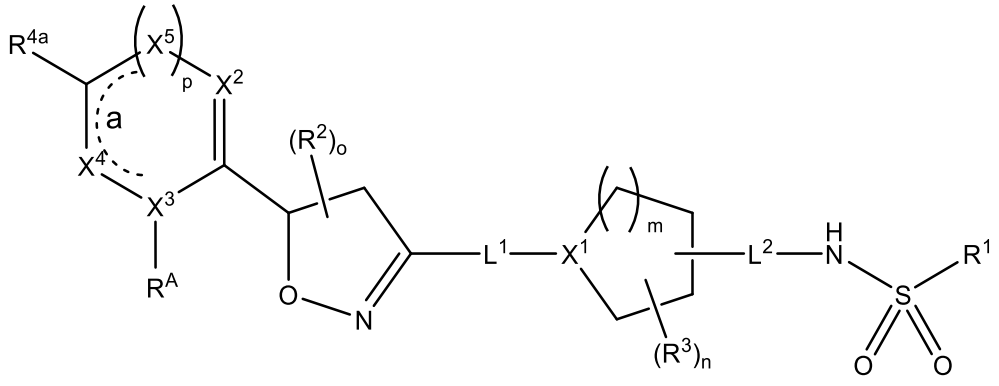
CLAIMS

1. A compound of formula (I)



(I),

wherein

R^1 is a C_{1-6} alkyl group, a C_{3-7} cycloalkyl group, or a mono- or di-C_{1-6} alkylamino group, wherein each of the C_{1-6} alkyl group, C_{3-7} cycloalkyl group, and mono- or di-C_{1-6} alkylamino group is optionally substituted;

each R^2 is the same or different, and is an optionally substituted C_{1-6} alkyl group;

each R^3 is the same or different, and is an optionally substituted C_{1-6} alkyl group, or a halogen atom;

R^A is an optionally substituted 3- to 8-membered non-aromatic heterocyclic group, an optionally substituted 5- to 6-membered aromatic heterocyclic group, an optionally substituted C_{6-14} aryl group, or an optionally substituted C_{3-10} cycloalkyl group;

L^1 is a bond, $-NR^6-$, or $-O-$; wherein R^6 is a hydrogen atom, or an optionally substituted C_{1-6} alkyl group;

L^2 is a bond or $-CH_2-$;

X^1 is N or $CR^{3'}$;

X^2 is N or CR^{4b};

X^3 is N or C;

X^4 is N or CR^{4c};

X^5 is N or CR^{4d};

provided that no more than two of X^2, X^3, X^4, and X^5 are N;

$R^{3'}$ is a hydrogen atom, an optionally substituted C_{1-6} alkyl

group, or a halogen atom;

R^{4a}, R^{4b}, R^{4c}, and R^{4d} are the same or different and each is a hydrogen atom, an optionally substituted C_{1-6} alkyl group, an optionally substituted C_{3-7} cycloalkyl group, a halogen atom, or an optionally substituted C_{1-6} alkoxy group;

m is an integer of 0 to 3;

n is an integer of 0 to 3;

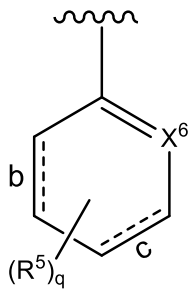
o is an integer of 0 to 3;

p is an integer of 0 or 1; and

<u>--a--</u> comprises one single bond and one double bond when p is 0 or one single bond and two double bonds when p is 1 to provide an aromatic ring structure;

or a salt thereof.

2. The compound according to claim 1, wherein R^A has the following structure:



wherein

X^6 is N or $CR^{5'}$;

each R^5 is the same or different, and is a halogen atom, or a C_{1-6} alkoxy group;

$R^{5'}$ is a hydrogen atom, or a halogen atom;

q is an integer of 0 to 7; and

<u>--b--</u> and <u>--c--</u> are the same and are both single bonds or both double bonds;

or a salt thereof.

