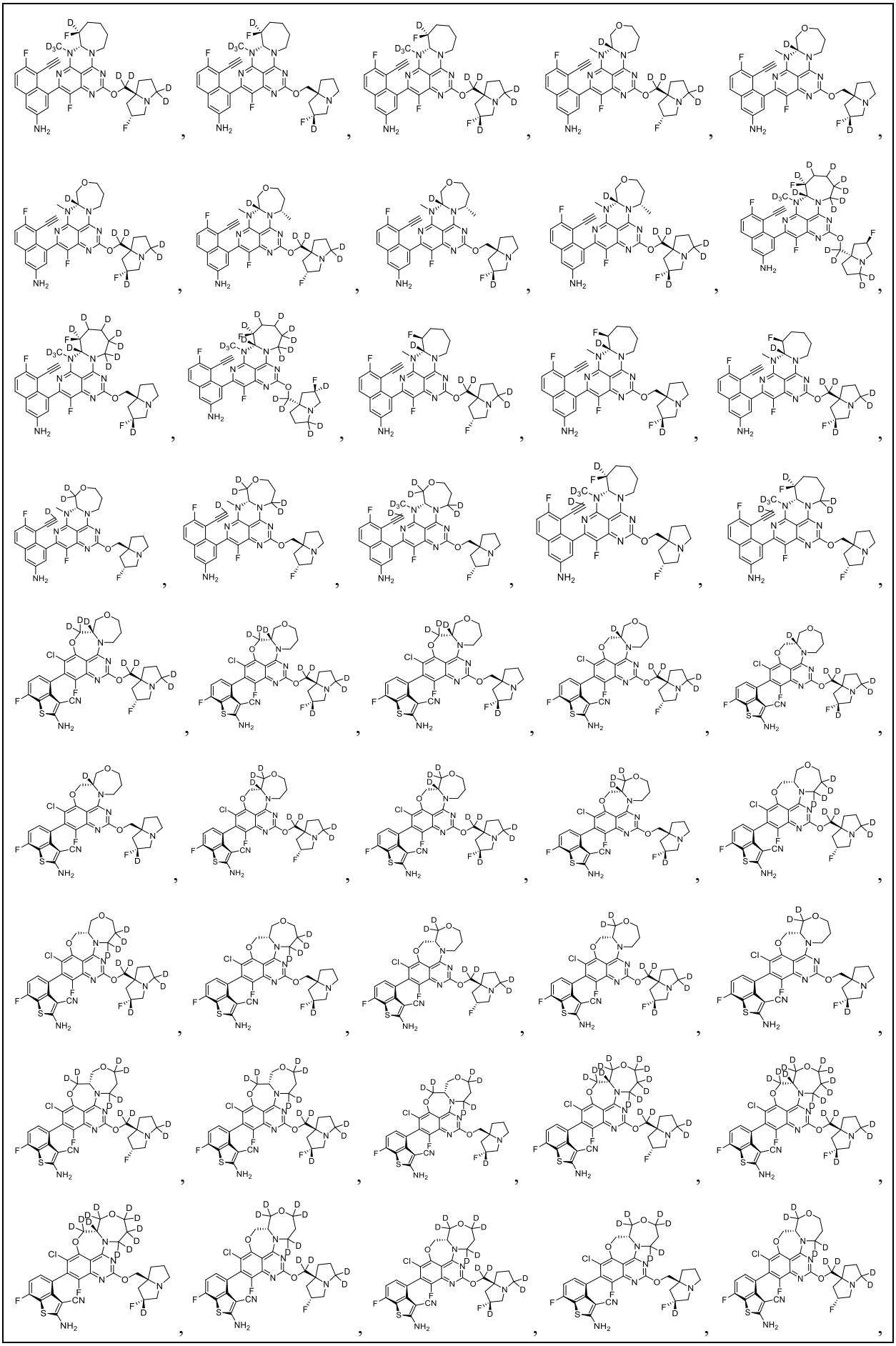
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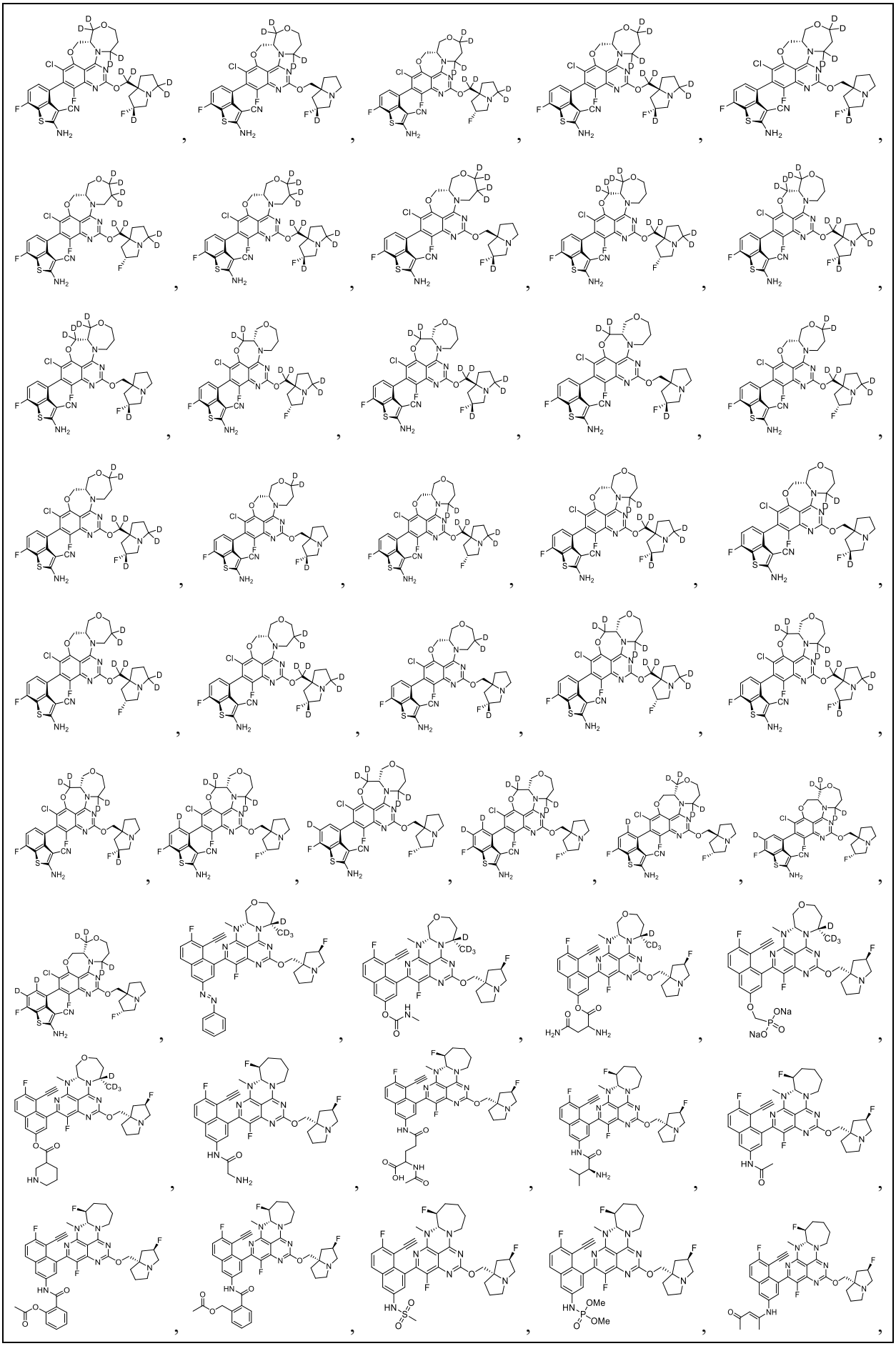


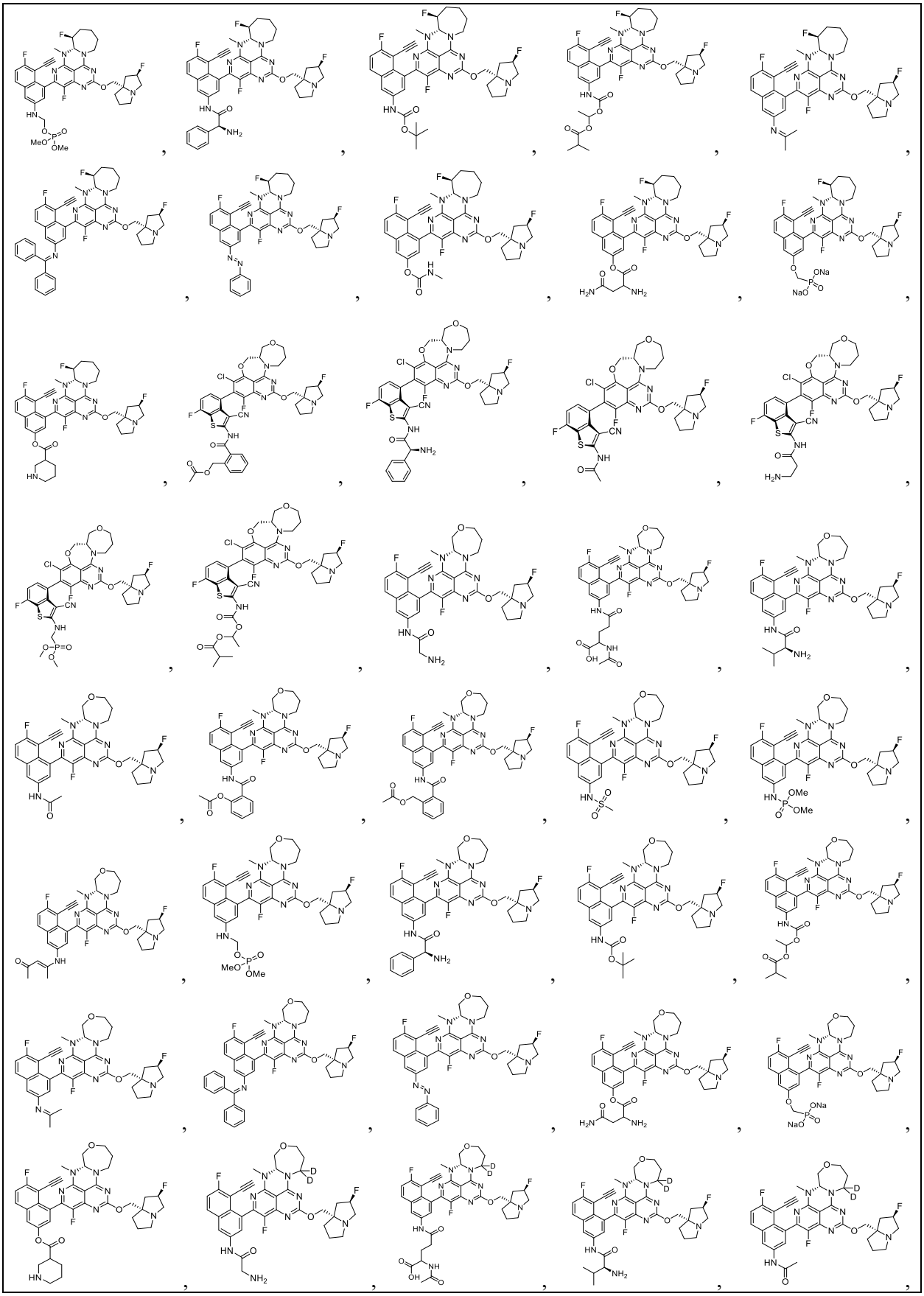


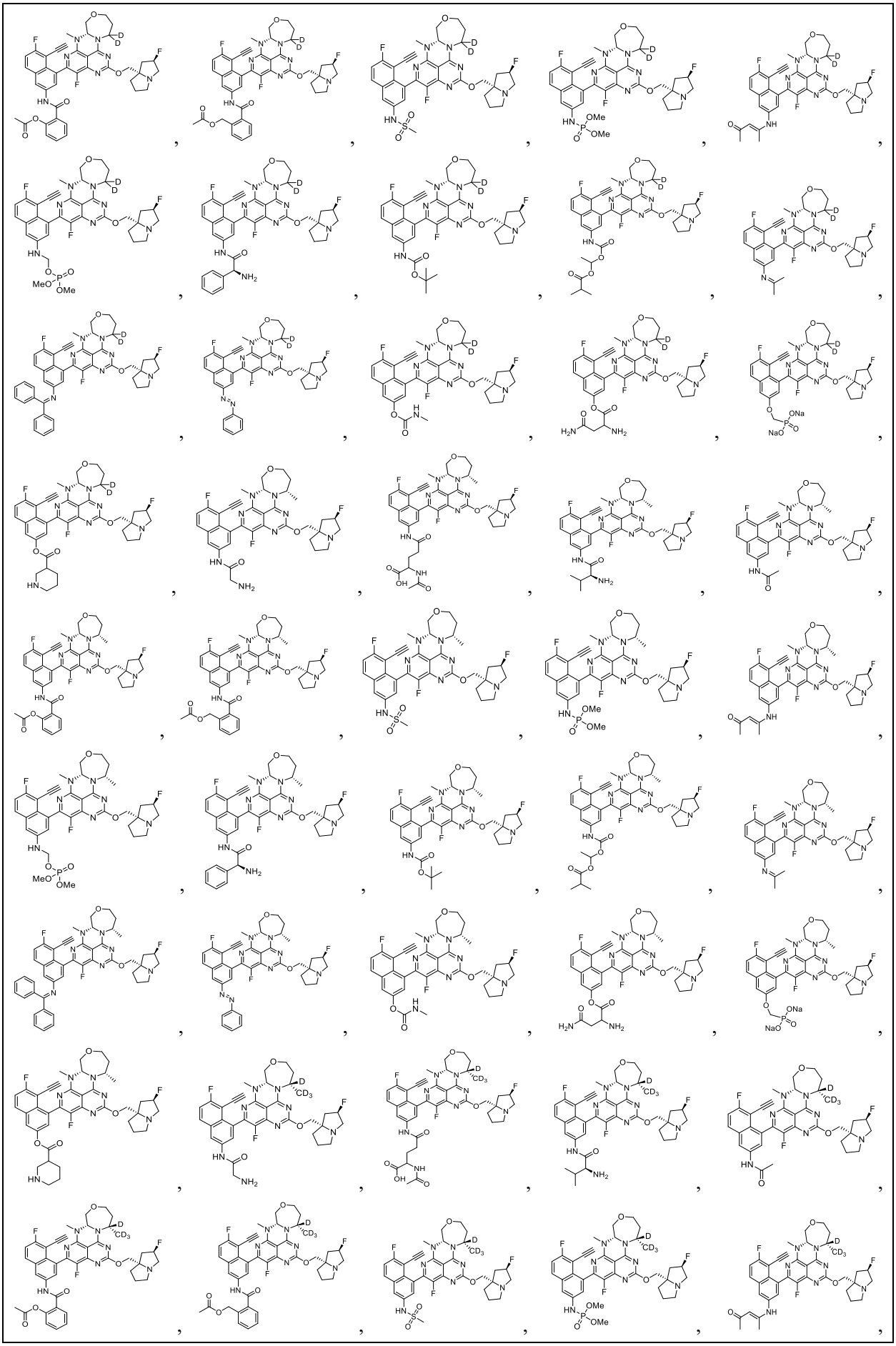


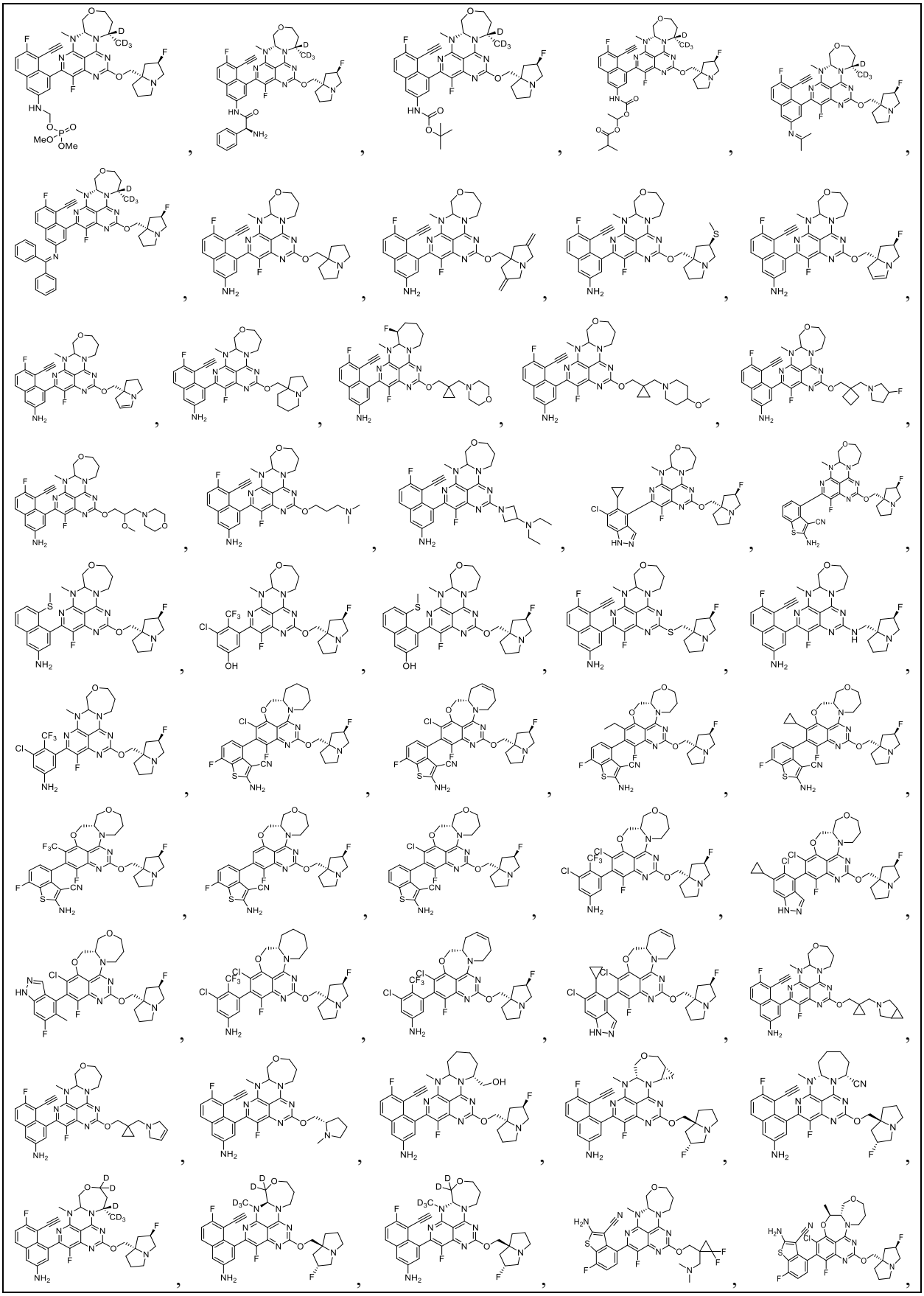


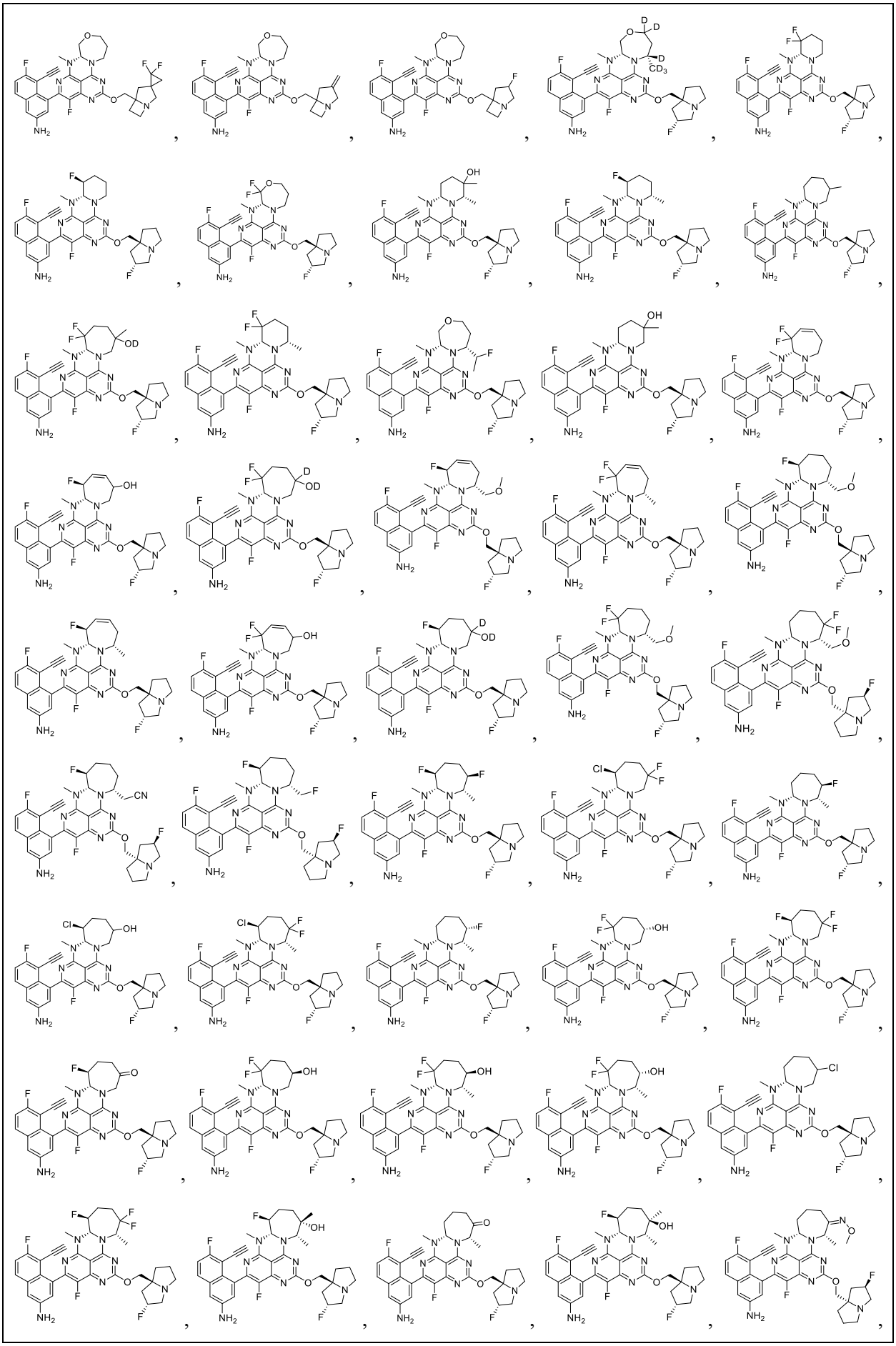


