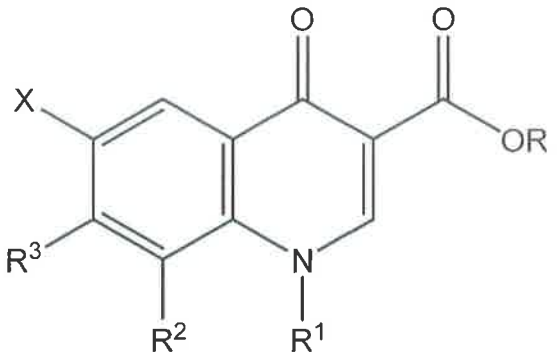
CLAIMS

1. A compound represented by the formula (I)



(I)

wherein

X is a hydrogen atom or a fluorine atom;

R is a hydrogen atom or alkyl;

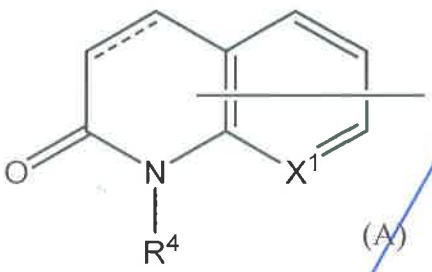
R^1 is (1) cyclopropyl optionally substituted by 1 to 3 halogen atoms or (2) phenyl optionally substituted by 1 to 3 halogen atoms;

R^2 is a hydrogen atom; alkyl optionally substituted by 1 or 2 substituents selected from the group consisting of a halogen atom and hydroxyl; alkoxy; haloalkoxy; a halogen atom; cyano; cyclopropyl; nitro; amino; formyl; alkenyl or alkynyl; or

R^1 and R^2 are bonded to form a 5- or 6-membered ring optionally substituted by alkyl;

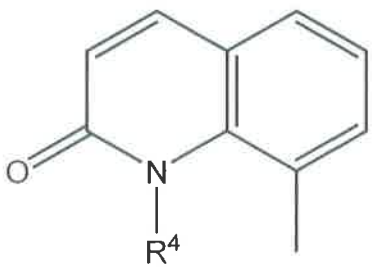
R^3 is

(1) a fused heterocyclic group of the formula



(A)

or



(B)

wherein

------ represents a single bond or a double bond,

X^1 is $C(R^5)$ or N,

R^4 is a hydrogen atom or alkyl, and

R^5 is (a) a hydrogen atom,

(b) a halogen atom,

(c) cyano,

(d) nitro,

(e) hydroxy,

(f) alkyl optionally substituted by 1 to 3 halogen atoms,

(g) alkenyl or alkynyl,

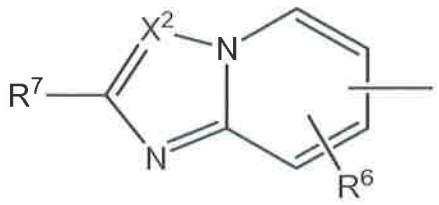
(h) aryl, or

(i) alkoxy optionally substituted by 1 to 3 halogen atoms,

when X^1 is $C(R^5)$, R^4 and R^5 are optionally bonded to form a 5- or 6-membered ring optionally substituted by oxo,

said fused heterocyclic group is optionally substituted by 1 or 2 substituents selected from the group consisting of a halogen atom, cyano, nitro, hydroxy and alkyl,

(2) a group of the formula



(C)

wherein

X^2 is $C(R^8)$ or N, and

R^6, R^7 and R^8 are each independently,

(a) a hydrogen atom,

(b) a halogen atom,

(c) cyano,

(d) nitro,

(e) amino,

(f) alkyl optionally substituted by 1 to 3 substituents selected from the group consisting of a halogen atom, alkoxy and amino,

(g) alkenyl,

(h) alkynyl,

(i) aryl,

(j) formyl or CH=N-OH,

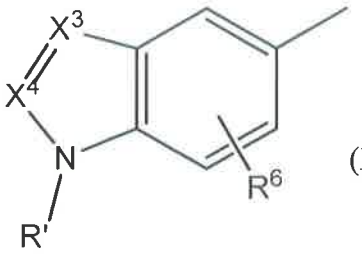
(k) carboxy,

(l) carbamoyl,

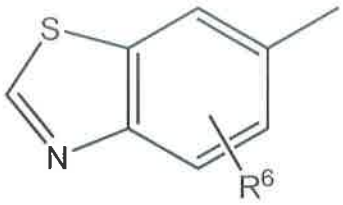
(m) a 5- to 10-membered aromatic heterocyclic group optionally substituted by alkyl, or

(n) alkenyloxy,

(3) a group of the formula



(D) or



(E)

