UNIVERSITY OF SÃO PAULO

SCHOOL OF DENTISTRY OF RIBEIRÃO PRETO

Postdoctoral Positions to Join a Thematic Project – FAPESP

Title: Postdoctoral Scholarship in Dentistry
FAPESP Grant: 2017/12622-7 (https://bv.fapesp.br/pt/pesquisa/?sort=-data_inicio&q2=id_pesquisador_exact%3A474+AND+auxilio%3A%2A+AND+situacao_exact%3A%22Em+andamento%22)
Title of Thematic Project: Cell therapy: potential of mesenchymal stem cells, vegf-a and bmp-9 to regenerate bone tissue
Research Field: Health Care Science – Dentistry – Oral and Maxillofacial Surgery
Principal Investigator: Professor Adalberto Luiz Rosa
Institution: School of Dentistry of Ribeirão Preto, University of São Paulo – Ribeirão Preto, SP, Brazil
Number of Scholarships: 02
Application Deadline: January 23rd, 2019

The Bone Research Lab from School of Dentistry of Ribeirão Preto, University of São Paulo – Ribeirão Preto, SP, Brazil, is taking applications for 02 postdoctoral research positions to join a thematic project supported by FAPESP for 02 years.

The highly motivated candidate must have taken a PhD degree in Dentistry in the past 02 years and should be interested in working with cell therapy to regenerate bone tissue.

The candidate must have proficiency, preferentially demonstrated by published articles, in cell culture with emphasis in primary culture of mesenchymal stem cells and their osteoblastic differentiation, cell transfection, CRISPR, real-time PCR, Western blot, animal surgery (rat and mouse), microtomographic analysis and histological analysis of non-decalcified tissues.

Excellent oral and written communication skills are required.

Each one of the 02 selected candidates will work on subprojects 1 and 2, respectively, which are described below in the Project Abstract.

Please, e-mail your application by **January 23rd, 2019**, including **cover letter, CV** and **02 recommendation letters** to Professor Adalberto Luiz Rosa (**adalrosa@forp.usp.br**).

Project Abstract

Bone tissue has high capacity of regeneration, but in several situations the extent of the injury overcomes its regenerative potential. In this scenario, therapies based on the use of mesenchymal stem cells (MSCs) have aroused the attention of many researchers for being a promising alternative compared with the available treatments. However, many molecular, cellular and tissue characteristics remain unmet in the literature to make cell therapy an effective treatment for bone repair both in healthy and systemic compromised patients by pathologies such as osteoporosis, diabetes and hypertension. In keeping with this, this research project consists of three subprojects that aim to: (1) evaluate the potential of MSCs harvested from either bone marrow (BM-MSCs) or adipose tissue (AT-MSCs) combined with vascular endothelial growth factor A (VEGF-A) and/or bone morphogenetic protein 9 (BMP-9) to repair bone defects; (2) evaluate the potential of these MSCs genetically edited to overexpress VEGF-A and/or BMP-9 to repair bone defects; and (3) evaluate the effect of BM-MSCs harvested from healthy rats on the osteogenic potential of BM-MSCs harvested from osteoporotic, diabetic and hypertensive rats. To develop subprojects 1 and 2, BM-MSCs and AT-MSCs will be treated with VEGF-A and/or BMP-9 or genetically edited by clustered regularly interspaced short palindromic repeats (CRISPR-Cas9) to overexpress VEGF-A and/or BMP-9. Those cells will be evaluated in vitro to assess their angiogenic and osteogenic potentials as well as their large scale genomic and proteomic profile. For bone repair, BM-MSCs and AT-MSCs either combined with VEGF-A and/or BMP-9 or edited to overexpress these factors will be directly injected into rat bone calvarial defects. To evaluate the presence of cells in the defects, Luc-expressing cells will be tracked by bioluminescent imaging. Up to 4 weeks, vasculogenesis and bone formation will be evaluated by in vivo micro-CT. After 4 weeks, the animals will be euthanized and the harvested calvaria evaluated by histological analysis. In the subproject 3, the effect of BM-MSCs harvested from healthy rats on the osteoblastic differentiation of BM-MSCs from osteoporotic, diabetic and hypertensive rats will be evaluated using an indirect co-culture model. These studies are the first step aiming to apply these cell therapies to regenerate bone defects in the presence of such pathologies.