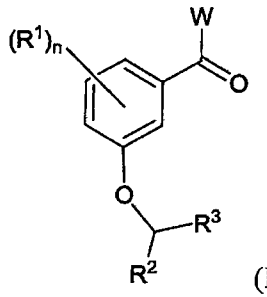
CLAIMS

1. A compound of formula (I):



(I)

wherein:

each R^1 is independently selected from hydrogen, halo, cyano, nitro, $(C_1$-$C_6)$alkyl, $(C_1$-$C_6)$alkoxy, $(C_1$-$C_6)$alkanoyl, $(C_1$-$C_6)$alkoxycarbonyl, $(C_1$-$C_6)$alkanoyloxy, aryl, heteroaryl, heterocycle, and NR^eR^f, wherein each $(C_1$-$C_6)$alkyl , $(C_1$-$C_6)$alkoxy, $(C_1$-$C_6)$alkanoyl, $(C_1$-$C_6)$alkoxycarbonyl, $(C_1$-$C_6)$alkanoyloxy, aryl, heteroaryl, and heterocycle is optionally substituted with one or more groups independently selected from halo, cyano, nitro, NR^eR^f, $-CR^g(=N)N(R^g)_2$, $-NR^gC(=N)$-$N(R^g)_2$, $-NR^g$-$C(=NR^g)R^g$, $(C_1$-$C_3)$alkyl , $(C_1$-$C_3)$alkoxy, $(C_1$-$C_3)$alkanoyl, $(C_1$-$C_3)$alkoxycarbonyl, $(C_1$-$C_3)$alkanoyloxy, aryl, heteroaryl, and heterocycle;

R^2 is H or $(C_1$-$C_6)$alkyl that is optionally substituted with one or more groups independently selected from $-OR^k$, halo, NR^eR^f, NR^eR^f, $-CR^g(=N)N(R^g)_2$, $-NR^gC(=N)$-$N(R^g)_2$, and $-NR^g$-$C(=NR^g)R^g$;

R^3 is aryl or heteroaryl, which aryl or heteroaryl is optionally substituted with one or more groups independently selected from R^h, halo, hydroxy, $-NR^eR^f$, $-CR^g(=N)N(R^g)_2$, $-NR^gC(=N)$-$N(R^g)_2$, $-NR^g$-$C(=NR^g)R^g$, $(C_1$-$C_6)$alkyl, and $(C_3$-$C_8)$cycloalkyl, wherein any $(C_1$-$C_6)$alkyl and $(C_3$-$C_8)$cycloalkyl is optionally substituted with one or more groups independently selected from halo, hydroxy, $-NR^eR^f$, $-CR^g(=N)N(R^g)_2$, $-NR^gC(=N)$-$N(R^g)_2$, $-NR^g$-$C(=NR^g)R^g$, and $(C_1$-$C_6)$alkyl that is optionally substituted with one or more groups independently selected from halo;

W is $-NHCOR^a$, $-N(COR^a)(COR^b)$, $-N=C(R^c)NR^aR^b$, $-NR^aCH_2OR^a$, $-NHC(=O)OR^a$, $-NHC(=O)NR^aR^b$, or $-N(R^a)SO_mR^d$;

each R^a is independently selected from H, aryl, heteroaryl, heterocycle, (C_3-C_8)cycloalkyl, (C_3-C_8)cycloalkyl(C_1-C_6)alkyl and (C_1-C_6)alkyl that is optionally substituted with one or more groups independently selected from hydroxy, halo, cyano, (C_1-C_6)alkoxycarbonyl, aryl, heteroaryl, -NR^eR^f, -CR^g(=N)$N(R^g)_2$, –NR^gC(=N)-$N(R^g)_2$, -NR^g-$C(=NR^g)R^g$ and heterocycle; wherein any aryl, heteroaryl, heterocycle, and (C_3-C_8)cycloalkyl(C_1-C_6)alkyl of R^a is optionally substituted with one or more groups independently selected from hydroxy, halo, cyano, trifluoromethoxy, (C_1-C_6)alkyl, (C_1-C_6)alkoxy, halo(C_1-C_6)alkyl, -NR^eR^f, -CR^g(=N)$N(R^g)_2$, –NR^gC(=N)-$N(R^g)_2$, -NR^g-$C(=NR^g)R^g$, and (C_1-C_6)alkoxycarbonyl;

each R^b is independently selected from H and (C_1-C_6)alkyl that is optionally substituted with one or more groups independently selected from hydroxy, halo, cyano, (C_1-C_6)alkoxycarbonyl, aryl, heteroaryl, -NR^eR^f, -CR^g(=N)$N(R^g)_2$, –NR^gC(=N)-$N(R^g)_2$, -NR^g-$C(=NR^g)R^g$, and heterocycle;

each R^c is independently selected from H and (C_1-C_6)alkyl that is optionally substituted with one or more groups independently selected from halo;

each R^d is independently selected from OH, -NH_2, -NR^eR^f, heterocycle, and (C_1-C_6)alkyl that is substituted with one or more groups independently selected from hydroxy, halo, cyano, (C_1-C_6)alkoxycarbonyl, aryl, heteroaryl, -NR^eR^f, -CH(=N)NH_2, –NHC(=N)-NH_2, -NH-C(=NH)R, and heterocycle;

