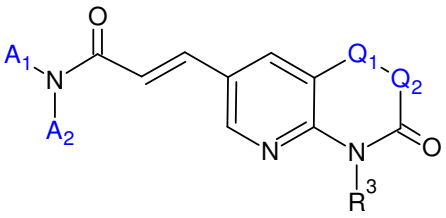
Claims

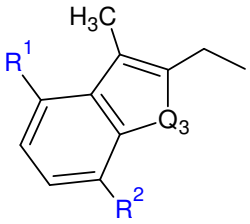
1. Compound, which is selected from the group of compounds represented by general formula I



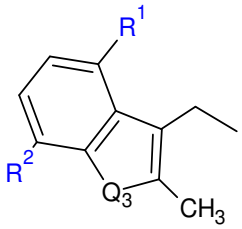
I

wherein

A_1 represents a moiety selected from the groups A_{11} and A_{12} having the following structures



A_{11} and



A_{12} ;

wherein the line connected to the exocyclic methylene group represents a single covalent bond formed with the nitrogen atom of formula I;

A_2 represents a methyl group;

Q_1 represents CH_2 or NH;

Q_2 represents CR^4R^5-CR^6R^7, wherein the CR^4R^5 group binds to Q_1;

Q_3 represents O or S;

R^1 represents a group selected from H, $-NH_2$;

R^2 represents a group selected from H, -O-Ar^1, -O-Het^1, $-NR^9R^{10}$, -O-Alk^1, wherein Ar^1 represents a phenyl group that may optionally be substituted by one or more groups individually selected from -CN, -O-C_{1-4}-alkyl, -O-$(CH_2)_{1-4}$-NR^9R^{10}, or wherein the phenyl group

may carry two substituent groups at adjacent ring atoms such that these adjacent substituent groups may be bonded together to form a 5-membered heterocycle having one or two heteroatoms individually selected from N and O, wherein Het^1 represents an aromatic heterocycle with 5 or 6 ring atoms including 1 or 2 heteroatoms individually selected from N, S and O, or a non-aromatic partially or fully saturated heterocycle with 6 ring atoms including 1 heteroatom selected from N and O, which Het^1 group may optionally be substituted by one or more groups individually selected from -C_{1-4}-alkyl, -O-C_{1-4}-alkyl, -CN, -$(CH_2)_{0-4}$-OH; wherein R^9 is selected from H and -C_{1-4}-alkyl; wherein R^{10} is selected from H, -C_{1-4}-alkyl and –C(=O)-CH_3; wherein Alk^1 represents an alkyl group having 1 to 6 carbon atoms, which is linear, branched, cyclic or a combination thereof, which Alk^1 group may optionally be substituted by one or more groups selected from –OH, -O-alkyl;

R^3 represents a group selected from H, -$PO_3R^{3a}_2$, -CH_2-$OPO_3R^{3a}_2$ and -CH_2-O-C(=O)-R^{3b};

R^{3a} represents a hydrogen atom or a cation suitable for forming a pharmaceutically acceptable salt or -CH_2-O-C(=O)-R^{3b} or -CHMe-O-C(=O)-R^{3b} or-CMe_2-O-C(=O)-R^{3b} or -CH_2-O-C(=O)-O-R^{3b} or -CHMe-O-C(=O)-O-R^{3b} or-CMe_2-O-C(=O)-O-R^{3b};

R^{3b} represents an alkyl group having 1 to 11 carbon atoms, which is linear, branched, cyclic or a combination thereof, which R^{3b} group may optionally be substituted by one or more groups independently selected from –OH, and -O-C_{1-6}-alkyl;

R^4 represents a group selected from H, C_{1-4}-alkyl, CN and C_{1-4}-alkylene-F;

R^5 represents a group selected from H, C_{1-4}-alkyl, C_{1-4}-alkylene-OH, C_{1-4}-alkylene-OR^3, -OH, -$OPO_3R^{3a}_2$;

or R^4 and R^5 together form a cyclic group having 4 to 6 ring members formed by methylene groups and optionally an oxygen atom;

