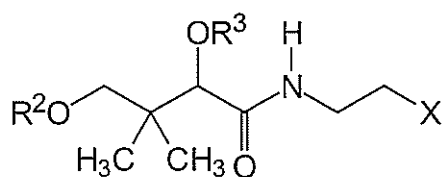


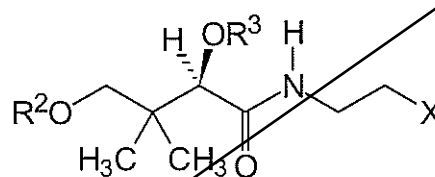
Claims

1. Endoprosthesis characterized by an active agent coating consisting of at least one antibiotic agent and at least one substance of the general formula (Ia) and/or (Ib):

(Ia)



(Ib)



wherein

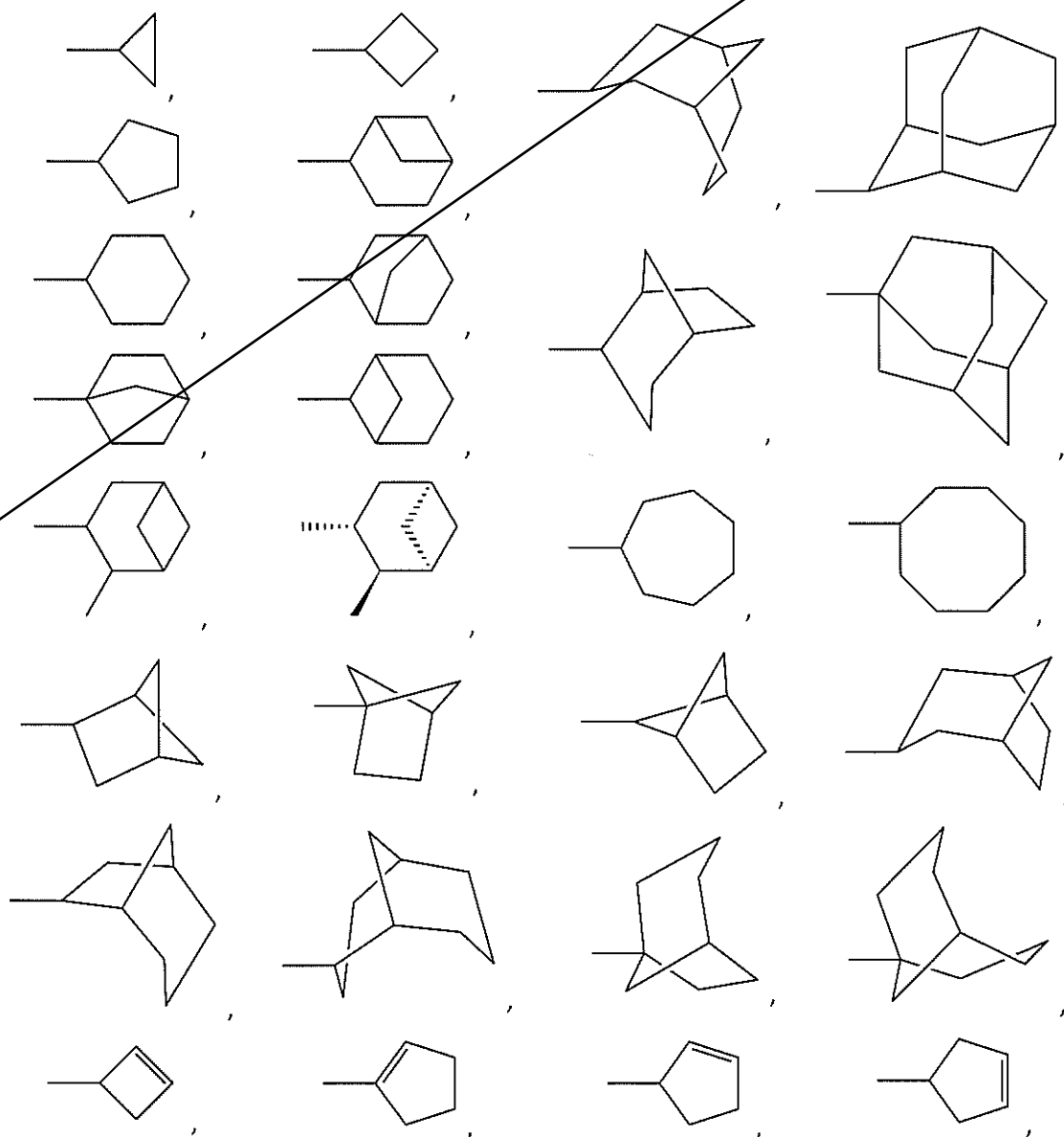
X represents $-\text{COOH}$, $-\text{COOR}^1$, $-\text{CH}_2\text{OH}$, $-\text{CH}_2\text{OR}^1$,

