

Postdoctoral Position

Bone regeneration: development of a dynamic seeding of stem cells into a porous scaffold

Bone tissue regeneration is a problem that is involved in trauma clinical applications (fracture healing), oncology or rheumatology (osteoporosis). Indeed, due to its importance in locomotion and calcium homeostasis, bone diseases or traumas are particularly annoying for the patient. To improve bone reparation and its regeneration, clinical protocols involving the use of biomaterials in the defect zone are often carried out. Nevertheless, the ability of bone cells to invade the volume of the three-dimensional porous scaffold is rather limited. Current strategies take generally advantage of the porous media morphology of the scaffolds generally displaying a high porosity (volume of pores divided by the total volume near to 0.5) and large pore length scales (near to 100 micrometers), that is to say an order of magnitude larger than the cell length scale. The use of perfusion bioreactors to force culture fluid to flow through the medium allows the enhancement of nutrient transport and generation of mechanical stimuli upon the cells.

The main objective of this postdoctoral position is to tune a perfusing seeding protocol of stem cells onto a porous biomaterial using a chemo-attractive biomolecule which also improve angiogenesis. The seeding chamber already exists in the laboratory and the candidates will have to optimize the hydraulic parameters such as the flow rate, the perfusing time, etc. to ensure a homogeneous seeding. The validation of the protocol will be made using histological analysis in the laboratory.

This experimental optimization of the seeding device will be in parallel guided by numerical fluid dynamics simulations devoted to evaluate the mechanical environment of the cells in terms of shear stress and nutrient transport properties.

To be effective in the one-year post-doc position, the candidate should have a PhD and has to be motivated by exploring a new clinical protocol and has to present skills in cellular biology and/or in biomechanical modelling.

For more information about the laboratory, please visit <http://msme.univ-mlv.fr/equipe-biomecanique/>

Application procedure: The application shall be written in English or French. Please send your cover letter and CV (including publication list, prior research experience and contact information of two references) as a single pdf file to: salah.naili@univ-paris-est.fr and thibault.lemaire@univ-paris-est.fr. Fixed deadline: 5 April 2013.

Contact: Salah Naili (salah.naili@univ-paris-est.fr) and Thibault Lemaire (thibault.lemaire@univ-paris-est.fr)

Salary, duration and localisation: Net salary: about 2100€/month (gross salary: 2600€/month). The postdoctoral position is for 12 months and can start in September 2013. The laboratory is localized at Créteil (Métro Créteil-Université).