R^6 represents a group selected from H, -OH, C_{1-4}-alkyl, -$OPO_3R^{3a}_2$;

R^7 represents a group selected from H, C_{1-4}-alkyl, C_{1-4}-alkylene-OH, C_{1-4}-alkylene-OR^3, C_{1-4}-alkylene-F, -CN;

with the proviso that at least one of R^6 and R^7 is not H;

or R^6 and R^7 together form a cyclic group having 4 to 6 ring members formed by methylene groups and optionally an oxygen atom; the cyclic group may optionally carry a substituent selected from –OH, -O-alkyl;

R^8 represents a group selected from –O-Ar^2 and –O-Het^2;

wherein Ar^2 represents a phenyl group that may optionally be substituted by one or more groups individually selected from –CN, -O-C_{1-4}-alkyl or wherein the phenyl group may carry two substituent groups at adjacent ring atoms such that these adjacent substituent groups may be bonded together to form a 5-membered heterocycle having one or two heteroatoms

individually selected from N, S and O, wherein said heterocycle may optionally carry one or two substituents selected from oxo, halogen, -O-C_{1-4}-alkyl, C_{1-4}-alkyl, and CN;

and

wherein Het^2 represents an aromatic heterocycle with 5 or 6 ring atoms including 1 or 2 heteroatoms individually selected from N, S and O, which may optionally be substituted by one or more groups individually selected from –O-C_{1-4}-alkyl, -CN, F, C_{1-4}-alkyl, and pharmaceutically acceptable salts thereof.

2. Compound according to claim 1, wherein

R^4 represents a group selected from C_{1-4}-alkyl, CN and C_{1-4}-alkylene-F; and

R^5 represents a group selected from H, C_{1-4}-alkyl, C_{1-4}-alkylene-OH, C_{1-4}-alkylene-OR^3, -OH, $-OPO_3R^{3a}{}_2$;

and the remaining variable groups are as defined in claim 1.

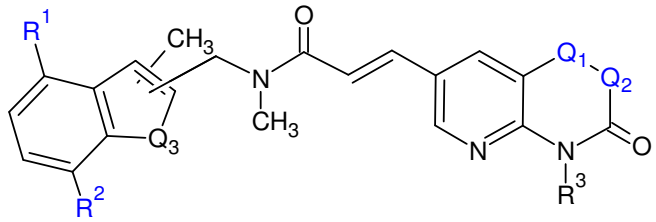
3. Compound according to claim 1, wherein

R^4 represents a group selected from H, C_{1-4}-alkyl, CN and C_{1-4}-alkylene-F; and

R^5 represents a group selected from C_{1-4}-alkyl, C_{1-4}-alkylene-OH, C_{1-4}-alkylene-OR^3, -OH, $-OPO_3R^{3a}{}_2$;

and the remaining variable groups are as defined in claim 1.

4. Compound according to claim 1, 2 or 3 wherein the compound is selected from the group of compounds represented by general formula II



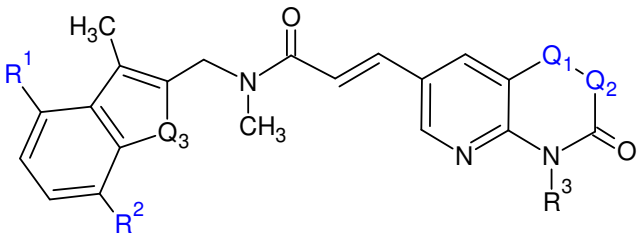
II

wherein

R^1, R^2, R^3, Q_1, Q_2, Q_3 have the same meanings as specified in claim 1, 2 or 3 above;

and wherein the five-membered heterocycle comprising Q_3 is bonded to the methylene-amide moiety at the 2-position and to the methyl group at the 3-position or is bonded to the methylene-amide moiety at the 3-position and to the methyl group at the 2-position.

