Introductory Remarks to Symposium 27

Brain Organoids for Modelling Immune-Neural Interactions in Epilepsy

Andreas G. Chiocchetti, Frankfurt/Main

Epilepsy is a central nervous system (CNS) disorder hallmarked by seizures and abnormal brain activity. Current anti-seizure drugs block seizures in only ~70% of patients, do not address the underlying pathology and do not impact the progression of the disorder. Hippocampal sclerosis (HS) as well as malformations of cortical development (MCD) such as focal cortical dysplasia (FCD) and lissencephaly as well as low-grade epilepsy-associated tumors (LEAT) such as ganglioglioma are among the most frequent causes for pharmacoresistant focal epilepsy. All these types of brain lesions harbor innate and adaptive immune cell infiltrations which likely contribute to and modulate their epileptogenicity
Understanding the specific mechanisms involved in the interaction of immune cells and cells of the brain parenchyma for the generation and progression of seizures and epilepsy in these disorders will allow the development of novel drugs that modify the process of epileptic neural network transformation itself.
Human induced pluripotent stem cells (hiPSCs) reprogrammed from patient somatic cells have proven as powerful tool to model human diseases including epilepsies. Platforms in which neurons, astrocytes, oligodendrocytes and microglia derived from healthy or diseased subjects mature in a single system represent a robust method to model human brain disorders.

In this symposium we will discuss the potentials and pitfalls of using hiPSC-derived glioneuronal cell cultures (2D) and brain organoids (3D) to address role the development and mechanisms of epileptic neural network aberration and the role of immune-neural interactions therein.

Symposium 27

Friday, March 28, 2025
14:30 - 16:30, Lecture Hall 104

Chairs: Andreas G. Chiocchetti, Frankfurt/Main

14:30 **Opening Remarks**
Andreas G. Chiocchetti and Nico Melzer

14:35 Nico Melzer, Duesseldorf
STUDYING IMMUNE-NEURAL INTERACTIONS IN A MODEL OF T-CELL DRIVEN HIPPOCAMPAL SCLEROSIS: PITFALLS AND TRANSLATIONAL VALUE (S27-1)

15:00 Denise Haslinger, Frankfurt
IN VITRO MODELLING OF MATERNAL IMMUNE ACTIVATION (MIA) IN CEREBRAL ORGANOIDS (S27-2)

15:25 Andrea Rossi, Duesseldorf
GENOME-EDITING TO MODEL SELECTIVE SOMATIC MUTATIONS ASSOCIATED WITH FOCAL EPILEPTOGENIC LESIONS (S27-3)

15:50 Julia Ladewig, Mannheim
OMICS INSIGHTS INTO LIS1-PATIENT-DERIVED CEREBRAL ORGANOIDS UNRAVEL NOVEL MOLECULAR PATHWAYS UNDERLYING DISEASE SEVERITY AND SUGGEST THERAPEUTIC STRATEGIES (S27-4)

16:15 **Discussion / Concluding Remarks**