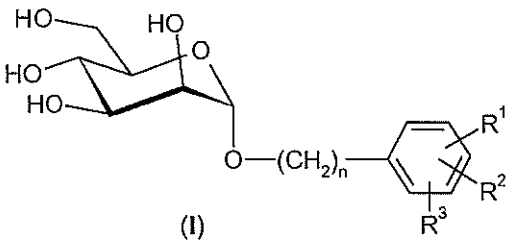
Claims

1. A compound of formula (I)



(I)

wherein

n is 0, 1 or 2;

R^1 is phenyl connected to the phenyl ring of formula (I) in meta- or para-position and substituted by one, two or three substituents selected from the group consisting of lower alkyl, halo-lower alkyl, hydroxy-lower alkyl, lower alkoxy-lower alkyl, optionally substituted alkenyl, optionally substituted alkinyl, cyclohexyl, cyclopropyl, aryl, heteroaryl, heterocyclyl;

para-hydroxy, lower alkoxy, halo-lower alkoxy, lower alkoxy-lower alkoxy, cycloalkyloxy, hydroxysulfonyloxy;

mercapto, alkylmercapto, hydroxysulfinyl, alkylsulfinyl, halo-lower alkylsulfinyl, hydroxysulfonyl, alkylsulfonyl, arylsulfonyl, heteroarylsulfonyl, aminosulfonyl wherein amino is unsubstituted or substituted by one or two substitutents selected from lower alkyl, cycloalkyl-lower alkyl, hydroxy-lower alkyl, lower alkoxy-lower alkyl, optionally substituted phenyl-lower alkyl and optionally substituted heteroaryl-lower alkyl, or wherein the two substituents on nitrogen form together with the nitrogen heterocyclyl;

amino optionally substituted by one or two substitutents selected from lower alkyl, cycloalkyl-lower alkyl, hydroxy-lower alkyl, lower alkoxy-lower alkyl and di-lower alkylamino-lower alkyl, or by one substituent cycloalkyl, optionally substituted phenyl, optionally substituted heteroaryl, alkylcarbonyl, optionally substituted phenylcarbonyl, optionally substituted pyridylcarbonyl, alkoxycarbonyl or aminocarbonyl, or wherein the two substituents on nitrogen form together with the nitrogen heterocyclyl;

carboxymethylamino or lower alkoxycarbonylmethylamino substituted at the methyl group such that the resulting substituent corresponds to one of the 20 naturally occurring standard amino acids, aminomethylcarbonylamino substituted at the methyl group such that the resulting acyl group corresponds to one of the 20 naturally occurring standard amino acids;

lower alkylcarbonyl, halo-lower alkylcarbonyl, para-carboxy, lower alkoxycarbonyl, lower alkoxy-lower alkoxycarbonyl; aminocarbonyl wherein amino is unsubstituted or substituted by one hydroxy or amino group or one or two substitutents selected from lower alkyl, hydroxy-lower alkyl, lower alkoxy-lower alkyl, optionally substituted phenyl-lower alkyl and optionally substituted heteroaryl-lower alkyl, or wherein the two substituents on nitrogen form together with the nitrogen heterocyclyl;
cyano, halogen, and nitro;
and wherein two substituents in ortho-position to each other can form a 5- or 6-membered heterocyclic ring containing one or two oxygen atoms and/or one or two nitrogen atoms, wherein the nitrogen atoms are optionally substituted by lower alkyl, lower alkoxy-lower alkyl or lower alkylcarbonyl;

or R^1 is aryl other than optionally substituted phenyl, heteroaryl, heterocyclyl with 5 or more atoms, optionally substituted phenylamino, or optionally substituted phenyl-thioureido; and

R^2 and R^3 are, independent of each other, hydrogen, lower alkyl, halo-lower alkyl, hydroxy-lower alkyl, lower alkoxy-lower alkyl, optionally substituted alkenyl, optionally substituted alkinyl, cycloalkyl, hydroxy, lower alkoxy, halo-lower alkoxy, lower alkoxy-lower alkoxy, phenoxy, hydroxysulfonyloxy; mercapto, alkylmercapto, hydroxysulfinyl, alkyl-sulfinyl, halo-lower alkylsulfinyl, hydroxysulfonyl, alkylsulfonyl, arylsulfonyl, heteroaryl-sulfonyl, aminosulfonyl, amino optionally substituted by one or two substitutents selected from lower alkyl, hydroxy-lower alkyl, lower alkoxy-lower alkyl; lower alkylcarbonylamino, alkoxycarbonylamino, benzoylamino, pyridinylcarbonylamino, carboxymethylamino or lower alkoxycarbonylmethylamino substituted at the methyl group such that the resulting substituent corresponds to one of the 20 naturally occurring standard amino acids, aminomethylcarbonylamino substituted at the methyl group such that the resulting acyl group corresponds to one of the 20 naturally occurring standard amino acids; carboxy, lower alkylcarbonyl, benzoyl, pyridinecarbonyl, pyrimidinecarbonyl, lower alkoxycarbonyl, aminocarbonyl, wherein amino is unsubstituted or substituted by one hydroxy or amino group or one or two substitutents selected from lower alkyl, hydroxy-lower alkyl or lower alkoxy-lower alkyl; tetrazolyl, cyano, halogen, or nitro; or wherein two substituents in ortho-position to each other form a 5- or 6-membered heterocyclic ring containing one or two oxygen atoms and/or one or two nitrogen atoms, wherein the nitrogen atoms are optionally substituted by lower alkyl, lower alkoxy-lower alkyl or lower alkylcarbonyl; and prodrugs and salts thereof.