5. Compound according to claim 4, wherein the compound is selected from the group of compounds represented by general formula III

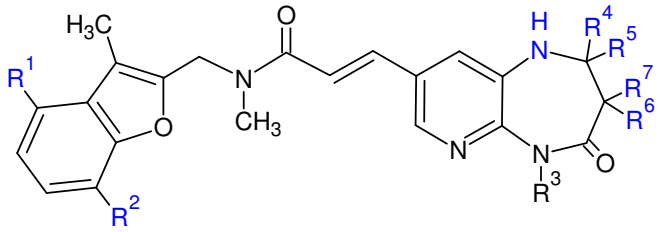


III

wherein

R^1, R^2, R^3, Q_1, Q_2, Q_3 have the same meanings as specified in claim 1, 2 or 3 above.

6. Compound according to claim 5, wherein the compound is selected from the group of compounds represented by general formula VI



VI

wherein

R^1, R^2, R^3, R^4, R^5, R^6 and R^7 have the same meanings as specified in claim 1, 2 or 3 above.

7. Compound according to claim 6, wherein

R^1 represents H, NH_2;

R^2 represents H;

R^3 represents a group selected from H, $-PO_3R^{3a}{}_2$, $-CH_2-OPO_3R^{3a}{}_2$ and $-CH_2-O-C(=O)-R^{3b}$;

R^{3a} represents a hydrogen atom or a cation suitable for forming a pharmaceutically acceptable salt or $-CH_2-O-C(=O)-R^{3b}$ or $-CHMe-O-C(=O)-R^{3b}$ or $-CMe_2-O-C(=O)-R^{3b}$ or $-CH_2-O-C(=O)-O-R^{3b}$ or $-CHMe-O-C(=O)-O-R^{3b}$ or $-CMe_2-O-C(=O)-O-R^{3b}$;

R^{3b} represents an alkyl group having 1 to 11 carbon atoms, which is linear, branched, cyclic or a combination thereof, which R^{3b} group may optionally be substituted by one or more groups independently selected from –OH, and -O-C_{1-6}-alkyl;

R^4 represents H, C_{1-4}-alkyl; and

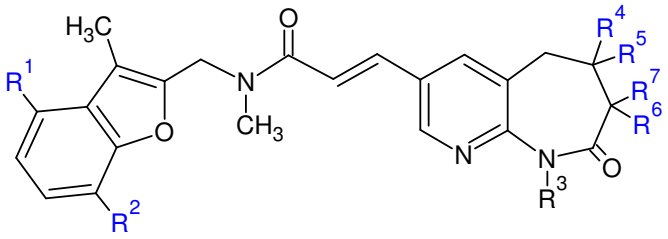
R^5 represents H, C_{1-4}-alkyl, C_{1-4}-alkylene-OR^3;

R^6 represents H, C_{1-4}-alkyl, OH, -$OPO_3R^{3a}_2$; and

R^7 represents H, C_{1-4}-alkyl, C_{1-4}-alkylene-OH, C_{1-4}-alkylene-OR^3, wherein R^3 is as specified above, C_{1-4}-alkylene-F;

with the proviso that at least one of R^6 and R^7 is not H.

8. Compound according to claim 5, wherein the compound is selected from the group of compounds represented by general formula VII



VII

wherein

R^1, R^2, R^3, R^6 and R^7 have the same meanings as specified in claim 1, 2 or 3 above.

9. Compound according to claim 8, wherein

R^1 represents H, NH_2;

R^2 represents H;

R^3 represents a group selected from H, -$PO_3R^{3a}_2$, -CH_2-$OPO_3R^{3a}_2$ and -CH_2-O-C(=O)-R^{3b};

R^{3a} represents a hydrogen atom or a cation suitable for forming a pharmaceutically acceptable salt or -CH_2-O-C(=O)-R^{3b} or -CHMe-O-C(=O)-R^{3b} or-CMe_2-O-C(=O)-R^{3b} or -CH_2-O-C(=O)-O-R^{3b} or -CHMe-O-C(=O)-O-R^{3b} or-CMe_2-O-C(=O)-O-R^{3b};

R^{3b} represents an alkyl group having 1 to 11 carbon atoms, which is linear, branched, cyclic or a combination thereof, which R^{3b} group may optionally be substituted by one or more groups independently selected from –OH, and -O-C_{1-6}-alkyl;

