Stem Cell Club Special

Multipotent adult stem cells

(Organised by the Stem Cells Research Singapore Website Committee http://www.stemcell.edu.sg)

Date: Oct, 31st 2007 (Wednesday)
Time: 5:30 pm
Venue: Aspiration, Level 2M, Matrix

Host: Robert Zweigerdt

Time	Title	Speaker
5:30- 6:30	***Homing of circulating stem cells and contribution to tissue remodeling***	**Thomas Braun** *Max-Planck-Institute for Heart and Lung Research, Germany*

Homing of circulating stem cells and contribution to tissue remodeling

Thomas Braun

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Cell therapy currently attracts growing interest as a new approach to treat diseases of the heart including heart failure. Several different types of stem/progenitor cells have been used in various preclinical and clinical trials. In particular, bone marrow-derived multipotent adult mesenchymal stem cells (BM-MASCs), mesenchymal stem cells (MSCs) and endothelial precursor cells (EPCs), which posses a certain degree of multipotency have attracted attention as therapeutic tools since they can be obtained with relative ease and expanded in culture. So far, most studies both in animals and in humans reported encouraging results in respect to post myocardial infarction remodeling and ventricular performance. Results from initial nonrandomized clinical trials demonstrated a moderate improvement of heart function after stem cell therapy although most of the beneficial effects were lost during the follow-up period and the underlying mechanisms have remained enigmatic.

There is no doubt that homing and tissue integration are prerequisites for a functional benefit of stem/progenitor cell therapies and any improvement of existing cell-based therapeutic approaches will depend on a better understanding of the interaction of stem cells with the environment that leads to homing and functional integration. We have recently described the isolation of multipotent adult mesenchymal stem cells (MASC) from different organs of mice including the bone marrow. MASCs can be induced to express cell-type specific markers and improve pathological conditions of the heart after systemic administration. After injection into mouse blastocyts these cells contributed to the development of chimeric embryos in vivo by a non-autonomous mechanism. Further analysis revealed that MASCs constitute a long-term renewing mesenchymal stem cell population, which can be recovered from the bone marrow of recipient mice after several serial transplantations. Screening for molecules that might mediate homing of long-term renewing adult multipotent mesenchymal stem cells (MASCs) by a combination of DNA microarray analysis and in vitro migration assays led to the identification of the cytokine receptor CCR-2, which is required for organ-specific homing of MASCs. CCR-2 mediated activation of stem cells critically depended on the intracellular adaptor molecule FROUNT, which caused polarization of stem cells resulting in clustering of CCR2 and reorganization of the cytoskeleton.

Short biography:

2004-	Managing Director of the Max-Planck-Institute for Heart and Lung Research, Bad Nauheim Full Professor, Univ. of Gießen, Medical Faculty, Dept. of Internal Medicine
1998 -2004	Full Professor, Univ. of Halle-Wittenberg, Medical Faculty, Director of the Institute of Physiological Chemistry
1997-1998	Associate Professor, Univ. of Würzburg, Medical Faculty, Inst. of Medical Radiology and Cell Research
1993-1997	Staff Scientist, Dept. of Cellular and Molecular Biology, Univ. of Braunschweig
1993	German "Habilitation" and PhD in Cellular Biochemistry
1991-1992	Visiting Scientist, Whitehead Institute for Biomedical Research, Cambridge, USA
1987-1992	Postdoctoral Associate, Dept. of Toxicology, Univ. of Hamburg
1989	EMBO short term fellowship, Visiting Scientist at the Medical Research Council Cambridge, England
1989	Visiting Scientist at the Institute of Virology, Oxford, UK. Elected member of the Saint Cross College Oxford
1987	Finished MD thesis
1980-87	Studies of Philosophy and Medicine, University of Göttingen and Hamburg, Germany