2. The compound according to claim 1 of formula (I) wherein n is 0 or 1; and prodrugs and salts thereof.

3. The compound according to claim 1 of formula (I) wherein n is 0; and prodrugs and salts thereof.

4. The compound according to claim 1, 2 or 3 of formula (I) wherein R^1 is

meta- or para-phenyl substited by lower alkyl, halo-lower alkyl, lower alkoxy-lower alkyl, cyclopropyl, para-hydroxy, lower alkoxy, halo-lower alkoxy, lower alkoxy-lower alkoxy, phenoxy, methylenedioxy, hydroxysulfonyloxy, hydroxysulfonyl, aminosulfonyl, lower alkylaminosulfonyl, di-lower alkyaminosulfonyl, lower alkylsulfonyl, amino, lower alkyl-carbonylamino, benzoylamino, pyridylcarbonylamino, carboxymethylamino or lower alkoxycarbonylmethylamino substituted at the methyl group such that the resulting substituent corresponds to one of the 20 naturally occurring standard amino acids, aminomethylcarbonylamino substituted at the methyl group such that the resulting acyl group corresponds to one of the 20 naturally occurring standard amino acids; para-carboxy, lower alkoxycarbonyl, aminocarbonyl, morpholinocarbonyl, pyrrolidinocarbonyl, piperidinocarbonyl, hydroxylaminocarbonyl, tetrazolyl, halo, cyano or nitro;

optionally substituted 1-naphthyl, optionally substituted 2-naphthyl, optionally substituted indanyl, or optionally substituted dihydro- or tetrahydronaphthyl;

pyrrolyl, thienyl, furyl, pyrazolyl, imidazolyl, triazolyl, tetrazolyl, oxazolyl, isoxazolyl, oxadiazolyl, thiazolyl, isothiazolyl, thiadiazolyl, pyridyl, pyridazinyl, pyrimidinyl, pyrazinyl, indolyl, benzimidazolyl, benzofuryl, pyridopyrrolyl, pyridoimidazolyl, quinolinyl, isoquinolinyl, quinazolinyl, or purinyl, all optionally substituted;

pyrrolidinyl, oxazolidinyl, thiazolidinyl, piperidinyl, morpholinyl, piperazinyl, dioxolanyl, tetrahydrofuranyl, tetrahydropyranyl, indolinyl, isoindolinyl, benzoxazolidinyl, benzothiazolidinyl, tetrahydroquinolinyl, or benzodihydrofuryl, all optionally substituted;

optionally substituted phenylamino, or optionally substituted phenylthioureido; and

prodrugs and salts thereof.

5. The compound according to anyone of claims 1 to 4 wherein R^2 and R^3 are hydrogen, lower alkyl, halo-lower alkyl, cyclopropyl, lower alkoxy, lower alkoxy-lower alkoxy, phenoxy, hydroxysulfonyl, aminosulfonyl, amino, lower alkylcarbonylamino, benzoylamino, carboxymethylamino or lower alkoxycarbonylmethylamino substituted at the methyl group such that the resulting substituent corresponds to one of the 20 naturally occurring standard amino acids, aminomethylcarbonylamino substituted at the methyl group such that the resulting acyl group corresponds to one of the 20 naturally occurring standard amino acids; carboxy, lower alkoxycarbonyl, aminocarbonyl, hydroxylaminocarbonyl, tetrazolyl, halo, cyano or nitro; and
prodrugs and salts thereof.

6. The compound according to anyone of claims 1 to 4 wherein R^2 and R^3 are hydrogen, lower alkoxy, or halo; and prodrugs and salts thereof.

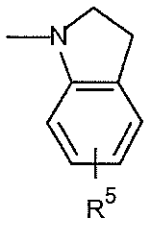
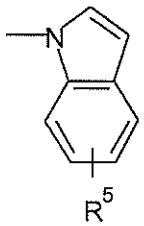
7. The compound according to anyone of claims 1 to 6 of formula (I) wherein R^1 is a residue of formula (A) connected to the phenyl ring of formula (I) in meta- or para-position



(A)

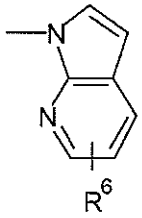
wherein R^4 is trifluoromethyl, cylcopropyl, para-hydroxy, lower alkoxy, lower alkoxy-lower alkoxy, phenoxy, hydroxysulfonyl, aminosulfonyl, lower alkylaminosulfonyl, di-lower alkylaminosulfonyl, lower alkylsulfonyl, amino, lower alkylcarbonylamino, benzoylamino, carboxymethylamino or lower alkoxycarbonylmethylamino substituted at the methyl group such that the resulting substituent corresponds to one of the 20 naturally occurring standard amino acids, aminomethylcarbonylamino substituted at the methyl group such that the resulting acyl group corresponds to one of the 20 naturally occurring standard amino acids, para-carboxy, lower alkoxycarbonyl, aminocarbonyl, morpholinocarbonyl, pyrrolidinocarbonyl, piperidinocarbonyl, hydroxylaminocarbonyl, tetrazolyl, nitro, cyano, or halo;
and wherein the phenyl ring of formula (A) may be further substituted by chloro or fluoro;

or of formula (B) or (C)


