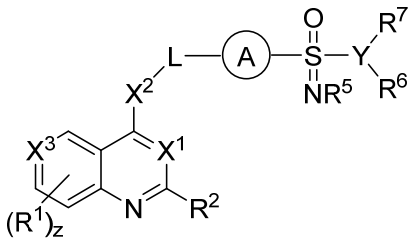
CLAIMS

WHAT IS CLAIMED IS:

1. A compound represented by the structure of Formula (I):



(I),

or a pharmaceutically acceptable salt thereof, wherein:

X^1 is selected from N and $C(R^3)$;

X^2 is absent or selected from O, S, $C(R^8)_2$, $N(R^4)$, and C_{3-6} carbocycle optionally substituted with one or more substituents independently selected from R^9;

X^3 is selected N and $C(R^{3'})$;

Y is selected from N and C(H);

R^1 is selected from:

halogen, $-OR^{11}$, $-SR^{11}$, $-N(R^{11})_2$, $-C(O)R^{11}$, $-C(O)N(R^{11})_2$, $-N(R^{11})C(O)R^{11}$, $-C(O)OR^{11}$, $-OC(O)R^{11}$, $-S(O)R^{11}$, $-S(O)_2R^{11}$, $-S(O)_2N(R^{11})_2$, $-N(R^{11})S(O)_2R^{11}$, $-S(O)(NR^{11})R^{11}$, $-S(NR^{11})_2R^{11}$, $-NO_2$, and -CN; and

C_{1-5} alkyl, C_{2-5} alkenyl, C_{2-5} alkynyl, each of which is optionally substituted with one or more substituents independently selected from halogen, $-OR^{11}$, $-SR^{11}$, $-N(R^{11})_2$, $-C(O)R^{11}$, $-C(O)N(R^{11})_2$, $-N(R^{11})C(O)R^{11}$, $-C(O)OR^{11}$, $-OC(O)R^{11}$, $-S(O)R^{11}$, $-S(O)_2R^{11}$, $-S(O)_2N(R^{11})_2$, $-N(R^{11})S(O)_2R^{11}$, $-S(O)(NR^{11})R^{11}$, $-S(NR^{11})_2R^{11}$, $-NO_2$, =O, =S, $=N(R^{11})$, -CN, C_{3-6} carbocycle and 3- to 6-membered heterocycle;

R^2 is selected from:

hydrogen, halogen, $-OR^{11}$, $-SR^{11}$, $-N(R^{11})_2$, $-C(O)R^{11}$, $-C(O)N(R^{11})_2$, $-N(R^{11})C(O)R^{11}$, $-C(O)OR^{11}$, $-OC(O)R^{11}$, $-S(O)R^{11}$, $-S(O)_2R^{11}$, $-S(O)_2N(R^{11})_2$, $-N(R^{11})S(O)_2R^{11}$, $-S(O)(NR^{11})R^{11}$, $-S(NR^{11})_2R^{11}$, $-NO_2$, and -CN; and

C_{1-5} alkyl, C_{2-5} alkenyl, C_{2-5} alkynyl, each of which is optionally substituted with one or more substituents independently selected from halogen, $-OR^{11}$, $-SR^{11}$, $-N(R^{11})_2$, $-C(O)R^{11}$,

-C(O)N(R^{11})$_2$, -N(R^{11})C(O)R^{11}, -C(O)OR^{11}, -OC(O)R^{11}, -S(O)R^{11}, -S(O)$_2R^{11}$, -S(O)$_2$N(R^{11})$_2$, -N(R^{11})S(O)$_2R^{11}$, -S(O)(NR^{11})R^{11}, -S(NR^{11})$_2R^{11}$, -NO_2, =O, =S, =N(R^{11}), -CN, C_{3-6} carbocycle and 3- to 6-membered heterocycle;

R^3 is selected from:

hydrogen, halogen, -OR^{11}, -SR^{11}, -N(R^{11})$_2$, -C(O)R^{11},-C(O)N(R^{11})$_2$, -N(R^{11})C(O)R^{11}, -C(O)OR^{11}, -OC(O)R^{11}, -S(O)R^{11}, -S(O)$_2R^{11}$, -S(O)$_2$N(R^{11})$_2$, -N(R^{11})S(O)$_2$ R^{11}, -S(O)(NR^{11})R^{11}, -S(NR^{11})$_2R^{11}$, -NO_2, and -CN; and

C_{1-5} alkyl, C_{2-5} alkenyl, C_{2-5} alkynyl, each of which is optionally substituted with one or more substituents independently selected from halogen, OR^{11}, -SR^{11}, -N(R^{11})$_2$, -C(O)R^{11}, -C(O)N(R^{11})$_2$,- N(R^{11})C(O)R^{11}, -C(O)OR^{11}, -OC(O)R^{11}, -S(O)R^{11}, -S(O)$_2R^{11}$, -S(O)$_2$N(R^{11})$_2$, -N(R^{11})S(O)$_2$ R^{11}, -S(O)(NR^{11})R^{11}, -S(NR^{11})$_2R^{11}$, -NO_2, =O, =S, =N(R^{11}), -CN, C_{3-6} carbocycle and 3- to 6-membered heterocycle;

$R^{3'}$ is selected from:

hydrogen, halogen, -OR^{11}, -SR^{11}, -N(R^{11})$_2$, -C(O)R^{11},-C(O)N(R^{11})$_2$, -N(R^{11})C(O)R^{11}, -C(O)OR^{11}, -OC(O)R^{11}, -S(O)R^{11}, -S(O)$_2R^{11}$, -S(O)$_2$N(R^{11})$_2$, -N(R^{11})S(O)$_2$ R^{11}, -S(O)(NR^{11})R^{11}, -S(NR^{11})$_2R^{11}$, -NO_2, and -CN; and