wherein

X^3 and X^4 are N, or

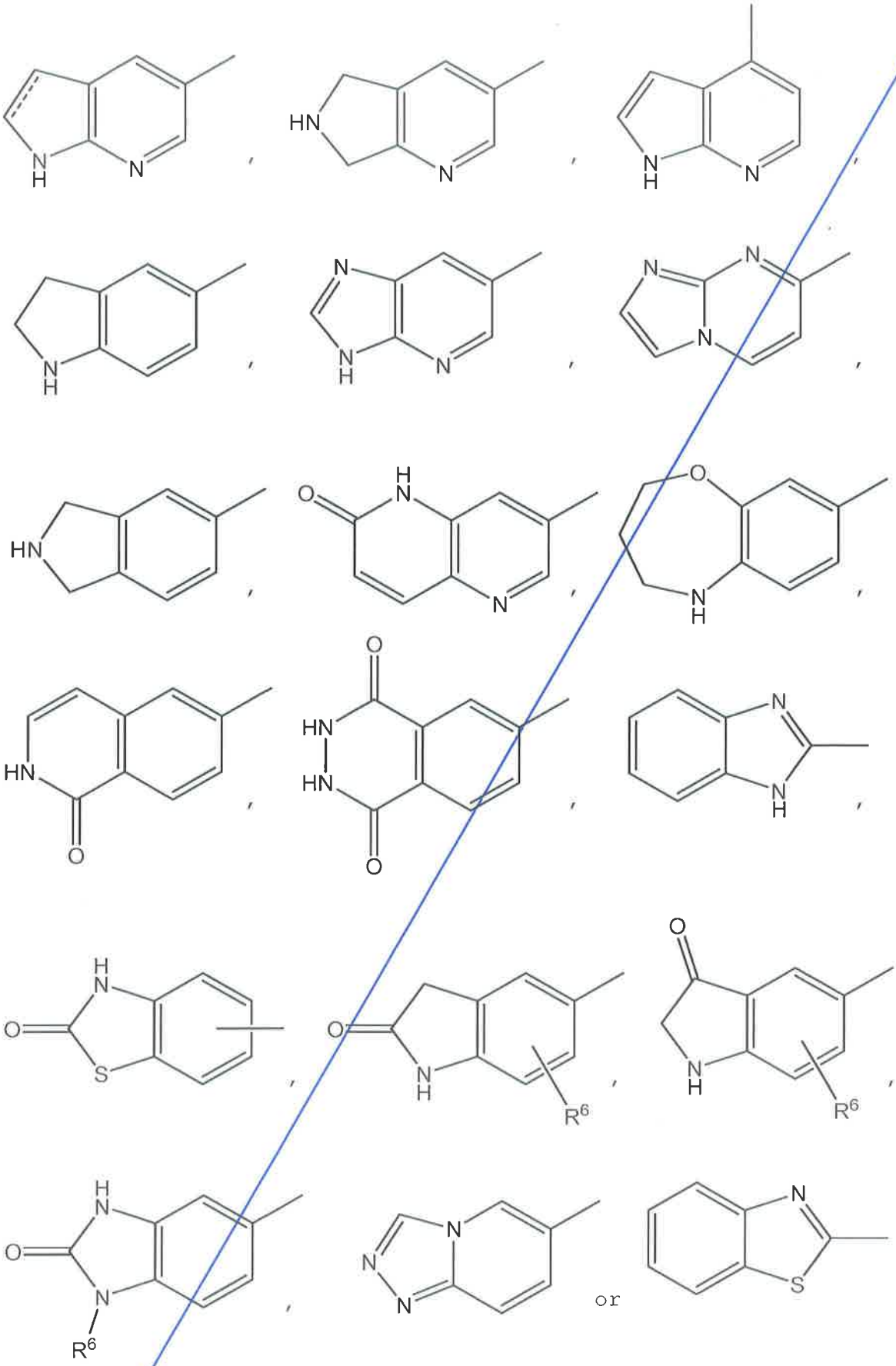
X^3 is N and X^4 is CR", wherein R" is hydrogen atom, amino, hydroxy, alkyl optionally substituted by 1 to 3 substituents selected from the group consisting of alkoxy and dimethylamino or mercapto, or

X^3 is CH and X^4 is N,

R' is a hydrogen atom or alkyl optionally substituted by 1 to 3 substituents selected from the group consisting of substituted hydroxyl and amino, and

R^6 is as defined above,

(4) a group of the formula



wherein

------ represents a single bond or a double bond and R^6 is as

defined above,

(5) 3-pyridyl optionally substituted by 1 or 2 substituents selected from the group consisting of

(a) a halogen atom,

(b) cyano,

(c) nitro,

(d) hydroxy,

(e) amino,

(f) alkyl optionally substituted by 1 to 3 substituents selected from the group consisting of a halogen atom, alkylamino, dialkylamino and hydroxy,

(g) alkenyl, alkynyl

(h) aryl,

(i) cycloalkyl,

(j) alkoxy,

(k) alkylamino,

(l) dialkylamino,

(m) phenylamino optionally substituted by 1 to 3 halogen atoms,

(n) a cyclic amino group optionally substituted by alkoxycarbonyl,

(o) formyl,

(p) carbamoyl optionally substituted by alkyl optionally substituted by hydroxy, and

(q) a 5- to 10-membered aromatic heterocyclic group optionally substituted by alkyl,

(6) 4-pyridyl optionally substituted by a halogen atom,

(7) 5-pyrimidinyl optionally substituted by 1 or 2 substituents selected from the group consisting of amino, alkylamino, dialkylamino and carboxy,

(8) 2-indolyl, 3-indolyl, 5-indolyl, 6-indolyl, benzofuranyl, benzothiophenyl, benzoxazolyl or benzothiazolyl, each optionally substituted by 1 or 2 substituents selected from the group consisting of