3. The compound according to claim 1, wherein X^1 is $CR^{3'}$, m is an integer of 0 to 2, and n is 0; or a salt thereof.

4. The compound according to claim 1, wherein X^1 is N; or a salt thereof.

5. The compound according to claim 2, wherein
R^1 is a C_{1-6} alkyl group, a C_{1-6} alkoxy-C_{1-6} alkyl group, a halo-C_{1-6} alkyl group, a cyclopropyl group, a halo-cyclopropyl group, or a mono- or di-C_{1-6} alkylamino group;
each R^2 is the same or different, and is a C_{1-6} alkyl group, a halo-C_{1-6} alkyl group, a C_{1-6} alkoxy-C_{1-6} alkyl group, or a hydroxy-C_{1-6} alkyl group;
each R^3 is the same or different, and is a C_{1-6} alkyl group, a C_{1-6} alkoxy-C_{1-6} alkyl group, or a halogen atom;
R^{4a} is a hydrogen atom, a C_{1-6} alkyl group, a cyclopropyl group, a C_{1-6} alkoxy group, a halo-C_{1-6} alkyl group, or a halogen atom; and
q is an integer of 0 to 4;
or a salt thereof.

6. The compound according to claim 1, wherein either
(i) X^2 is CR^{4b}, X^3 is N, X^4 is N, and p is 0; or
(ii) X^2 is N, X^3 is N, X^4 is CR^{4c}, and p is 0;
or a salt thereof.

7. The compound according to claim 1, wherein X^2 is CR^{4b}, X^3 is C, X^4 is CR^{4c}, X^5 is CR^{4d}, and p is 1; or a salt thereof.

8. The compound according to claim 1, wherein X^2 is N, X^3 is C, X^4 is CR^{4c}, X^5 is CR^{4d}, and p is 1; or a salt thereof.

9. The compound according to claim 1, wherein X^2 is CR^{4b}, X^3 is C, X^4 and X^5 are N, and p is 1; or a salt thereof.

10. The compound according to claim 1, wherein X^2 is CR^{4b}, X^3 is C, X^4 is CR^{4c}, X^5 is N, and p is 1; or a salt thereof.

11. The compound according to claim 1, wherein X^2 and X^4 are N, X^3 is C, X^5 is CR^{4d}, and p is 1; or a salt thereof.

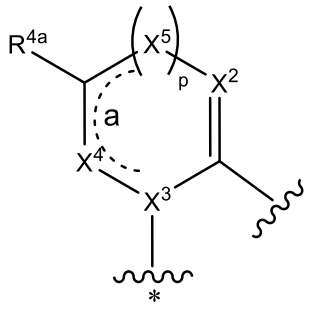
12. The compound according to claim 1, wherein X^2 is CR^{4b}, X^3 is C, X^4 is N, X^5 is CR^{4d}, and p is 1; or a salt thereof.