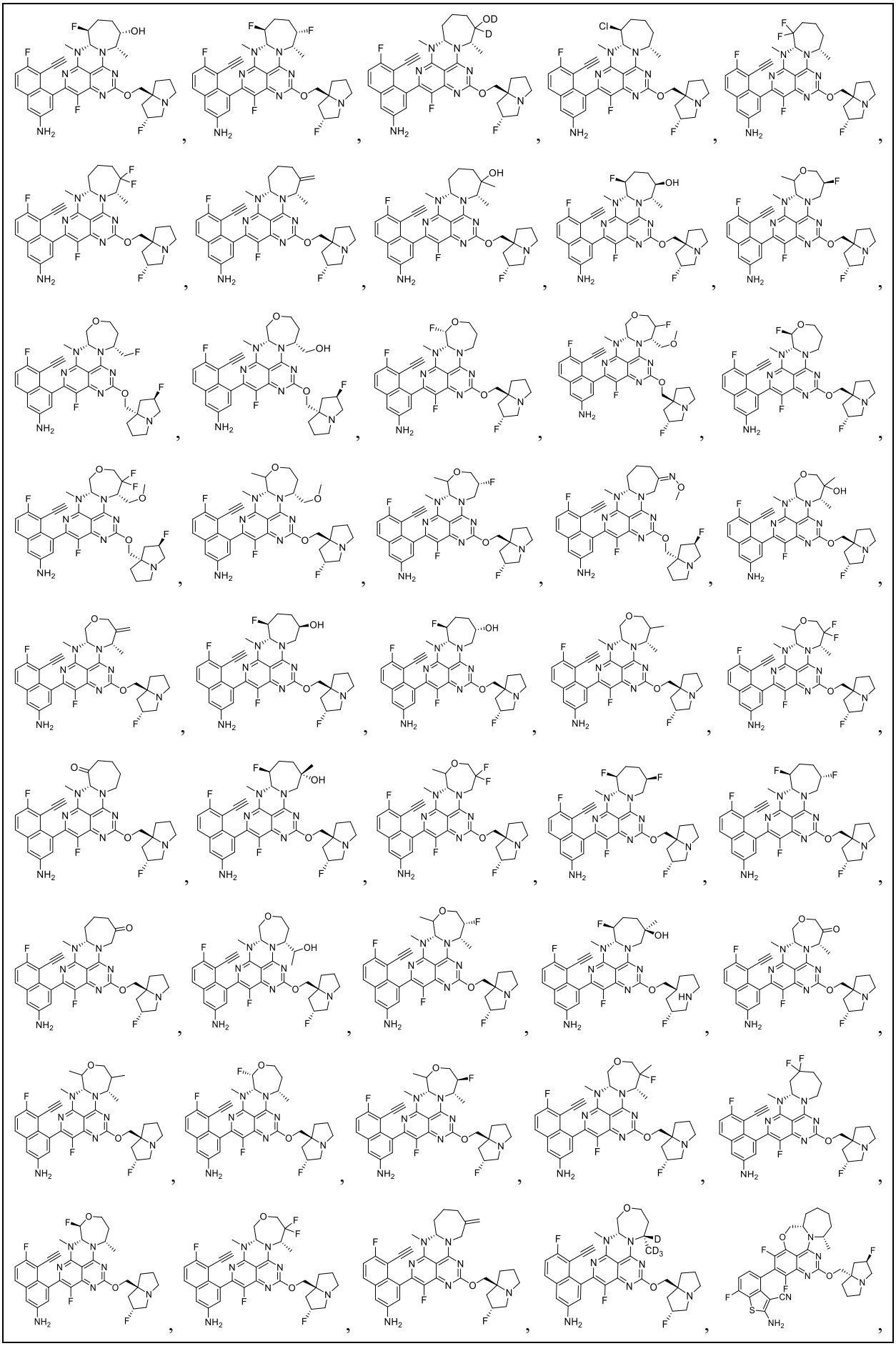


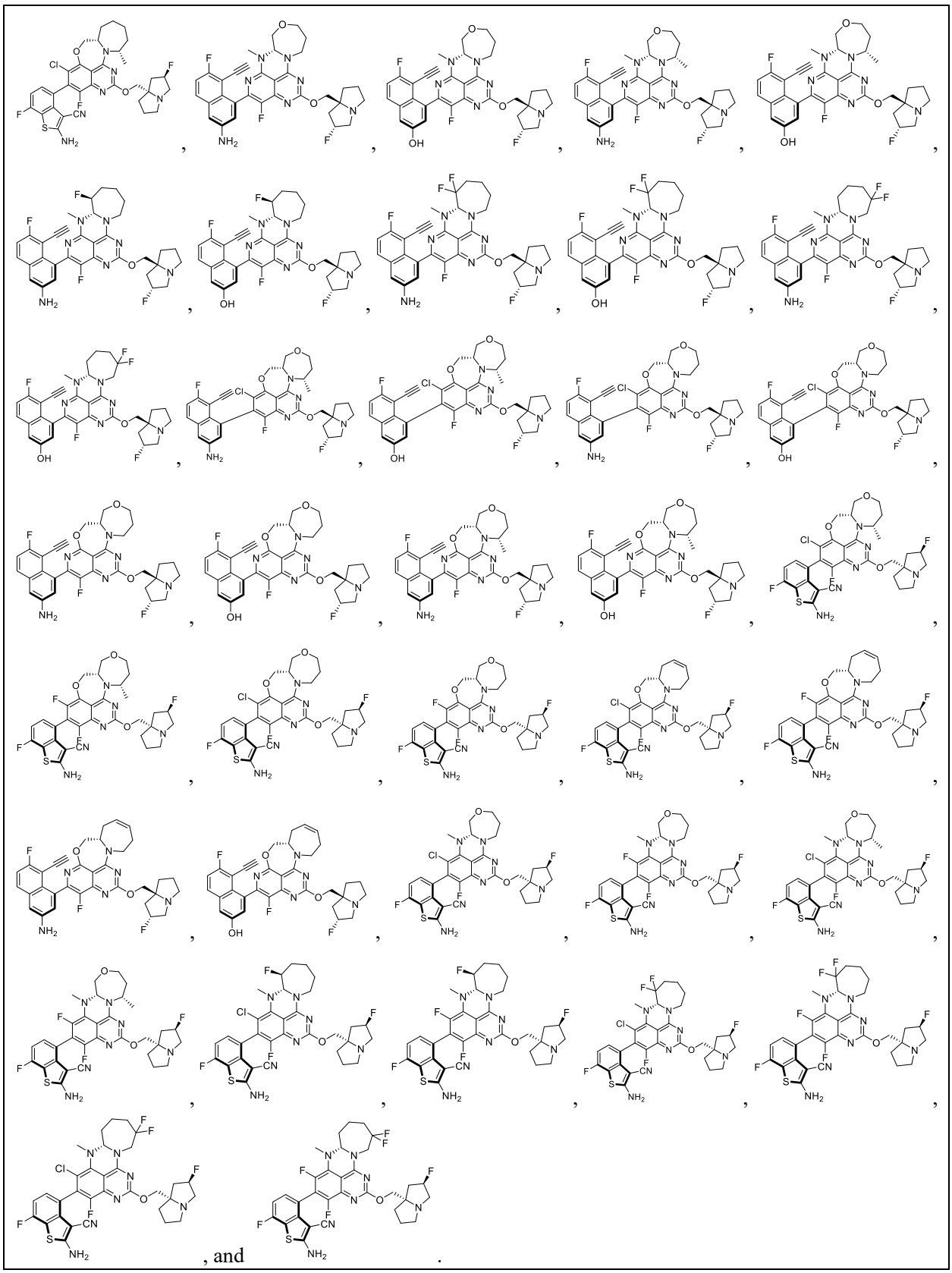












, and .

12. A pharmaceutical composition, comprising a therapeutically effective amount of the compound of formula (I), a stereoisomer thereof, a pharmaceutically acceptable salt thereof, a pharmaceutically acceptable salt of