each R^e is independently selected from H, aryl, heteroaryl, heterocycle, and (C_1-C_6)alkyl that is optionally substituted with one or more groups independently selected from hydroxy, halo, cyano, (C_1-C_6)alkoxycarbonyl, aryl, heteroaryl, and heterocycle; and each R^f is independently selected from H and (C_1-C_6)alkyl that is optionally substituted with one or more groups independently selected from hydroxyl, halo, cyano, (C_1-C_6)alkoxycarbonyl, aryl, heteroaryl, and heterocycle; or R^e and R^f together with the nitrogen to which they are attached form a aziridino, azetidino, morpholino, piperazino, pyrrolidino or piperidino;

each R^g is independently selected from H and (C_1-C_6)alkyl that is optionally substituted with one or more groups independently selected from halo;

each R^h is independently selected from aryl and heteroaryl, wherein any aryl and heteroaryl of R^h is optionally substituted with one or more groups independently selected from halo, hydroxy, -NR^eR^f, -CR^g(=N)$N(R^g)_2$, -NR^gC(=N)-$N(R^g)_2$, -NR^g-$C(=NR^g)R^g$ and (C_1-

C_6)alkyl that is optionally substituted with one or more groups independently selected from hydroxy, halo, $-NR^eR^f$, $-CR^g(=N)N(R^g)_2$, $-NR^gC(=N)-N(R^g)_2$, and $-NR^g-C(=NR^g)R^g$;

each R^k is independently selected from H or (C_1-C_6)alkyl that is optionally substituted with one or more groups independently selected from hydroxy, halo, oxo, carboxy, (C_1-C_6)alkoxy, (C_1-C_6)alkoxycarbonyl, and (C_1-C_6)alkanoyloxy;

each aryl is independently a single aromatic ring or a multiple condensed ring system having 9 to 20 carbon atoms in which at least one ring is aromatic;

each cycloalkyl is independently a saturated or partially unsaturated carbocyclic ring system;

m is 0, 1, or 2; and

n is 1, 2, 3, or 4;

or a salt thereof.

2. The compound of claim 1 wherein:

each R^1 is independently selected from hydrogen, halo, cyano, nitro, (C_1-C_6)alkyl, (C_1-C_6)alkoxy, (C_1-C_6)alkanoyl, (C_1-C_6)alkoxycarbonyl, (C_1-C_6)alkanoyloxy, aryl, heteroaryl, heterocycle, and NR^eR^f, wherein each (C_1-C_6)alkyl , (C_1-C_6)alkoxy, (C_1-C_6)alkanoyl, (C_1-C_6)alkoxycarbonyl, (C_1-C_6)alkanoyloxy, aryl, heteroaryl, and heterocycle is optionally substituted with one or more groups independently selected from halo, cyano, nitro, $-NR^eR^f$, $-CR^g(=N)N(R^g)_2$, $-NR^gC(=N)-N(R^g)_2$, $-NR^g-C(=NR^g)R^g$, (C_1-C_3)alkyl , (C_1-C_3)alkoxy, (C_1-C_3)alkanoyl, (C_1-C_3)alkoxycarbonyl, (C_1-C_3)alkanoyloxy, aryl, heteroaryl, and heterocycle;

R^2 is H or (C_1-C_6)alkyl that is optionally substituted with one or more groups independently selected from hydroxy, $-NR^eR^f$, $-CR^g(=N)N(R^g)_2$, $-NR^gC(=N)-N(R^g)_2$, and $-NR^g-C(=NR^g)R^g$;

R^3 is aryl or heteroaryl, which aryl or heteroaryl is optionally substituted with one or more groups independently selected from R^h, halo, hydroxy, $-NR^eR^f$, $-CR^g(=N)N(R^g)_2$, $-NR^gC(=N)-N(R^g)_2$, $-NR^g-C(=NR^g)R^g$ and (C_1-C_6)alkyl that is optionally substituted with one or more groups independently selected from hydroxy, $-NR^eR^f$, $-CR^g(=N)N(R^g)_2$, $-NR^gC(=N)-N(R^g)_2$, and $-NR^g-C(=NR^g)R^g$;

W is $-NHCOR^a$, $-N(COR^a)(COR^b)$, $-N=C(R^c)NR^aR^b$, $-NR^aCH_2OR^a$, or $-N(R^a)SO_mR^d$;

each R^a is independently selected from H, aryl, heteroaryl, heterocycle, (C_3-C_8)cycloalkyl, (C_3-C_8)cycloalkyl(C_1-C_6)alkyl and (C_1-C_6)alkyl that is optionally substituted with one or more groups independently selected from hydroxyl, halo, cyano, (C_1-C_6)alkoxycarbonyl, aryl, heteroaryl, -NR^eR^f, -CR^g(=N)$N(R^g)_2$, –NR^gC(=N)-$N(R^g)_2$, -NR^g-C(=NR^g)R^g and heterocycle; wherein any aryl, heteroaryl, heterocycle, and (C_3-C_8)cycloalkyl(C_1-C_6)alkyl of R^a is optionally substituted with one or more groups independently selected from hydroxy, halo, cyano, trifluoromethoxy, (C_1-C_6)alkyl, halo(C_1-C_6)alkyl, -NR^eR^f, -CR^g(=N)$N(R^g)_2$, –NR^gC(=N)-$N(R^g)_2$, -NR^g-C(=NR^g)R^g, and (C_1-C_6)alkoxycarbonyl;