(B)

(C)

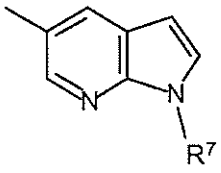
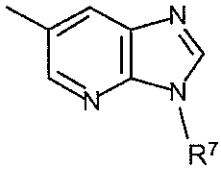
wherein R^5 is hydrogen, trifluoromethyl, cylcopropyl, lower alkoxy, lower alkoxy-lower alkoxy, phenyl-lower alkoxy, phenoxy, hydroxysulfonyl, aminosulfonyl, lower alkylsulfonyl, amino, lower alkylcarbonylamino, benzoylamino, carboxymethylamino or lower alkoxycarbonylmethylamino substituted at the methyl group such that the resulting substituent corresponds to one of the 20 naturally occurring standard amino acids, aminomethylcarbonylamino substituted at the methyl group such that the resulting acyl group corresponds to one of the 20 naturally occurring standard amino acids, carboxy, lower alkoxycarbonyl, aminocarbonyl, hydroxylaminocarbonyl, tetrazolyl, nitro, cyano, or halo;

or of formula (D)


(D)

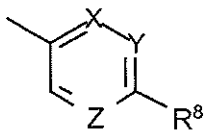
wherein R^6 is hydrogen, trifluoromethyl, cylcopropyl, lower alkoxy, lower alkoxy-lower alkoxy, phenoxy, hydroxysulfonyl, aminosulfonyl, lower alkylsulfonyl, amino, lower alkylcarbonylamino, benzoylamino, carboxymethylamino or lower alkoxycarbonylmethyl-amino substituted at the methyl group such that the resulting substituent corresponds to one of the 20 naturally occurring standard amino acids, aminomethylcarbonylamino substituted at the methyl group such that the resulting acyl group corresponds to one of the 20 naturally occurring standard amino acids, carboxy, lower alkoxycarbonyl, aminocarbonyl, hydroxylaminocarbonyl, tetrazolyl, nitro, cyano, or halo;

or of formula (E) or (F)


(E)

(F)

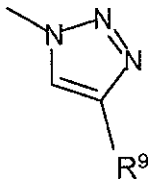
wherein R^7 is hydrogen, lower alkyl, lower alkoxy-lower alkyl, lower alkylcarbonyl, optionally substituted phenylcarbonyl, or aminomethylcarbonyl substituted at the methyl group such that the resulting acyl group corresponds to one of the 20 naturally occurring standard amino acids;

or of formula (G)


(G)

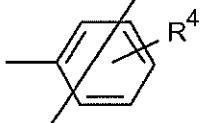
wherein R^8 is carboxy or lower alkoxycarbonyl; X or Y or Z, or X and Z, or Y and Z are nitrogen atoms and the other atoms X, Y and Z are carbon atoms;

or of formula (H)


(H)

wherein R^9 is carboxy or lower alkoxycarbonyl; and
prodrugs and pharmaceutically acceptable salts thereof.

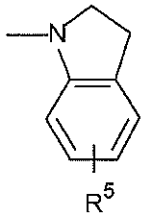
8. The compound according to anyone of claims 1 to 6 of formula (I) wherein R^1 is a residue of formula (A) connected to the phenyl ring of formula (I) in meta- or para-position

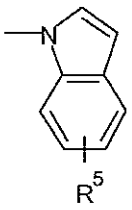

(A)

wherein R^4 is para-hydroxy, aminosulfonyl, lower alkylaminosulfonyl, di-lower alkylamino-sulfonyl, lower alkylsulfonyl, amino, lower alkylcarbonylamino, para-carboxy, lower alkoxycarbonyl, aminocarbonyl, morpholinocarbonyl, pyrrolidinocarbonyl, piperidino-carbonyl, tetrazolyl, nitro, cyano, or halo;

and wherein the phenyl ring of formula (A) may be further substituted by chloro or fluoro;

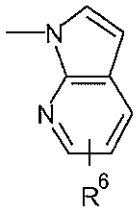
or of formula (B) or (C)


(B)


(C)

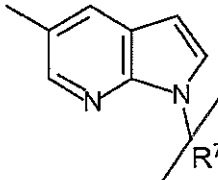
wherein R^5 is hydrogen, trifluoromethyl, lower alkoxy, such as methoxy, benzyloxy, amino, carboxy, lower alkoxycarbonyl, tetrazolyl, nitro, cyano, or halo;

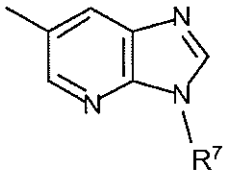
or of formula (D)


(D)

wherein R^6 is hydrogen, trifluoromethyl, lower alkoxy, such as methoxy, carboxy, lower alkoxycarbonyl, tetrazolyl, nitro, cyano, or halo;

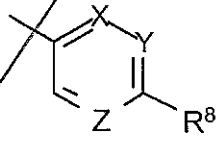
or of formula (E) or (F)


(E)


(F)

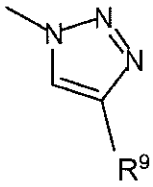
wherein R^7 is hydrogen or lower alkyl, such as methyl;

or of formula (G)


(G)

wherein R^8 is carboxy or lower alkoxycarbonyl; X or Y or Z, or X and Z, or Y and Z are nitrogen atoms and the other atoms X, Y and Z are carbon atoms;

or of formula (H)

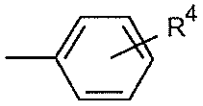


(H)

wherein R^9 is carboxy or lower alkoxycarbonyl; and

prodrugs and pharmaceutically acceptable salts thereof.