(a) a halogen atom,

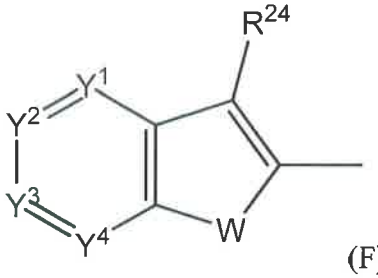
(b) cyano,
(c) nitro,
(d) hydroxy,
(e) alkyl optionally substituted by 1 to 3 substituents selected from the group consisting of amino, alkoxycarbonylamino, alkylamino and dialkylamino,
(f) alkoxy,
(g) formyl,
(h) carboxy, and
(j) amino optionally substituted by 1 or 2 substituents selected from the group consisting of
(i) alkoxycarbonyl,
(ii) alkylcarbonyl optionally substituted by a substituent selected from the group consisting of
(A) cycloalkyloxy optionally substituted by 1 to 3 alkyl,
(B) alkylamino,
(C) dialkylamino,
(D) a cyclic amino group optionally substituted by alkoxycarbonyl, and
(E) a halogen atom,
(iii) phenylcarbonyl optionally substituted by 1 to 3 substituents selected from the group consisting of alkyl and alkoxy,
(iv) cycloalkylcarbonyl,
(v) a 5- to 10-membered aromatic heterocyclylcarbonyl group optionally substituted by alkyl optionally substituted by 1 to 3 halogen atoms,
(vi) benzylcarbonyl optionally substituted by 1 to 3 substituents selected from the group consisting of a halogen atom and alkoxy,
(vii) arylsulfonyl optionally substituted by alkoxy,
(viii) cycloalkylalkylsulfonyl optionally substituted by 1 to 3 substituents selected from the

group consisting of alkyl and oxo,

(ix) a 5- to 10-membered aromatic heterocyclylsulfonyl group optionally substituted by 1 to 3 alkyl, and

(x) $-C(=N-CN)-SR^9$ wherein R^9 is alkyl,

(9) a group of the formula



(F)

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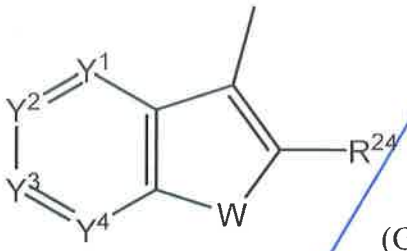


(G)

wherein

one of Y^1, Y^2, Y^3 and Y^4 is N or $N^+(-O^-)$, and the remaining three are each $C(R^{25})$, $C(R^{26})$ and $C(R^{27})$,

W is O, S, NH or $N(R^{23})$

R^{23} is a hydrogen atom or alkyl, and

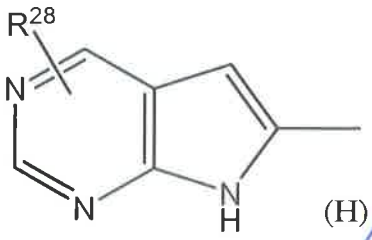
R^{24}, R^{25}, R^{26} and R^{27} are each independently,

(a) a hydrogen atom,

(b) cyano, or

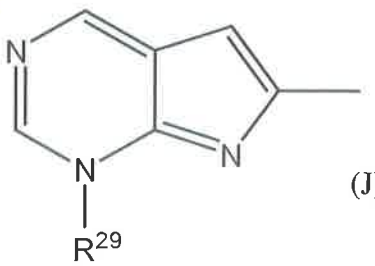
(c) nitro,

(10) a group of the formula



(H)

or



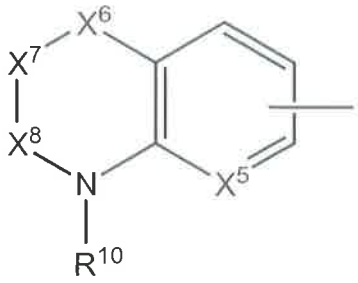
(J)

wherein

R^{28} is a hydrogen atom or hydroxy, and

R^{29} is a hydrogen atom or alkyl,

(11) a group of the formula



(K)

wherein

X^5 is $C(R^{11})$ or N,

X^6 is CH_2, C(=O), O, S, SO_2 or $N(R^{12})$,

X^7 is $CH(R^{13})$, C(=O) or $N(R^{14})$,

X^8 is $CH(R^{15})$ or C(=O),

R^{10}, R^{12} and R^{14} are each independently,

(a) a hydrogen atom or

(b) alkyl, and

R^{11}, R^{13} and R^{15} are each independently,

(a) a hydrogen atom,

(b) a halogen atom,

(c) cyano,

(d) nitro,

(e) amino,

(f) alkylamino,

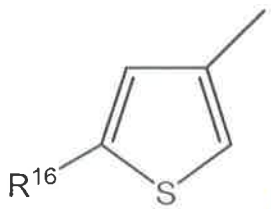
(g) dialkylamino,

(h) alkyl optionally substituted by hydroxy, or

(i) alkenyl,

when X^5 is $C(R^{11})$, R^{10} and R^{11} are optionally bonded to form a 5- or 6-membered ring optionally substituted by alkyl or oxo, and when X^6 is $N(R^{12})$ and X^7 is $CH(R^{13})$, R^{12} and R^{13} are optionally bonded to form a 5- or 6-membered ring,

(12) a group of the formula



(L)

wherein R^{16} is

(a) a hydrogen atom,

(b) alkyl optionally substituted by 1 to 3 substituents selected from the group consisting of cyano, alkylamino and dialkylamino,

(c) alkenyl optionally substituted by carboxy,

(d) formyl,

(e) carboxy,

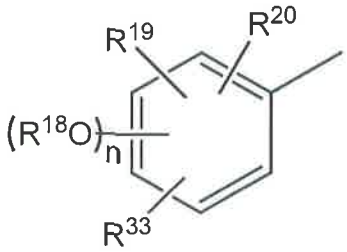
(f) carbamoyl,

(g) $-C(R^{17})=N-OH$ wherein R^{17} is a hydrogen atom, cyano or hydroxy,

(h) a 5- to 10-membered aromatic heterocyclic group optionally substituted by alkyl, alkoxycarbonyl, carboxy or phenyl, or

