

POST-DOCTORAL POSITION

Biofunctionalization of layer-by-layer coatings by grafting and vectorization of osteogenic compounds

12 months, position available from jan. 2019

Location: CNRS UMR 6270 PBS, BioMMAT Team, University of Rouen Normandy, Campus of Evreux

Keywords: Biomaterials, Osseointegration, Biopolymers, Cyclodextrins

Increasing the lifespan of orthopaedic, cranio-facial and dental implants is an important biomedical, health and economical issue. To limit the risks of implant loosening, it is necessary to optimize osseointegration that is, rapid creation, by so-called contact osteoformation, as an intimate, chemically and biologically stable junction between the biomaterial and the host tissue. This problem can be addressed by surface treatments offering a biomimetic microenvironment for bone cells.

The layer-by-layer method (LbL) allows to mimick the osteoid (organic fraction of the bone tissue), using ultrathin organic coatings with controlled architecture, obtained by self-assembly of biomimetic polyelectrolytes (polysaccharides, polypeptides, proteins). We can control the stiffness of these coatings (crucial factor controlling cell behaviours) and use them as nanoreservoirs of bioactive agents. The challenge of the project is to use LbL coatings as nanoreservoirs of osteogenic compounds, by vectorization-incorporation with cyclodextrins, or by grafting methods.

This project at the interface between biology and chemistry, requires an interdisciplinary approach using various methods, mainly: (i) LbL deposition and vectorization-incorporation of drugs, (ii) culture and evaluation of bone cells on the coated substrates.

Laboratory experience related to biomaterials with skills in cell culture, preferably bone cells, is recommended. An experience of surface characterization or drug vectorization will be appreciated.

Please send CV, letter, and scientific production to Prof. Guy Ladam (guy.ladam@univ-rouen.fr / +33 (0)2 32 29 15 94