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Post-Doctorat offer to start 01/06/2021

SAINBIOSE Laboratory, Jean Monnet University Saint Etienne FRANCE

H2020 European innovation project « LaserImplant »

Effects of femtosecond laser texturing on the differentiation of mesenchymal stem cells and development of an infectious model (cordis.europa.eu/project/id/951730)

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Abstract
<p>The preparation of the state of implant surfaces is recognized as being a key step in the bio-integration of dental implants made of titanium or alloys, not only to facilitate primary osseointegration but also to help maintain a functional implant as long as possible. Existing methods of texturing the surface of dental implants cannot provide a sufficiently developed or controlled relief, at several scales, in order to optimize their osseointegration over time. One way to solve this problem is to perform texturing using a pulsed laser, such as a femtosecond laser.</p> <p>In our project, the goal is to use the femtosecond laser (FS), to texture titanium plates to provide surface functionalities at the interfaces between bone and implant. The post-doctoral student will have to find a texturation abled to improve cell adhesion and accelerate osteoblastic differentiation.</p> <p>Moreover, a challenge will be to develop an infectious model to analyses cells and bacteria interactions in contact with a laser textured surface.</p> <p>Keywords: Multifunctional texturations, femtosecond laser, surface biofunctionalization, in vitro studies, cell adhesion, anti-bacterial surface, osteodifferentiation</p>
<p>Candidate profile: The candidate could have a multidisciplinary profile and / or a strong motivation to adapt to new fields. He should have a strong background in at least one of one of the following: Cell biology and molecular biology, microscopy techniques, surface characterizations. Knowledge of English will be strongly encouraged</p>
<p>Remuneration: 2100-2500€ net per month depending on experience Type of funding: H2020 LaserImplant project (Grant agreement ID: 951730)</p>
<p>Laboratory SAINBIOSE: The symbolism of its acronym, SAINBIOSE, indicates the desire of researchers from different disciplines (doctors, engineers, biologists) to work together to improve patient care. SAINBIOSE studies chronic pathologies and aging of the vascular and osteoarticular systems through transversal approaches combining fundamental, technological and clinical research. Web site: https://www.univ-st-etienne.fr/fr/sainbiose.html</p> <p>On this post-doctorate subject, the SAINBIOSE Laboratory will collaborate with: -The LTDS laboratory specialized in surface characterization -The Hubert Curien laboratory and the Manutech-USD platform, specialists in laser texturing</p>
<p>Laboratory publications related to the post-doc subject:</p> <ul style="list-style-type: none">• Laser-Based Hybrid Manufacturing of Endosseous Implants: Optimized Titanium Surfaces for Enhancing Osteogenic Differentiation of Human Mesenchymal Stem Cells. G. Bouet et al. ACS Biomaterials Science & Engineering 2019 5 (9), 4376-4385• Femtosecond laser nano/micro patterning of titanium influences mesenchymal stem cell adhesion and commitment V. Dumas et al. Biomedical Materials, Vol 10, N. 5. 2015• Multiscale grooved titanium processed with femtosecond laser influences mesenchymal stem cell morphology, adhesion, and matrix organization. Dumas V. et al. J Biomed Mater Res A. 2012

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