

Claims

1. A composition comprising a first, second and third constituents, wherein
 - said first constituent is a glycosaminoglycan, a hydrolysed glycosaminoglycan, a glycosamine, chemically modified or not or a blend of different glycosaminoglycans, hydrolysed glycosaminoglycans, glycosamines, chemically modified or not;
 - said second constituent is a protein, a peptide or a blend of different proteins or peptides;
 - said third constituent is a polyhydroxyurethane (PHU) which is obtained by the covalent coupling of bis or poly cyclic carbonates (CC) and di or polyamines (PA) molecules.
2. The composition of claim 1 wherein said protein is a collagen, elastin, keratin, fibronectin, actin, myosin, laminin, a peptide or a blend of those proteins or peptides, hydrolysed, chemically modified, fibrillated or not.
3. The composition of claim 1 or 2 obtained by the polymerisation or covalent bond formation between the constituents of two preparations a and b, in which,
 - The preparation a has at least 1% of glycosaminoglycans, hydrolysed glycosaminoglycans, glycosamines, or chemically modified glycosaminoglycan, hydrolysed glycosaminoglycans, glycosamines with cyclic polycarbonates or with Pre-polymer of polyhydroxyurethanes terminated by cyclic carbonates functions (PRE-CC) or a blend of those different constituents in a blend containing acceptable solvents and optionally CC monomers of PHU or PRE-CC or a blend of PRE-CC and CC to ensure that the preparation a contains cyclic carbonate functions, and

- The preparation b has at least 1% of collagens, elastins, keratins, fibronectins, actins, myosins, laminins, peptides, hydrolysed, fibrillated or not, or chemically modified collagens, elastins, keratins, fibronectins, actins, myosins, laminins, peptides, hydrolysed, fibrillated or not with PA or with Pre-polymer of polyhydroxyurethanes terminated by amines functions (PRE-PA) or a blend of those constituents in a blend containing acceptable solvents and optionally PA monomers of PHU or PRE-PA or a blend of PRE-PA and PA to ensure that the preparation b contains amine functions from polyamines.
4. The composition of claim 1 or 2 obtained by the polymerisation or covalent bond formation between the constituents of two preparations a and b, in which,
- The preparation a has at least 1% of glycosaminoglycans, hydrolysed glycosaminoglycans, glycosamines, or chemically modified glycosaminoglycan, hydrolysed glycosaminoglycans, glycosamines with CC or with PRE-CC or a blend of those different constituents and chemically modified collagens, elastins, keratins, fibronectins, actins, myosins, laminins, peptides, or a blend of those constituents hydrolysed, fibrillated or not terminated by CC functions in a blend containing acceptable solvents and optionally CC monomers of PHU or a PRE-CC or a blend of PRE-CC and CC to ensure that the preparation a contains CC functions, and
 - The preparation b contains PA monomers PHU or PRE-PA or a blend of PRE-PA and PA optionally in acceptable solvents to ensure that the preparation b contains amine functions from polyamines,
5. The composition of claim 1 or 2 obtained by the polymerisation or covalent bond formation between the constituents of two preparations a and b, in which,

- The preparation a contains CC monomers of PHU or PRE-CC of PHU or a blend of PRE-CC and CC optionally in acceptable solvents to ensure that the preparation a contains CC functions and,
 - The preparation b contains chemically modified, glycosaminoglycan, hydrolysed glycosaminoglycans, glycosamines or a blend of those constituents, terminated by amine functions and at least 1% of collagens, elastins, keratins, fibronectins, actins, myosins, laminins, peptides, hydrolysed, fibrillated or not, or chemically modified collagens, elastins, keratins, fibronectins, actins, myosins, laminins, peptides, hydrolysed, fibrillated or not with PA or with PRE-PA or a blend of those constituents in a blend containing acceptable solvents and optionally PA monomers PHU or PRE-PA or a blend of PRE-PA and PA to ensure that the preparation b contains amine functions from PA.
6. The composition of anyone of claims 1 to 5 in which the CC monomers are cyclic polycarbonates of cycles of 5 to 8 atoms obtained from polyhydroxylated molecules containing at least three, primary or secondary, non aromatic, hydroxyl functions, and the PA monomers are primary or secondary PA.
 7. The composition of claim 5 in which the PRE-CC is PHU of 1 to 200,000, preferably 1 to 20,000, CC and PA monomers, terminated by CC monomers, and the PRE-PA is a PHU of 1 to 200,000, preferably 1 to 20,000, CC and PA monomers, terminated by PA monomers.
 8. The composition of claim 1, 3 or 4 in which the chemical modification of the glycosaminoglycans, the hydrolysed glycosaminoglycans, the glycosamines of glycosaminoglycans or the blend of the different glycosaminoglycans, hydrolysed glycosaminoglycans, glycosamines of glycosaminoglycans is an esterification, or a deacetylation followed by an esterification and a

carbamatation, or a deacetylation followed by a carbamatation with CC or PRE-CC.

9. The composition of claim 1 or 5 in which the first constituent is chemically modified through an amidation with the monomer PA or PRE-PA or a combination of both.
10. The composition of anyone of claim 1, 3-4 or 8 in which the first constituent is chemically modified and is carbamated with the monomer PA or PRE-PA.
11. The composition of anyone of claim 1, 3-5 or 8-10 which is further carbamated successively with CC and PA to obtain CC or PA terminated PHU chemically grafted on glycosaminoglycans, hydrolysed glycosaminoglycans, glycosamines of glycosaminoglycans or the blend of the different glycosaminoglycans, hydrolysed glycosaminoglycans, glycosamines of glycosaminoglycans.
12. The composition of anyone of claim 1, 3 to 8 or 10-11 in which the CC monomers are cyclic polycarbonates of erythritol, xylitol, arabitol, ribitol, sorbitol, dulcitol, mannitol, maltitol, isomaltitol, lactitol, or polyether polyols and their mixtures.
13. The composition of anyone of claim 1, 3 to 8 or 10-11, in which the CC monomers are cyclic polycarbonates of (1,2-dihydroxyethyl), or (2,3-dihydroxypropyl) ether, ester, ketone, amide, phosphate, sulphate, sulphide, disulfide, alkanes, cycloalkanes, alkenes, cycloalkenes, aryls, or heterocycles containing one or more oxygen atom, or aromatic heterocycles containing one or more nitrogen or sulphur atom.
14. The composition of anyone of claim 1, 3 to 8 or 10 to 11, in which the cyclic polycarbonates monomers (CC) are a mixture cyclic polycarbonates of the claim 12 and 13.

15. The composition of anyone of the previous claims in which the constituent (A) is a glycosaminoglycan, a hydrolysed glycosaminoglycan, a glycosamine of glycosaminoglycan, chemically modified or not or a blend of different glycosaminoglycans, hydrolysed glycosaminoglycans, glycosamines of glycosaminoglycans chemically modified or not taken from the list of the following substances:
- Chondroitin sulphates ;
 - Hyaluronic acid ;
 - Heparan sulphates ;
 - Dermatan sulphates ;
 - Keratan sulphates ;
 - Aggrecans ;
16. The composition of anyone of claim 2 or 3 to 5 in which the chemical modifications of collagens, elastins, keratins, fibronectins, actins, myosins, laminins, peptides or a blend of those proteins or peptides, hydrolysed, fibrillated or not are amidation with PA or PRE-PA or a blend of PA and PRE-PA or successive amidation with PA and PRE-PA.
17. The composition of anyone of claim 2, 3-5 or 16 in which the chemically modified collagens, elastins, keratins, fibronectins, actins, myosins, laminins, peptides or a blend of those proteins or peptides, hydrolysed, fibrillated or not is carbamated with the CC monomer or Pre-polymer PRE-CC.
18. The composition of anyone of claim 2, 3-5, 16 or 17 which is further carbamated successively with PA and CC to obtain PA or CC terminated PHU chemically grafted on collagens, elastins, keratins, fibronectins, actins, myosins, laminins, peptides or a blend of those proteins or peptides, hydrolysed, fibrillated or not.

19. The composition of anyone of claim 1 to 11 or 16 to 18 in which the primary and secondary PA monomers are primary or secondary polyamines of ether, ester, ketone, amide, phosphate, sulphate, sulphide, disulfide, alkanes, cycloalkanes, alkenes, cycloalkenes, aryls, substituted or not with hydroxyl functions; or primary or secondary polyamines and primary or secondary polyalkylamines of heterocycles containing one or more oxygen, nitrogen or sulphur atom, substituted or not with hydroxyl functions; or polyetheramines simple or mixed of ethylene glycol and propylene glycol; or a mixture of those compounds.
20. The composition of anyone of claim 1 and 3 to 5 in which the ratio of the number of non polymerised, or covalently bond carbonate cyclic functions from CC monomers, PRE-CC and chemically modified first and second constituents, and the number of non polymerised, or covalently bond primary and secondary amine functions from PA monomers, the PRE-PA and the chemically modified first and second constituents are between 50 and 0.02.
21. The composition of anyone of claim 1 to 20 in which a catalyst or a blend of catalyst taken from the ionic or covalent form of Li, Na, K, Mg, Zn, B and Al or an Infrared photonic source is used to control the polymerisation or covalent bonds formation between cyclic carbonates and primary or secondary amines functions.
22. A composition of anyone of claim 1 or 3 to 14 or 16 to 21 for the substitution or the reconstruction of connective, epithelial, nervous, muscular, bones, cartilaginous, or dermal, animal or human extra cellular matrix for which the ratio of the number of non polymerised, or covalently bond carbonate cyclic functions from CC monomers, PRE-CC and chemically modified first and second constituents, and the number of non polymerised, or covalently bond primary and secondary amine functions from PA monomers, the PRE-PA and the chemically modified first and second constituents are between 2 and 0.5.

23. A composition of anyone of claim 1 to 21 for coating the surfaces of foreign materials implanted in living organisms for permanent or transitory periods.
24. A composition of anyone of claim 1 to 21 as carrier, modifier or protector of living cells, biological and pharmacological materials and substances.