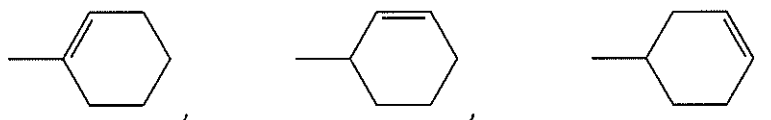
R^2 and R^3 represent independently of each other $-\text{COOR}^4$, $-\text{COOR}^5$, $-\text{COR}^4$, $-\text{COR}^5$, $-\text{R}^4$, $-\text{R}^5$, $-\text{H}$;

R^1 , R^4 and R^5 represent independently of each other $-\text{CH}_3$, $-\text{C}_2\text{H}_5$, $-\text{C}_3\text{H}_7$, $-\text{CH}(\text{CH}_3)_2$, $-\text{C}_4\text{H}_9$, $-\text{CH}_2\text{CH}(\text{CH}_3)_2$, $-\text{CH}(\text{CH}_3)\text{C}_2\text{H}_5$, $-\text{C}(\text{CH}_3)_3$, $-\text{C}_5\text{H}_{11}$, $-\text{CH}(\text{CH}_3)\text{C}_3\text{H}_7$, $-\text{CH}_2\text{CH}(\text{CH}_3)\text{C}_2\text{H}_5$, $-\text{CH}(\text{CH}_3)\text{CH}(\text{CH}_3)_2$, $-\text{C}(\text{CH}_3)_2\text{C}_2\text{H}_5$, $-\text{CH}_2\text{C}(\text{CH}_3)_3$, $-\text{CH}(\text{C}_2\text{H}_5)_2$, $-\text{C}_2\text{H}_4\text{CH}(\text{CH}_3)_2$, $-\text{C}_6\text{H}_{13}$, $-\text{C}_3\text{H}_6\text{CH}(\text{CH}_3)_2$, $-\text{C}_2\text{H}_4\text{CH}(\text{CH}_3)\text{C}_2\text{H}_5$, $-\text{CH}(\text{CH}_3)\text{C}_4\text{H}_9$, $-\text{CH}_2\text{CH}(\text{CH}_3)\text{C}_3\text{H}_7$, $-\text{CH}(\text{CH}_3)\text{CH}_2\text{CH}(\text{CH}_3)_2$, $-\text{CH}(\text{CH}_3)\text{CH}(\text{CH}_3)\text{C}_2\text{H}_5$, $-\text{CH}_2\text{CH}(\text{CH}_3)\text{CH}(\text{CH}_3)_2$, $-\text{CH}_2\text{C}(\text{CH}_3)_2\text{C}_2\text{H}_5$, $-\text{C}(\text{CH}_3)_2\text{C}_3\text{H}_7$, $-\text{C}(\text{CH}_3)_2\text{CH}(\text{CH}_3)_2$, $-\text{CH}(\text{CH}_3)\text{C}(\text{CH}_3)_3$, $-\text{C}_7\text{H}_{15}$, $-\text{C}_3\text{H}_6\text{C}(\text{CH}_3)_3$, $-\text{C}_4\text{H}_8\text{CH}(\text{CH}_3)_2$, $-\text{C}_8\text{H}_{17}$, $-\text{C}_4\text{H}_8\text{C}(\text{CH}_3)_3$, $-\text{C}_5\text{H}_{10}\text{CH}(\text{CH}_3)_2$, $-\text{C}_9\text{H}_{19}$, $-\text{C}_5\text{H}_{10}\text{C}(\text{CH}_3)_3$, $-\text{C}_6\text{H}_{12}\text{CH}(\text{CH}_3)_2$, $-\text{C}_{10}\text{H}_{21}$, $-\text{C}_6\text{H}_{12}\text{C}(\text{CH}_3)_3$ and $-\text{C}_7\text{H}_{14}\text{CH}(\text{CH}_3)_2$, $-\text{CH}=\text{CH}_2$, $-\text{CH}_2\text{CH}=\text{CH}_2$, $-\text{C}(\text{CH}_3)=\text{CH}_2$, $-\text{CH}=\text{CH}-\text{CH}_3$, $-\text{C}_2\text{H}_4\text{CH}=\text{CH}_2$, $-\text{CH}_2\text{CH}=\text{CH}-\text{CH}_3$, $-\text{CH}=\text{CH}-\text{C}_2\text{H}_5$, $-\text{CH}_2\text{C}(\text{CH}_3)=\text{CH}_2$, $-\text{CH}(\text{CH}_3)\text{CH}=\text{CH}$, $-\text{CH}=\text{C}(\text{CH}_3)_2$, $-\text{C}(\text{CH}_3)=\text{CH}-\text{CH}_3$, $-\text{CH}=\text{CH}-\text{CH}=\text{CH}_2$, $-\text{C}_3\text{H}_6\text{CH}=\text{CH}_2$, $-\text{C}_2\text{H}_4\text{CH}=\text{CH}-\text{CH}_3$, $-\text{CH}_2\text{CH}=\text{CH}-\text{C}_2\text{H}_5$, $-\text{CH}=\text{CH}-\text{C}_3\text{H}_7$, $-\text{CH}_2\text{CH}=\text{CH}-\text{CH}=\text{CH}_2$, $-\text{CH}=\text{CH}-\text{CH}=\text{CH}-\text{CH}_3$, $-\text{CH}=\text{CH}-\text{CH}_2\text{CH}=\text{CH}_2$, $-\text{C}(\text{CH}_3)=\text{CH}-\text{CH}=\text{CH}_2$, $-\text{CH}=\text{C}(\text{CH}_3)-\text{CH}=\text{CH}_2$, $-\text{CH}=\text{CH}-\text{C}(\text{CH}_3)=\text{CH}_2$, $-\text{C}_2\text{H}_4-\text{C}(\text{CH}_3)=\text{CH}_2$, $-\text{CH}_2-\text{CH}(\text{CH}_3)-\text{CH}=\text{CH}_2$, $-\text{CH}(\text{CH}_3)-\text{CH}_2-\text{CH}=\text{CH}_2$, $-\text{CH}_2-\text{CH}=\text{C}(\text{CH}_3)_2$, $-\text{CH}_2-\text{C}(\text{CH}_3)=\text{CH}-\text{CH}_3$, $-\text{CH}(\text{CH}_3)-\text{CH}=\text{CH}-\text{CH}_3$, $-\text{CH}=\text{CH}-\text{CH}(\text{CH}_3)_2$, $-\text{CH}=\text{C}(\text{CH}_3)-\text{C}_2\text{H}_5$, $-\text{C}(\text{CH}_3)=\text{CH}-\text{C}_2\text{H}_5$, $-\text{C}(\text{CH}_3)=\text{C}(\text{CH}_3)_2$, $-\text{C}(\text{CH}_3)_2-\text{CH}=\text{CH}_2$, $-\text{CH}(\text{CH}_3)-\text{C}(\text{CH}_3)=\text{CH}_2$,