C_{1-5} alkyl, C_{2-5} alkenyl, C_{2-5} alkynyl, each of which is optionally substituted with one or more substituents independently selected from halogen, OR^{11}, -SR^{11}, -N(R^{11})$_2$, -C(O)R^{11}, -C(O)N(R^{11})$_2$,- N(R^{11})C(O)R^{11}, -C(O)OR^{11}, -OC(O)R^{11}, -S(O)R^{11}, -S(O)$_2R^{11}$, -S(O)$_2$N(R^{11})$_2$, -N(R^{11})S(O)$_2$ R^{11}, -S(O)(NR^{11})R^{11}, -S(NR^{11})$_2R^{11}$, -NO_2, =O, =S, =N(R^{11}), -CN, C_{3-6} carbocycle and 3- to 6-membered heterocycle;

L is absent or selected from methylene optionally substituted with one or more substituents selected from halogen, -OR^{21}, -SR^{21}, -N(R^{21})$_2$, -C(O)R^{21}, -C(O)N(R^{21})$_2$, -N(R^{21})C(O)R^{21}, -C(O)OR^{21}, -OC(O)R^{21}, -S(O)R^{21}, -S(O)$_2R^{21}$, -NO_2, and -CN;

Ring A is selected from an optionally substituted C_{3-10} carbocycle and optionally substituted 3- to 10-membered heterocycle wherein substituents on Ring A are independently selected at each occurrence from:

halogen, -OR^{31}, -SR^{31}, -N(R^{31})$_2$, -C(O)R^{31}, -C(O)N(R^{31})$_2$, N(R^{31})C(O)R^{31}, -C(O)OR^{31}, -OC(O)R^{31}, -S(O)R^{31}, -S(O)$_2R^{31}$, -NO_2, =O, -CN, and C_{1-5} haloalkyl; and

C_{1-5} alkyl C_{2-5} alkenyl, C_{2-5} alkynyl, each of which is optionally substituted with one or more substituents independently selected from halogen, $-OR^{31}$, $-SR^{31}$, $-N(R^{31})_2$, $-C(O)R^{31}$, $-C(O)N(R^{31})_2$, $-N(R^{31})C(O)R^{31}$, $-C(O)OR^{31}$, $-OC(O)R^{31}$, $-S(O)R^{31}$, $-S(O)_2R^{31}$, $-NO_2$, =O, and -CN;

R^4 is selected from hydrogen, C_{1-5} alkyl, and C_{3-6} carbocycle wherein C_{1-5} alkyl and C_{3-6} carbocycle are optionally substituted with one or more substituents independently selected from R^9;

R^5, R^6, and R^7 are each independently selected from hydrogen, optionally substituted C_{1-6} alkyl, optionally substituted C_{3-12} carbocycle, and optionally substituted 3- to 12-membered heterocycle; or

R^5 and R^6 come together to form an optionally substituted 5- to 8-membered heterocycle, and R^7 is selected from hydrogen, optionally substituted C_{1-6} alkyl, optionally substituted C_{3-12} carbocycle and optionally substituted 3- to 12-membered heterocycle; or

R^6 and R^7 come together to form an optionally substituted 5- to 8-membered heterocycle, and R^5 is selected from hydrogen, optionally substituted C_{1-6} alkyl, optionally substituted C_{3-12} carbocycle and optionally substituted 3- to 12-membered heterocycle;

wherein the substituents on R^5, R^6, and R^7 or rings formed therefrom are independently selected at each occurrence from:

halogen, $-OR^{41}$, $-SR^{41}$, $-N(R^{41})_2$, $-C(O)R^{41}$,$-C(O)N(R^{41})_2$,$-N(R^{41})C(O)R^{41}$, $-N(R^{41})C(O)OR^{41}$, $-C(O)OR^{41}$, $-OC(O)R^{41}$, $-S(O)R^{41}$, $-S(O)_2R^{41}$, $-S(O)_2N(R^{41})_2$, $-N(R^{41})S(O)_2R^{41}$, $-S(O)(NR^{41})R^{41}$, $-S(NR^{41})_2R^{41}$, $-NO_2$, =O, =S, $=N(R^{41})$, and -CN; and

C_{1-5} alkyl, C_{2-5} alkenyl, C_{2-5} alkynyl, each of which is optionally substituted with one or more substituents independently selected from halogen, $-OR^{41}$, $-SR^{41}$, $-N(R^{41})_2$, $-C(O)R^{41}$, $-C(O)N(R^{41})_2$, $-N(R^{41})C(O)R^{41}$, $-N(R^{41})C(O)OR^{41}$, $-C(O)OR^{41}$, $-OC(O)R^{41}$, $-S(O)R^{41}$, $-S(O)_2R^{41}$, $-S(O)_2N(R^{41})_2$, $-N(R^{41})S(O)_2R^{41}$, $-S(O)(NR^{41})R^{41}$, $-S(NR^{41})_2R^{41}$, $-NO_2$, =O, =S, $=N(R^{41})$, -CN, C_{3-12} carbocycle and 3- to 12-membered heterocycle;

C_{3-12} carbocycle and 3- to 12-membered heterocycle each of which is optionally substituted with one or more substituents independently selected from halogen, $-OR^{41}$, $-SR^{41}$, $-N(R^{41})_2$, $-C(O)R^{41}$, $-C(O)N(R^{41})_2$, $-N(R^{41})C(O)R^{41}$, $-N(R^{41})C(O)OR^{41}$, $-C(O)OR^{41}$, $-OC(O)R^{41}$, $-S(O)R^{41}$, $-S(O)_2R^{41}$, $-S(O)_2N(R^{41})_2$, $-N(R^{41})S(O)_2R^{41}$, $-S(O)(NR^{41})R^{41}$, -