(i) cyano,

(13) a group of the formula



(M)

wherein

R^{18} is a hydrogen atom or alkyl optionally substituted by 1 to 3 substituents selected from the group consisting of a halogen atom and phenyl,

n is 0 or 1,

R^{19}, R^{20} and R^{33} are each independently,

(a) a hydrogen atom,

(b) a halogen atom,

(c) cyano,

(d) alkyl optionally substituted by 1 to 3 substituents selected from the group consisting of

(i) a halogen atom,

(ii) cyano,

(iii) hydroxy,

(iv) amino,

(v) alkylamino,

(vi) dialkylamino, and

(vii) a cyclic amino group optionally substituted by alkyl,

(e) alkoxy,

(f) amino optionally substituted by 1 or 2 substituents selected from the group consisting of

(i) alkylcarbonyl optionally substituted by a cyclic amino group,

(ii) alkylsulfonyl,

(iii) carbamoyl,

(iv) alkyl, cycloalkyl or cycloalkylalkyl, and

(v) 5- to 10-membered saturated heterocyclic group,

(g) carboxy,

(h) alkoxycarbonyl,

(i) carbamoyl optionally substituted by alkyl optionally substituted by amino, alkylamino, dialkylamino or alkoxycarbonylamino,

(j) formyl,

(k) a 5- to 10-membered aromatic heterocyclic group optionally substituted by alkyl,

(l) $-CH=N-OR^{21}$ wherein R^{21} is a hydrogen atom or alkyl optionally substituted by alkylamino or dialkylamino,

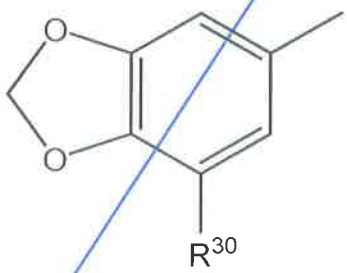
(m) nitro,

(n) a 5- to 10-membered saturated heterocyclic group optionally substituted by amino,

(o) phenyl, or

(p) -NHC(SMe)=CHCN,

(14) a group of the formula



(N)

wherein

R^{30} is (a) a hydrogen atom,

(b) a halogen atom,

(c) cyano,

(d) alkyl optionally substituted by 1 to 3 substituents selected from the group consisting of a halogen atom and hydroxy,

(e) alkenyl,

(f) alkynyl,

(g) alkoxy,

(h) formyl,

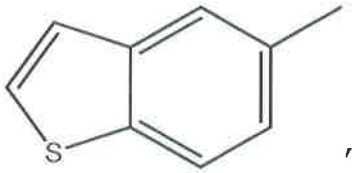
(i) -CH=N-OH, or

(j) carbamoyl,

(15) naphthyl or isochromenyl,

(16) quinolyl or isoquinolyl, or their oxide derivatives,

(17) a group of the formula



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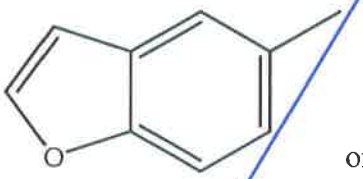

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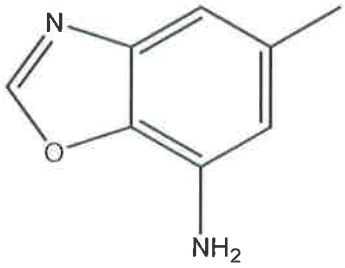

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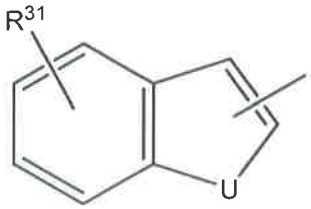
(18) a group of the formula



wherein

U is O or S, and

R^{31} is (a) a hydrogen atom,

(b) a halogen atom,

(c) alkyl optionally substituted by 1 to 3 halogen atoms,

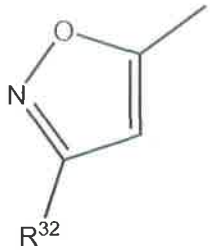
(d) carboxy,

(e) nitro,

(f) cyano, or

(g) amino,

(19) a group of the formula

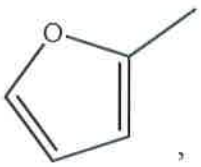
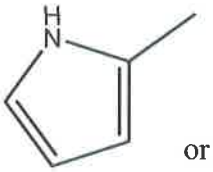
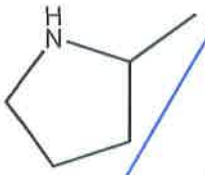


wherein

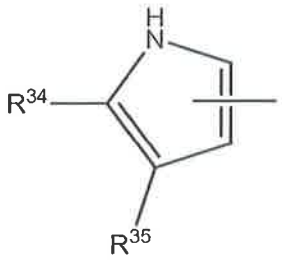
R^{32} is (a) a halogen atom,

(b) phenyl, or

(c) a group of the formula

 ,  or  ,

(20) a group of the formula



wherein

R^{34} and R^{35} are each independently,

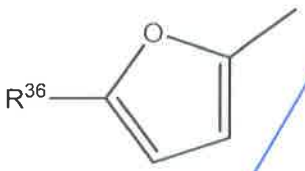
(a) a hydrogen atom, or

(b) aminoalkyl,

or

R^{34} and R^{35} are bonded to form a 6-membered ring optionally substituted by amino or oxo,