13. The compound according to claim 2, wherein X^6 is $CR^{5'}$, and b and c are both single bonds; or a salt thereof.

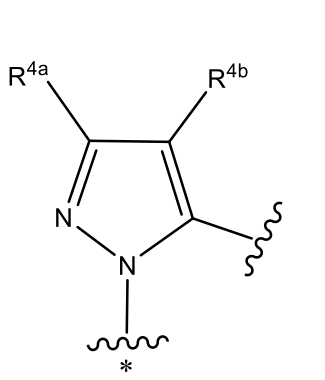
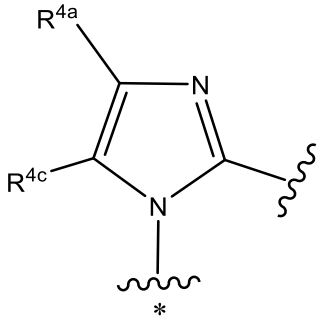
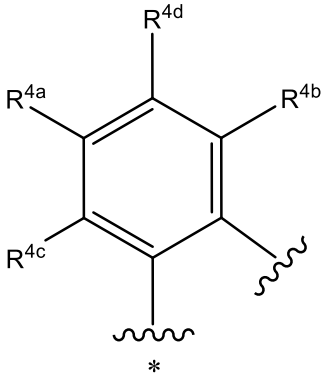
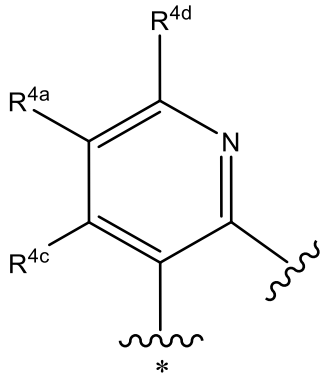
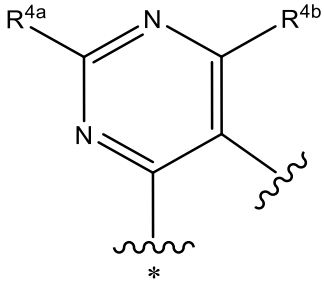
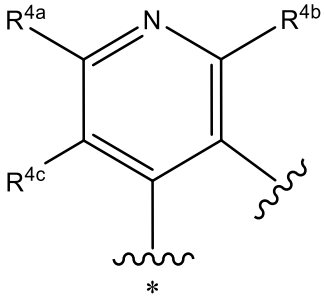
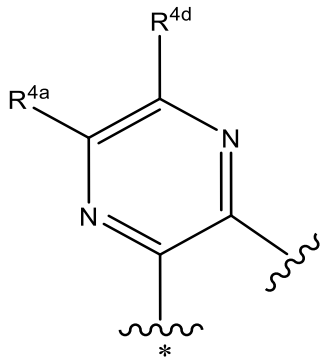
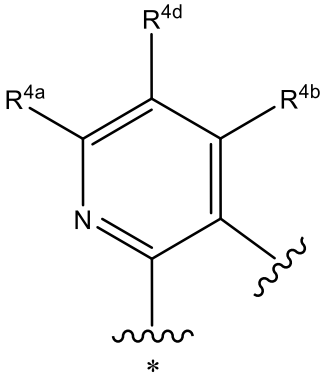
14. The compound according to claim 2, wherein X^6 is $CR^{5'}$, and b and c are both double bonds; or a salt thereof.

15. The compound according to claim 2, wherein X^6 is N′, and b and c are both double bonds; or a salt thereof.

16. The compound according to claim 1, wherein the moiety:



is selected from the group consisting of:









, and ;

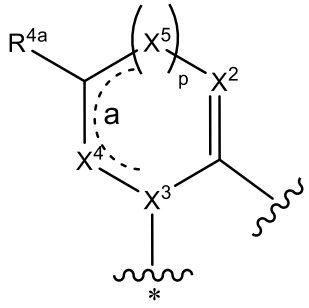
wherein

* indicates the bonding site to R^A; and

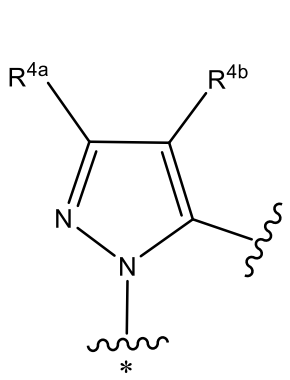
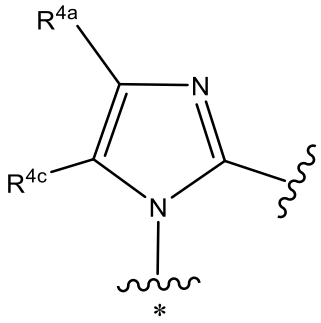
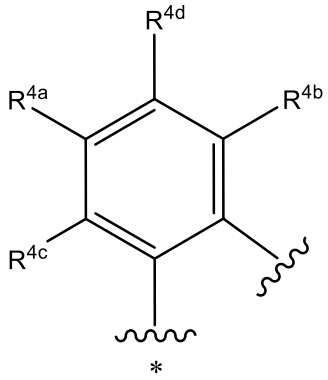
R^{4a}, R^{4b}, R^{4c}, and R^{4d} are as defined in claim 1;