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- C_2H_5 , $-C\equiv C-CH_2-CH(CH_3)_2$, $-C\equiv C-C(CH_3)_3$, $-CH(C_2H_5)-C\equiv C-CH_3$,
 $-C(CH_3)_2-C\equiv C-CH_3$, $-CH(C_2H_5)-CH_2-C\equiv CH$, $-CH_2-CH(C_2H_5)-C\equiv CH$,
 $-C(CH_3)_2-CH_2-C\equiv CH$, $-CH_2-C(CH_3)_2-C\equiv CH$, $-CH(CH_3)-CH(CH_3)-C\equiv CH$,
 $-CH(C_3H_7)-C\equiv CH$, $-C(CH_3)(C_2H_5)-C\equiv CH$, $-C\equiv C-C\equiv CH$, $-CH_2-C\equiv C-$
 5 $C\equiv CH$, $-C\equiv C-C\equiv C-CH_3$, $-CH(C\equiv CH)_2$, $-C_2H_4-C\equiv C-C\equiv CH$, $-CH_2-$
 $C\equiv C-CH_2-C\equiv CH$, $-C\equiv C-C_2H_4-C\equiv CH$, $-CH_2-C\equiv C-C\equiv C-CH_3$, $-C\equiv C-$
 $CH_2-C\equiv C-CH_3$, $-C\equiv C-C\equiv C-C_2H_5$, $-C\equiv C-CH(CH_3)-C\equiv CH$, $-CH(CH_3)-$
 $C\equiv C-C\equiv CH$, $-CH(C\equiv CH)-CH_2-C\equiv CH$, $-C(C\equiv CH)_2-CH_3$, $-CH_2-$
 $CH(C\equiv CH)_2$,
 10 $-CH(C\equiv CH)-C\equiv C-CH_3$, $-C\equiv C-C_5H_{11}$, $-C_4H_8-C\equiv C-CH_3$, $-C_5H_{10}-C\equiv CH$,
 $-C\equiv C-C_6H_{13}$, $-C_5H_{10}-C\equiv C-CH_3$, $-C_6H_{12}-C\equiv CH$, $-C\equiv C-C_7H_{15}$, $-C_6H_{12}-$
 $C\equiv C-CH_3$, $-C_7H_{14}-C\equiv CH$, $-C\equiv C-C_8H_{17}$, $-C_7H_{14}-C\equiv C-CH_3$ and $-C_8H_{16}-$
 $C\equiv CH$,