each R^b is independently selected from H and (C_1-C_6)alkyl that is optionally substituted with one or more groups independently selected from hydroxyl, halo, cyano, (C_1-C_6)alkoxycarbonyl, aryl, heteroaryl, -NR^eR^f, -CR^g(=N)$N(R^g)_2$, –NR^gC(=N)-$N(R^g)_2$, -NR^g-C(=NR^g)R^g, and heterocycle;

each R^c is independently selected from H and (C_1-C_6)alkyl;

each R^d is independently selected from OH, -NH_2, -NR^eR^f, heterocycle, and (C_1-C_6)alkyl that is substituted with one or more groups independently selected from hydroxy, halo, cyano, (C_1-C_6)alkoxycarbonyl, aryl, heteroaryl, -NR^eR^f, -CH(=N)NH_2, –NHC(=N)-NH_2, -NH-C(=NH)R, and heterocycle;

each R^e is independently selected from H, aryl, heteroaryl, heterocycle, and (C_1-C_6)alkyl that is optionally substituted with one or more groups independently selected from hydroxyl, halo, cyano, (C_1-C_6)alkoxycarbonyl, aryl, heteroaryl, and heterocycle; and each R^f is independently selected from H and (C_1-C_6)alkyl that is optionally substituted with one or more groups independently selected from hydroxyl, halo, cyano, (C_1-C_6)alkoxycarbonyl, aryl, heteroaryl, and heterocycle; or R^e and R^f together with the nitrogen to which they are attached form a aziridino, azetidino, morpholino, piperazino, pyrrolidino or piperidino;

each R^g is independently selected from H and (C_1-C_6)alkyl;

each R^h is independently selected from aryl and heteroaryl, wherein any aryl and heteroaryl of R^h is optionally substituted with one or more groups independently selected from halo, hydroxy, -NR^eR^f, -CR^g(=N)$N(R^g)_2$, -NR^gC(=N)-$N(R^g)_2$, -NR^g-C(=NR^g)R^g and (C_1-C_6)alkyl that is optionally substituted with one or more groups independently selected from hydroxy, -NR^eR^f, -CR^g(=N)$N(R^g)_2$, –NR^gC(=N)-$N(R^g)_2$, and -NR^g-C(=NR^g)R^g;

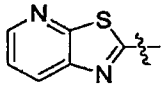
m is 0, 1, or 2; and

n is 1, 2, 3, or 4;

or a salt thereof.

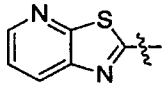
3. The compound of any one of claims 1 or 2 wherein R^3 is heteroaryl, which is optionally substituted with one or more groups independently selected from R^h, halo, hydroxy, $-NR^eR^f$, $-CR^g(=N)N(R^g)_2$, $-NR^gC(=N)-N(R^g)_2$, $-NR^g-C(=NR^g)R^g$, (C_1-C_6)alkyl, and (C_3-C_8)cycloalkyl, wherein any (C_1-C_6)alkyl and (C_3-C_8)cycloalkyl is optionally substituted with one or more groups independently selected from halo, hydroxy, $-NR^eR^f$, $-CR^g(=N)N(R^g)_2$, $-NR^gC(=N)-N(R^g)_2$, $-NR^g-C(=NR^g)R^g$, and (C_1-C_6)alkyl that is optionally substituted with one or more groups independently selected from halo.

4. The compound of any one of claims 1or 2 wherein R^3 is:



which is optionally substituted with one or more groups independently selected from R^h, halo, hydroxy, $-NR^eR^f$, $-CR^g(=N)N(R^g)_2$, $-NR^gC(=N)-N(R^g)_2$, $-NR^g-C(=NR^g)R^g$, (C_1-C_6)alkyl, and (C_3-C_8)cycloalkyl, wherein any (C_1-C_6)alkyl and (C_3-C_8)cycloalkyl is optionally substituted with one or more groups independently selected from halo, hydroxy, $-NR^eR^f$, $-CR^g(=N)N(R^g)_2$, $-NR^gC(=N)-N(R^g)_2$, $-NR^g-C(=NR^g)R^g$, and (C_1-C_6)alkyl that is optionally substituted with one or more groups independently selected from halo.

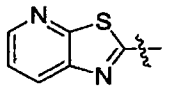
5. The compound of any one of claims 1 or 2 wherein R^3 is:



which is optionally substituted with one or more groups independently selected from (C_1-C_6)alkyl, and (C_3-C_8)cycloalkyl, wherein any (C_1-C_6)alkyl and (C_3-C_8)cycloalkyl is optionally

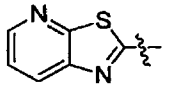
substituted with one or more groups independently selected from halo, hydroxy, and $(C_1\text{-}C_6)$alkyl that is optionally substituted with one or more groups independently selected from halo.

