

A Stem Cells *Tour de Force* in Dresden – GSCN Satellite Symposium: Neural Stem Cells in Evolution

Tuesday, July 8th, 2014-07-17, CRTD Dresden

Organizers: Elly Tanaka and Federico Calegari



This July, the Center for Regenerative Therapies Dresden (CRTD) has hosted the 5th International Congress on Stem Cells and Tissue Formation bringing together 25 leading international speakers with several talks selected from the posters covering the whole spectrum of the stem cell field. On this background, CRTD director Elly Tanaka and Federico Calegari organized the satellite symposium on *Neural Stem Cells in Evolution*, an event open to the public entirely supported by the German Stem Cell Network (GSCN). This symposium was a phylogenetic *tour de force* of the various model organisms that are key to decipher the lineage of neural stem cells and their differentiation to finally understand the evolution of our most complex organ, the brain.

The list of speakers included nine international researchers studying neural stem cells in insects, fishes, reptiles, rodents, carnivores and primates as well as GSCN founding president Oliver Brüstle representing the field of human ES-derived neural stem cells for modeling disease and address therapy. Studies in drosophila, represented by Stefan Thor have stressed an intrinsic sequence of transcription factors that sets the timing and fate of neural progenitor cells. This theme started discussions on whether drosophila versus vertebrate systems support a cell intrinsic neurogenic program that is modifiable by external signaling, and to what extent the relative importance of intrinsic versus extrinsic program may have changed over evolution. Another theme started by the drosophila work, was the ability to uncouple cell fate determination with proliferation control via mutations in the drosophila *Capo* gene which acts like the p27 cell cycle regulator. In drosophila this leads to a switch in the type of stem cell division without changing fate. This may be relevant of situation, like those described by Tadashi Nomura of lizard corticogenesis, in which surprisingly little cell proliferation was seen in the neural progenitor pool setting up the pallium. Nancy Papalopulu spoke about her elegant work modeling damping in the dynamic HES oscillatory network playing a critical role in the decision to self-renew or differentiate while Yoichi Kosodo proposed physical stiffness of the tissue as a possibly modulating force. Federico Calegari brought in a new player in the control of mammalian neurogenesis with the transcription factor *Tox* controlling the expression of a panel of downstream genes involved in neurogenesis and neuronal maturation. Linking vertebrate model systems, Caghan Kizil discussed the role of genes upregulated in the zebrafish brain upon injury that, opposite to the mammalian brain, may allow the establishment of a permissive niche for regeneration. The discussion then moved toward the relation of cell dynamics to morphogenesis of gyrencephalic brains. Victor Borrell who had performed work showing that expansion of basal progenitors is functionally connected with generation of infoldings, presented striking new data in the ferret brain indicating that the pattern of folds is stereotyped and controlled by the localized gene expression. Colette Dehay discussed her elegant data characterizing

five morphological subtypes of neural progenitors and evidence of dynamic interchanging from one type into another in the primate brain. The symposium was closed by Oliver Brüstle who is reconstituting the generation and differentiation of the neural precursors for the cortex using human ES cells. He made the important point that in order to obtain radial glial cells with a stable positional identity, it is important to differentiate ES cells to radial glial cells first before inducing other differentiation manipulations.

As icing on the cake, the symposium was followed by the congress' opening lecture by the president of the International Society for Stem Cell Research (ISSCR) Rudolf Jaenisch and three more days of a dense stem cells program. The organizers of the symposium and the invited speakers are very grateful to the GSCN for supporting this important event and look forward to similar initiatives in the future.

text: Federico Calegari



Group picture Front, left to right: Tadashi Nomura, Kyoto, Japan; Colette Dehay, Lyon, France; Nancy Papalopulu, Manchester, UK; Elly Tanaka, Dresden, Germany; Yoichi Kosodo, Kurashiki, Japan. Back: Victor Borrell, Alicante, Spain; Stefan Thor, Linköping, Sweden; Oliver Brüstle, Bonn, Germany; Federico Calegari, Dresden, Germany and Daniel Besser, Berlin, Germany

Symposium Program:



GermanStemCellNetwork

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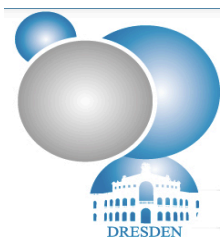
**GSCN Satellite Symposium:
Neural Stem Cells in Evolution**

Tuesday, July 8, 2014

Organizers: Elly Tanaka and Federico Calegari

09:20 – 09:30	Opening remarks
09:30 – 10:00	"To divide or not to divide; the control of alternate daughter cell proliferation in the <i>Drosophila</i> embryonic CNS" Stefan Thor ; Linköping University, Sweden
10:00 – 10:30	"Gene expression oscillations control neural progenitor maintenance and the timing of differentiation" Nancy Papalopulu ; University of Manchester, UK
10:30 – 11:00	"Regulation of neural stem cells and brain evolution in amniotes" Tadashi Nomura ; Kyoto University, Japan
11:00 – 11:20	Coffee break
11:20 – 11:50	"Intermediate Progenitor Cells in Cortical Development" Robert Hevner ; University of Washington, USA
11:50 – 12:05	"Tox: a new player in corticogenesis" Federico Calegari ; Centre f. regenerative therapies Dresden, Germany
12:05 – 12:20	"Systematic profiling of the physical environment in the developing brain" Yoichi Kosodo ; Kawasaki Medical School, Japan
12:20 – 12:35	"Gata3 is an injury-induced molecular program required for regenerative ability of adult zebrafish brain" Caghan Kizil ; German Center for Neurodegenerative Diseases, Dresden, Germany
12:35 – 13:40	Lunch break
13:40 – 14:10	"Evo-devo mechanisms of brain origami" Victor Borrell Franco ; Instituto de Neurociencias, Alicante, Spain
14:10 – 14:40	"Diversity of precursors and cell-cycle regulation during corticogenesis" Colette Dehay ; Stem-cell and Brain Research Institute, Lyon, France
14:40 – 15:10	"In vitro evolution of neural stem cells and their application in biomedicine" Oliver Brüstle ; University Bonn, Germany

17:00 Opening lecture 5th International Stem Cell Congress



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