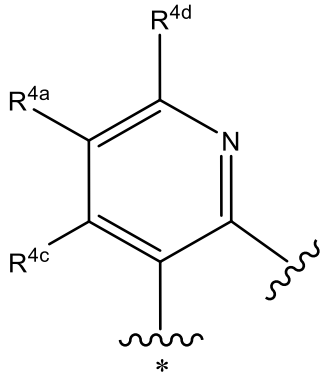
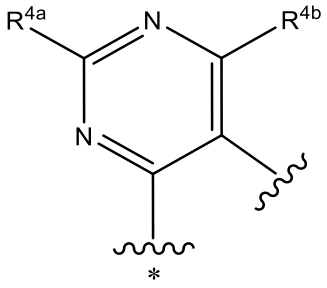
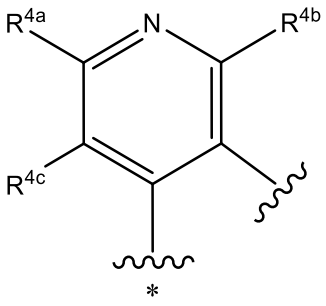
or a salt thereof.

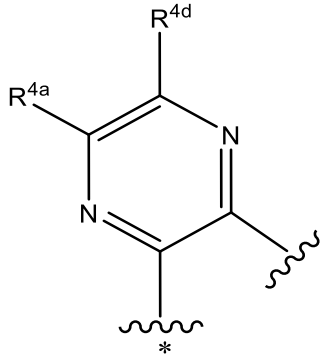
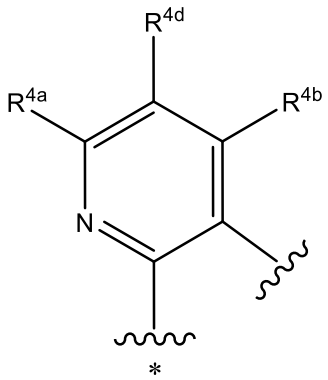
17. The compound according to claim 2, wherein the moiety:



is selected from the group consisting of:


,

,

,


,

,

,



, and ;

wherein * indicates the bonding site to R^A;

R^1 is a C_{1-6} alkyl group, a C_{1-6} alkoxy-C_{1-6} alkyl group, a halo-C_{1-}

$_{6}$ alkyl group, a cyclopropyl group, a halo-cyclopropyl group, or a mono- or di-C_{1-6} alkylamino group;

each R^2 is the same or different, and is a C_{1-6} alkyl group, a halo-C_{1-6} alkyl group, a C_{1-6} alkoxy-C_{1-6} alkyl group, or a hydroxy-C_{1-6} alkyl group;

each R^3 is the same or different, and is a C_{1-6} alkyl group, a C_{1-6} alkoxy-C_{1-6} alkyl group, or a halogen atom;

L^1 is a bond, $-NR^6-$, or $-O-$; wherein R^6 is a hydrogen atom, or a C_{1-6} alkyl group;

L^2 is a bond or $-CH_2-$;

X^1 is N or $CR^{3'}$; wherein $R^{3'}$ is a hydrogen atom;

R^{4a} is a hydrogen atom, a C_{1-6} alkyl group, a cyclopropyl group, a C_{1-6} alkoxy group, a halo-C_{1-6} alkyl group, or a halogen atom;

X^2 is N or CR^{4b}; wherein R^{4b} is a hydrogen atom, or a halogen atom;

X^4 is N or CR^{4c}; wherein R^{4c} is a hydrogen atom, or a halogen atom;

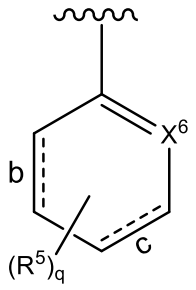
X^5 is N or CR^{4d}; wherein R^{4d} is a hydrogen atom;

m is an integer of 0 to 3;

