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REGULATION OF THE CHEMOTACTIC MIGRATION OF MESENCHYMAL STEM CELLS AND THE IMPLICATIONS FOR THE CELL-BASED THERAPY STRATEGIES

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Precise migration of stem cells 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. Given the fact that only a very limited number of transplanted cells successfully reach the injured tissues, which severely restricts their clinical applications; further understanding of the cellular and molecular events underlying the directed migration of these cells will help to improve the application of stem cells as therapeutic vehicles. The multipotent mesenchymal stem cells (MSCs) with the ability to self-renew and differentiate into a variety of tissue cells have emerged as a promising source for cell-based therapies. In an effort to find a population of MSCs with strong migratory capacity, especially in response to growth factors or cytokines that are released from the injury sites and that act as chemo attractants to stimulate the directed migration of MSCs, our work has been focusing on the relationship between the chemotactic responses of MSCs and their differentiation status, as well as the delineation of the underlying regulatory mechanisms. Results showed that MSCs in varying differentiation states display different chemotactic responses to a variety of chemo attractants, such as hepatocyte growth factor (HGF). In this talk, I will summarize our data regarding the regulatory effects of PI3K/Akt, MAPKs, microRNAs, and beta-catenin signalling on the differentiating MSCs that undergo chemotaxis.

Biography

Huanxiang Zhang has completed his PhD from Beijing Normal University, China and Post-doctoral 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. Recently, his group demonstrated the close relationship between the chemotactic migration of stem cells and their differentiation states, and further systematically studied the underlying mechanisms, thereby shedding light on optimization of the therapeutic potential of stem cells to be employed for tissue regeneration after injury.

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