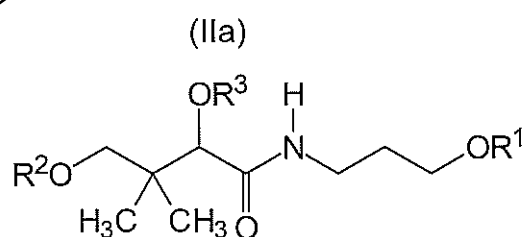
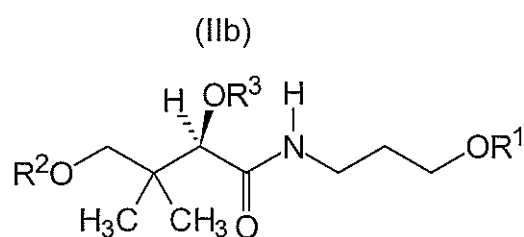
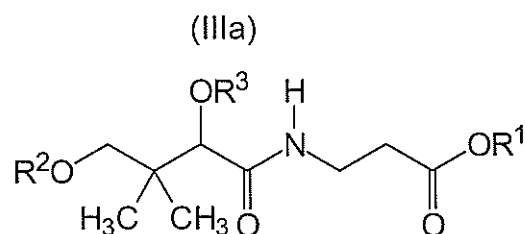
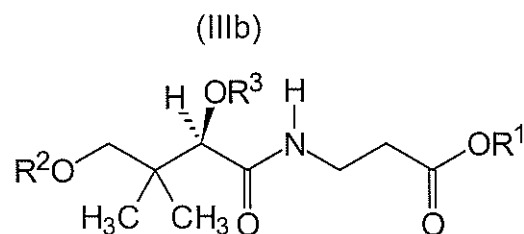


as well as salts, hydrates, solvates, enantiomers, diastereomers, racemates, mixtures of enantiomers and mixtures of diastereomers of the above mentioned compounds.

2. Endoprosthesis according to claim 1, wherein the antibiotic agent is selected from the group of amino glycoside antibiotics.

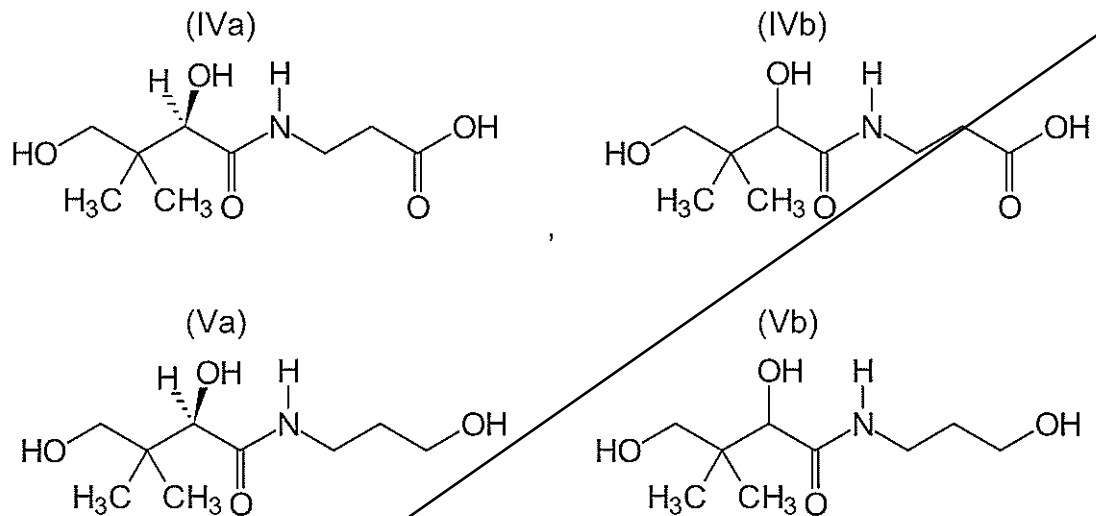
3. Endoprosthesis according to claim 2, wherein the amino glycoside antibiotic or amino glycoside derivative is selected from the group comprising streptomycin, neomycin, framycetin, paromomycin, ribostamycin, kanamycin, amikacin, arbekacin, bekanamycin, dibekacin, tobramycin, spectinomycin, hygromycin B, paromomycin sulfate, gentamicin, netilmicin, sisomicin, isepamicin, verdamicin, astromicin, apramycin, ansamycine, rifampicin and geneticin.