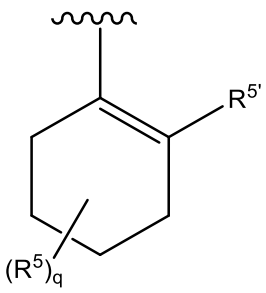
n is an integer of 0 to 3;

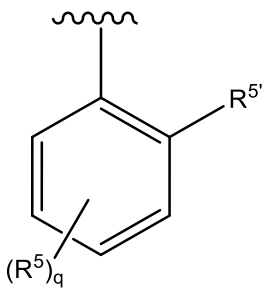
o is an integer of 0 to 3; and

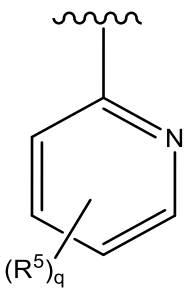
the moiety:



is selected from the group consisting of:



,


, and


;

wherein

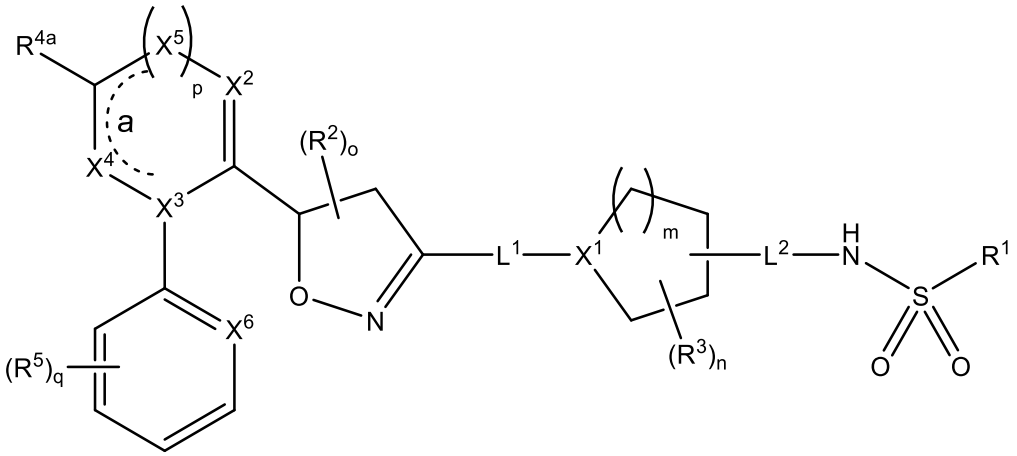
each R^5 is the same or different, and is a halogen atom, or a C_{1-6} alkoxy group;

$R^{5'}$ is a hydrogen atom, or a halogen atom; and

q is an integer of 0 to 4;

or a salt thereof.