6. The compound of any one of claims 1 or 2 wherein R^3 is:



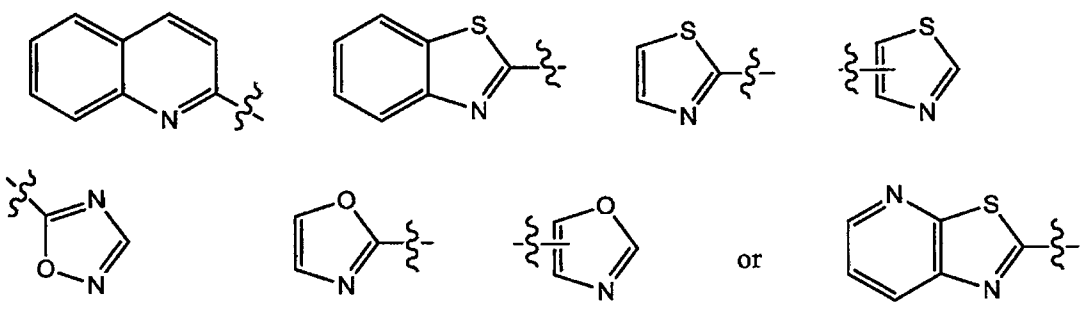
which is substituted with one or more groups independently selected from $(C_1\text{-}C_6)$alkyl, and $(C_3\text{-}C_8)$cycloalkyl, wherein any $(C_1\text{-}C_6)$alkyl and $(C_3\text{-}C_8)$cycloalkyl is optionally substituted with one or more groups independently selected from halo and $(C_1\text{-}C_6)$alkyl that is optionally substituted with one or more groups independently selected from halo.

7. The compound of any one of claims 1 or 2 wherein R^3 is:



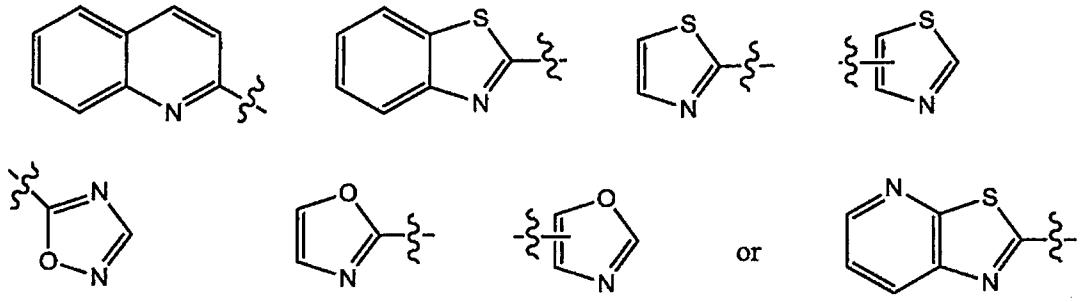
which is substituted with one or more groups independently selected from trifluoromethyl, pentafluoroethyl, or 1-(trifluoromethyl)cyclopropyl.

8. The compound of any one of claims 1 or 2 wherein R^3 is:



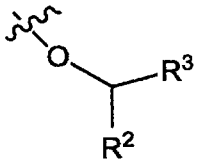
which is optionally substituted with one or more groups independently selected from R^h, halo, hydroxy, $-NR^eR^f$, $-CR^g(=N)N(R^g)_2$, $-NR^gC(=N)-N(R^g)_2$, $-NR^g-C(=NR^g)R^g$, (C_1-C_6)alkyl, and (C_3-C_8)cycloalkyl, wherein any (C_1-C_6)alkyl and (C_3-C_8)cycloalkyl is optionally substituted with one or more groups independently selected from halo, hydroxy, $-NR^eR^f$, $-CR^g(=N)N(R^g)_2$, $-NR^gC(=N)-N(R^g)_2$, $-NR^g-C(=NR^g)R^g$, and (C_1-C_6)alkyl that is optionally substituted with one or more groups independently selected from halo.