(21) a group of the formula



wherein R^{36} is

(a) a hydrogen atom,

(b) a halogen atom,

(c) nitro, or

(d) thienyl, or

(22) a group of the formula



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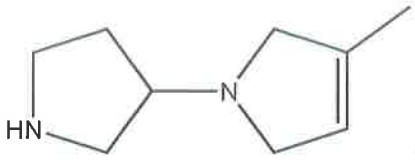

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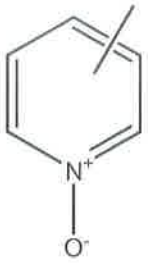

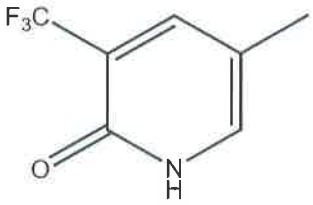

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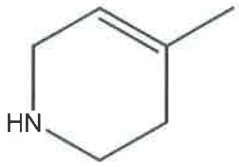

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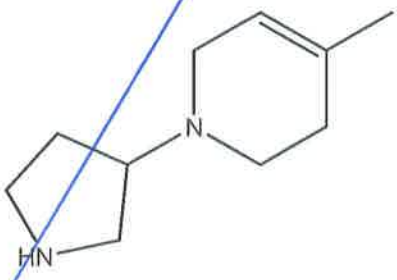
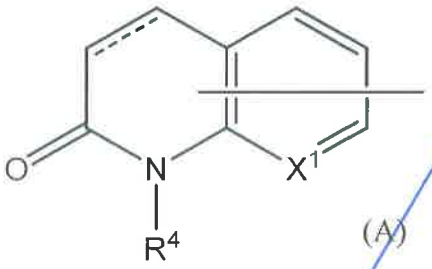


,

or a salt thereof.

2. The compound of claim 1, wherein X is a fluorine atom, or a salt thereof.

3. The compound of claim 1, wherein R^3 is a fused heterocyclic group of the formula



(A)
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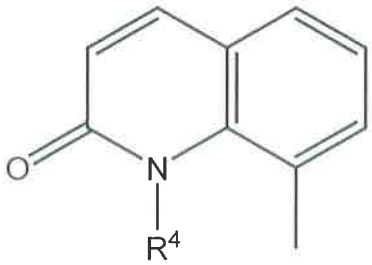
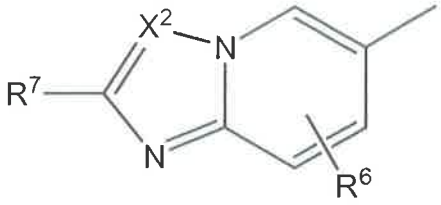


(B)

wherein ------, X^1 and R^4 are as defined in claim 1, and said fused heterocyclic group is optionally substituted by 1 or 2 substituents selected from the group consisting of a halogen atom, cyano, nitro, hydroxy and alkyl, or a salt thereof.

4. The compound of claim 1, wherein R^3 is a group of the formula



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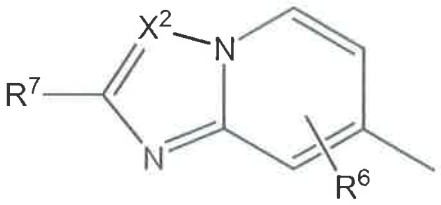
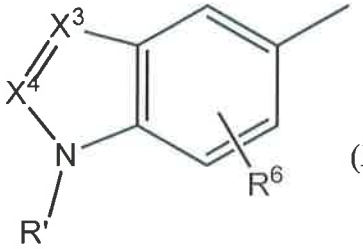
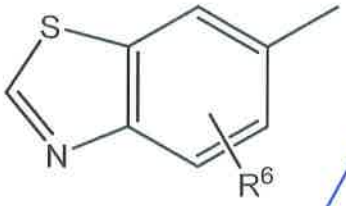


wherein X^2, R^6 and R^7 are as defined in claim 1, or a salt thereof.

