Introductory Remarks to Symposium 8

Molecular mechanisms of synaptic brain disorders

Dilja Krueger-Burg and Noa Lipstein, Mainz and Berlin

Synaptic dysfunction has long been known to result in human brain disorders, and in recent years the advent of genomic- and transcriptomic-based diagnostic methods has identified a plethora of potentially disease-causing variations in synaptic proteins. These findings raise urgent challenges that require novel scientific frameworks and technologies, particularly for faster diagnosis of pathogenicity, for incorporating aspects of synaptic diversity, and for closing the bench-to-bedside gap. Here, we invite the international synaptic community as well as scientists from clinical disciplines to discuss these issues and initiate new collaborations. The selected talks will highlight the strong involvement of synaptic function in neurological, neurodevelopmental, neuropsychiatric and neurodegenerative brain diseases, the diversity of molecules and mechanisms that contribute to disease, and the methodological advances that allow us to characterize and possibly combat such disorders.

Alexandros Poulopoulos (University of Maryland School of Medicine) will discuss the use of *in vivo* CRISPR genome editing techniques to study mechanisms of abnormal brain circuit formation and potential therapeutic interventions in neurodevelopmental disorders. Pietro Fratta (University College London) will then present recent work on how failures in alternative splicing of mRNA transcripts encoding synaptic proteins contribute to the pathology of neurodegenerative diseases such as ALS and FTD. Dilja Krueger-Burg (Mainz University Medical Center) will discuss the molecular diversity of GABAergic synaptic complexes and their role in the development of novel therapeutic strategies for psychiatric disorders. Matthijs Verhage (VU University Medical Center) will speak about human pluripotent stem cells as models for synaptic disease, with a focus on Munc18-1 (STXBP1) mutations in early infantile epileptic encephalopathy. Finally, Abderazzaq El Khallouqi (Mainz University) will present his PhD work on Cav2.1 channels in short-term hippocampal plasticity.

This session is supported by SFB1286: Quantitative Synaptology.

Symposium 8

Thursday, March 23, 2023
11:00 - 13:00, Lecture Hall 8

Chairs: Dilja Krueger-Burg and Noa Lipstein, Mainz and Berlin

11:00 **Opening Remarks**

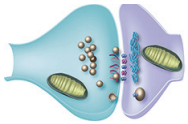
11:05 Alexandros Poulopoulos, Baltimore, USA
PERSONALIZED MEDICINE OF BRAIN WIRING? IN UTERO CRISPR TECHNOLOGIES FOR RAPID MODELING OF INDIVIDUAL PATIENTS (S8-1)

11:30 Pietro Fratta, London, UK
AMYOTROPHIC LATERAL SCLEROSIS: LOSS OF TDP-43 FROM THE NUCLEUS AND CONSEQUENCES AT THE SYNAPSE (S8-2)

11:55 Dilja Krueger-Burg, Mainz
GABAERGIC SYNAPSE DIVERSITY AS A MEANS TO DEVELOPING NOVEL THERAPEUTIC STRATEGIES FOR PSYCHIATRIC DISORDERS (S8-3)

12:20 Matthijs Verhage, Amsterdam, The Netherlands
DISEASE MECHANISMS AND INTERVENTION STRATEGIES FOR SNAREOPATHIES, SYNDROMES CAUSED BY MUTATIONS IN PRESYNAPTIC GENES (S8-4)

12:45 Abderazzaq El Khallouqi, Mainz
ORGANIZATION AND DYNAMICS OF CAV2.1 CHANNELS SHAPE THE SHORT-TERM PLASTICITY IN HIPPOCAMPAL SYNAPSES (S8-5)



SFB 1286 Quantitative Synaptology