9. The compound according to anyone of claims 1 to 6 of formula (**I**) wherein R^1 is a residue of formula (A) connected to the phenyl ring of formula (**I**) in meta- or para-position

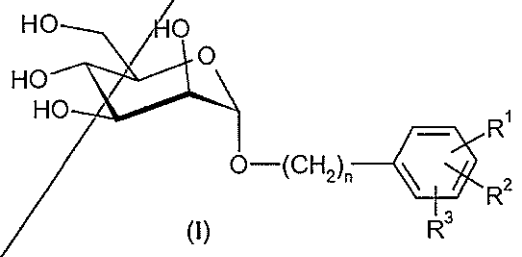


(A)

wherein R^4 is para-hydroxy, aminosulfonyl, lower alkylaminosulfonyl, di-lower alkylamino-sulfonyl, lower alkylsulfonyl, amino, lower alkylcarbonylamino, para-carboxy, lower alkoxycarbonyl, aminocarbonyl, morpholinocarbonyl, pyrrolidinocarbonyl, piperidino-carbonyl, tetrazolyl, nitro, cyano, or halo;
and wherein the phenyl ring of formula (A) may be further substituted by chloro or fluoro;
and prodrugs and pharmaceutically acceptable salts thereof.

10. The prodrug of a compound according to anyone of claims 1 to 10 which is the tetraacetate.

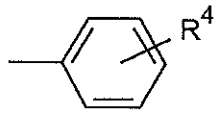
11. A compound of formula (**I**)



(I)

wherein
n is 0, 1 or 2;

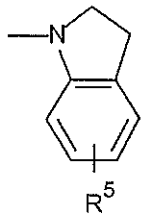
R^1 is a residue of formula (A)



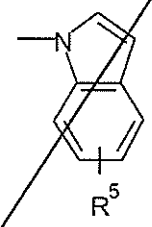
(A)

wherein R^4 is hydrogen, trifluoromethyl, cylcopropyl, lower alkoxy, lower alkoxy-lower alkoxy, phenoxy, hydroxysulfonyl, aminosulfonyl, lower alkylsulfonyl, amino, lower alkylcarbonylamino, benzoylamino, carboxymethylamino or lower alkoxycarbonylmethyl-amino substituted at the methyl group such that the resulting substituent corresponds to one of the 20 naturally occurring standard amino acids, aminomethylcarbonylamino substituted at the methyl group such that the resulting acyl group corresponds to one of the 20 naturally occurring standard amino acids, carboxy, lower alkoxycarbonyl, aminocarbonyl, hydroxylaminocarbonyl, tetrazolyl, nitro, cyano, or halo;

or of formula (B) or (C)



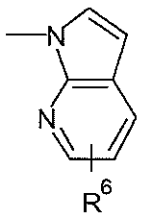
(B)



(C)

wherein R^5 is hydrogen, trifluoromethyl, cylcopropyl, lower alkoxy, lower alkoxy-lower alkoxy, phenoxy, hydroxysulfonyl, aminosulfonyl, lower alkylsulfonyl, amino, lower alkylcarbonylamino, benzoylamino, carboxymethylamino or lower alkoxycarbonylmethyl-amino substituted at the methyl group such that the resulting substituent corresponds to one of the 20 naturally occurring standard amino acids, aminomethylcarbonylamino substituted at the methyl group such that the resulting acyl group corresponds to one of the 20 naturally occurring standard amino acids, carboxy, lower alkoxycarbonyl, aminocarbonyl, hydroxylaminocarbonyl, tetrazolyl, nitro, cyano, or halo;

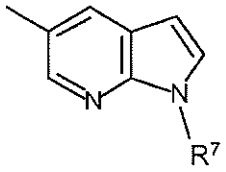
or of formula (D)



(D)

wherein R^6 is hydrogen, trifluoromethyl, cylcopropyl, lower alkoxy, lower alkoxy-lower alkoxy, phenoxy, hydroxysulfonyl, aminosulfonyl, lower alkylsulfonyl, amino, lower alkylcarbonylamino, benzoylamino, carboxymethylamino or lower alkoxycarbonylmethyl-amino substituted at the methyl group such that the resulting substituent corresponds to one of the 20 naturally occurring standard amino acids, aminomethylcarbonylamino substituted at the methyl group such that the resulting acyl group corresponds to one of the 20 naturally occurring standard amino acids, carboxy, lower alkoxycarbonyl, aminocarbonyl, hydroxylaminocarbonyl, tetrazolyl, nitro, cyano, or halo;

or of formula (E)



(E)

wherein R^7 is hydrogen, lower alkyl, lower alkoxy-lower alkyl, lower alkylcarbonyl, optionally substituted phenylcarbonyl, or aminomethylcarbonyl substituted at the methyl group such that the resulting acyl group corresponds to one of the 20 naturally occurring standard amino acids;
prodrugs and salts thereof
for use in the prevention and treatment of infectious diseases.