18. The compound according to claim 2, wherein the compound is a compound of formula (Ia):



(Ia),

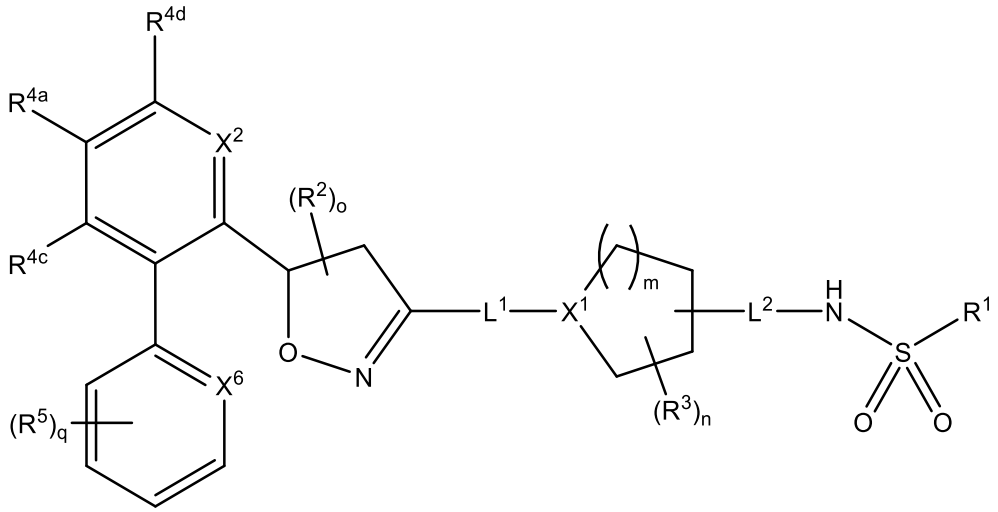
wherein

q is an integer of 0 to 4; and

the other symbols are as defined in claim 2;

or a salt thereof.

19. The compound according to claim 2, wherein the compound is a compound of formula (Ib):



(Ib),

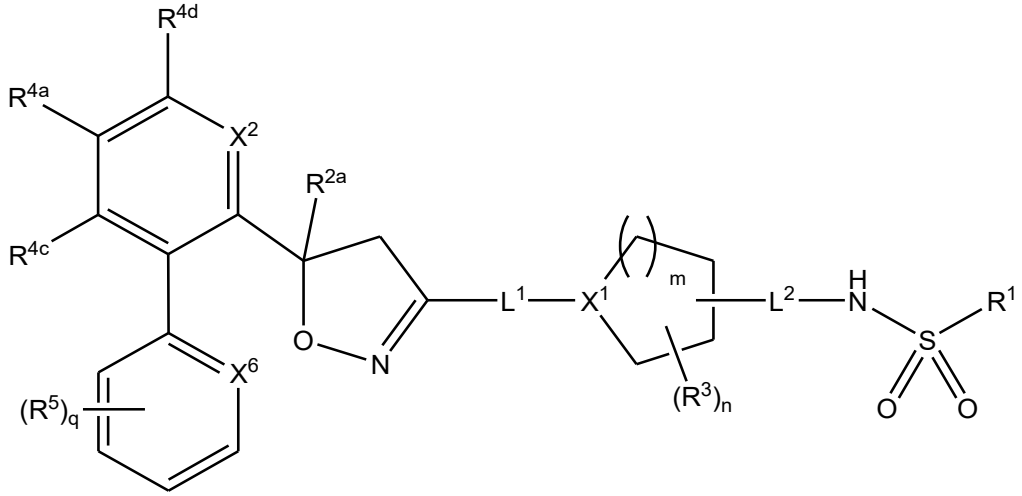
wherein

q is an integer of 0 to 4; and

the other symbols are as defined in claim 2;

or a salt thereof.

20. The compound according to claim 2, wherein the compound is a compound of formula (Ic):



(Ic),

wherein

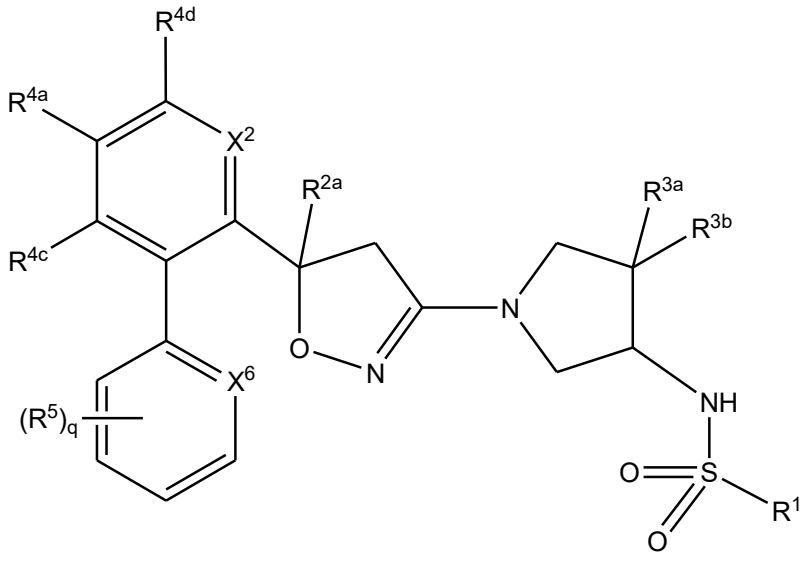
R^{2a} is a hydrogen atom, or an optionally substituted C_{1-6} alkyl group;

q is an integer of 0 to 4; and

the other symbols are as defined in claim 2;

or a salt thereof.