5. The compound of claim 1, wherein R^3 is a group of the formula

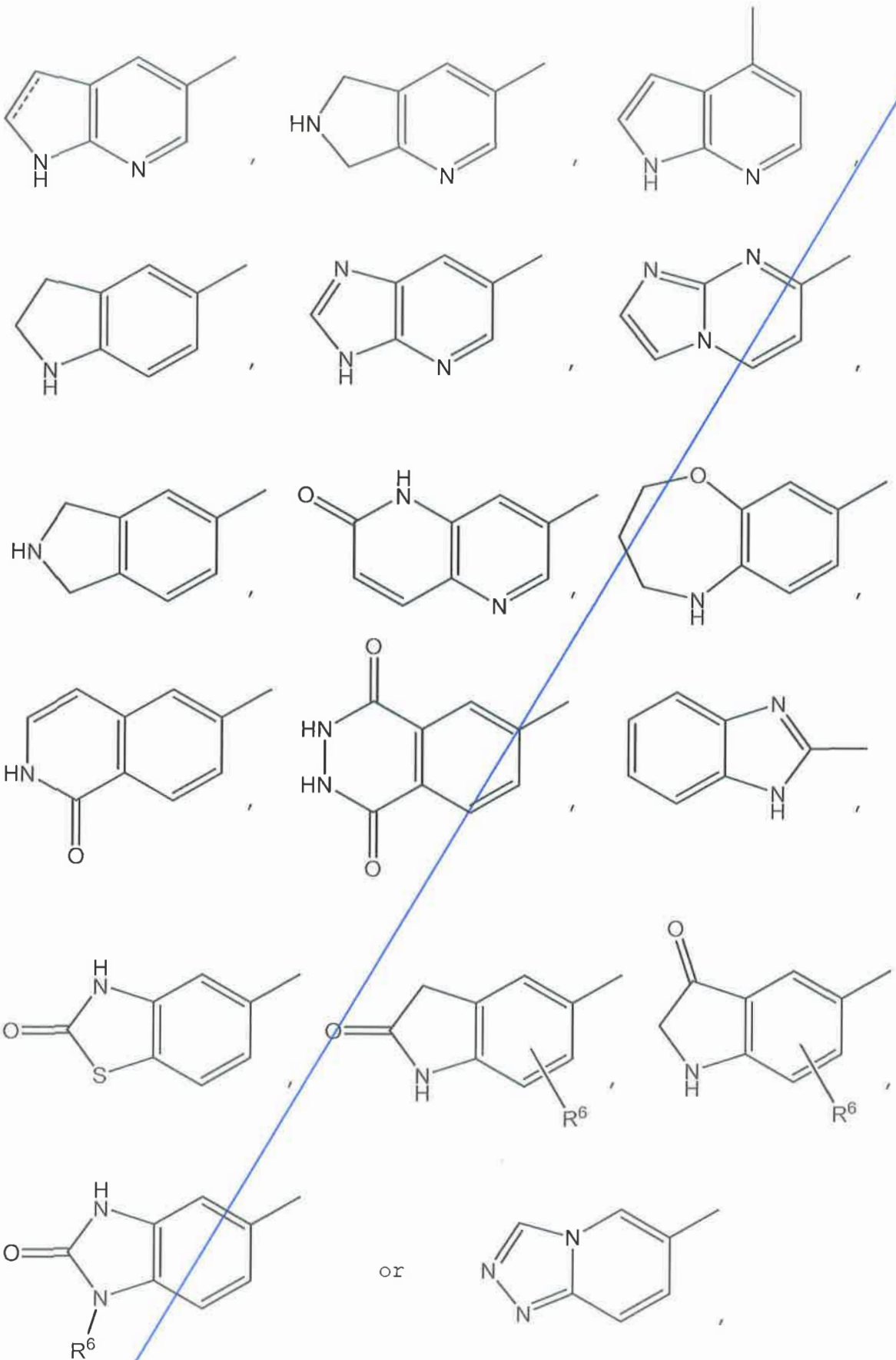


(D)
or


(E)

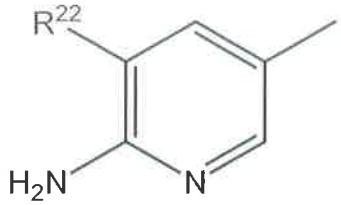
wherein X^3, X^4, R^6 and R' are as defined in claim 1, or a salt thereof.

6. The compound of claim 1, wherein R^3 is a group of the formula



wherein ----- and R^6 are as defined in claim 1, or a salt thereof.

7. The compound of claim 1, wherein R^3 is a group of the formula



wherein R^{22} is

(a) a halogen atom,

(b) cyano,

(c) nitro,

(d) alkyl optionally substituted by 1 to 3 substituents selected from the group consisting of a halogen atom, alkylamino, dialkylamino and hydroxy,

(e) alkenyl, alkynyl,

(f) aryl,

(g) cycloalkyl,

(h) alkoxy,

(i) formyl, or

(j) carbamoyl optionally substituted by alkyl optionally substituted by hydroxyl,

or a salt thereof.

8. The compound of claim 1, wherein R^3 is 5-pyrimidinyl substituted by 1 or 2 substituents selected from the group consisting of amino, alkylamino, dialkylamino and carboxy, or a salt thereof.

9. The compound of claim 1, wherein R^3 is 2-indolyl optionally substituted by 1 or 2 substituents selected from the group consisting of

(a) a halogen atom,

(b) cyano,

(c) nitro,

(d) hydroxy,

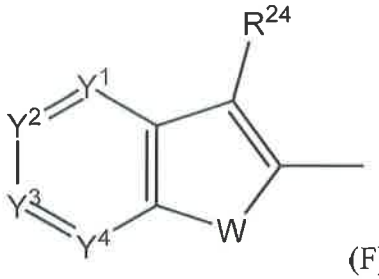
(e) alkyl optionally substituted by 1 to 3 substituents selected from the group consisting of amino, alkoxycarbonylamino, alkylamino and dialkylamino,
(f) alkoxy,
(g) formyl,
(h) carboxy, or
(j) amino optionally substituted by 1 or 2 substituents selected from the group consisting of
(i) alkoxycarbonyl,
(ii) alkylcarbonyl optionally substituted by a substituent selected from the group consisting of
(A) cycloalkyloxy optionally substituted by 1 to 3 alkyl,
(B) alkylamino,
(C) dialkylamino,
(D) a cyclic amino group optionally substituted by alkoxycarbonyl, and
(E) a halogen atom,
(iii) phenylcarbonyl optionally substituted by 1 to 3 substituents selected from the group consisting of alkyl and alkoxy,
(iv) cycloalkylcarbonyl,
(v) a 5- to 10-membered aromatic heterocyclylcarbonyl group optionally substituted by alkyl optionally substituted by 1 to 3 halogen atoms,
(vi) benzylcarbonyl optionally substituted by 1 to 3 substituents selected from the group consisting of a halogen atom and alkoxy,
(vii) arylsulfonyl optionally substituted by alkoxy,
(viii) cycloalkylalkylsulfonyl optionally substituted by 1 to 3 substituents selected from the group consisting of alkyl and oxo,
(ix) a 5- to 10-membered aromatic heterocyclylsulfonyl group optionally substituted by

1 to 3 alkyl, and

(x) $-C(=N-CN)-SR^9$ wherein R^9 is alkyl,

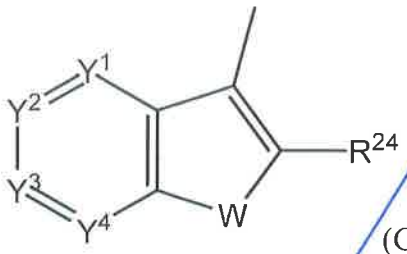
or a salt thereof.

