Stem Cell Club

Stem Cells and CNS Repair

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

Date: 23rd November 2005, Wednesday
Time: 5.15- 8.00
Venue: Breakthrough theatrette (Level 4), The Matrix, Biopolis

Time	Title	Speaker
5.15-6.00	***Fetomaternal Microchimerism in the Brain***	Gavin Dawe (NUS)
6.00-6.45	***Cross-Talk between Axon and Glia during Oligodendrocyte Differentiation***	Zhi-Cheng Xiao (SGH/IMCB)
6.45-8.00	***Cheese and Wine***	

This event is sponsored by Carl Zeiss SEA.

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Fetomaternal Microchimerism in the Brain

Gavin Dawe (NUS)

Fetal cells can enter the maternal blood circulation during pregnancy. Some of these fetal cells can engraft maternal tissues. In humans, male cells of fetal origin have been found in maternal skin, spleen and liver decades after pregnancy. We have recently shown in mice that, despite the blood-brain-barrier, fetal cells can also enter the maternal brain. The maternal brain some fetal cells can differentiate to express immunocytochemical markers typical of neural cell types. The evidence for this fetomaternal microchimerism in the brain will be discussed. We propose that such fetomaternal microchimerism may offer a novel model to study the behaviour of fetal cells in the adult brain environment without in vitro isolation or invasive transplantation. We suggest that identification of molecular markers characteristic of microchimeric fetal cells capable of entering the brain may allow for selection of cells with similar properties for human umbillical cord blood for intravenous transplantation for brain repair.

Reference:

X. W. Tan, H. Liao, L. Sun, M. Okabe, Z. C. Xiao, G. S. Dawe (2005).
Fetal microchimerism in the maternal mouse brain: A novel population of fetal progenitor or stem cells able to cross the blood-brain barrier? Stem Cells (Stem Cells Express, published online August 9, 2005; doi:10.1634/stemcells.2004-0169

Cross-talk between Axon and Glia during Oligodendrocyte Differentiation

Zhi-Cheng Xiao (SGH/IMCB)

Myelination in the vertebrate central nervous system (CNS) is essential for rapid impulse conduction. We have identified F3/contactin/NB-3 as a trans-acting extracellular ligand of Notch, an interaction involves in promoting oligodendrocyte differentiation and maturation. In our ongoing projects, we are trying to induce umbilical cord blood and bone marrow stem cell differentiation into oligodendrocytes by stimulating the F3/NB-3/Notch signalling pathway in vitro. Then, the treated cells will be transplanted into PLP tg mice, a chronic demyelination animal model, in order to promote remyelination. Predifferentiation of donor cells will facilitate stem cell therapies for remylenination. The project will provide pre-clinical validation of a novel product allowing for the first time reliable and selective predifferentiation of cord blood and bone marrow stem cells to oligodendrocyte precursor cells and/or oligodendrocytes lineages.

Reference:

1. X. Y. Cui, et. al., (2004). NB-3/Notch1 pathway via Deltex1 promotes neural progenitor cell differentiation into oligodendrocytes. **J. Biol. Chem. 279**, 25858-25865.

2. Q. D. Hu, et. al.(2003). F3/Contactin acts as a functional ligand for Notch during oligodendrocyte maturation. **Cell (cover story) 115**, 163-175.