21. The compound according to claim 2, wherein the compound is a compound of formula (Id):



(Id),

wherein

R^{2a} is a hydrogen atom, or an optionally substituted C_{1-6} alkyl group;

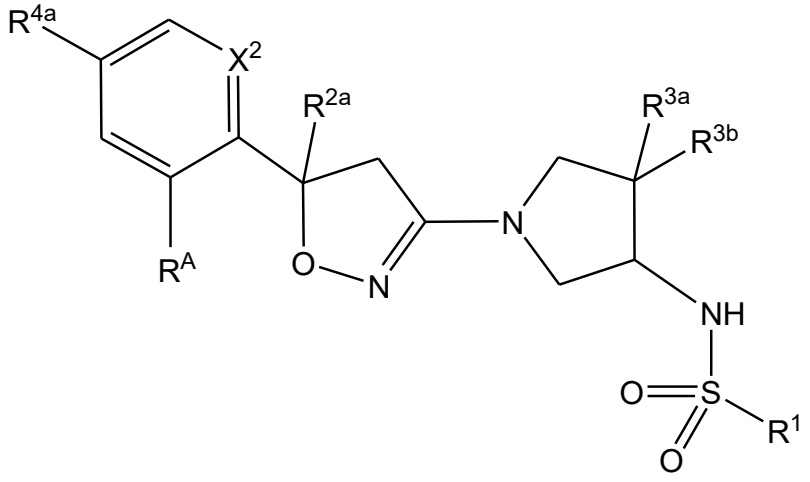
R^{3a} and R^{3b} are the same or different and each is a hydrogen atom, an optionally substituted C_{1-6} alkyl group, or a halogen atom;

q is an integer of 0 to 4; and

the other symbols are as defined in claim 2;

or a salt thereof.

22. The compound according to claim 1, wherein the compound is a compound of formula (Ie):



(Ie),

wherein

R^1 is a C_{1-6} alkyl group, or a halo-C_{1-6} alkyl group;

R^{2a} is a hydrogen atom, a C_{1-6} alkyl group, or a halo-C_{1-6} alkyl group;

R^{3a} and R^{3b} are the same or different and each is a C_{1-6} alkyl group, or a halogen atom;

R^{4a} is a C_{1-6} alkyl group, or a halogen atom;

X^2 is N or CR^{4b}; wherein R^{4b} is a halogen atom; and

R^A is a phenyl group, or a pyridyl group, wherein each of the phenyl group and pyridyl group is optionally substituted by one to three halogen atoms;

or a salt thereof.

23. The compound according to claim 22, wherein

R^1 is a C_{1-6} alkyl group, or a halo-C_{1-6} alkyl group;

R^{2a} is a hydrogen atom, a C_{1-6} alkyl group, or a halo-C_{1-6} alkyl group;

R^{3a} and R^{3b} are each a halogen atom;

R^{4a} is a C_{1-6} alkyl group, or a halogen atom;

X^2 is N or CR^{4b}; wherein R^{4b} is a halogen atom; and

R^A is a phenyl group, or a pyridyl group, wherein each of the phenyl group and pyridyl group is optionally substituted by one to three halogen atoms;

or a salt thereof.

24. The compound according to claim 22, wherein
R^1 is a C_{1-6} alkyl group, or a halo-C_{1-6} alkyl group;
R^{2a} is a C_{1-6} alkyl group, or a halo-C_{1-6} alkyl group;
R^{3a} and R^{3b} are each a halogen atom;
R^{4a} is a halogen atom;
X^2 is N; and
R^A is a phenyl group optionally substituted by one to three halogen atoms;
or a salt thereof.