10. The compound of claim 1, wherein R^3 is a group of the formula



(F)

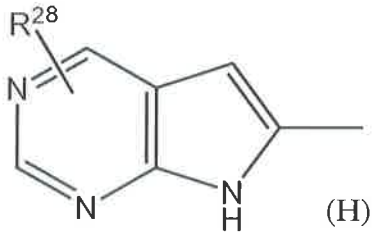
or



(G)

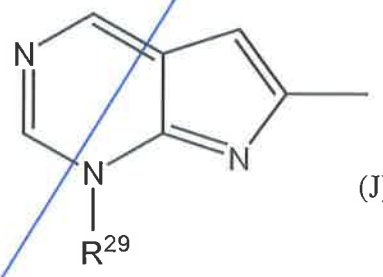
wherein Y^1, Y^2, Y^3, Y^4, W and R^{24} are as defined in claim 1, or a salt thereof.

11. The compound of claim 1, wherein R^3 is a group of the formula



(H)

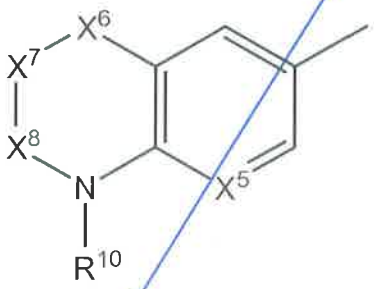
or



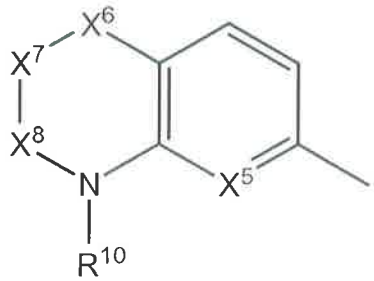
(J)

wherein R^{28} and R^{29} are as defined in claim 1, or a salt thereof.

12. The compound of claim 1, wherein R^3 is a group of the formula



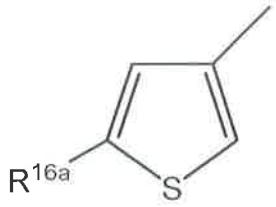
or



wherein X^5, X^6, X^7, X^8 and R^{10} are as defined in claim 1, or a

salt thereof.

13. The compound of claim 1, wherein R^3 is a group of the formula



wherein R^{16a} is

(a) alkyl optionally substituted by 1 to 3 substituents selected from the group consisting of cyano, alkylamino and dialkylamino,

(b) alkenyl optionally substituted by carboxy,

(c) formyl,

(d) carboxy,

(e) carbamoyl,

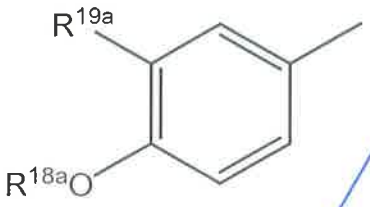
(f) $-C(R^{17})=N-OH$ wherein R^{17} is a hydrogen atom, cyano or hydroxy,

(g) a 5- to 10-membered aromatic heterocyclic group optionally substituted by alkyl, alkoxycarbonyl, carboxy or phenyl, or

(h) cyano,

or a salt thereof.

14. The compound of claim 1, wherein R^3 is a group of the formula



wherein

R^{18a} is alkyl, and

R^{19a} is (a) a halogen atom,

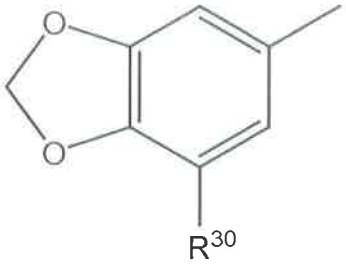
(b) cyano,

(c) alkyl optionally substituted by 1 to 3 substituents

selected from the group consisting of
(i) a halogen atom,
(ii) cyano,
(iii) hydroxy,
(iv) amino,
(v) alkylamino,
(vi) dialkylamino, and
(vii) a cyclic amino group optionally substituted by alkyl,
(d) alkoxy,
(e) amino optionally substituted by 1 or 2 substituents selected from the group consisting of
(i) alkylcarbonyl optionally substituted by a cyclic amino group,
(ii) alkylsulfonyl,
(iii) carbamoyl, and
(iv) alkyl or cycloalkyl,
(f) carboxy,
(g) alkoxycarbonyl,
(h) carbamoyl optionally substituted by alkyl optionally substituted by amino, alkylamino, dialkylamino or alkoxycarbonylamino,
(i) formyl,
(j) a 5- to 10-membered aromatic heterocyclic group optionally substituted by alkyl,
(k) $-CH=N-OR^{21}$ wherein R^{21} is a hydrogen atom or alkyl optionally substituted by alkylamino or dialkylamino, or
(l) nitro,

or a salt thereof.

15. The compound of claim 1, wherein R^3 is a group of the formula



(N)

wherein R^{30} is as defined in claim 1, or a salt thereof.

