

PhD project: Mechano-bactericidal Titanium Surfaces for bone tissue engineering

Bone reconstruction is one of the main therapeutic application in orthopedic, maxillofacial or dental surgery. Despite the development of biomaterials with osteoconductive, osteoinductive or osteogenic properties, 5 to 10% of complications are due to nosocomial infections. These infections are very difficult to treat and antibiotic therapy alone is rarely sufficient. The development of biomaterials combining both osteogenic and antibiotic activity is therefore a crucial public health issue, but remains a real challenge.

Our team had initiated a collaboration with Elena Ivanova (RMIT University, Melbourne, Australia), who develops materials with topography bio-inspired by insect wings, providing them bactericidal mechanical properties. Our preliminary results showed that these scaffolds support the adhesion and proliferation of human Mesenchymal Stem Cells and could promote osteogenic differentiation. Therefore, the objective of the PhD project will be to determine if these innovative surfaces with both regenerative and bactericidal properties could be an innovative therapeutic tool to significantly improve the success rate of reconstructive surgery.

Key-words: bio-inspired materials, mesenchymal stem cells, regenerative medicine, anti-bactericidal biomaterials

Contact:

Véronique FRACHET, veronique.frachet@univ-grenoble-alpes.fr

Jean-Luc COLL, jean-luc.coll@univ-grenoble-alpes.fr