$S(NR^{41})_2R^{41}$, $-NO_2$, =O, =S, $=N(R^{41})$, -CN, C_{1-6} alkyl, C_{1-6} haloalkyl, C_{2-6} alkenyl, C_{2-6} alkynyl, C_{3-12} carbocycle and 3- to 12-membered heterocycle;

each R^8 is independently selected from:

hydrogen, halogen, $-OR^{51}$, $-SR^{51}$, $-N(R^{51})_2$, $-NO_2$, and -CN; and

C_{1-5} alkyl optionally substituted with one or more substituents independently selected from halogen, $-OR^{51}$, $-SR^{51}$, $-N(R^{51})_2$, $-NO_2$, and -CN;

each R^9 is independently selected from:

halogen, $-OR^{61}$, $-SR^{61}$, $-N(R^{61})_2$, $-NO_2$, and -CN; and

C_{1-5} alkyl optionally substituted with one or more substituents independently selected from halogen, $-OR^{61}$, $-SR^{61}$, $-N(R^{61})_2$, $-NO_2$, and -CN;

each R^{11}, R^{21}, R^{31}, R^{41}, R^{51}, and R^{61} is independently selected from: hydrogen; and C_{1-5} alkyl, C_{2-5} alkenyl, C_{2-5} alkynyl, C_{3-8} carbocycle, and 3- to 8-membered heterocycle, each of which is optionally substituted with one or more substituents independently selected from halogen, -OH, -CN, $-NO_2$, $-NH_2$, =O, =S, C_{1-5} alkyl, $-C_{1-5}$ haloalkyl, and $-O-C_{1-5}$ alkyl; and

z is selected from 0-3.

2. The compound or salt of claim 1, wherein X^1 is selected from C(H) and N.

3. The compound or salt of claim 1 or 2, wherein X^2 is selected from O and $N(R^4)$.

4. The compound or salt of any one of claims 1 to 3, wherein X^3 is selected from C(H) and N.

5. The compound or salt of any one of claims 1 to 4, wherein each R^1 is independently selected from halogen, $-OR^{11}$, $-SR^{11}$, $-N(R^{11})_2$, $-C(O)N(R^{11})_2$, $N(R^{11})C(O)R^{11}$, $-C(O)OR^{11}$, $-OC(O)R^{11}$,-CN and C_{1-5} alkyl optionally substituted with one or more substituents independently selected from halogen, $-OR^{11}$, and -CN.

6. The compound or salt of any one of claims 1 to 5, wherein z is 1.

7. The compound or salt of any one of claims 1 to 6, wherein R^2 is hydrogen.

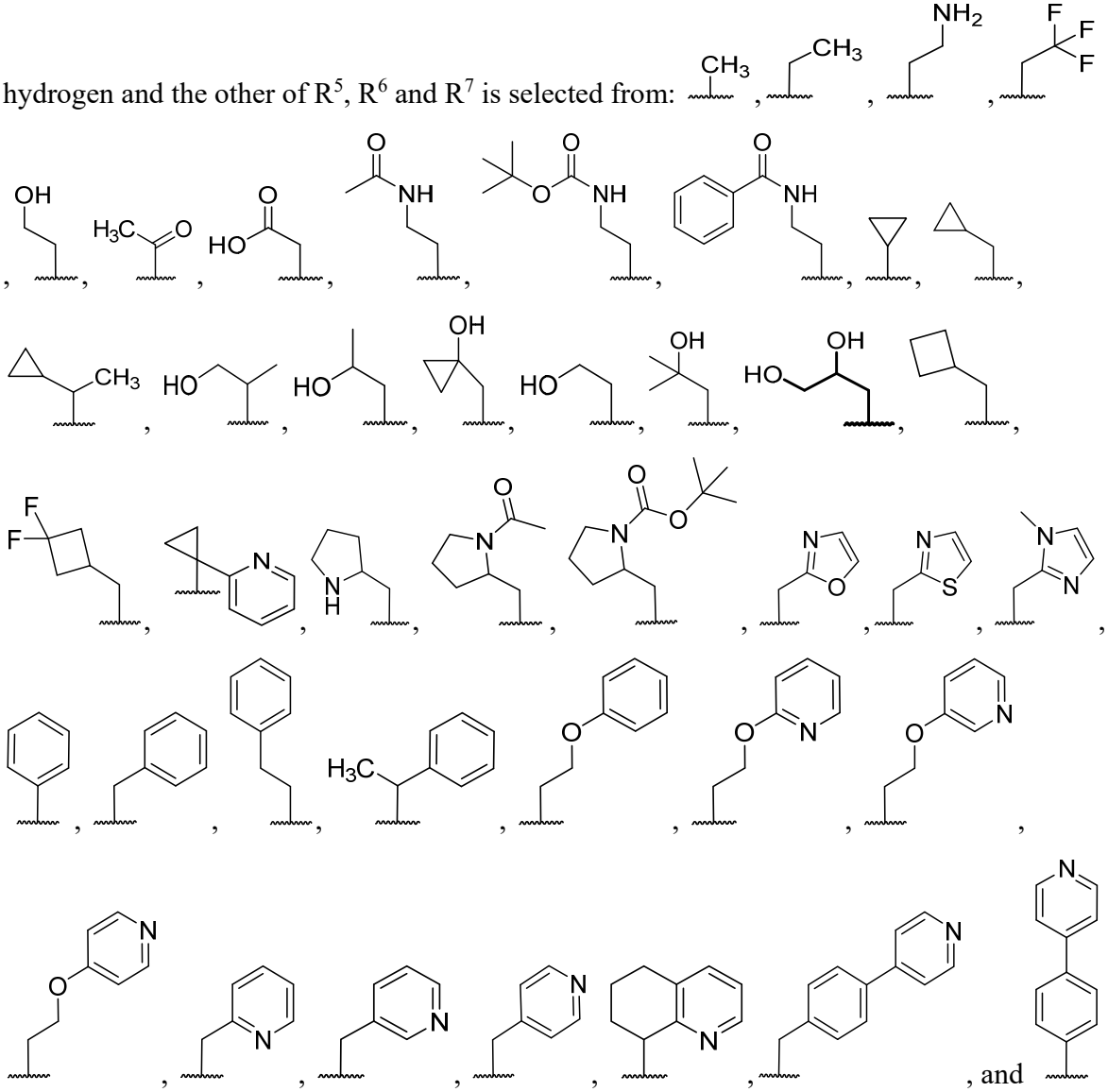
8. The compound or salt of any one of claims 1 to 7, wherein L is absent or methylene.