16. The compound of claim 1, wherein R^3 is naphthyl or isochromenyl, or a salt thereof.

17. The compound of claim 1, wherein R^3 is quinolyl or isoquinolyl, or their oxide derivatives, or a salt thereof.

18. The compound of claim 1, wherein R is a hydrogen atom, or a salt thereof.

19. The compound of claim 1, wherein R^1 is cyclopropyl, 2-fluorocyclopropyl or 2,4-difluorophenyl, or a salt thereof.

20. The compound of claim 1, wherein R^2 is methyl, methoxy or a chlorine atom, or a salt thereof.

21. A pharmaceutical composition comprising a compound of claim 1 or a salt thereof and a pharmaceutically acceptable carrier.

22. An antimicrobial agent comprising a compound of claim 1 or a salt thereof.

23. A compound of claim 1 or a salt thereof for use as a medicament.

24. A compound of claim 1 or a salt thereof for use as an antimicrobial agent.

25. A compound of claim 1 or a salt thereof for use in the

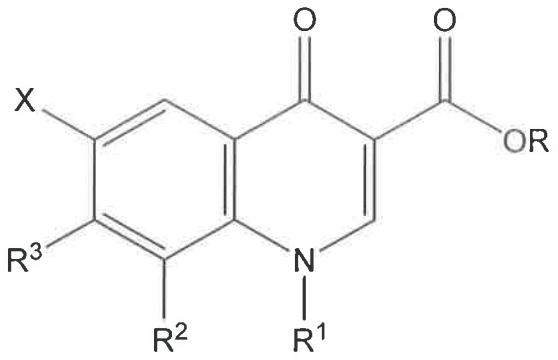
prevention or treatment of a bacterial infection.

26. Use of a compound of claim 1 or a salt thereof for the manufacture of a medicament for preventing or treating a bacterial infection.

27. A method for preventing or treating a bacterial infection which comprises administering an effective amount of a compound of claim 1 or a salt thereof to a human or an animal.

CLAIMS

1. A compound represented by the formula (I)



(I)

wherein

X is a hydrogen atom or a fluorine atom;

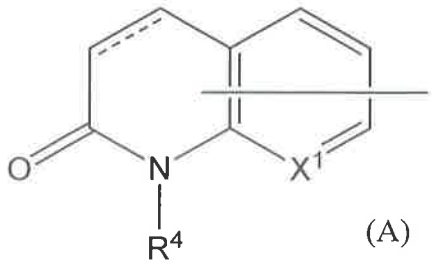
R is a hydrogen atom or alkyl;

R^1 is (1) cyclopropyl optionally substituted by 1 to 3 halogen atoms or (2) phenyl optionally substituted by 1 to 3 halogen atoms;

R^2 is a hydrogen atom; alkyl optionally substituted by 1 or 2 substituents selected from the group consisting of a halogen atom and hydroxyl; alkoxy; haloalkoxy; a halogen atom; cyano; cyclopropyl; nitro; amino; formyl; alkenyl or alkynyl; or

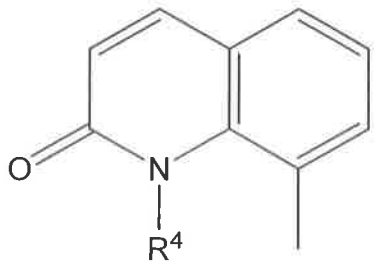
R^1 and R^2 are bonded to form a 5- or 6-membered ring optionally substituted by alkyl;

R^3 is a fused heterocyclic group of the formula



(A)

or



(B)

wherein

------ represents a single bond or a double bond,

X^1 is $C(R^5)$ or N,

R^4 is a hydrogen atom or alkyl, and

R^5 is (a) a hydrogen atom,

(b) a halogen atom,

(c) cyano,
(d) nitro,
(e) hydroxy,
(f) alkyl optionally substituted by 1 to 3 halogen atoms,
(g) alkenyl or alkynyl,
(h) aryl, or
(i) alkoxy optionally substituted by 1 to 3 halogen atoms,

when X^1 is $C(R^5)$, R^4 and R^5 are optionally bonded to form a 5- or 6-membered ring optionally substituted by oxo,
said fused heterocyclic group is optionally substituted by 1 or 2 substituents selected from the group consisting of a halogen atom, cyano, nitro, hydroxy and alkyl,
or a salt thereof.

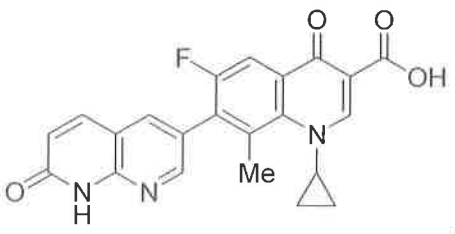
2. The compound of claim 1, wherein X is a fluorine atom, or a salt thereof.

3. The compound of claim 1, wherein R is a hydrogen atom, or a salt thereof.

4. The compound of claim 1, wherein R^1 is cyclopropyl, 2-fluorocyclopropyl or 2,4-difluorophenyl, or a salt thereof.

5. The compound of claim 1, wherein R^2 is methyl, methoxy or a chlorine atom, or a salt thereof.

6. The compound of claim 1, which is a compound represented by the formula



or a salt thereof.

7. A pharmaceutical composition comprising a compound of claim 1 or a salt thereof and a pharmaceutically acceptable carrier.

8. An antimicrobial agent comprising a compound of claim 1 or a salt thereof.

9. A compound of claim 1 or a salt thereof for use as a medicament.

10. A compound of claim 1 or a salt thereof for use as an antimicrobial agent.

11. A compound of claim 1 or a salt thereof for use in the prevention or treatment of a bacterial infection.

12. Use of a compound of claim 1 or a salt thereof for the manufacture of a medicament for preventing or treating a bacterial infection.