

BioCapabili:

**Biomimetic Calcium Phosphate Anti-bacterial
Bone Implants for Local-infection Inhibition**

CIRIMAT Carnot Institute (Toulouse)

Fraunhofer IGB (Stuttgart)



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Objectives of the project and challenges

The Bio-capabili project was conceived as a response to an industrial (and socio-economical) need concerning the prevention of hospital-acquired bone infections through the intimate association of anti-bacterial agents and bioactive biomimetic calcium phosphates (most appropriate bone repair materials). Indeed, as “nosocomial infections” are considered to affect nearly 1 out of 10 patients in occidental countries, and an alarming estimation of 5% of all patients treated in European hospitals contract a nosocomial infection today, leading to heavy health and economical consequences.

Several scientific and technological objectives were therefore anticipated at the time of elaborating this joint project. The three main objectives are 1) to provide detailed and comparative strategies for conveying intrinsic anti-bacterial properties to calcium phosphates, and propose functional protocols for industrial scaling-up, 2) to investigate innovative surface-engineering approaches for associations of biomimetic CaP with anti-bacterial mineral or organic agents, and 3) to predict/investigate the materials behavior after implantation. A constant dialogue with industrial partners is envisaged throughout the duration of the project.

Creation of a long-term strategic French-German alliance

This project gathers physico-chemists, biologists and materials scientists in a complementary approach.

The CIRIMAT Carnot Institute (*Phosphates, Pharmacotechnics, Biomaterials* research group) specializes in the physico-chemistry of calcium phosphates and nano-biotechnologies for bone tissue engineering applications as well as therapeutic/diagnosis aspects.

In a complementary view, the Fraunhofer IGB is expert in microbiology assessments and the study of anti-bacterial surfaces, as well as in surface modifications and analytical methods.

Expected results and market opportunities

The BioCapabili project aims at defining functional strategies for conveying to highly-bioactive biomimetic calcium phosphate bone repair materials some internal anti-bacterial properties that should be efficient but not detrimental to bone growth and bone cells metabolism. It will lead to derive a proof of concept and will consider scaling-up issues and market aspects by maintaining a constant interaction with industrial companies.