



BPS2023

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Monday, February 20

9:30 AM – 11:00 AM

Room 9

Nanon Technologies

Need for Speed: No Limits For Automated Electrophysiology

For over 20 years, Nanion Technologies has been providing diverse solutions for electrophysiologists worldwide. We aim to successfully implement innovative technologies in the fields of ion channel automated patch clamp (APC) electrophysiology, monitoring of cell viability and contraction, as well as electrogenic transporters, with various throughput capabilities. This year, our symposium will start with an introduction by Dr. Andrea Brüggemann (CSO, Nanion) who will guide you through the overall capabilities of Nanion's portfolio. Following this, we will welcome our speakers, whose work focuses on ion channel and transporter physiology and pathophysiology.

Dr. Jean-Francois Rolland will provide an overview of when and how automated patch clamp instruments are used for supporting ion channel drug discovery programs (cell line generation, primary screening, hit-to-lead/SAR, compound profiling and / or "mode of actions" studies) in Axxam. Dr. Rolland's presentation will also include a comparison of data generated using surrogate techniques and with the manual patch clamp. In particular, he will describe experiments where the intracellular solution perfusion, an extremely difficult technique to perform using conventional patch clamp, was used with ease using the Port-a-Patch and SyncroPatch 384. Additionally, Dr. Rolland will show experiments where ligand-gated ion channels were studied using the 'Ligand Puff' feature of the SyncroPatch 384 (fast external solution addition and low exposure times) and finally, give a glimpse of how automated patch-clamp can be associated with optogenetics.

Dr. James Costantin will focus on activation and pharmacology nicotinic acetylcholine receptors. Nicotinic acetylcholine receptors (nAChR) are cation-permeable ion channels, which mediate fast synaptic transmission when activated by the endogenous neurotransmitter acetylcholine (ACh) or the exogenous natural alkaloid, nicotine. nACh α 7R are widely distributed in the mammalian brain including in the cerebral cortex, hippocampus, basal ganglia and cerebellum and have been proposed to play a role in many neurological disorders such as Alzheimer's Disease, Parkinson's, schizophrenia and depression. The most abundantly expressed nAChR in the mammalian brain are the α 7 homomeric and α 4 β 2 heteromeric receptors. Nicotinic α 7 are particularly challenging to record using patch clamp because of their extremely fast desensitization. Dr. Costantin will show activation and pharmacology of α 4 β 2 and α 7/ric3 receptors using the well-based high throughput automated patch clamp system, the SyncroPatch 384.

Transporters and ion pumps are transmembrane proteins that facilitate ion flux across biological membranes against their concentration gradient. Solid supported membrane (SSM) electrophysiology using the SURFE²R instruments from Nanion can be used to measure electrogenic membrane transport, even with low turnover rates, as well as ligand-gated, and leak channels. Any membrane source can be used, meaning that intracellular transporter and channels still present in organellar membrane can be targeted using this method, allowing for direct and functional recordings in a physiologically relevant context. Transporters and intracellular ion channels are increasingly important pharmacological targets for the treatment of a wide variety of diseases. In this presentation, scientist Nataliia Dmitrieva, will present her work on the molecular basis of the function of DgoT, a bacterial homolog of vesicular glutamate transporters.

Speakers

Andrea Brüggemann, CSO, Nanion Technologies

James Costantin, Scientific Market Development Manager – Ion Channels, Eurofins DiscoverX

Nataliia Dmitrieva, Forschungszentrum Jülich

Jean-Francois Rolland, Head, Electrophysiology, Deputy Director, Discovery Services Axxam SpA