4. Endoprosthesis according to any one of the previous claims characterized in that the at least one substance of the general formula (Ia) and/or (Ib) corresponds to one of the following general formulas,



wherein R¹, R² and R³ have the meaning as defined in claim 1.

5. Endoprosthesis according to any one of the previous claims characterized in that the at least one substance of the general formula (Ia) and/or (Ib) falls under one of the following general formulas,



6. Endoprosthesis according to any one of the previous claims, wherein the endoprosthesis is selected from the group comprising dental implants, pacemakers, stents, vascular grafts, brain pacemakers, artificial hearts, port catheter, orthopedic implants, visual implant, retina, vitreous body, cornea, skull reconstruction, bone replacement, penile prostheses, sphincter prostheses, cochlear implants, catheters, urinary catheters, breathing hoses, venous catheters and cannulas.

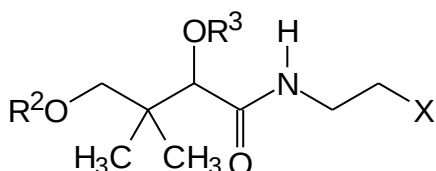
7. Endoprosthesis according to claim 6, wherein the orthopedic implant is selected from the group comprising spinal implants, hip joint implants, pedicle screw, wedge of bone, bone screw, shoulder joint implants, elbow implants, intervertebral implants, finger joint implants, ankle implants, toe joints implants, knee implants, subtalar joint implants, wrist implants, implants for fusion of bone, radial head implants, anchoring pins of implants or for implants, implants for the skull, correction wedges, angle implants, implants for osteotomies (high tibial osteotomy), metatarsal surgery, and hindfoot surgery.

8. Endoprosthesis according to any one of the previous claims, wherein the endoprosthesis comprises further a base coat and/or a toplayer made of polymers.
- 5 9. Endoprosthesis according to claim 8, wherein the base coat and/or the toplayer consists/consist of biodegradable polymers.
- 10 10. Method for coating of an endoprosthesis comprising the following steps:
- a) providing an uncoated endoprosthesis,
 - b) providing a coating solution consisting of at least one antibiotic and a substance of formula (Ia) and/or (Ib) in at least one solvent,
 - c) applying the coating solution by spraying, dipping, brushing, painting,
 - 15 pipetting, vapor deposition or spattering.

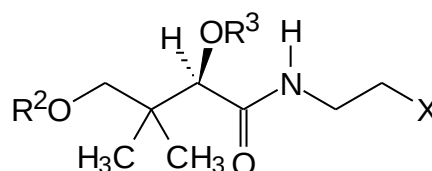
Claims

1. Endoprosthesis characterized by an active agent coating consisting of at least one antibiotic agent and at least one substance of the general formula (Ia) and/or (Ib):

(Ia)



(Ib)



wherein

X represents $-\text{COOH}$, $-\text{COOR}^1$, $-\text{CH}_2\text{OH}$, $-\text{CH}_2\text{OR}^1$,

R^2 and R^3 represent independently of each other $-\text{COOR}^4$, $-\text{COOR}^5$, $-\text{COR}^4$, $-\text{COR}^5$, $-\text{R}^4$, $-\text{R}^5$, $-\text{H}$;

R^1 , R^4 and R^5 represent independently of each other $-\text{CH}_3$, $-\text{C}_2\text{H}_5$, $-\text{C}_3\text{H}_7$,

$-\text{CH}(\text{CH}_3)_2$, $-\text{C}_4\text{H}_9$, $-\text{CH}_2-\text{CH}(\text{CH}_3)_2$, $-\text{CH}(\text{CH}_3)-\text{C}_2\text{H}_5$, $-\text{C}(\text{CH}_3)_3$, $-\text{C}_5\text{H}_{11}$,

