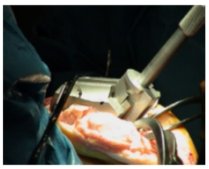
New Generation of Improved biomaterials

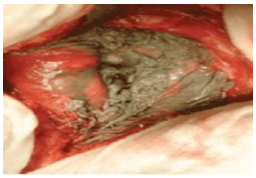
General information Participating Countries: Gr, ES, UK, FR, SL, Cy Duration: 24 months; Kick-off: 11 September, 2014

NEED

- Orthopaedic biomaterial market is one of the fastest growing markets in healthcare industry with a turnover of €23.5 billion in 2012 and annual growth rate 7-15% over the last 10 years.
- The currently used orthopaedic implants do not address the patient's needs in terms of mechanical, electrochemical and biological properties and service life.
- As a result patients requiring hip surgeries submit themselves to painful and expensive treatments



- Some of the commercial implants have biocompatibility issues: release of metal ions (shavings) from the implants into the tissue and circulatory system => poor wear resistance
- Bone has very low elastic modulus compared to the current commercial implants resulting to stress shielding effect and bone atrophy



Significant requirements for implants	Results of not fulfilling the requirements
Long life time	Implant mechanical failure and revision surgery
Adequate fatigue strength	Implant failure, pain to patient and revision surgery
Modulus equivalent to that of the bone	Stress shielding effect, loosening, failure, revision surgery
High wear resistance	Implant loosening, severe inflammatory response, destruction of the healthy bone
High corrosion resistance	Releasing non compatible metallic ions and allergic reactions
Biocompatibility	Body reaction and adverse effects in the organic system

NEWBIOGEN concept

NEWBIOGEN project aims to address these problems by

- Developing new biocompatible raw materials
- Design and manufacture a scale up production process for the development of orthopaedic hip implants and
- Manufacturing of implants with low modulus which will be near to the bone (50GPa), not toxic, lower price, enhanced wear resistance and will last more than the current solutions currently in the market.

Description of technological objectives

Development of biocompatible raw materials mixture with low elastic modulus
Development of orthopaedic implant which will allow the tissue ingrowth through the interconnected pores, the improved tribological and wear resistance properties.
Development of an automated mixing and airtight packaging equipment
Development of a ZrO2/Zr coating on the implant with eliminated coating separation risk
Development of an automated scale up production equipment for improved orthopaedic implants
Development of a simulation model for powder metallurgy production process

The research leading to these results has received funding from the European Union's Seventh Framework Programme managed by REA-Research Executive Agency ([FP7/2007-2013] [FP7/2007-2011]) under grant agreement n° 606112

SUMMARY OF NEWBIOGEN

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CETRI Center for Technology Research and Innovation

GDT

Brunel University London

METROPOLITAN HOSPITAL

New Generation of Improved Biomaterials

NEWBIOGEN

Start: 1st August 2014
Duration: 24 months
Coordinator: SOCINSER

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