the stereoisomer, a prodrug thereof, a deuterated molecule thereof or a PROTAC molecule thereof of any one of claims 1 to 11, and a pharmaceutically acceptable excipient.

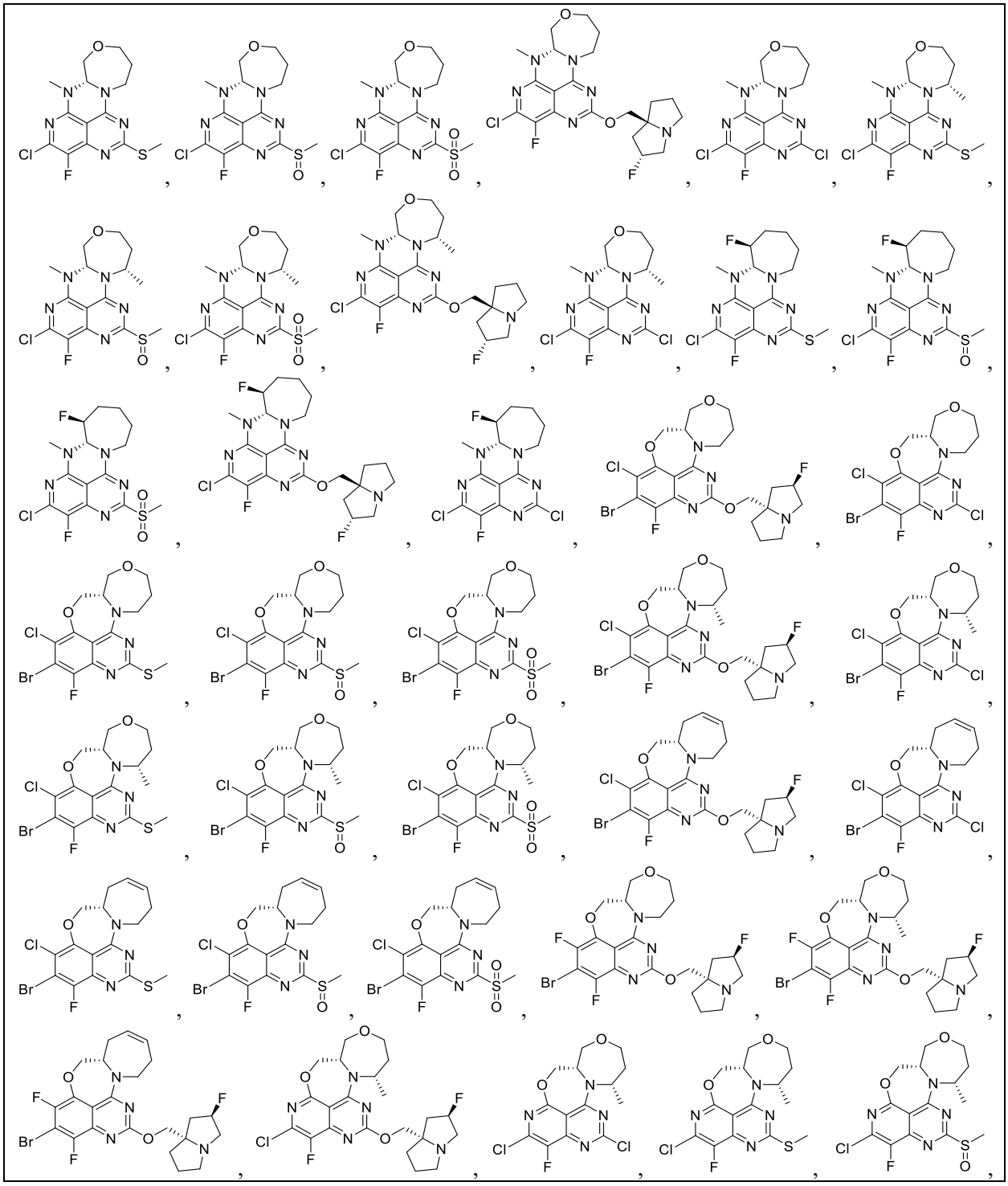
13. The compound of formula (I), a stereoisomer thereof, a pharmaceutically acceptable salt thereof, a