12. The compound according to claim 11, prodrugs and pharmaceutically acceptable salts thereof for use in the prevention and treatment of urinary tract infections caused by virulent strains of *E.coli*.

13. A process for the manufacture of a compound according to anyone of claims 1 to 12, wherein a compound of formula (I), wherein the hydroxy functions of the α-D-manno-pyranoside are protected and wherein R^1 is halogen, is condensed with a reagent replacing halogen by aryl, heteroaryl of heterocyclyl, the protective groups are removed, and, if so desired, an obtainable compound of formula (I) is converted into another

compound of formula (I), compound of formula (I) is converted into a prodrug, a free compound of formula (I) is converted into a salt, an obtainable salt of a compound of formula (I) is converted into the free compound or another salt, and/or a mixture of isomeric compounds of formula (I) is separated into the individual isomers.

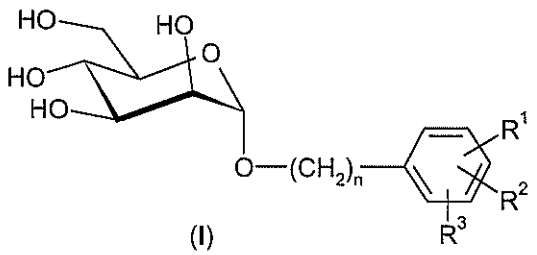
14. A pharmaceutical composition comprising a compound according to anyone of claims 1 to 12.

15. A method of treating a mammal having a bacterial infection comprising administering a compound according to anyone of claims 1 to 12 in a therapeutically effective amount to a mammal in need thereof.

16. A method of preventing a bacterial infection in a mammal comprising administering a compound according to anyone of claims 1 to 12 in a prophylactically effective amount to a mammal in need thereof.

Claims

1. A compound of formula (I)

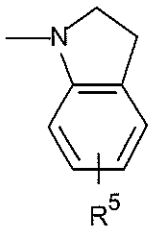


(I)

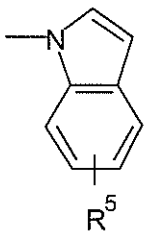
wherein

n is 0, 1 or 2;

R^1 is a residue of formula (B) or (C)



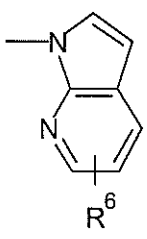
(B)



(C)

wherein R^5 is hydrogen, trifluoromethyl, cylcopropyl, C1-C4-alkoxy, C1-C4-alkoxy-C1-C4-alkoxy, phenyl-C1-C4- alkoxy, phenoxy, hydroxysulfonyl, aminosulfonyl, C1-C4-alkylsulfonyl, amino, C1-C4-alkylcarbonylamino, benzoylamino, carboxymethylamino or C1-C4-alkoxycarbonylmethylamino substituted at the methyl group such that the resulting substituent corresponds to one of the 20 naturally occurring standard amino acids, aminomethylcarbonylamino substituted at the methyl group such that the resulting acyl group corresponds to one of the 20 naturally occurring standard amino acids, carboxy, C1-C4-alkoxycarbonyl, aminocarbonyl, hydroxylaminocarbonyl, tetrazolyl, nitro, cyano, or halo;

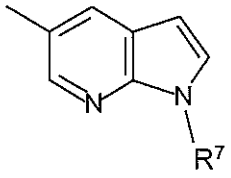
or of formula (D)



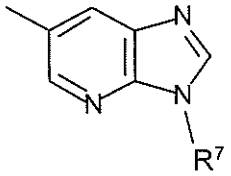
(D)

wherein R^6 is hydrogen, trifluoromethyl, cylcopropyl, C1-C4-alkoxy, C1-C4-alkoxy-C1-C4-alkoxy, phenoxy, hydroxysulfonyl, aminosulfonyl, C1-C4-alkylsulfonyl, amino, C1-C4-alkylcarbonylamino, benzoylamino, carboxymethylamino or C1-C4-alkoxycarbonylmethyl-amino substituted at the methyl group such that the resulting substituent corresponds to one of the 20 naturally occurring standard amino acids, aminomethylcarbonylamino substituted at the methyl group such that the resulting acyl group corresponds to one of the 20 naturally occurring standard amino acids, carboxy, C1-C4-alkoxycarbonyl, aminocarbonyl, hydroxylaminocarbonyl, tetrazolyl, nitro, cyano, or halo;

or of formula (E) or (F)



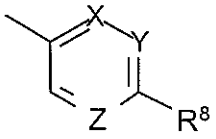
(E)



(F)

wherein R^7 is hydrogen, C1-C4-alkyl, C1-C4-alkoxy-C1-C4-alkyl, C1-C4-alkylcarbonyl, phenylcarbonyl, or aminomethylcarbonyl substituted at the methyl group such that the resulting acyl group corresponds to one of the 20 naturally occurring standard amino acids;

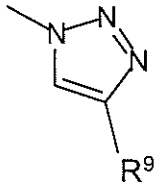
or of formula (G)



(G)

wherein R^8 is carboxy or C1-C4-alkoxycarbonyl; X or Y or Z, or X and Z, or Y and Z are nitrogen atoms and the other atoms X, Y and Z are carbon atoms;

or of formula (H)



(H)

wherein R^9 is carboxy or C1-C4-alkoxycarbonyl;