9. The compound or salt of any one of claims 1 to 8, wherein Ring A is selected from an optionally substituted aryl and optionally substituted 6-membered heteroaryl wherein substituents on Ring A are independently selected at each occurrence from: halogen, $-OR^{31}$, $-N(R^{31})_2$, $-C(O)R^{31}$, $-C(O)N(R^{31})_2$, $N(R^{31})C(O)R^{31}$, $-C(O)OR^{31}$, $-OC(O)R^{31}$, -CN, and C_{1-5} haloalkyl; and C_{1-5} alkyl optionally substituted with one or more substituents independently selected from halogen, $-OR^{31}$, =O, and -CN.

10. The compound or salt of any one of claims 1 to 9, wherein Y is N.

11. The compound or salt of any one of claims 1 to 10, wherein R^5, R^6, and R^7 are each independently selected from hydrogen, optionally substituted C_{1-6} alkyl, optionally substituted C_{3-12} carbocycle and optionally substituted 3- to 12-membered heterocycle, wherein substituents on C_{1-6} alkyl, C_{3-12} carbocycle and 3- to 12-membered heterocycle are independently selected at each occurrence from: halogen, $-OR^{41}$, $-N(R^{41})_2$, $-C(O)R^{41}$, $-C(O)N(R^{41})_2$, $-N(R^{41})C(O)R^{41}$, $-N(R^{41})C(O)OR^{41}$, $-C(O)OR^{41}$, $-OC(O)R^{41}$, =O, and -CN; and C_{1-5} alkyl optionally substituted with one or more substituents independently selected from halogen, $-OR^{41}$, $-N(R^{41})_2$, =O, and -CN; and phenyl or 6-membered heteroaryl, each of which is optionally substituted with one or more substituents independently selected from halogen, $-OR^{41}$, $-N(R^{41})_2$, =O, =S, -CN, C_{1-6} alkyl, C_{1-6} haloalkyl, C_{2-6} alkenyl, C_{2-6} alkynyl, phenyl and 6-membered heteroaryl.

12. The compound or salt of any one of claims 1 to 11, wherein two of R^5, R^6 and R^7 are hydrogen and the other of R^5, R^6 and R^7 is selected from hydrogen, optionally substituted C_{1-6} alkyl, optionally substituted C_{3-12} carbocycle and optionally substituted 3- to 12-membered heterocycle.

13. The compound or salt of any one of claims 1 to 12, wherein two of R^5, R^6 and R^7 are hydrogen and the other of R^5, R^6 and R^7 is selected from: .

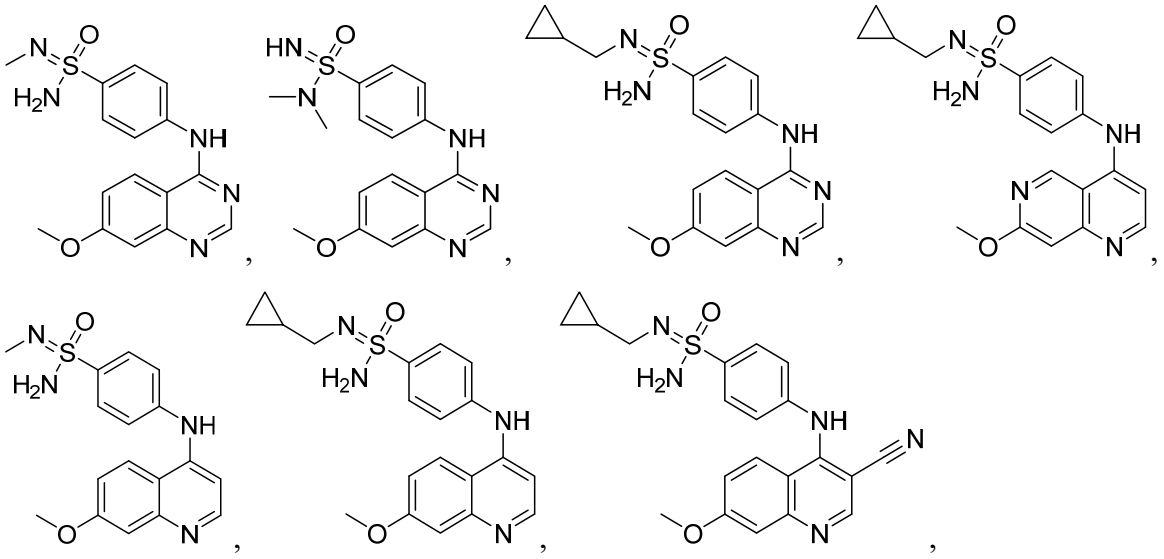
14. The compound or salt of any one of claims 1 to 13, wherein R^5 and R^6 are each hydrogen, and R^7 is selected from optionally substituted C_{1-4} alkyl, optionally substituted C_{3-10} carbocycle and optionally substituted 3- to 10-membered heterocycle; or
R^6 and R^7 are each hydrogen, and R^5 is selected from optionally substituted C_{1-4} alkyl, optionally substituted C_{3-10} carbocycle and optionally substituted 3- to 10-membered heterocycle.