9. The compound of any one of claims 1 or 2 wherein R^3 is:

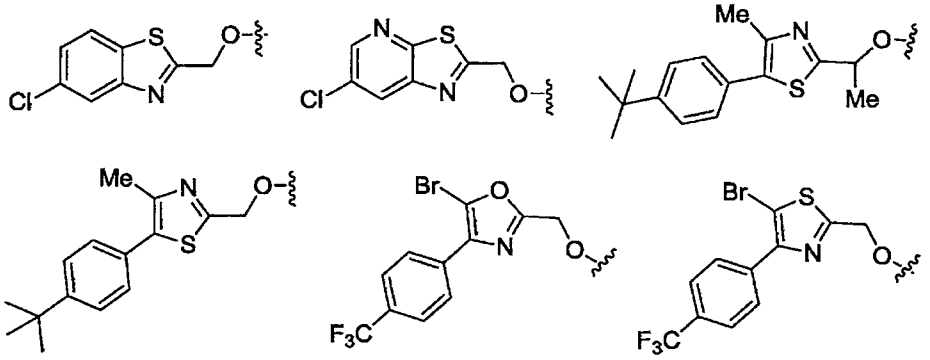


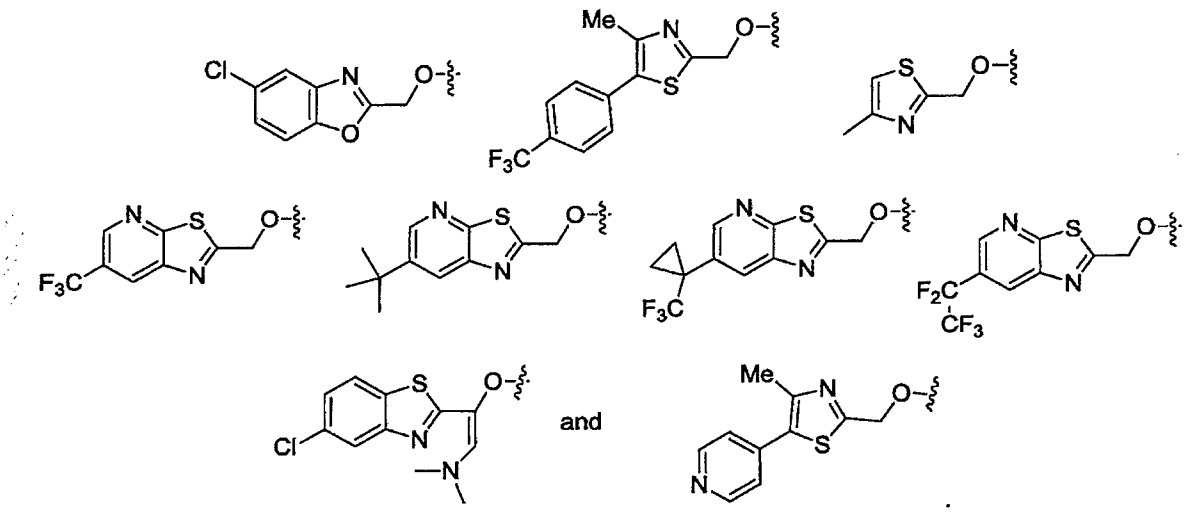
which is optionally substituted with one or more groups independently selected from trifluoromethyl, pentafluoroethyl, or 1-(trifluoromethyl)cyclopropyl.

10. The compound of any one of claims 1 or 2 wherein:

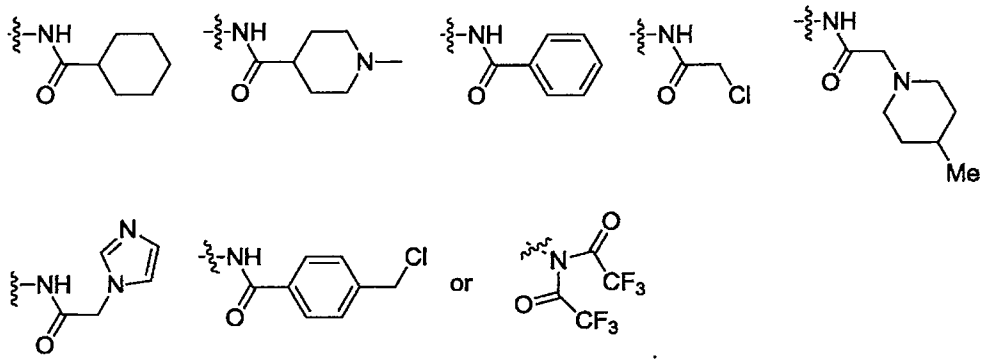


is selected from:

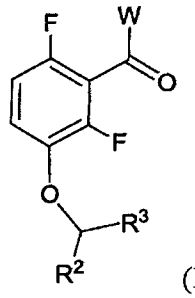




11. The compound of any one of claims 1-2 wherein W is –NHC(=O)H, –NHC(=O)CH_3, -NHC(=O)CH_2CH_3, -NHC(=O)$CH_2CH_2CH_3$, -N=NCH-N$(CH_3)_2$, -N=NC(CH_3)-N$(CH_3)_2$,



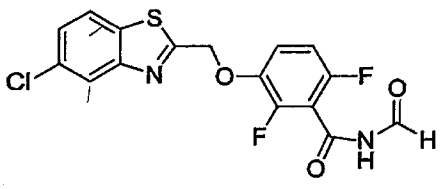
12. The compound of any one of claims 1 or 2 which is a compound of formula (Ia):

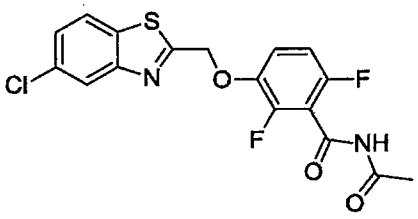


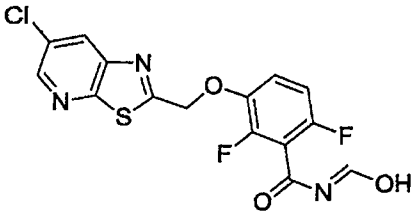
(Ia)

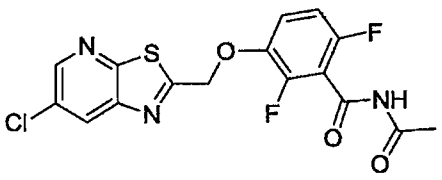
or a salt thereof.

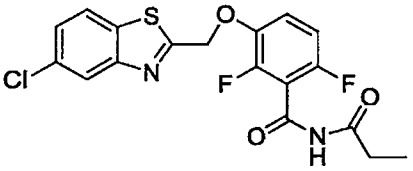
13. A compound of claim 1 which is selected from:

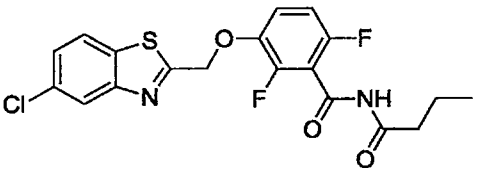


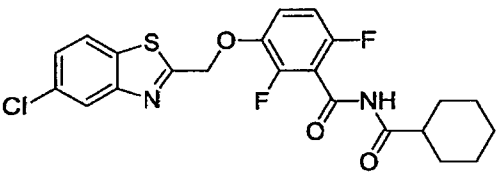


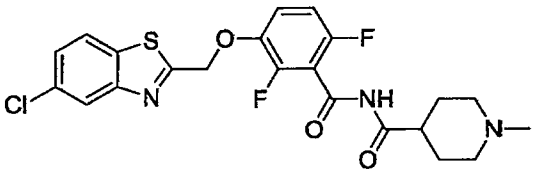


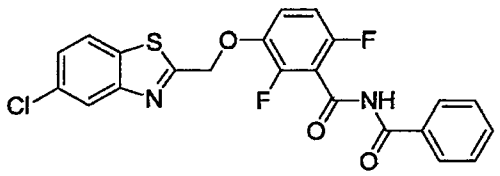


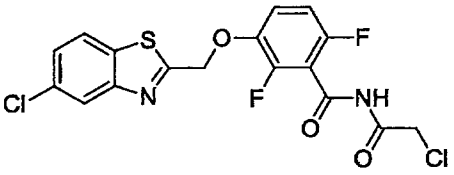


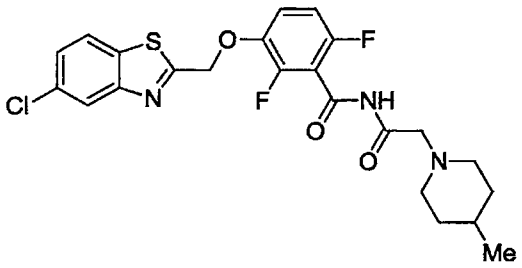


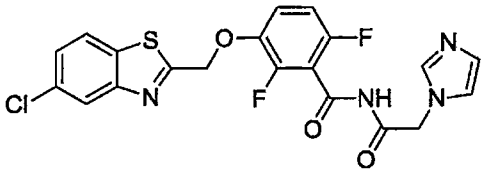


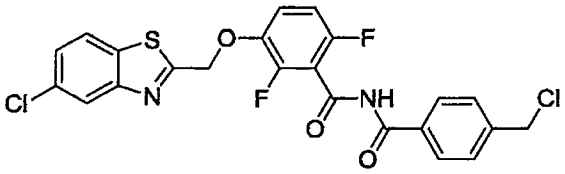


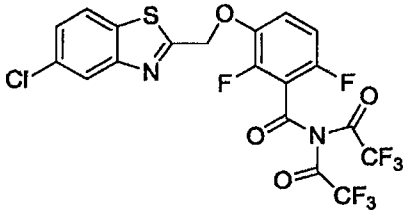


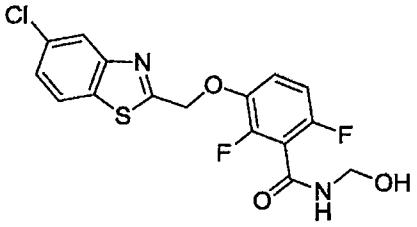


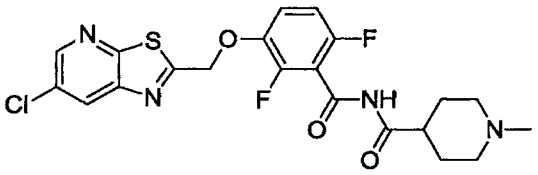


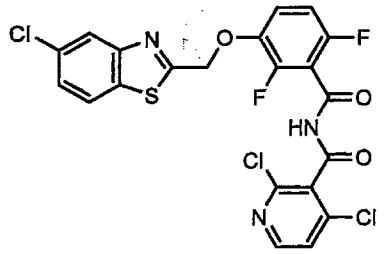


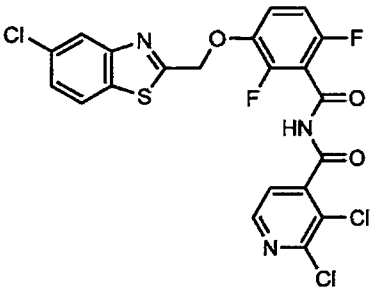


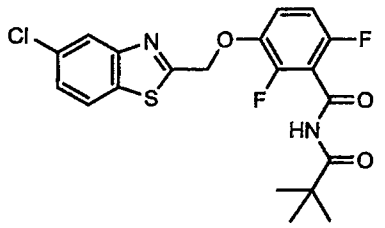


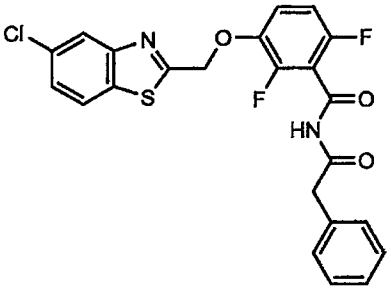


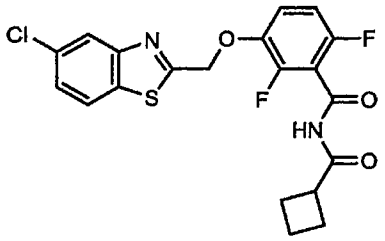


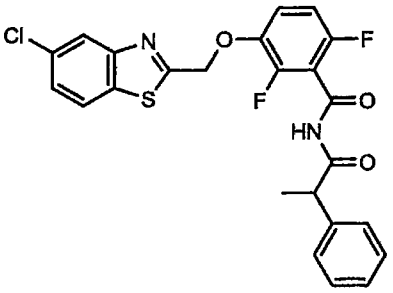


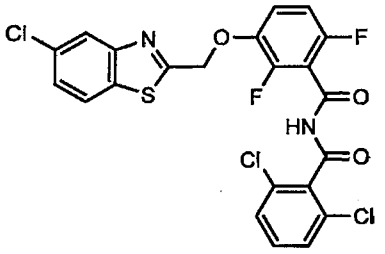


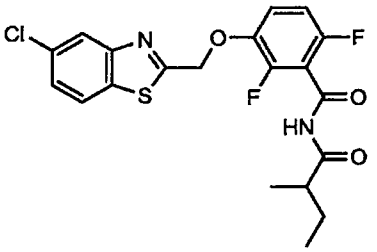


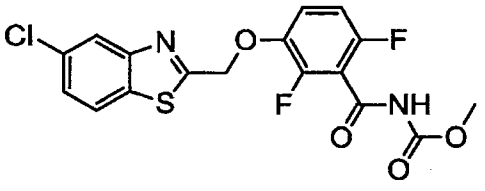


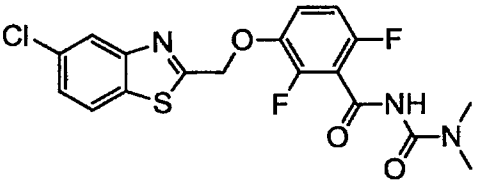


