5. Stem Cell and Tissue Regeneration Research

PI: **Gang Li (Orthopaedics & Traumatology)**
Team: **Stem Cells and Regenerative Medicine**

Research Progress Summary:

Since the PI formal appointment as a professor in ORT department and as a PI in LiKS Institute in April 2009, the PI has spent most of his time to develop his own research team in 2009. Our main research interests for 2009 are to (1) to develop tendon stem cells from tendon and bone marrow tissues and study the factors controlling their differentiation; (2) to study the role of circulating stem cells in diseases and repair and their homing and recruitment mechanisms; (3) to study the novel means of promoting fracture healing; (4) gene therapy work using bone marrow mesenchymal stem cells over-expressing TK gene as anti-tumour gene therapy carrier; (5) plan clinical trials using autologous MSCs therapy for tendinopathy and spinal cord injury patients. We have recruited 2 PhD students and 1 Postdoc RA, and 2 research technicians to work on these projects. These projects are all progressing well, some of these already archived good results. 7 papers have been published from the research work and over HK$4.0 Million research grants have been secured by this PI over the period 2009-2010. In addition, the PI has actively seeking research collaborations with mainland partner universities and has submitted a 973 and a NSFC-RGC grant application with mainland institutions. The PI has also submitted a GRF grant application, two ITF-Tier 3 applications, one Schemed D application as PI for 2009-2010 year and also acted as Co-I on 8 other GRF grant applications with colleagues from CUHK and other Hong Kong institutions. The PI also lead the Stem Cells and Regeneration theme of CUHK School of Biomedical Sciences, and have been involved in establishing the CUHK Stem Cells and Regeneration Centre within the Faculty of Medicine. The PI also involved in purchasing and be in charge of two major pieces of equipment for the Faculty, one in vivo imaging system machine and one flowcytometor, both all over HK$2.5 Millions. The PI also spent his time in managing the GMP standard human cell culture laboratory at Li KS Institute, and helping to organize several potential clinical trials to be started in 2010 in the said GMP facility. The PI has been invited to give keynote speeches and lectures at various national and international conferences and meetings for more than 10 times in 2009.

Recognitions:

Awards and Fellowships

Member's Name	Details
Gang Li	Best Basic Research Paper Award, Hong Kong Orthopaedic Association Annual Meeting, 2008.
Gang Li	Visiting Professor, Key Laboratory of Cell Biology, Ministry of Education of PRC, China Medical University, Shenyang, China.
Gang Li	Member of Member of Advisory Board, Shanghai Key Laboratory of Orthopaedic Implant, Shanghai Jiaotong University, China.
Gang Li	Member of Editorial Board, NeuroImage
Gang Li	Member of Editorial Board, Word Journal of Stem Cells
Gang Li	Member of Editorial Board, Orthopaedics Journal of China

Gang Li Member of Editorial Board, Journal of Orthopaedic Surgery and Research

Grants and Consultancy

Details	Member's Name	Amount (HK$)
Contract Research Grant, Amgen USA (TA084488) Assessment of time-course effect of an antibody on mouse femoral fracture healing (01/03/08-30/03/10)	LI, Gang (PI)	HK$1,020,649
Project Grant, Osteosynthesis and Trauma Care Foundation, Switzerland (2009-WHLG). Can Low Intensity Pulsed Ultrasound Accelerate Systemic Recruitment of Osteoblastic Cells for Fracture Healing? (01/01/09-31/12/11)	LI, Gang (Co-I)	Ng HK$387,505
Project Grant China Natural Science Foundation (30872635/C160705). Study of osteogenic potentials and mechanisms of circulating MSCs. (01/10/08-30/09/11)	LI, Gang (PI)	HK$352,000
ITF-Tier 3 Project. Development of an Immortalized Human Mesenchymal Stem Cell Line Overexpressing Thymidine Kinase (TK) Gene for Anti-tumor Therapy. (01/01/10-30/06/12)	LI, Gang (PI)	HK$997,000
Contract Research Grant, Eli Lily Co., USA (TE095245) Animal studies of proprietary bioproduct or small molecules with potential osteogenesis stimulation effect. (01/01/10-30/12/12)	LI, Gang (PI)	HK$1,337,000

Publications:

Xiang J, Tang JQ, Song C, Zhao L, Yang ZQ, Hirst DG**, Li G.** Mesenchymal stem cells as a gene therapy carrier for treatment of fibrosarcoma. Cytotherapy, 2009; 26:1-11.

Zhao L, **Li G,** KM Chan, Wang Y, Tang PF. Comparison of multipotent differentiation potentials of primary bone marrow stromal cells and the mesenchymal stem cell line C3H10T1/2. Calcified Tissue International, 2009; 84:56-64.

Tang PF, **Li G,** Huang P, Wang Y. Development, characterization and validation of porous carbonated hydroxyapatite bone cement. Journal of Biomedical Material Research Part B: Applied Biomaterials. 2009; 90(2):886-93.

Hanratty BM, Raby JT, Tang PF, **LI G.** Thrombin related peptide TP508 promoted fracture repair in a mouse high energy fracture model. Journal of Orthopaedic Research and Surgery, 2009, 4: 1

Tang PF, Burke G, **Li G,** Wang Y. Patients with long bone fracture have altered Caveolin-1 expression in their peripheral blood mononuclear cells. Archives of Orthopaedic and Trauma Surgery, 2009; 129(9):1287-92.

Wang Y, Ni M, Tang PF, **Li G.** Novel application of HA-TCP biomaterials in distraction osteogenesis shortened the lengthening time and promoted bone consolidation. Journal of Orthopaedic Research, 2009; 27:477-482.

Yang ZQ, He JR, **Li G,** Yang SH, Wei XC. Research on preparatiojn and characters of decellularized cartilage matrix for tissue engineering. Chinese Journal of Reparative and Reconstructive Surgery, 2008; 22(10):98-103.