$-\text{CH}(\text{CH}_3)-\text{C}_3\text{H}_7$, $-\text{CH}_2-\text{CH}(\text{CH}_3)-\text{C}_2\text{H}_5$, $-\text{CH}(\text{CH}_3)-\text{CH}(\text{CH}_3)_2$, $-\text{C}(\text{CH}_3)_2-\text{C}_2\text{H}_5$,

$-\text{CH}_2-\text{C}(\text{CH}_3)_3$, $-\text{CH}(\text{C}_2\text{H}_5)_2$, $-\text{C}_2\text{H}_4-\text{CH}(\text{CH}_3)_2$, $-\text{C}_6\text{H}_{13}$, $-\text{C}_3\text{H}_6-\text{CH}(\text{CH}_3)_2$,

$-\text{C}_2\text{H}_4-\text{CH}(\text{CH}_3)-\text{C}_2\text{H}_5$, $-\text{CH}(\text{CH}_3)-\text{C}_4\text{H}_9$, $-\text{CH}_2-\text{CH}(\text{CH}_3)-\text{C}_3\text{H}_7$,

$-\text{CH}(\text{CH}_3)-\text{CH}_2-\text{CH}(\text{CH}_3)_2$, $-\text{CH}(\text{CH}_3)-\text{CH}(\text{CH}_3)-\text{C}_2\text{H}_5$, $-\text{CH}_2-\text{CH}(\text{CH}_3)-\text{CH}(\text{CH}_3)_2$,

$-\text{CH}_2-\text{C}(\text{CH}_3)_2-\text{C}_2\text{H}_5$, $-\text{C}(\text{CH}_3)_2-\text{C}_3\text{H}_7$, $-\text{C}(\text{CH}_3)_2-\text{CH}(\text{CH}_3)_2$,

$-\text{CH}(\text{CH}_3)-\text{C}(\text{CH}_3)_3$, $-\text{C}_7\text{H}_{15}$, $-\text{C}_3\text{H}_6-\text{C}(\text{CH}_3)_3$, $-\text{C}_4\text{H}_8-\text{CH}(\text{CH}_3)_2$,

$-\text{C}_8\text{H}_{17}$, $-\text{C}_4\text{H}_8-\text{C}(\text{CH}_3)_3$, $-\text{C}_5\text{H}_{10}-\text{CH}(\text{CH}_3)_2$, $-\text{C}_9\text{H}_{19}$, $-\text{C}_5\text{H}_{10}-\text{C}(\text{CH}_3)_3$,

$-\text{C}_6\text{H}_{12}-\text{CH}(\text{CH}_3)_2$, $-\text{C}_{10}\text{H}_{21}$, $-\text{C}_6\text{H}_{12}-\text{C}(\text{CH}_3)_3$ and $-\text{C}_7\text{H}_{14}-\text{CH}(\text{CH}_3)_2$,

$-\text{CH}=\text{CH}_2$, $-\text{CH}_2-\text{CH}=\text{CH}_2$, $-\text{C}(\text{CH}_3)=\text{CH}_2$, $-\text{CH}=\text{CH}-\text{CH}_3$,

$-\text{C}_2\text{H}_4-\text{CH}=\text{CH}_2$, $-\text{CH}_2-\text{CH}=\text{CH}-\text{CH}_3$, $-\text{CH}=\text{CH}-\text{C}_2\text{H}_5$, $-\text{CH}_2-\text{C}(\text{CH}_3)=\text{CH}_2$,

$-\text{CH}(\text{CH}_3)-\text{CH}=\text{CH}$, $-\text{CH}=\text{C}(\text{CH}_3)_2$, $-\text{C}(\text{CH}_3)=\text{CH}-\text{CH}_3$, $-\text{CH}=\text{CH}-\text{CH}=\text{CH}_2$,

$-\text{C}_3\text{H}_6-\text{CH}=\text{CH}_2$, $-\text{C}_2\text{H}_4-\text{CH}=\text{CH}-\text{CH}_3$, $-\text{CH}=\text{CH}-\text{C}_3\text{H}_7$, $-\text{CH}_2-\text{CH}=\text{CH}-\text{CH}=\text{CH}_2$,

$-\text{CH}=\text{CH}-\text{CH}=\text{CH}-\text{CH}_3$, $-\text{CH}=\text{CH}-\text{CH}_2-\text{CH}=\text{CH}_2$, $-\text{C}(\text{CH}_3)=\text{CH}-\text{CH}=\text{CH}_2$,