R^2 and R^3 are, independent of each other, hydrogen, C1-C4-alkyl, halo-C1-C4-alkyl, hydroxy-C1-C4-alkyl, C1-C4-alkoxy-C1-C4-alkyl, alkenyl, alkinyl, cycloalkyl, hydroxy, C1-

C4-alkoxy, halo-C1-C4-alkoxy, C1-C4-alkoxy-C1-C4-alkoxy, phenoxy, hydroxysulfonyloxy; mercapto, alkylmercapto, hydroxysulfinyl, alkylsulfinyl, halo-C1-C4-alkylsulfinyl, hydroxysulfonyl, alkylsulfonyl, arylsulfonyl, heteroarylsulfonyl, aminosulfonyl, amino optionally substituted by one or two substituents selected from C1-C4-alkyl, hydroxy-C1-C4-alkyl, C1-C4-alkoxy-C1-C4-alkyl; C1-C4-alkylcarbonylamino, alkoxycarbonylamino, benzoylamino, pyridinylcarbonylamino, carboxymethylamino or C1-C4-alkoxycarbonylmethylamino substituted at the methyl group such that the resulting substituent corresponds to one of the 20 naturally occurring standard amino acids, aminomethylcarbonylamino substituted at the methyl group such that the resulting acyl group corresponds to one of the 20 naturally occurring standard amino acids; carboxy, C1-C4-alkylcarbonyl, benzoyl, pyridinecarbonyl, pyrimidinecarbonyl, C1-C4-alkoxycarbonyl, aminocarbonyl, wherein amino is unsubstituted or substituted by one hydroxy or amino group or one or two substituents selected from C1-C4-alkyl, hydroxy-C1-C4-alkyl or C1-C4-alkoxy-C1-C4-alkyl; tetrazolyl, cyano, halogen, or nitro; or wherein two substituents in ortho-position to each other form a 5- or 6-membered heterocyclic ring containing one or two oxygen atoms and/or one or two nitrogen atoms, wherein the nitrogen atoms are optionally substituted by C1-C4-alkyl, C1-C4-alkoxy-C1-C4-alkyl or C1-C4-alkylcarbonyl; and

tetraacetate prodrugs; and

salts thereof.

2. The compound according to claim 1 of formula (**I**) wherein n is 0 or 1; and tetraacetate prodrugs and salts thereof.

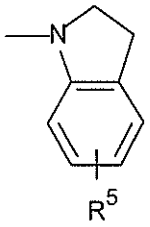
3. The compound according to claim 1 of formula (**I**) wherein n is 0; and tetraacetate prodrugs and salts thereof.

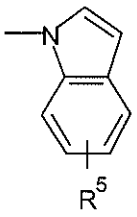
4. The compound according to anyone of claims 1 to 3 wherein R^2 and R^3 are hydrogen, C1-C4-alkyl, halo-C1-C4-alkyl, cyclopropyl, C1-C4-alkoxy, C1-C4-alkoxy-C1-C4-alkoxy, phenoxy, hydroxysulfonyl, aminosulfonyl, amino, C1-C4-alkylcarbonylamino, benzoylamino, carboxymethylamino or C1-C4-alkoxycarbonylmethylamino substituted at the methyl group such that the resulting substituent corresponds to one of the 20 naturally occurring standard amino acids, aminomethylcarbonylamino substituted at the methyl group such that the resulting acyl group corresponds to one of the 20 naturally occurring

standard amino acids; carboxy, C1-C4-alkoxycarbonyl, aminocarbonyl, hydroxylaminocarbonyl, tetrazolyl, halo, cyano or nitro; and tetraacetate prodrugs and salts thereof.

5. The compound according to anyone of claims 1 to 3 wherein R^2 and R^3 are hydrogen, C1-C4-alkoxy, or halo; and prodrugs and salts thereof.

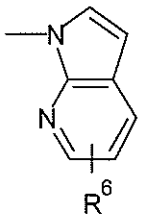
6. The compound according to anyone of claims 1 to 5 of formula (I) wherein R^1 is a residue of formula (B) or (C)


(B)


(C)

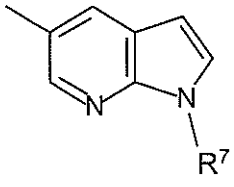
wherein R^5 is hydrogen, trifluoromethyl, C1-C4-alkoxy, benzyloxy, amino, carboxy, C1-C4-alkoxycarbonyl, tetrazolyl, nitro, cyano, or halo;

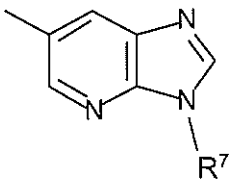
or of formula (D)


(D)

wherein R^6 is hydrogen, trifluoromethyl, C1-C4-alkoxy, carboxy, C1-C4-alkoxycarbonyl, tetrazolyl, nitro, cyano, or halo;

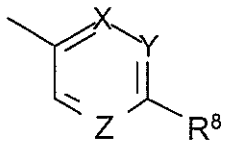
or of formula (E) or (F)


(E)


(F)

wherein R^7 is hydrogen or C1-C4-alkyl;

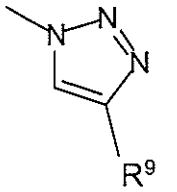
or of formula (G)



(G)

wherein R^8 is carboxy or C1-C4-alkoxycarbonyl; X or Y or Z, or X and Z, or Y and Z are nitrogen atoms and the other atoms X, Y and Z are carbon atoms;

or of formula (H)



(H)

wherein R^9 is carboxy or C1-C4-alkoxycarbonyl; and

tetraacetate prodrugs and pharmaceutically acceptable salts thereof.

