# 31st Stem Cell Club Meeting

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

Date: January, 23rd, 2008 (**Wednesday**)
Time: 6:00 pm
Venue: Exploration Theatrette, Level 4, Matrix

Host: Robert Zweigerdt

| Time | Title | Speakers |
|---|---|---|
| *6:00-6:45* | **Neurogenesis and Transplantation of Bioreactor-expanded human telencephalic neural cells and skin derived precursor cells** | ***Nao Kobayashi*** *SSCC, IMB, Singapore* |
| **6:45 -** | **Wine and Cheese (at Invitrogen facilities, 4th floor Chromos)** | |

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**Neurogenesis and Transplantation of Bioreactor-Expanded Human Telencephalic Neural cells and Skin-Derived Precursor Cells**

**Nao Kobayashi**

Accumulating evidence supports the use of stem cells as an unlimited source of transplantable cells to treat neurodegenerative diseases. In order to provide clinical-grade and –quantities of neural precursor cells (NPCs), our research has established a suspension bioreactor expansion system to scale up human telencephalic NSCs while maintaining their ability to yield neural progenies. In particular, I have derived γ-aminobutyric acid (GABA) positive neurons, analogous to cells that progressively degenerate in striatum of Huntington's disease patients. *In vitro* analysis using immunofluorescence staining and confocal microscopy revealed that after a 7 day-differentiation condition, over 99% of cells were GABA immunopositive, co-expressing GABA synthesizing enzyme, glutamate decarboxylase. Furthermore, grafting of these GABA-expressing cells into the quinolinic acid lesioned striatum, a rodent model of Huntington's disease, restored behavioural and memory deficits 4 weeks post-transplantation. These findings confer support for NPC derived cell replacement therapy in neurodegenerative disorders.

Although embryonic stem cells and embryo-derived progenitor cells are attractive candidates for a restorative strategy in degenerative disorders, host tissue rejection and ethical issues remain to be addressed for clinical use. In this regard, our group has isolated novel multipotential skin-derived precursor cells (SKPs) from dermis similar to previously characterized embryonic neural crest-derived stem cells. I have investigated neurogenic potential of SKPs *in vitro*, incorporating a transplantation paradigm using hippocampal slice culture. SKP cultures follow an appropriate pattern and time-course of neuronal differentiation, with proliferating nestin-expressing SKPs generating post-mitotic neuronal cells that co-express pan-neuronal beta-III tubulin and peripheral autonomic lineage markers such as tyrosine hydroxylase. These SKP-derived neuron-like cells survive and maintain their peripheral phenotype for at least 5 weeks when transplanted into normal or kainate-injured hippocampal slices. Further studies are required to address weather these cells will be suitable as autologous sources of transplantable cells for therapeutic application.