CLAIMS

1. A sterile and desiccated biomaterial comprising devitalized differentiated cells having tissue regenerating and/or repairing properties, and a particulate material, the cells and the particulate material being embedded in an extracellular matrix.

2. The biomaterial according to claim **1**, wherein said cells are selected in a group comprising primary cells, stem cells, genetically modified cells, and a combination thereof.

3. The biomaterial according to claim **1** or **2**, wherein at most 10% of said cells are viable, preferably at most 1%.

4. The biomaterial according to any one of claims **1** to **3**, wherein said particulate material is selected from the group comprising or consisting of:

- an organic material, including demineralized bone matrix (DBM), gelatin, agar/agarose, alginates chitosan, chondroitin sulfate, collagen, elastin or elastin-like peptides (ELP), fibrinogen, fibrin, fibronectin, proteoglycans, heparan sulfate proteoglycans, hyaluronic acid, polysaccharides, laminins and cellulose derivatives;

- a ceramic material, including particles of calcium phosphate (CaP), calcium carbonate ($CaCO_3$), calcium sulfate ($CaSO_4$), or calcium hydroxide ($Ca(OH)_2$), or combinations thereof;

- a polymer, including polyanhydrides, polylactic acid (PLA), poly(lactic-co-glycolic acid) (PLGA), polyethylene oxide/ polyethylene glycol (PEO/PEG), poly(vinyl alcohol) (PVA), fumarate-based polymers such as, for example poly(propylene fumarate) (PPF) or poly(propylene fumarate-co-ethylene glycol) (P(PF-co-EG)), oligo(poly(ethylene glycol) fumarate) (OPF), poly (n-isopropylacrylamide) (PNIPPAAm), poly(aldehyde guluronate) (PAG), poly(n-vinyl pyrrolidone) (PNVP), or combinations thereof;

- a gel, including a self-assembling oligopeptide gel, a microgel, a nanogel, a particulate gel, a hydrogel, a thixotropic gel, a xerogel, a responsive gel, or combinations thereof;

- a creamer;

and any combination thereof.

5. The biomaterial according to any one of claims **1** to **4**, wherein said biomaterial comprises an altered factors content as compared to the factors content obtained from a corresponding fresh, non-sterile, non-desiccated biomaterial.

6. The biomaterial according to claim **5**, wherein the factors content includes growth factors and/or transcription factors.

7. The biomaterial according to claim **5** or **6**, wherein the factors content comprises IGF-1 and/or VEGF and/or SDF-1α and/or OPG.

8. The biomaterial according to claim **5**, wherein said factors content includes a RNAs content.

~~**9.** The biomaterial according to claim **8**, wherein the RNAs content comprises at least one miRNA selected in any one of **Table 1**, **Table 2**, **Table 3**, **Table 4**, **Table 5**, **Table 6**, **Table 7**, **Table 8**, **Table 9**, **Table 10**, **Table 11** or **Table 12**.~~

~~**10.**~~9. The biomaterial according to any one of claims **1** to **8**~~**9**~~, wherein said desiccated biomaterial is obtained by freeze-drying.

~~**11.**~~10. The biomaterial according to any one of claims **1** to **9**~~**10**~~, wherein said sterile biomaterial is obtained by gamma-irradiation, preferably at a dose of about 7 kGy to about 45 kGy, more preferably at room temperature.

~~**12.**~~11. A method for generating a sterile and desiccated biomaterial comprising devitalized differentiated cells and a particulate material, the cells and the particulate material being embedded in an extracellular matrix, said method comprising the steps of:

- (1) contacting (i) viable cells capable to undergo differentiation with (ii) a particulate material, so as to obtain a first combination;

- (2) culturing the first combination obtained in step (1) in a culture medium such that the cells secrete an extracellular matrix and synthesize a factors content, so as to acquire tissue regenerating and/or repairing properties, and wherein the cells and the particulate material are embedded in the extracellular matrix, so as to form a multidimensional structure;

- (3) submitting the multidimensional structure obtained at step (2) to desiccation, so as to obtain a desiccated biomaterial;

- (4) submitting the desiccated biomaterial obtained at step (3) to sterilization, preferably by gamma-irradiation, so as to obtain a sterile, desiccated biomaterial.

~~**13.** The method according to claim **12**, wherein the viable cells capable to undergo differentiation are selected in a group comprising primary cells; stem cells, in particular stems cells from adipose tissue, bone marrow, or umbilical cord blood; genetically modified cells; and a mixture thereof.~~

~~**14.** A desiccated and sterile biomaterial obtainable by the method according to any one of claims **12** to **13**.~~

~~**15.**~~12. A pharmaceutical composition comprising a biomaterial according to any one of claims **1** to **10**~~**1**~~, or according to claim **11**~~**14**~~, and a pharmaceutically acceptable vehicle.

~~**16.** The pharmaceutical composition according to claim **15**, wherein the composition is in the form of a paste or a film.~~

~~**17.**~~13. A medical device comprising a biomaterial according to any one of claims **1** to **10**~~**1**~~, according to claim **11**~~**4**~~, or a pharmaceutical composition according to claim 12~~**15 or 16**~~.

~~18.~~14. A biomaterial according to any one of claims **1** to **10**~~1~~, according to claim **11**~~4~~, or a pharmaceutical composition according to claim ~~–~~12~~15 or 16~~, for use as a medicament.

~~19.~~15. The biomaterial or the pharmaceutical composition for use according to claim **14**~~18~~, for preventing and/or treating a tissue disorder.

~~20. The biomaterial or the pharmaceutical composition for use according to claim 19, wherein said tissue is selected from the group comprising bone tissue, cartilage tissue, skin tissue, muscular tissue, epithelial tissue, endothelial tissue, neural tissue, connective tissue and adipose tissue.~~

~~21. The biomaterial or the pharmaceutical composition for use according to claim 19, wherein the tissue disorder is selected in a group comprising aplasia cutis congenita; a burn; a cancer, including a breast cancer, a skin cancer and a bone cancer; a Compartment syndrome (CS); epidermolysis bulbosa; giant congenital nevi; an ischemic muscular injury of lower limbs; a muscle contusion, rupture or strain; a post-radiation lesion; and an ulcer, including a diabetic ulcer, preferably a diabetic foot ulcer; arthritis; bone fracture; bone frailty; Caffey's disease; congenital pseudarthrosis; cranial deformation; cranial malformation; delayed union; infiltrative disorders of bone; hyperostosis; loss of bone mineral density; metabolic bone loss; osteogenesis imperfecta; osteomalacia; osteonecrosis; osteopenia; osteoporosis; Paget's disease; pseudarthrosis; sclerotic lesions; spina bifida; spondylolisthesis; spondylolysis; chondrodysplasia; costochondritis; enchondroma; hallux rigidus; hip labral tear; osteochondritis dissecans; osteochondrodysplasia; polychondritis; and the likes.~~

~~22. The biomaterial or the pharmaceutical composition for use according to claim 18 or 19, for preventing and/or treating a bone disorder and/or a cartilage disorder.~~

~~23. The biomaterial or the pharmaceutical composition for use according to claim 18, for tissue reconstruction.~~

~~**24.** The biomaterial or the pharmaceutical composition for use according to claim **18** or **19**, for compensating the side effects of a primary treatment of a tissue disorder, and/or for strengthening a primary treatment of a tissue disorder.~~

~~**25.** The biomaterial or the pharmaceutical composition for use according to claim **18** or **19**, for compensating the side effects of a therapeutic treatment known to have a deleterious effect on tissues, in particular bone tissue, cartilage tissue, skin tissue, muscular tissue, epithelial tissue, endothelial tissue, neural tissue, connective tissue and adipose tissue.~~