29th Stem Cell Club Meeting

Basic and Clinical Science of Blood Stem Cells

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

Date: November, 21st, 2007 (**Wednesday**)
Time: 5:30 pm
Venue: Aspiration Theatrette, Level 2M, Matrix

Host: Paul Robson, GIS

Time	Title	Speakers
5:30-6:15	**Hemangioblasts and the establishment of hematopoietic programmes**	***Tara Huber*** *GIS*
6:15-7:00	**Optimizing hematopoietic stem cells for transplantation**	**William Hwang,** *SHS, SCBB, SGH*
7:00 -	**Wine and Cheese (at Invitrogen facilities, 4th floor Chromos)**	

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Hemangioblasts and the Establishment of Hematopoietic Programs

Tara Huber
Senior Research Scientist
Stem Cell & Developmental Biology
Genome Institute of Singapore

Hematopoietic stem cells (HSCs) are defined as self-renewing cells that give rise to all hematopoietic lineages. They are generated during embryogenesis from mesoderm in what is still an unclear process. Our approach to understanding the establishment of hematopoietic programs, in particular to the generation of HSCs is to study a progenitor known as the hemangioblast. It is the precursor of the hematopoietic and vascular lineages and is a stage at which key molecular decisions are made regarding commitment to the hematopoietic or vascular fate. During embryogenesis, hematopoiesis initiates at two independent sites; the yolk sac (YS) and the intraembryonic paraaortic splanchnopleura (P-Sp)/aortal-gonad-mesonephros (AGM) region. The hematopoietic programs that develop at these sites differ in potential; notably the P-Sp/AGM, but not the YS, produces HSCs that can reconstitute lethally irradiated mice. Utilizing culture conditions defined in studies using the embryonic stem cell differentiation model, we identified a progenitor with hemangioblast characteristics in the early gastrulating mouse embryo which contributes to the formation of the YS blood islands. We have also cultured a progenitor from the day 8.25 embryo caudal region (containing the P-Sp) with hematopoietic and vascular potentials that differ to those of the YS hemangioblast. The P-Sp-derived progenitor displays definitive but not primitive erythroid potential which is instead exhibited by the YS hemangioblast. In addition the vascular potential appears to be preferentially that of vascular smooth muscle rather than endothelial. When plated on OP9-delta-like 1 stromal cells, the P-Sp-derived colonies can generate T lymphoid cells. Together our findings suggest that we have identified progenitors that represent the early commitment events for the YS and P-Sp hematopoietic programs and encourage future experiments to determine how the molecular profiles of these progenitors differ.

Optimizing Haematopoietic Stem Cells for Transplantation

William Hwang Ying Khee

Singapore Health Services Pte Ltd,
Singapore Cord Blood Bank,
and Singapore General Hospital

Haematopoietic Stem Cell Transplants (HSCTs) work. Tens of thousands of lives around the world attest to that. However, HSCTs sometimes fail to cure the malignancies, immune disorders or genetic diseases that they were called on to treat. How can we make HSCTs better? In military warfare, success is often determined by strategic placement of forces, timely placement of reinforcements, as well as adequate troop expansion and training. Similarly, we will discuss how HSCTs may be improved by better strategies in HSC placement and expansion, as well as through optimization selected cell populations for specific purposes. Such strategies also bear relevance to basic scientists hoping to translate exciting new research to clinical applications.