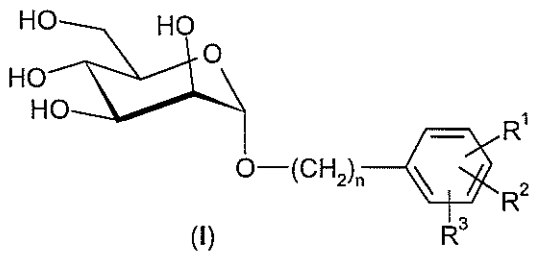
7. A compound selected from
methyl 3'-chloro-4'-(α-D-mannopyranosyloxy)-biphenyl-4-carboxylate,
3'-chloro-4'-(α-D-mannopyranosyloxy)-biphenyl-4-carboxylic acid,
methyl 2'-chloro-4'-(α-D-mannopyranosyloxy)-biphenyl-4-carboxylate,
2'-chloro-4'-(α-D-mannopyranosyloxy)-biphenyl-4-carboxylic acid,
methyl 3',5'-dichloro-4'-(α-D-mannopyranosyloxy)-biphenyl-4-carboxylate,
3',5'-dichloro-4'-(α-D-mannopyranosyloxy)-biphenyl-4-carboxylic acid,
methyl 2',6'-dichloro-4'-(α-D-mannopyranosyloxy)-biphenyl-4-carboxylate,
2',6'-dichloro-4'-(α-D-mannopyranosyloxy)-biphenyl-4-carboxylic acid,
methyl 4'-chloro-3'-(α-D-mannopyranosyloxy)-biphenyl-4-carboxylate,
4'-chloro-3'-(α-D-mannopyranosyloxy)-biphenyl-4-carboxylic acid,
methyl 3'-(α-D-mannopyranosyloxy)-biphenyl-4-carboxylate,
3'-(α-D-mannopyranosyloxy)-biphenyl-4-carboxylic acid,
4'-(α-D-mannopyranosyloxy)-3'-chloro-biphenyl-4-carbonitrile,
2-chloro-4'-(1*H*-tetrazol-5-yl)-biphenyl α-D-mannopyranoside,
methyl 4'-(α-D-mannopyranosyloxy)-biphenyl-4-carboxylate,
4'-(α-D-mannopyranosyloxy)-biphenyl-4-carboxylic acid,
prodrugs, wherein all four hydroxy groups of the mannose ring are acetylated, and pharmaceutically acceptable salts thereof.

8. A compound of claim 7 selected from the group consisting of
methyl 4'-(2,3,4,6-tetra-*O*-acetyl-α-D-mannopyranosyloxy)-3'-chloro-biphenyl-4-carboxylate;
methyl 4'-(2,3,4,6-tetra-*O*-acetyl-α-D-mannopyranosyloxy)-2'-chloro-biphenyl-4-carboxylate;
methyl 4'-(2,3,4,6-tetra-*O*-acetyl-α-D-mannopyranosyloxy)-3',5'-dichloro-biphenyl-4-carboxylate;
methyl 4'-(2,3,4,6-tetra-*O*-acetyl-α-D-mannopyranosyloxy)-2',6'-dichloro-biphenyl-4-carboxylate;
methyl 3'-(2,3,4,6-tetra-*O*-acetyl-α-D-mannopyranosyloxy)-4'-chloro-biphenyl-4-carboxylate;
mthyl 3'-(2,3,4,6-tetra-*O*-acetyl-α-D-mannopyranosyloxy)-biphenyl-4-carboxylate;
methyl 3'-chloro-4'-(α-D-mannopyranosyloxy)-biphenyl-4-carboxylate;
sodium 3'-chloro-4'-(α-D-mannopyranosyloxy)-biphenyl-4-carboxylate;
methyl 2'-chloro-4'-(α-D-mannopyranosyloxy)-biphenyl-4-carboxylate;
sodium 2'-chloro-4'-(α-D-mannopyranosyloxy)-biphenyl-4-carboxylate;
methyl 3',5'-dichloro-4'-(α-D-mannopyranosyloxy)-biphenyl-4-carboxylate;
methyl 2',6'-dichloro-4'-(α-D-mannopyranosyloxy)-biphenyl-4-carboxylate;
methyl 4'-chloro-3'-(α-D-mannopyranosyloxy)-biphenyl-4-carboxylate;
sodium 4'-chloro-3'-(α-D-mannopyranosyloxy)-biphenyl-4-carboxylate;
methyl 3'-(α-D-mannopyranosyloxy)-biphenyl-4-carboxylate;
sodium 3'-(α-D-mannopyranosyloxy)-biphenyl-4-carboxylate;
4'-(2,3,4,6-tetra-*O*-acetyl-α-D-mannopyranosyloxy)-3'-chloro-biphenyl-4-carbonitrile;
5-[4'-(2,3,4,6-tetra-*O*-acetyl-α-D-mannopyranosyloxy)-3'-chloro-biphenyl-4-yl]-1*H*-tetrazole;
5-[3'-chloro-4'-(α-D-mannopyranosyloxy)-biphenyl-4-yl]-1*H*-tetrazole;
methyl 4'-(2,3,4,6-tetra-*O*-acetyl-α-D-mannopyranosyloxy)-biphenyl-4-carboxylate; and
4'-(α-D-mannopyranosyloxy)-biphenyl-4-carboxylic acid.