pharmaceutically acceptable salt of the stereoisomer, a prodrug thereof, a deuterated molecule thereof or a

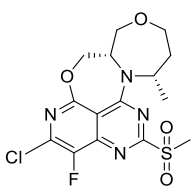
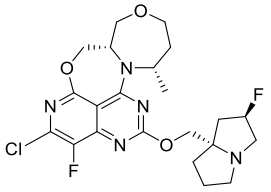
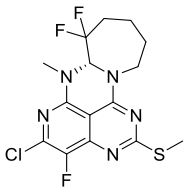
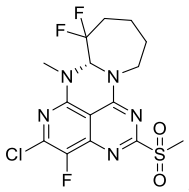
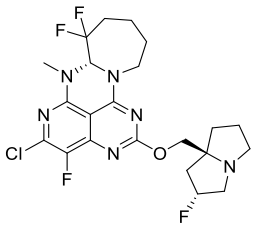
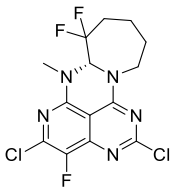
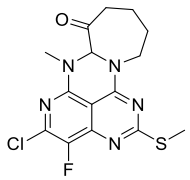
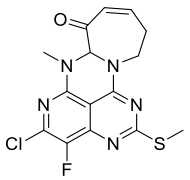
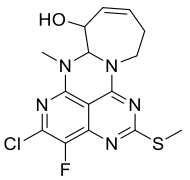
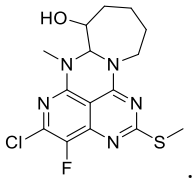
PROTAC molecule thereof of any one of claims 1 to 11, or the pharmaceutical composition of claim 12 for use as a medicament.

14. The compound of formula (I), a stereoisomer thereof, a pharmaceutically acceptable salt thereof, a pharmaceutically acceptable salt of the stereoisomer, a prodrug thereof, a deuterated molecule thereof or a PROTAC molecule thereof of any one of claim 1 to 11, or the pharmaceutical composition of claim 12 for use in the treatment of cancer, said cancer is pancreatic carcinoma, colorectal carcinoma, non-small cell lung cancer, breast carcinoma, large intestine carcinoma, stomach carcinoma, endometrial carcinoma, esophageal carcinoma or gastroesophageal junction carcinoma, the cancer is associated with at least one of K-Ras G12C, K-Ras G12D, K-Ras G12V, K-Ras G13D, K-Ras G12R, K-Ras G12S, K-Ras G12A, K-Ras Q61H mutation and/or K-Ras wild type amplification.

15. An intermediate selected from the group consisting of any one of intermediates in **Table D**:

Table D



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