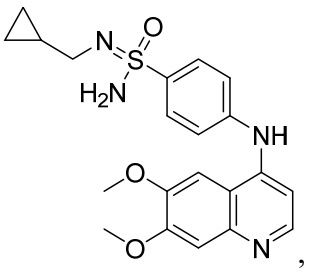
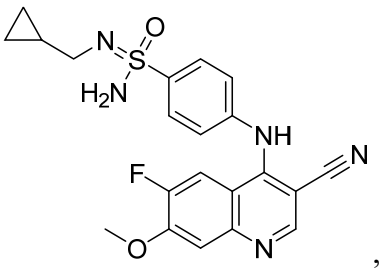
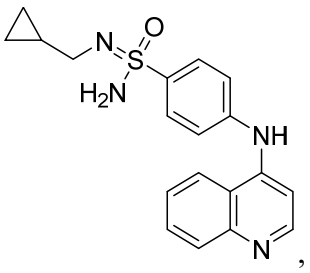
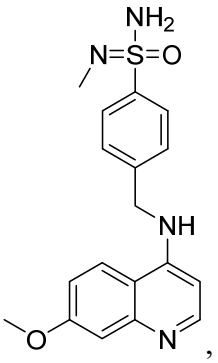
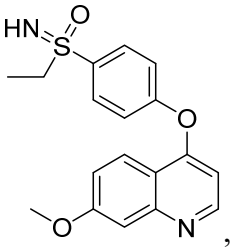
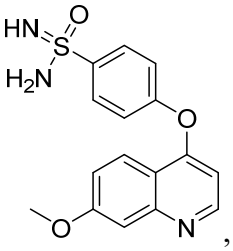
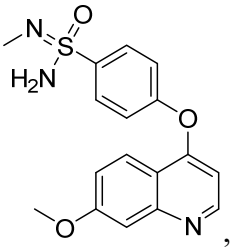
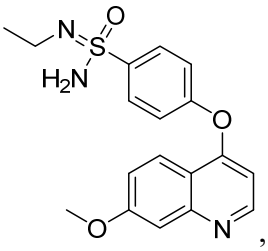
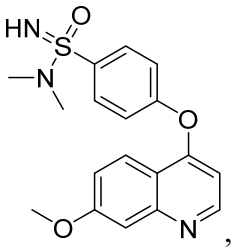
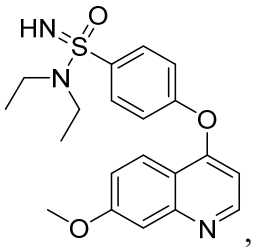
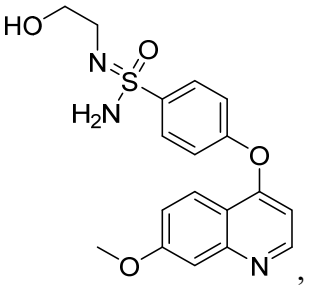
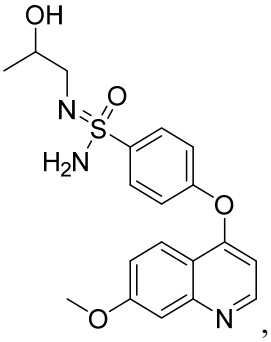
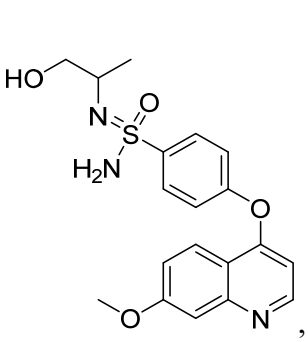
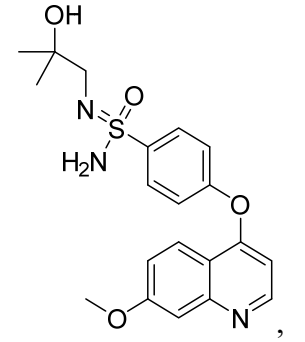
15. The compound or salt of any one of claims 1 to 12, wherein R^5, R^6, and R^7 are each hydrogen.

16. The compound or salt of any one of claims 1 to 11, wherein one of R^5, R^6 and R^7 is hydrogen and the other two of R^5, R^6 and R^7 are independently selected from optionally substituted C_{1-6} alkyl, optionally substituted C_{3-12} carbocycle and optionally substituted 3- to 12-membered heterocycle.

17. The compound or salt of any one of claims 1 to 10, wherein R^6 and R^7 come together to form an optionally substituted 5- to 6-membered saturated heterocycle, and R^5 is hydrogen; or R^5 and R^6 come together to form an optionally substituted 5- to 8-membered heterocycle, and R^7 is selected from hydrogen, optionally substituted C_{1-6} alkyl, optionally substituted C_{3-12} carbocycle and optionally substituted 3- to 12-membered heterocycle.