R^4 represents H, C_{1-4}-alkyl; and

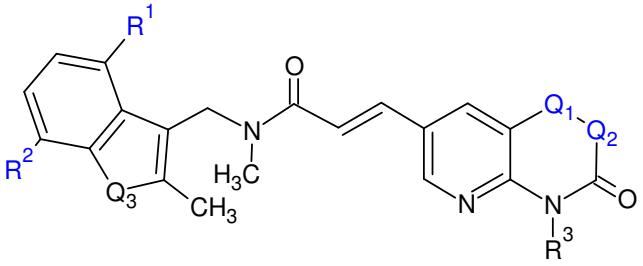
R^5 represents H, C_{1-4}-alkyl, C_{1-4}-alkylene-OR^3;

R^6 represents H, C_{1-4}-alkyl, OH, -$OPO_3R^{3a}_2$; and

R^7 represents H, C_{1-4}-alkyl, C_{1-4}-alkylene-OH, C_{1-4}-alkylene-OR^3, wherein R^3 is as specified above, C_{1-4}-alkylene-F;

with the proviso that at least one of R6 and R7 is not H.

10. Compound according to claim 4, wherein the compound is selected from the group of compounds represented by general formula VIII

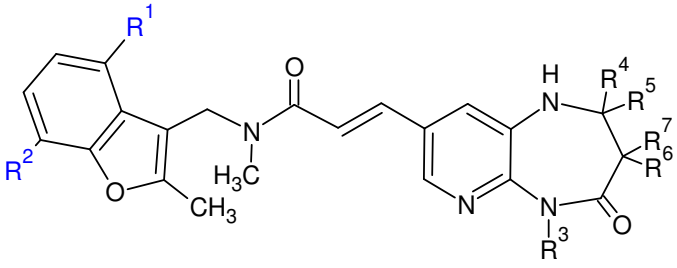


VIII

wherein

R^1, R^2, R^3, Q_1, Q_2, Q_3 have the same meanings as specified in claim 1, 2 or 3 above.

11. Compound according to claim 9, wherein the compound is selected from the group of compounds represented by general formula XI



XI

wherein

R^1, R^2, R^3, R^4, R^5, R^6 and R^7 have the same meanings as specified in claim 1, 2 or 3 above.

12. Compound according to claim 11, wherein

R^1 represents H;

R^2 represents a group selected from H, -O-Ar^1, -O-Het^1, -NH_2, wherein Ar^1 represents a phenyl group that may optionally be substituted by one or more groups individually selected from -CN, -O-C_{1-4}-alkyl, or wherein the phenyl group may carry two substituent groups at adjacent ring atoms such that these adjacent substituent groups may be bonded together to form a 5-membered heterocycle having one or two heteroatoms individually selected from N and O, wherein Het^1 represents an aromatic heterocycle with 5 or 6 ring atoms including 1 or 2 heteroatoms individually selected from N, S and O, or a non-aromatic partially or fully saturated heterocycle with 6 ring atoms including 1 heteroatom selected from N, S and O, which Het^1 group may optionally be substituted by one or more groups individually selected from -C_{1-4}-alkyl, -O-C_{1-4}-alkyl, -CN;

R^3 represents a group selected from H, -$PO_3R^{3a}{}_2$, -CH_2-$OPO_3R^{3a}{}_2$ and -CH_2-O-C(=O)-R^{3b};

R^{3a} represents a hydrogen atom or a cation suitable for forming a pharmaceutically acceptable salt or -CH_2-O-C(=O)-R^{3b} or -CHMe-O-C(=O)-R^{3b} or-CMe_2-O-C(=O)-R^{3b} or -CH_2-O-C(=O)-O-R^{3b} or -CHMe-O-C(=O)-O-R^{3b} or-CMe_2-O-C(=O)-O-R^{3b};

R^{3b} represents an alkyl group having 1 to 11 carbon atoms, which is linear, branched, cyclic or a combination thereof, which R^{3b} group may optionally be substituted by one or more groups independently selected from –OH, and -O-C_{1-6}-alkyl;