25. The compound according to claim 22, wherein
R^1 is a C_{1-6} alkyl group;
R^{2a} is a halo-C_{1-6} alkyl group;
R^{3a} and R^{3b} are each a halogen atom;
R^{4a} is a halogen atom;
X^2 is N; and
R^A is a phenyl group optionally substituted by one to three halogen atoms;
or a salt thereof.

26. The compound according to claim 1, wherein the compound is selected from the group consisting of:

N-[(3R)-4,4-difluoro-1-{(5S)-5-[5-methyl-3-(2,4,6-trifluorophenyl)pyridin-2-yl]-4,5-dihydro-1,2-oxazol-3-yl}pyrrolidin-3-yl]methanesulfonamide;

N-[(3R)-1-{(5S)-5-[3-(2,6-difluorophenyl)-5-fluoropyridin-2-yl]-5-(fluoromethyl)-4,5-dihydro-1,2-oxazol-3-yl}-4,4-difluoropyrrolidin-3-yl]methanesulfonamide;

N-[(3R)-1-{(5S)-5-[3-(2,6-difluorophenyl)-5-fluoropyridin-2-yl]-5-(fluoromethyl)-4,5-dihydro-1,2-oxazol-3-yl}-4,4-difluoropyrrolidin-3-yl]-1-fluoromethanesulfonamide; and

N-[(3R)-1-{(5S)-5-[3-(2,6-difluorophenyl)-5-fluoropyridin-2-yl]-5-methyl-4,5-dihydro-1,2-oxazol-3-yl}-4,4-

difluoropyrrolidin-3-yl]methanesulfonamide,
or a salt thereof.

27. A pharmaceutical composition comprising the compound as defined in any one of claims 1 to 26 or a salt thereof, and a pharmacologically acceptable carrier.

28. A medicament comprising the compound as defined in any one of claims 1 to 26 or a salt thereof.

29. The compound as defined in any one of claims 1 to 26, or a salt thereof, for use in therapy.

30. The compound or salt according to claim 29, wherein the therapy comprises treatment of a disease or disorder associated with an orexin type 2 receptor.

31. The compound or salt according to claim 30, wherein the disease or disorder is selected from the group consisting of narcolepsy, idiopathic hypersomnia, hypersomnia, sleep apnea syndrome, narcolepsy syndrome accompanied by narcolepsy-like symptoms, hypersomnia syndrome accompanied by daytime hypersomnia, Alzheimer’s disease, obesity, insulin resistance syndrome, cardiac failure, diseases related to bone loss, sepsis, disturbance of consciousness, and side effects and complications due to anesthesia.

32. The compound or salt according to claim 30, wherein the disease or disorder is selected from the group consisting of narcolepsy, idiopathic hypersomnia, hypersomnia, and sleep apnea syndrome.

33. The compound or salt according to claim 30, wherein the disease or disorder is narcolepsy.

34. Use of the compound as defined in any one of claims 1 to 26 or a salt thereof, in the manufacture of a medicament for the prophylaxis or treatment of a disease or disorder associated with an orexin type 2 receptor.

35. The use according to claim 34, wherein the disease or disorder is selected from the group consisting of narcolepsy, idiopathic hypersomnia, hypersomnia, sleep apnea syndrome, narcolepsy syndrome accompanied by narcolepsy-like symptoms, hypersomnia syndrome accompanied by daytime hypersomnia, Alzheimer's disease, obesity, insulin resistance syndrome, cardiac failure, diseases related to bone loss, sepsis, disturbance of consciousness, and side effects and complications due to anesthesia.

36. The use according to claim 34, wherein the disease or disorder is selected from the group consisting of narcolepsy, idiopathic hypersomnia, hypersomnia, and sleep apnea syndrome.

37. The use according to claim 34, wherein the disease or disorder is narcolepsy.