$-\text{CH}=\text{C}(\text{CH}_3)-\text{CH}=\text{CH}_2$, $-\text{CH}=\text{CH}-\text{C}(\text{CH}_3)=\text{CH}_2$, $-\text{C}_2\text{H}_4-\text{C}(\text{CH}_3)=\text{CH}_2$,

$-\text{CH}_2-\text{CH}(\text{CH}_3)-\text{CH}=\text{CH}_2$, $-\text{CH}(\text{CH}_3)-\text{CH}_2-\text{CH}=\text{CH}_2$, $-\text{CH}_2-\text{CH}=\text{C}(\text{CH}_3)_2$,

$-\text{CH}_2-\text{C}(\text{CH}_3)=\text{CH}-\text{CH}_3$, $-\text{CH}(\text{CH}_3)-\text{CH}=\text{CH}-\text{CH}_3$, $-\text{CH}=\text{CH}-\text{CH}(\text{CH}_3)_2$,

$-\text{CH}=\text{C}(\text{CH}_3)-\text{C}_2\text{H}_5$, $-\text{C}(\text{CH}_3)=\text{CH}-\text{C}_2\text{H}_5$, $-\text{C}(\text{CH}_3)=\text{C}(\text{CH}_3)_2$,

$-\text{C}(\text{CH}_3)_2-\text{CH}=\text{CH}_2$, $-\text{CH}(\text{CH}_3)-\text{C}(\text{CH}_3)=\text{CH}_2$, $-\text{C}(\text{CH}_3)=\text{CH}-\text{CH}=\text{CH}_2$,

$-\text{CH}=\text{C}(\text{CH}_3)-\text{CH}=\text{CH}_2$, $-\text{CH}=\text{CH}-\text{C}(\text{CH}_3)=\text{CH}_2$, $-\text{C}_4\text{H}_8-\text{CH}=\text{CH}_2$,

$-\text{C}_3\text{H}_6-\text{CH}=\text{CH}-\text{CH}_3$, $-\text{C}_2\text{H}_4-\text{CH}=\text{CH}-\text{C}_2\text{H}_5$,

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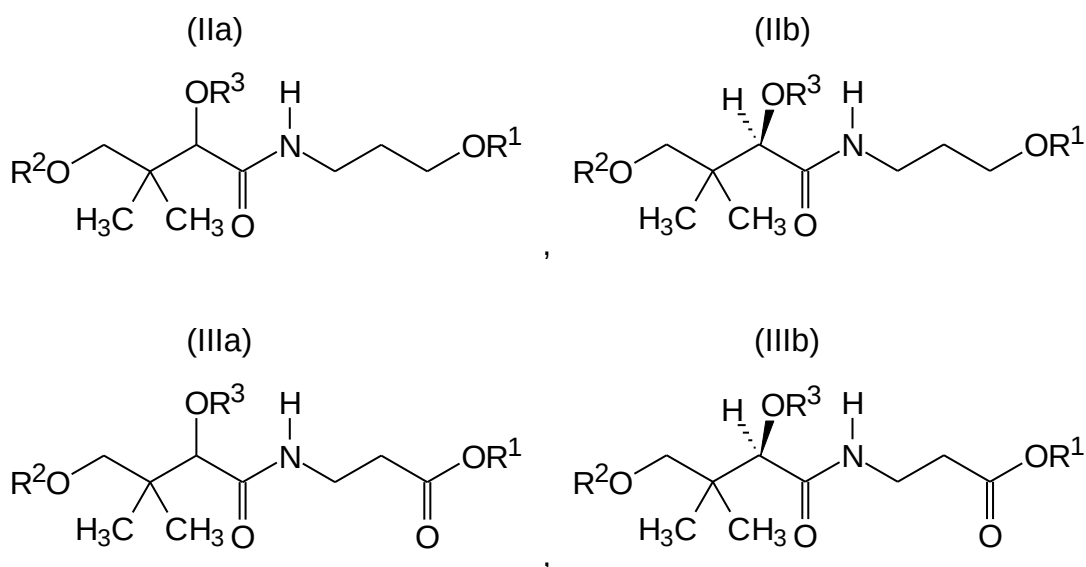


as well as salts, hydrates, solvates, enantiomers, diastereomers, racemates, mixtures of enantiomers and mixtures of diastereomers of the above mentioned compounds.