18. The compound or salt of any one claims 1 to 17, wherein Formula (I) is selected from:




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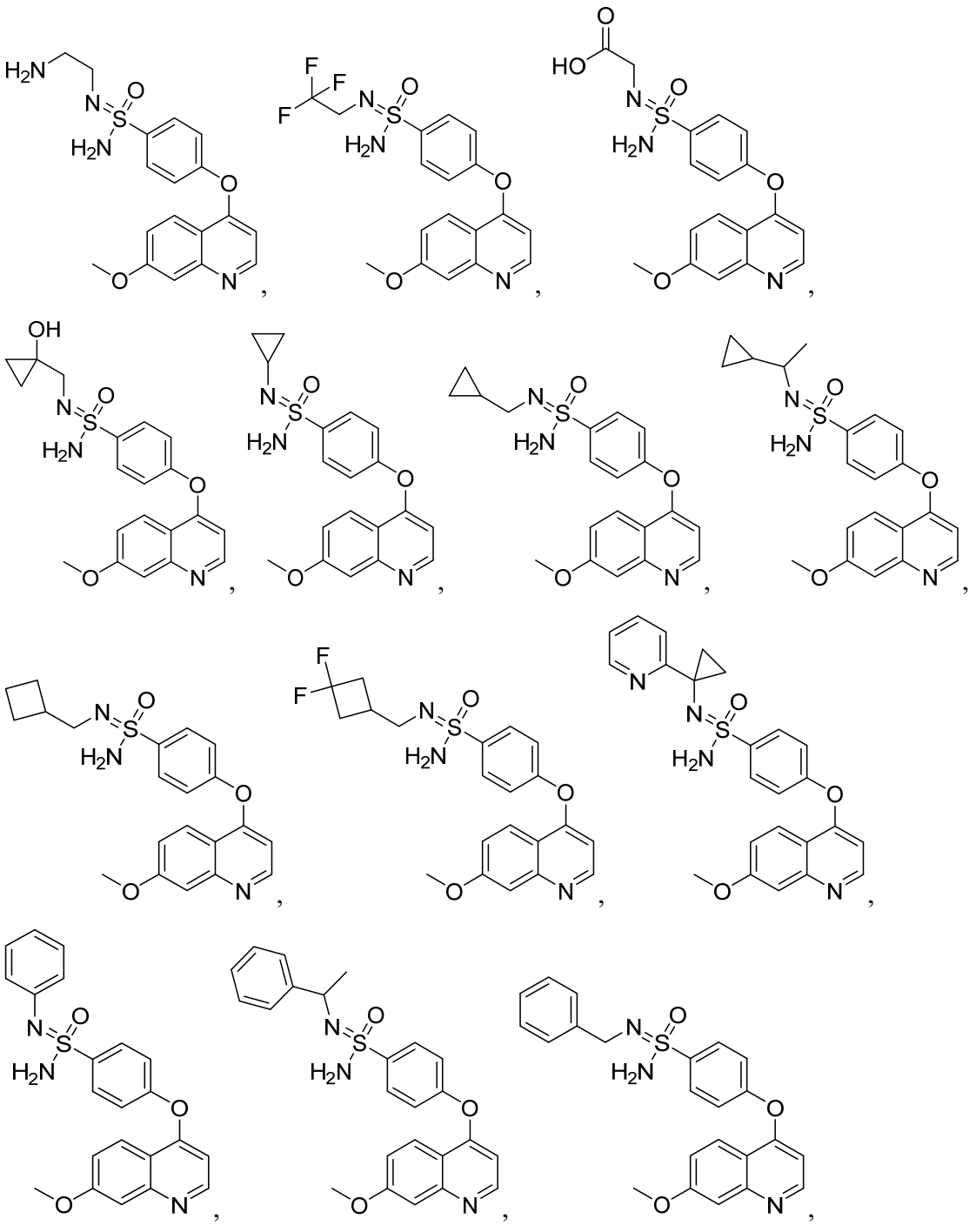
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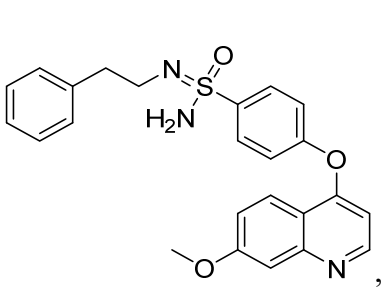
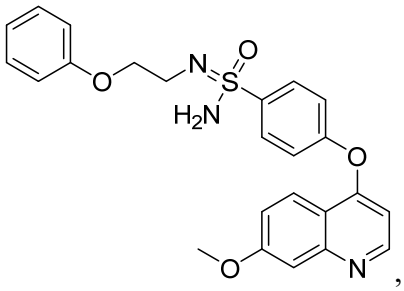
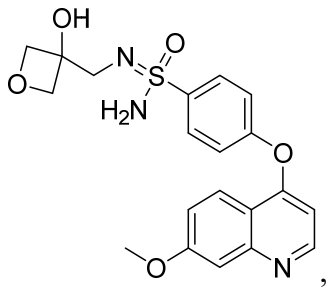
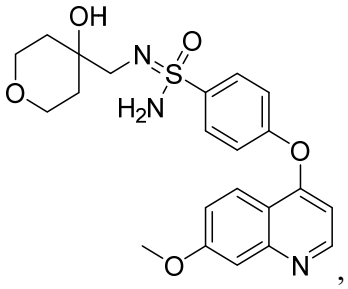
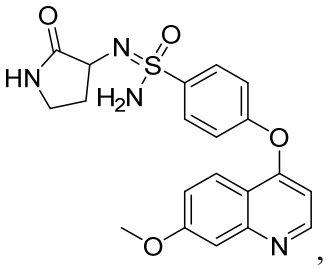
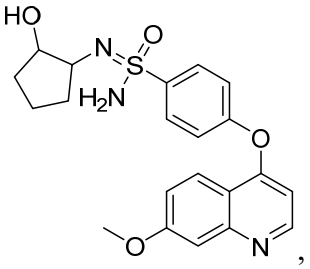
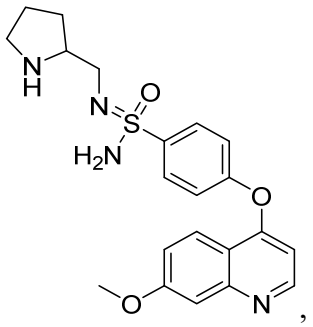
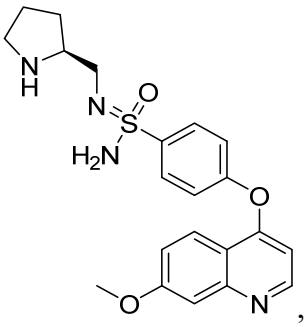
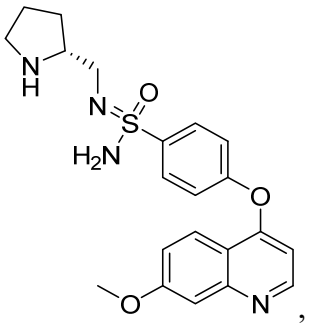
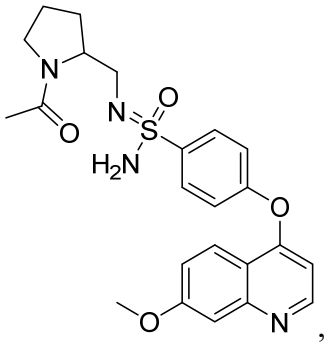
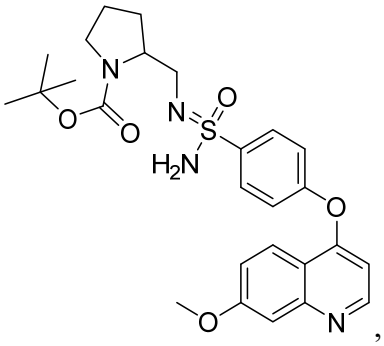
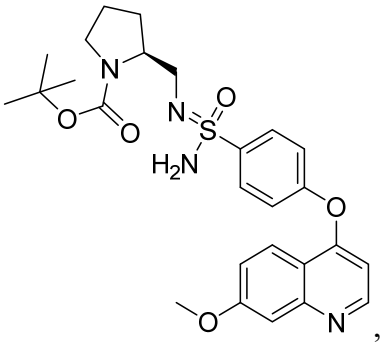
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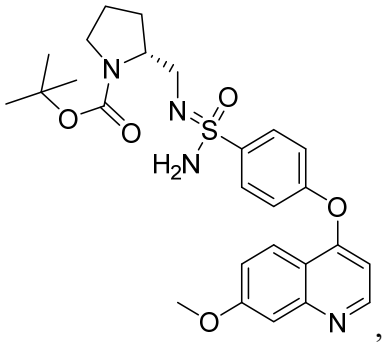