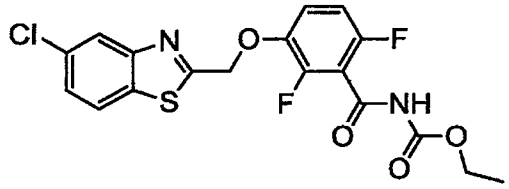


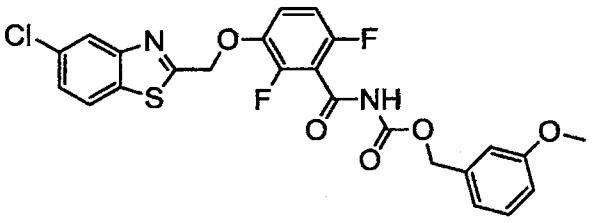


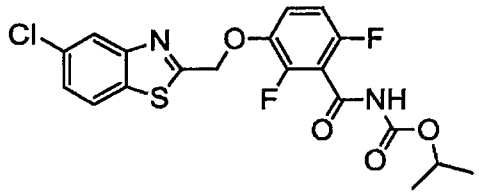


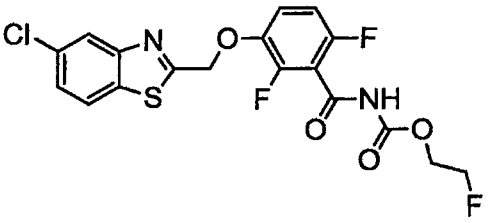


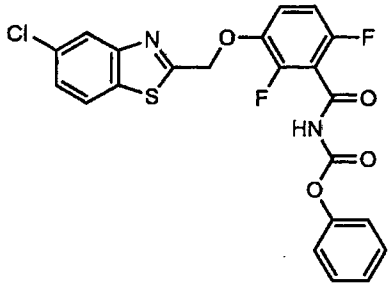


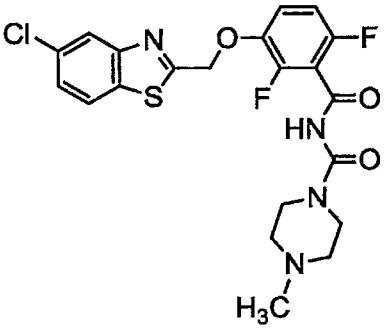


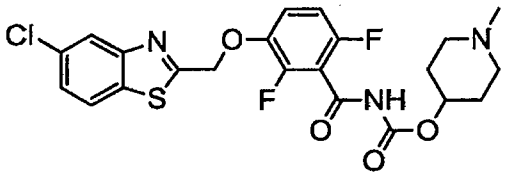


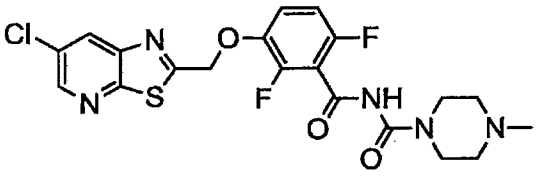


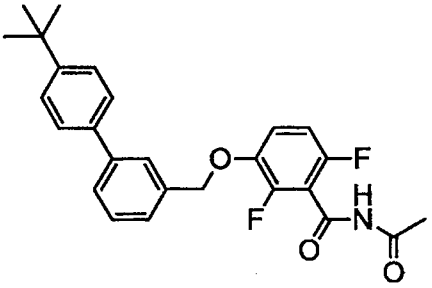


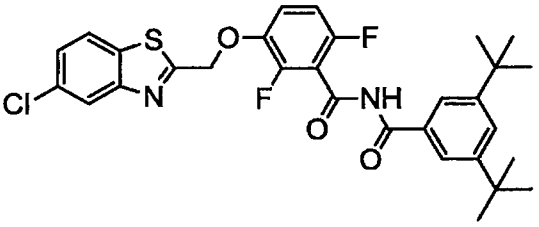


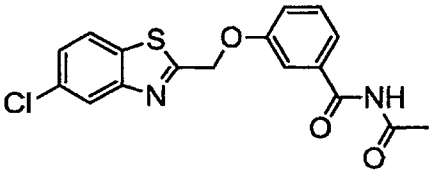


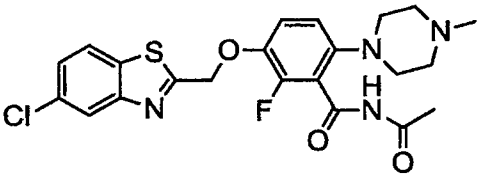


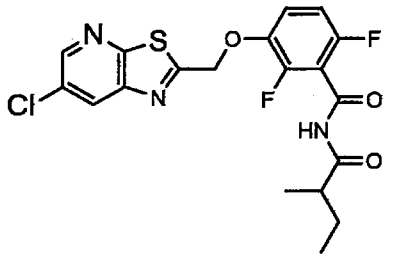


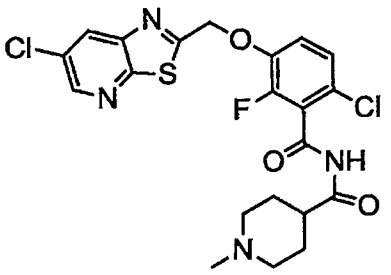


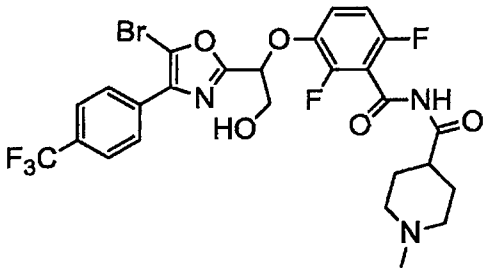


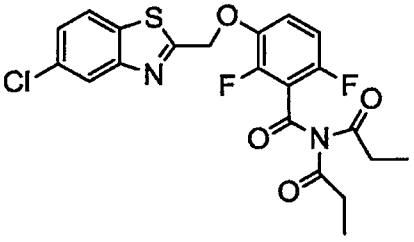


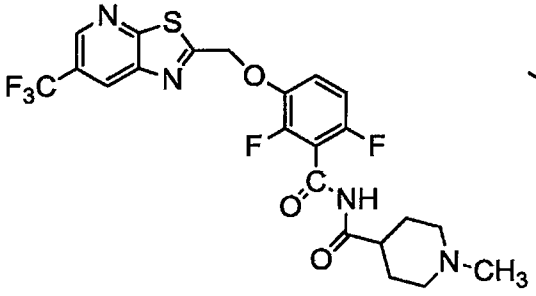


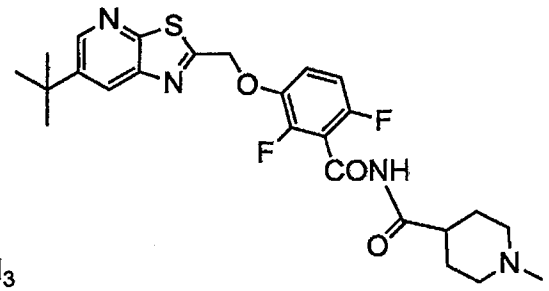


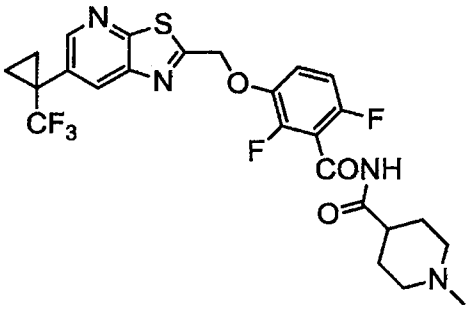




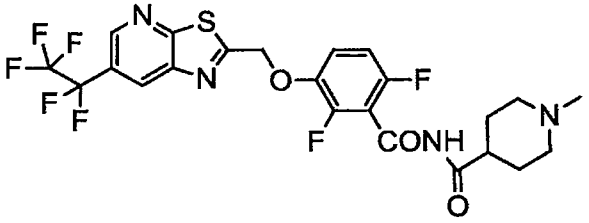