2. Endoprosthesis according to claim 1, wherein the antibiotic agent is selected from the group of amino glycoside antibiotics.

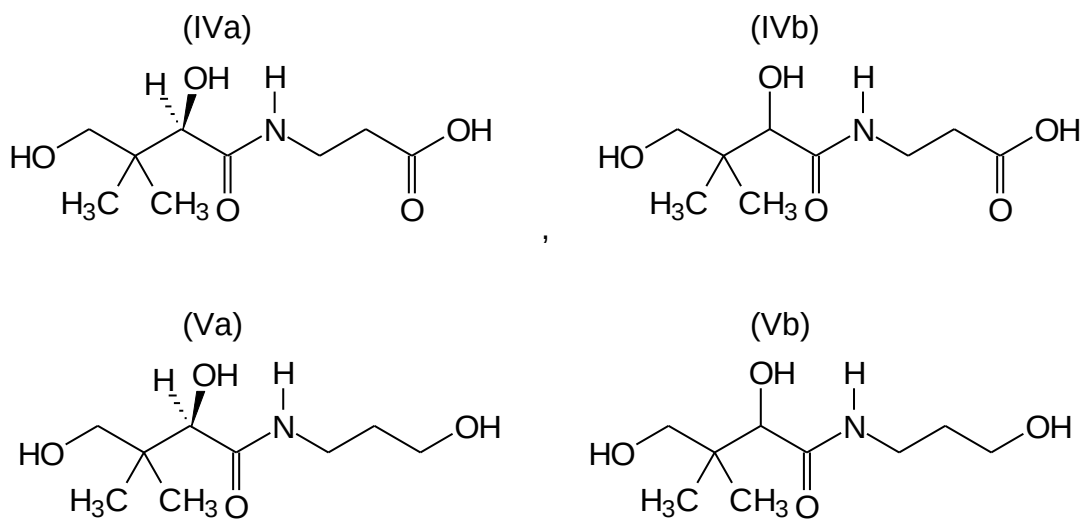
3. Endoprosthesis according to claim 2, wherein the amino glycoside antibiotic or amino glycoside derivative is selected from the group comprising streptomycin, neomycin, framycetin, paromomycin, ribostamycin, kanamycin, amikacin, arbekacin, bekanamycin, dibekacin, tobramycin, spectinomycin, hygromycin B, paromomycin sulfate, gentamicin, netilmicin, sisomicin, isepamicin, verdamicin, astromicin, apramycin, ansamycine, rifampicin and geneticin.

4. Endoprosthesis according to any one of the previous claims characterized in that the at least one substance of the general formula (Ia) and/or (Ib) corresponds to one of the following general formulas,



wherein R^1 , R^2 and R^3 have the meaning as defined in claim 1.

5. Endoprosthesis according to any one of the previous claims characterized in that the at least one substance of the general formula (Ia) and/or (Ib) falls under one of the following general formulas,



6. Endoprosthesis according to any one of the previous claims, wherein the endoprosthesis is selected from the group comprising dental implants, pacemakers, stents, vascular grafts, brain pacemakers, artificial hearts, port catheter, orthopedic implants, visual implant, retina, vitreous body, cornea, skull reconstruction, bone replacement, penile prostheses, sphincter prostheses, cochlear implants, catheters, urinary catheters, breathing hoses, venous catheters and cannulas.
7. Endoprosthesis according to claim 6, wherein the orthopedic implant is selected from the group comprising spinal implants, hip joint implants, pedicle screw, wedge of bone, bone screw, shoulder joint implants, elbow implants, intervertebral implants, finger joint implants, ankle implants, toe joints implants, knee implants, subtalar joint implants, wrist implants, implants for fusion of bone, radial head implants, anchoring pins of implants or for implants, implants for the skull, correction wedges, angle implants, implants for osteotomies (high tibial osteotomy), metatarsal surgery, and hindfoot surgery.
8. Endoprosthesis according to any one of the previous claims, wherein the endoprosthesis comprises further a base coat and/or a toplayer made of polymers.
9. Endoprosthesis according to claim 8, wherein the base coat and/or the toplayer consists/consist of biodegradable polymers.

10. Method for coating of an endoprosthesis comprising the following steps:
 - a) providing an uncoated endoprosthesis,
 - b) providing a coating solution consisting of at least one antibiotic and a substance of formula (Ia) and/or (Ib) in at least one solvent,
 - 5 c) applying the coating solution by spraying, dipping, brushing, painting, pipetting, vapor deposition or spattering.