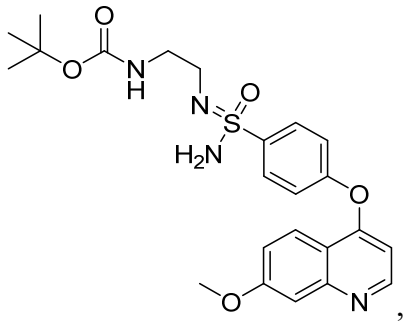
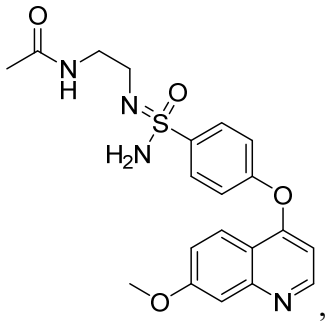
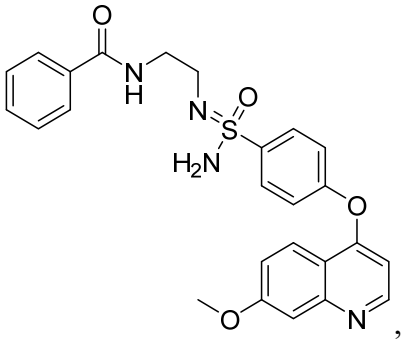
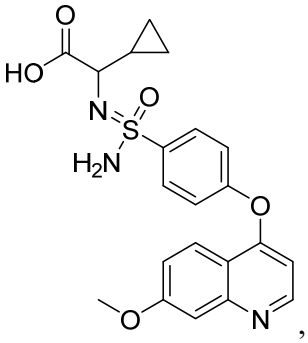
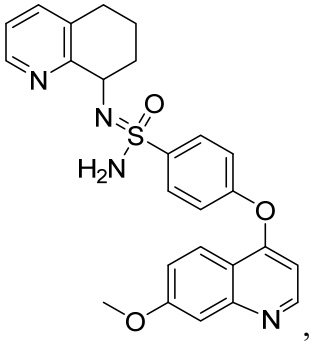
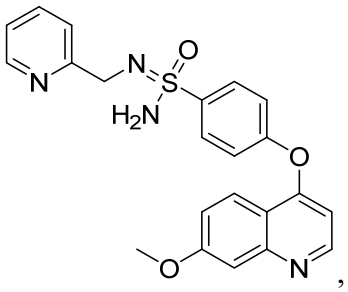
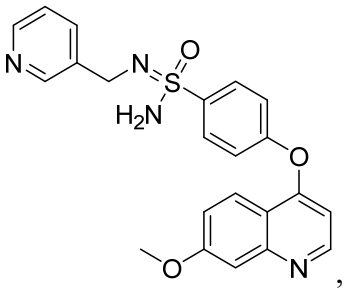
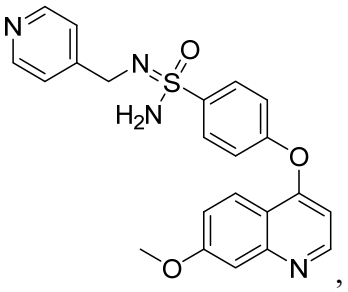
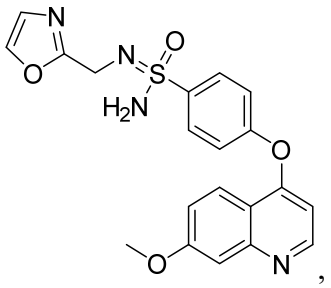
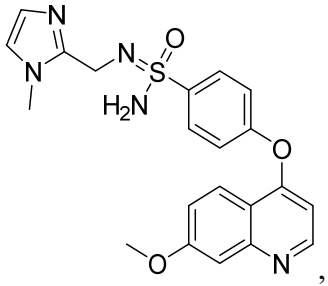
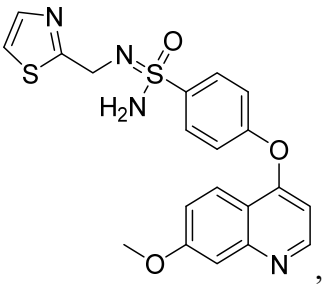
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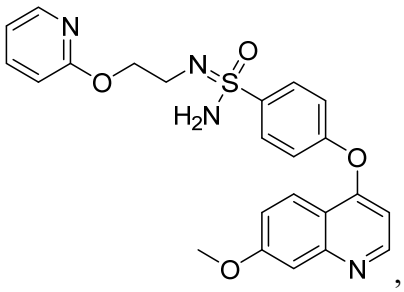
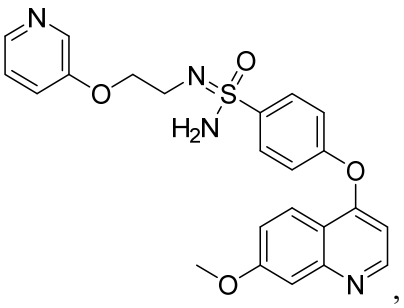
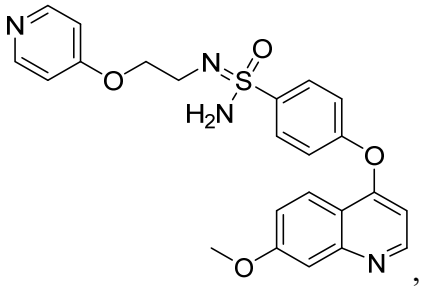
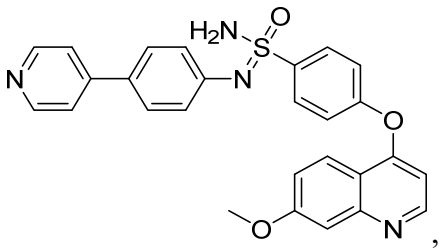
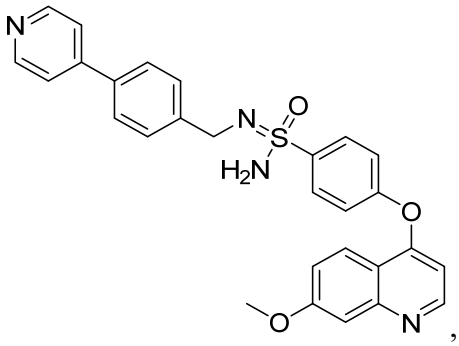
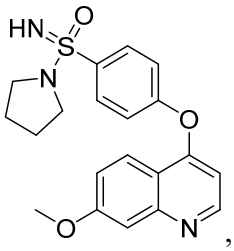
