Huanxiang Zhang, J Tissue Sci Eng 2014, 5:3
http://dx.doi.org/10.4172/2157-7552.S1.014

OMICS Group Conferences
Accelerating Scientific Discovery

3rd International Conference on
Tissue Science & Regenerative Medicine
September 24-26, 2014 Valencia Convention Centre, Spain

Beta-catenin signaling regulates the chemotactic responses of mesenchymal stem cells

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Precise migration of stem cells, either endogenous or transplanted, is crucially important for embryonic development, homeostasis in adults, and tissue repair after injury. However, the detailed mechanisms of the directed migration of these cells are not clear. During the past few years, our study showed that the differentiating mesenchymal stem cells (MSCs) possess different migratory capacity and the chemotactic responses of these cells correlates closely with their differentiation states. Accordingly, the formation and the asymmetrical distribution of focal adhesions (FAs) between the leading lamella and the cell rear, the phosphorylation of focal adhesion kinase (FAK) and paxillin, as well as the turnover of FAs varied greatly in differentiating MSCs, leading to the most effective chemotactic responses of MSCs in certain differentiation states. Further, we demonstrated that signaling through PI3K/Akt and MAPKs are involved in regulating the directed migration of MSCs. More importantly, we found that beta-catenin signaling is prerequisite for the chemotactic migration of MSCs. In this talk, I will summarize our data regarding the regulatory effects of beta-catenin signaling on MSCs that undergo chemotaxis.

Biography

Huanxiang Zhang has completed his PhD at the age of 28 years from Beijing Normal University, China and postdoctoral studies from Geneva University School of Medicine, Switzerland. He is now working in the Department of Cell Biology, Medical College of Soochow University, China. His research focuses on the control of the directed migration and differentiation of stem cells, including neural stem cells, mesenchymal stem cells and embryonic stem cells, and tissue engineering, especially the interaction between stem cells and the silk fibroin scaffolds with a variety of physical and chemical properties.

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