9. A compound selected from
4'-(α-D-mannopyranosyloxy)-biphenyl-4-carbonitrile
[4'-(α-D-mannopyranosyloxy)-biphenyl-4-yl](morpholino)methanone,
3,5-difluoro-4'-(α-D-mannopyranosyloxy)-biphenyl-4-ol,
4'-(α-D-mannopyranosyloxy)-*N*-methyl-biphenyl-4-sulfonamide,
4'-(α-D-mannopyranosyloxy)-4-(methylsulfonyl)-biphenyl,
5-[4'-(α-D-mannopyranosyloxy)biphenyl-4-yl]-1*H*-tetrazole,
[3'-chloro-4'-(α-D-mannopyranosyloxy)-biphenyl-4-yl](morpholino)methanone,

prodrugs, wherein all four hydroxy groups of the mannose ring are acetylated, and pharmaceutically acceptable salts thereof.

10. A compound of formula (I)

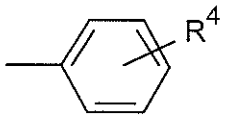


(I)

wherein

n is 0, 1 or 2;

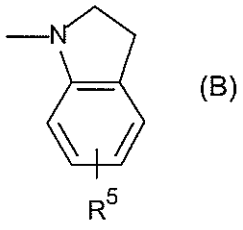
R^1 is a residue of formula (A)



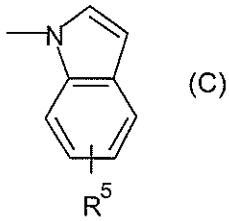
(A)

wherein R^4 is hydrogen, trifluoromethyl, cylcopropyl, C1-C4-alkoxy, C1-C4-alkoxy-C1-C4-alkoxy, phenoxy, hydroxysulfonyl, aminosulfonyl, C1-C4-alkylsulfonyl, amino, C1-C4-alkylcarbonylamino, benzoylamino, carboxymethylamino or C1-C4-alkoxycarbonylmethyl-amino substituted at the methyl group such that the resulting substituent corresponds to one of the 20 naturally occurring standard amino acids, aminomethylcarbonylamino substituted at the methyl group such that the resulting acyl group corresponds to one of the 20 naturally occurring standard amino acids, carboxy, C1-C4-alkoxycarbonyl, aminocarbonyl, hydroxylaminocarbonyl, tetrazolyl, nitro, cyano, or halo;

or of formula (B) or (C)



(B)

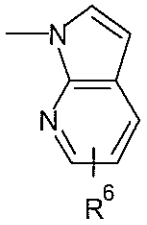


(C)

wherein R^5 is hydrogen, trifluoromethyl, cylcopropyl, C1-C4-alkoxy, C1-C4-alkoxy-C1-C4-alkoxy, phenoxy, hydroxysulfonyl, aminosulfonyl, C1-C4-alkylsulfonyl, amino, C1-C4-alkylcarbonylamino, benzoylamino, carboxymethylamino or C1-C4-alkoxycarbonylmethyl-

amino substituted at the methyl group such that the resulting substituent corresponds to one of the 20 naturally occurring standard amino acids, aminomethylcarbonylamino substituted at the methyl group such that the resulting acyl group corresponds to one of the 20 naturally occurring standard amino acids, carboxy, C1-C4-alkoxycarbonyl, aminocarbonyl, hydroxylaminocarbonyl, tetrazolyl, nitro, cyano, or halo;

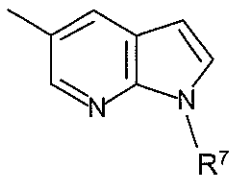
or of formula (D)



(D)

wherein R^6 is hydrogen, trifluoromethyl, cylcopropyl, C1-C4-alkoxy, C1-C4-alkoxy-C1-C4-alkoxy, phenoxy, hydroxysulfonyl, aminosulfonyl, C1-C4-alkylsulfonyl, amino, C1-C4-alkylcarbonylamino, benzoylamino, carboxymethylamino or C1-C4-alkoxycarbonylmethyl-amino substituted at the methyl group such that the resulting substituent corresponds to one of the 20 naturally occurring standard amino acids, aminomethylcarbonylamino substituted at the methyl group such that the resulting acyl group corresponds to one of the 20 naturally occurring standard amino acids, carboxy, C1-C4-alkoxycarbonyl, aminocarbonyl, hydroxylaminocarbonyl, tetrazolyl, nitro, cyano, or halo;

or of formula (E)



(E)

wherein R^7 is hydrogen, C1-C4-alkyl, C1-C4-alkoxy-C1-C4-alkyl, C1-C4-alkylcarbonyl, phenylcarbonyl, or aminomethylcarbonyl substituted at the methyl group such that the resulting acyl group corresponds to one of the 20 naturally occurring standard amino acids;

tetraacetate prodrugs and salts thereof

for use in the prevention and treatment of urinary tract infections caused by virulent strains of *E.coli*.

11. A pharmaceutical composition comprising a compound according to anyone of claims 1 to 9.