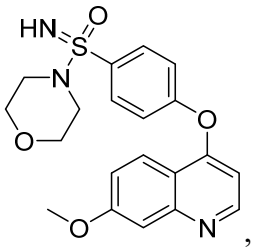
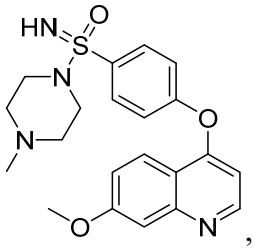
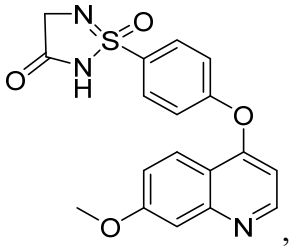
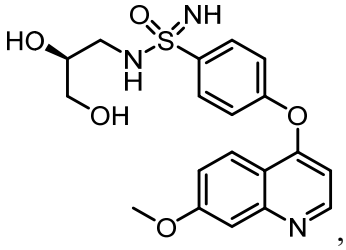
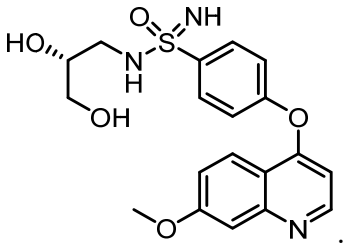
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19. A pharmaceutical composition comprising the compound or salt of any one of claims 1 to 18 and a pharmaceutically acceptable excipient.

20. Use of a compound of any one of claims 1 to 18 or the pharmaceutical composition of claim 19 in the manufacture of a medicament for inhibiting ENPP1 in a subject in need thereof.

21. Use of a compound of any one of claims 1 to 18 or the pharmaceutical composition of claim 19 in the manufacture of a medicament for activating STING activity in a subject in need thereof.