Research Training Group 2162: Neurodevelopment and Vulnerability of the Central Nervous System

Speaker
Prof. Dr. med. Dieter Chichung Lie

Coordination
Dr. rer. nat. Andrea Link

Address
Fahrstr. 17
91054 Erlangen
Phone: +49 9131 8524622
Fax: +49 9131 8524605
grk2162@fau.de
www.grk2162.med.fau.de

Aims and structure

The GK 2162 „Neurodevelopment and Vulnerability of the Central Nervous System" aims to investigate the pathophysiological links between neurodevelopment and adult-onset neuropsychiatric and -degenerative disorders.
In the GK 2162, eleven groups of the Faculties of Medicine and of Sciences combine forces to train a total of 48 PhD and MD students over the period of 4.5 years in the novel concept that neurodevelopment constitutes a major determinant for the individual's vulnerability to neuropsychiatric and -degenerative disease in later life.
The team is composed of basic and physician-neuroscientists with expertise in the areas of CNS (central nervous system) development, genetics of CNS disorders, and modeling of neuropsychiatric and –degenerative diseases. Project leaders of the GK 2162 are

- Prof. Dr. S. Kürten (Chair of Anatomy and Cell Biology)
- Prof. Dr. C. Alzheimer (Chair of Physiology and Pathophysiology)
- Prof. J.H. Brandstätter (Chair of Animal Physiology)
- Prof. Dr. M. Wegner (Chair of Biochemistry and Pathobiochemistry)
- Prof. Dr. J. Winkler (Division of Molecular Neurology)
- Prof. Dr. B. Winner (Division of Stem Cell Biology)
- Prof. Dr. J. Kornhuber (Chair of Psychiatry and Psychotherapy)
- Prof. Dr. A. Reis (Chair of Human Genetics)
- Prof. Dr. A. Fejtová (Professorship of Molecular Psychiatry)
- Prof. Dr. D.C. Lie (Professorship of Molecular Medicine with focus on Molecular Imaging).

Research

Development of the CNS is a complex sequence of patterning, proliferation, migration, differentiation, and synapse formation steps. These events ultimately lead to the formation of neural circuits - the structural basis for behavior, learning, and cognition. Failure to form precise neural circuits has long been known to result in neurodevelopmental disorders, such as CNS malformations, intellectual disability, and autism, which manifest at birth or in early childhood. Evidence has emerged indicating that the pathogenesis of neuropsychiatric and -degenerative disorders, which typically show an onset of disease during adulthood, may be linked to perturbation of neurodevelopmental processes.
The goal of GK 2162 is to significantly promote the understanding of the interconnection between neurodevelopment and adult CNS disorders. Research projects address three central topics:
1) What is the overlap in genetics and disease pathways between neurodevelopmental and adult-onset CNS disorders?
2) What are developmental functions of neuropsychiatric and -degenerative disease genes?
3) What is the impact of neurodevelopmental factors and processes on vulnerability versus resilience to disease-precipitating insults in later life?

Training

The interdisciplinary qualification program of the GK 2162 aims to endow its graduate students with comprehensive education and key qualifications in the field of neuroscience. They acquire a broad overview of current key questions and pitfalls in block seminars and learn how to approach solutions in a theoretical and experimental manner.
The program places a major emphasis on graduate students taking initiative and establishing scientific networks. To promote that purpose, graduate students are encouraged to regularly invite experts in their field of research as guest speakers and to present their work at national and international conferences.
Many excellent speakers from all over the world joined our first international symposium "Neurodevelopment and CNS vulnerability", which took place in September 2018 in Erlangen. International leaders in the field of neuronal development und vulnerability, such as Prof. F. Gage (Salk Institute, USA), Prof. Dr. S. Jessberger (UZH, Zurich, Switzerland) or Prof. H. Song (University of Pennsylvania, USA) held lectures and gave the students valuable input during lively and interactive poster sessions.
A particular concern of GK 2162 is to provide excellent training across all levels and biomedical disciplines to ensure a high degree of translational and interdisciplinary research. One focus is to encourage medical students and physicians to pursue a physician-scientist career by offering them stipends and fully paid rotation positions. In parallel to their experimental doctoral thesis, the medical students pass an intense neuroscientific training while physicians can pursue full-time research in translational topics of the GK's focus and develop their own scientific profiles.
Additionally, five postdoctoral researchers are associated to the GK who receive intensive mentoring and support to promote the development of their academic career, and the establishment of their independent research profile and scientific network.

Lively poster session at the first international GK 2162 symposium

Participants of the first international GK 2162 symposium