Universität Basel

Research Project

NeuroStemX - Systems Biology of Mammalian Forebrain Development

Third-party funded project

Project title NeuroStemX - Systems Biology of Mammalian Forebrain Development
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Departement Biomedizin / Embryology and Stem Cell Biology (Taylor)
Departement Biomedizin / Cellular Neurobiology (Atanasoski)
Departement Biozentrum / Bioinformatics (van Nimwegen)
Department
Project Website http://www.systemsx.ch/projects/research-technology-and-development-project s/neurostemx/
Project start 01.03.2013
Probable end 28.02.2017
Status Completed

0.0.1 In this project we will address stem cell heterogeneity during the development of cerebral cortex and the signaling pathways controlling their fate to predict and model the processes of cortical development. Minor changes in coordination and aberrations in these networks may lead to developmental defects with profound effects on brain integrity and function.

The mammalian brain is the most complex organ in the animal kingdom. The cerebral cortex controls complex functions including cognition, motor coordination and memory. The increase in the complexity of the cerebral cortex across species has paralleled and probably driven the increased cognitive function throughout evolution.

0.0.2 Stem cell potential and cortical development control

A thin sheet of neural stem cells in the embryo generate the cerebral cortex which contains billions of cells and hundreds of functionally distinct neuron types organized into precise networks. The maintenance of stem cell potential and the control of cortical development are regulated by dynamic signaling pathways organized in space and time. Changes in these key networks control the regimental differentiation and fate specification of neural stem cells required to form the precise structures of the cerebral cortex.

0.0.3 Understanding brain formation and aberrant development

We are combining state-of-the-art computation modeling, high-resolution small sample gene profiling, and cell culture to analyze neural stem cell differentiation and address the mechanisms of forebrain development. A detailed understanding of the dynamic interplay between transcriptional networks and their upstream regulators which may arise from this project will help our understanding brain formation and aberrant development and may enable the generation of defined cortical neuron populations.

Financed by
Swiss Government (Research Cooperations)

Add publication

Published results

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Add documents

Specify cooperation partners

ID	Kreditinhaber	Kooperationspartner	Institution	Laufzeit - von	Laufzeit - bis
2310617	van Nimwegen, Erik; Taylor, Verdon	Beisel, Christian	D-BSSE, ETH-Z	01.03.2013	28.02.2017
2310619	van Nimwegen, Erik; Taylor, Verdon	Iber, Dagmar	D-BSSE, ETH-Z	01.03.2013	28.02.2017
2310621	van Nimwegen, Erik; Taylor, Verdon	Tay, Savas	D-BSSE, ETH-Z	01.03.2013	28.02.2017