R^4 represents H, C_{1-4}-alkyl; and

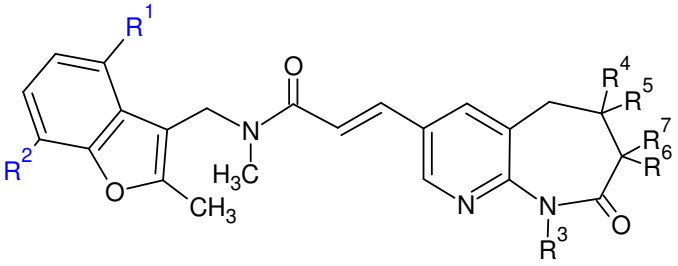
R^5 represents H, C_{1-4}-alkyl, C_{1-4}-alkylene-OR^3.

R^6 represents H, C_{1-4}-alkyl, OH, -$OPO_3R^{3a}{}_2$; and

R^7 represents H, C_{1-4}-alkyl, C_{1-4}-alkylene-OH, C_{1-4}-alkylene-OR^3, wherein R^3 is as specified above, C_{1-4}-alkylene-F;

with the proviso that at least one of R^6 and R^7 is not H.

13. Compound according to claim 10, wherein the compound is selected from the group of compounds represented by general formula XII



XII

wherein

R^1, R^2, R^3, R^6 and R^7 have the same meanings as specified in claim 1, 2 or 3 above.

14. Compound according to claim 13, wherein

R^1 represents H;

R^2 represents a group selected from H, -O-Ar^1, -O-Het^1, -NH_2, wherein Ar^1 represents a phenyl group that may optionally be substituted by one or more groups individually selected from -CN, -O-C_{1-4}-alkyl, or wherein the phenyl group may carry two substituent groups at adjacent ring atoms such that these adjacent substituent groups may be bonded together to form a 5-membered heterocycle having one or two heteroatoms individually selected from N and O, wherein Het^1 represents an aromatic heterocycle with 5 or 6 ring atoms including 1 or 2 heteroatoms individually selected from N, S and O, or a non-aromatic partially or fully saturated heterocycle with 6 ring atoms including 1 heteroatom selected from N, S and O, which Het^1 group may optionally be substituted by one or more groups individually selected from -C_{1-4}-alkyl, -O-C_{1-4}-alkyl, -CN;

R^3 represents a group selected from H, -$PO_3R^{3a}_2$, -CH_2-$OPO_3R^{3a}_2$ and -CH_2-O-C(=O)-R^{3b};

R^{3a} represents a hydrogen atom or a cation suitable for forming a pharmaceutically acceptable salt or -CH_2-O-C(=O)-R^{3b} or -CHMe-O-C(=O)-R^{3b} or-CMe_2-O-C(=O)-R^{3b} or -CH_2-O-C(=O)-O-R^{3b} or -CHMe-O-C(=O)-O-R^{3b} or-CMe_2-O-C(=O)-O-R^{3b};

R^{3b} represents an alkyl group having 1 to 11 carbon atoms, which is linear, branched, cyclic or a combination thereof, which R^{3b} group may optionally be substituted by one or more groups independently selected from –OH, and -O-C_{1-6}-alkyl;

R^4 represents H, C_{1-4}-alkyl; and

R^5 represents H, C_{1-4}-alkyl, C_{1-4}-alkylene-OR^3.

R^6 represents H, C_{1-4}-alkyl, OH, -$OPO_3R^{3a}_2$; and

R^7 represents H, C_{1-4}-alkyl, C_{1-4}-alkylene-OH, C_{1-4}-alkylene-OR^3, wherein R^3 is as specified above, C_{1-4}-alkylene-F;

with the proviso that at least one of R^6 and R^7 is not H.

15. Pharmaceutical composition comprising the compound of any one of claims 1 to 14.

16. Use of a compound according to any one of claims 1 to 14 or pharmaceutical composition according to claim 15 in the manufacture of a medicament for the treatment of a bacterial infection selected from infections by N. gonorrhoeae and Chlamydia trachomatis.

17. Use of a compound or a pharmaceutical composition according to claim 16, wherein the infection is by N. gonorrhoeae alone or in combination with Chlamydia trachomatis.