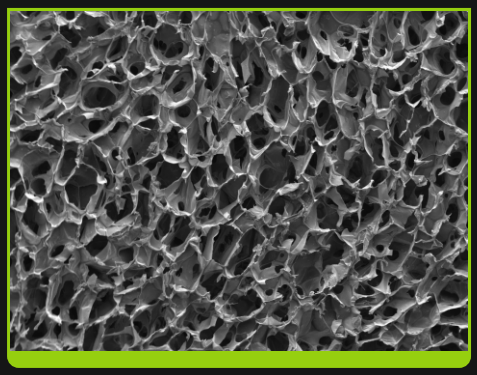
Łukasiewicz
Institute of Ceramics
and Building Materials

TECHNOLOGICAL OFFER



MULTIFUNCTIONAL COMPOSITE IMPLANT MATERIALS FOR BONE FILLING AND BONE REGENERATION

ABOUT THE SOLUTION:

Multifunctional, biocompatible, porous composite implant materials with a unique form and composition.

The innovation of the materials lies in the combination of the following components: (i) a biocompatible polymer – chitosan, (ii) an original bioactive, antibacterial SiO_2 –P_2O_5 – CaO glass doped with ZnO and SrO, obtained by a sol-gel method guaranteeing homogeneity and high chemical purity, and (iii) innovative bioactive peptides with pro-regenerative, antibacterial and anti-inflammatory properties.

The developed biomaterials exhibit a complex action. Their porous structure provides an environment for cell life and migration. In addition, they have osteoconductive abilities, are not cytotoxic, and show antibacterial activity against various bacterial strains by inhibiting the growth of microorganisms, e.g. ***Staphylococcus aureus*** and ***Pseudomonas aeruginosa***. In addition, they are bioactive and, with appropriate peptide release kinetics, show biocompatibility in ***in vivo*** tests.

AUTHORS:

Research teams of scientists from:

- Łukasiewicz – Institute of Ceramics and Building Materials
- University of Gdansk,
- Wroclaw University of Science and Technology,
- Institute of Biotechnology and Molecular Medicine,
- SensDX S.A.

IP protection:

The inventions are the subject of patent applications:

P.442878,
P.442879,
P.442880,
P.442881
EPO: EP23174685.0

SCOPE OF COOPERATION:

- Licensing,
- Sale of property rights,
- Partnership in further research and commercialisation,
- Spin-off.

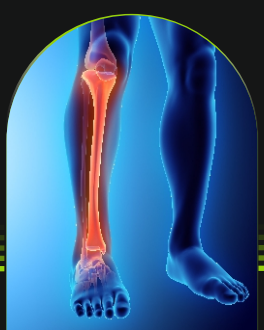
TECHNOLOGY READINESS LEVEL:

TRL 4

Implantable material concept validated under conditions of use, materials tested in vivo on a small animal model (rabbit) with the approval of the National Ethical Committee for Animal Experimentation; TRL classification for medical devices.

The resulting materials can act as a biomaterial to fill a bone defect and provide a matrix for cells, while promoting regeneration of damaged tissue. This can significantly accelerate the healing process and reduce post-operative complications in surgery and microsurgery. These materials can also act as a carrier for other active substances or as a base for biomaterials with therapeutic properties.

A commercialisation strategy is created for the developed material, with a market analysis, an implementation plan, a business model, a marketing strategy, a financial plan and a valuation of the intellectual property.



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Wrocław
University
of Science
and Technology

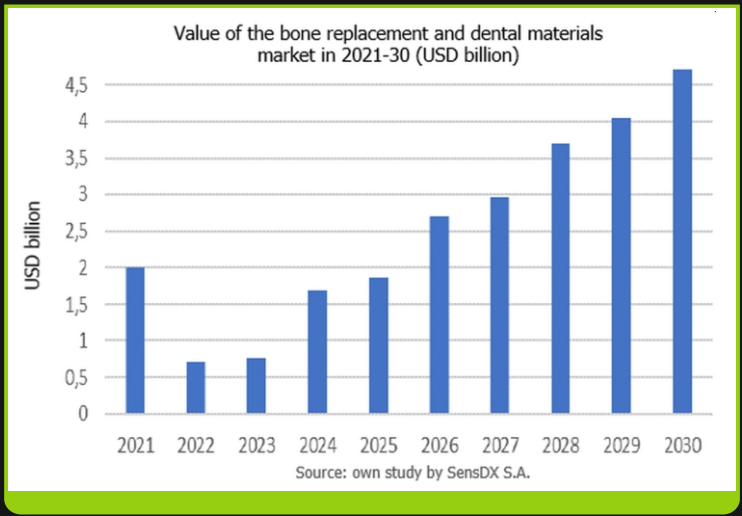
IBMM
INSTITUTE OF BIOTECHNOLOGY
AND MOLECULAR MEDICINE

SensDx
DIGITAL DIAGNOSTICS

MARKET:

The number of patients suffering from fractures and bone disease continues to rise. This is due to an ageing population and diseases of civilisation (including cancer).

According to information published in Osteoporosis International based on 2010 data, approximately 158 million people over the age of 50 are at high risk of bone fractures, and it is estimated that this number will double by 2040.



A detailed market analysis was carried out for the biomaterials developed.

These materials fit into the market in general: biomaterials, bio-glass and, above all, the market for bone substitute and dental materials. The market for these materials was worth approx. USD 700 billion, and projected to grow at a CAGR of 9.5 per cent until 2030 to reach up to USD 4.7 billion. In doing so, it is the synthetic bone regeneration materials segment that is expected to show the highest growth of 10.6% over the forecast period.

The target group in the market for the products will be companies producing and marketing implant materials for orthopaedics and traumatology. With their pro-regenerative effect, osteoconductive ability, antibacterial properties and biological activity, they represent a major advantage over existing biomaterials in the medical device market.

APPLICATIONS:

Multifunctional composite materials with properties such as osteoconductive, antimicrobial and pro-regenerative can be used, among others, in orthopaedic and traumatological procedures as a filling material for bone defects resulting from bone tissue degeneration (osteoporosis), cancerous resections or defects resulting from complex bone damage following accidents, e.g. traffic accidents. The suitability of the material has been verified in vivo in a rabbit model.

We look forward
to working with you!

Program strategiczny
TECHMATSTRATEG

NCBR
National Centre for Research
and Development

The material was developed as part of the project 'Multifunctional composite material with antimicrobial and pro-regenerative properties for the reconstruction of bone tissue' with the acronym **GlassPoPep** National funded by the **Centre for Research and Development (grant no TECHMATSTRATEG2/406384/7/NCBR/2019).**

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