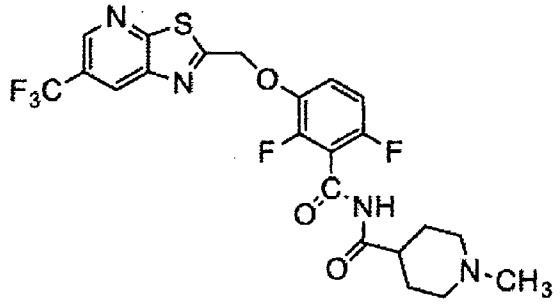


and



and salts thereof.

14. A compound of claim 1 which is



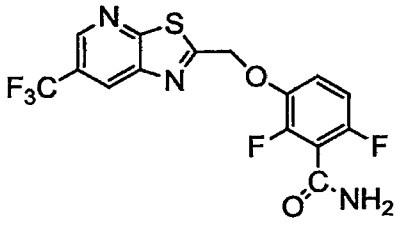
or a salt thereof.

15. A pharmaceutical composition comprising a compound of formula I as described in any one of claims 1-14 or a pharmaceutically acceptable salt thereof, and a pharmaceutically acceptable vehicle.

16. A compound of formula I as described in any one of claims 1-14 or a pharmaceutically acceptable salt thereof for use in the prophylactic or therapeutic treatment of a bacterial infection.

17. A compound of formula I as described in any one of claims 1-14 or a pharmaceutically acceptable salt thereof for use in medical treatment.

18. A method for preparing the compound of claim 14 comprising converting an amide of formula:



with 1-methylpiperidine-4-carbonyl chloride in the presence of NaH.

19. Amide of formula:

