



Biologically active composites for applications in regenerative medicine for small bone defects

The offer concerns know-how for the manufacture of multifunctional bioactive composites for applications in regenerative medicine for small bone defects, in part protected by patent applications - "Solid elastomeric bioactive polymer-ceramic composites and a method for their manufacture" No. P.443751, "Porous elastomeric bioactive polymer-ceramic composites for bone defect filling" P.443750 and PCT application "Porous and solid elastomeric bioactive composites for filling of bone defects and bone tissue regeneration and method of their production" - PCT/PL2023/050048.

The know-how is owned by a consortium - Wrocław University of Technology, Łukasiewicz Research Network - Institute of Ceramics and Building Materials, University of Lodz, Krakow University of Technology.



TECHNICAL DETAILS

The know-how is a range of knowledge relating to the manufacture of polymer-ceramic biocomposites based on poly(glycerol sebacate) (PGS) containing calcium phosphate particles, produced as flexible porous or flexible solid materials, intended to be used as an implantable materials for filling bone defects.

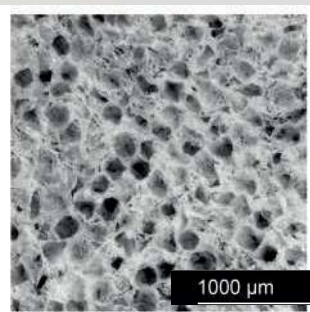
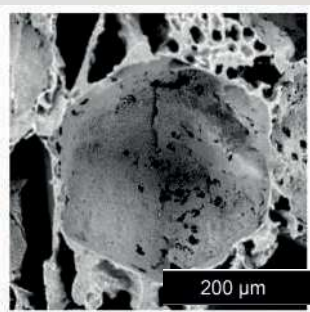
The scientific team carried out synthesis studies and basic verification studies on the manufactured elastomeric bioactive polymer-ceramic composites. The materials were approved by the National Ethical Committee for Animal Experiments. In vivo studies for solid and porous implant prototypes were conducted on a small animal model (rats).

The biocomposites have proven osteoinductive properties and are cytocompatible at the cellular level in vitro and in vivo with respect to bone and normative cells, are proadhesive for bone cells.



APPLICATIONS / MARKETS

Implantable material for filling small bone defects, particularly in the flat bones of the skull.



INNOVATION / ADVANTAGES

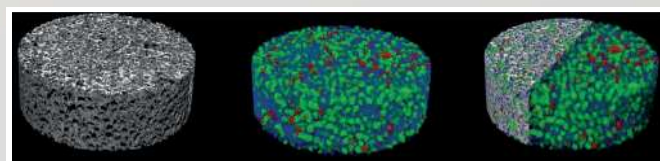
>>> The elastomeric nature of the matrix ensures easy adaptation of the material to the shape of the bone defect and does not cause mechanical stress at the implantation site.

>>> The ceramic component of the composite is a hydroxyapatite material with proven osteoconductive properties.

>>> The biocomposites are not rinsed out of the body. Implantation studies have shown that after 60 days no signs of material disintegration and degradation can be seen.

>>> The composites can be used as a material for filling defects in flat bones.

>>> The rubbery plateau modulus is in the range of several MPa, the storage modulus in the glassy state is in the range of several hundred MPa.



The invention "Porous and solid elastomeric bioactive polymer-ceramic composites for bone defect filling and regeneration" achieved Platinum Medal at the PRIX Eiffel International Invention Competition Paris, 2023.

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