

10th Stem Cell Club Meeting

Mesenchymal stem cells: isolation and potential applications

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

Date: April, 20th 2006 (Thursday)

Time: 5:30 pm

Venue: Matrix, 4th Level, Creation Theatre

Host: Suzanne Kadereit, IBN

Time	Title	Speaker
5:30-6:10	Stem Cells for Rejuvenating the Failing Heart	Philip Wong <i>National Heart Center, Singapore</i>
6:10-6:50	Non-hematopoietic Stem Cells and their Potential for Cell Therapy	Susan Donath <i>Miltenyi Biotec, Germany</i>
6.50 –	Networking with cheese and wine	

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Stem Cells for Rejuvenating the Failing Heart

Philip Wong
Dept. Cardiology
National Heart Centre, Singapore

Cellular-based therapy has emerged as a potential new therapy for patients with advance heart failure. Numerous cell types have been explored in pre-clinical and clinical trials with encouraging results.

Bone marrow stem cells are ideal for myocardial transplantation since they are capable of developing into various mesodermal lineages that include smooth muscle, cardiac muscle and angioblast. Mesenchymal stem cells in particular have been demonstrated to transdifferentiate into cardiomyocytes and endothelial cells following engraftment into the myocardium.

We have in appropriate culture conditions, coaxed bone marrow stem cells harvested from patients undergoing coronary bypass surgery, towards cardiac like cells that express a wide range of cardiac specific proteins. These cells, although they show no spontaneous contraction, express many markers of the contractile apparatus of the cardiomyocyte.

Extracellular matrices may play a role in the lineage development of stem cells. We discuss several methods being used together with extracellular matrices to coax stem cells toward cardiomyocytes. Attempts at creating artificial heart tissue using differentiated stem cells are also discussed.

In the translational research arena, we will show minimally-invasive methods, using electrical-mechanical voltage maps of the heart, to target stem cells into damaged areas of the heart.

Non-hematopoietic Stem Cells and their Potential for Cell Therapy

Susan Donath,
Product Manager, Cell Biology - Stem Cell products
Miltenyi Biotec

Throughout the whole life cycle, the human body maintains a supply of adult stem cells that are able to proliferate and differentiate into mature cells of multiple hematopoietic and non-hematopoietic (NH) lineages. These stem cells have the potential to revolutionize tissue regeneration therapies. The use of defined stem cell populations from the outset, in addition to reproducibility of data and standardization of protocols are key to unraveling the full potential of stem cells. Therefore, the establishment of efficient and reproducible procedures for the isolation of defined populations of stem cells for the implementation of reliable and predictable therapies is an important first step. This presentation will give an overview about recent findings in research on stem cell from hematopoietic and non-hematopoietic sources and their regenerative potential.

Furthermore, attempts will be discussed to isolate homogeneous populations of marrow stromal cells (MSCs) – non-hematopoietic stem cells from bone marrow - using different positive selection markers such as CD133, CD271 (LNGFR), Stro-1, CD117, CD105, and anti-fibroblast antigen. Furthermore, standardization of the cultivation and quality control of cultured MSCs will be discussed.