
**Thursday, February 25, 2021**
**11:30 AM-12:00 PM**
**Nanion Technologies**

**Automated Electrophysiology For Any Kinetics: Ion Channels & Transporters**
Ion channels and transporters are important physiological and pharmacological targets. Electrophysiology remains the gold standard for studying these important targets and automation of the technique ensures higher throughput is achieved whilst maintaining high data quality. In this virtual symposium, Nanion Technologies provides two case studies where automated patch clamp (APC) or solid-supported membrane (SSM)-based electrophysiology devices were used in different applications. After a short greeting by Dr. Niels Fertig (CEO), Nanion Technologies will welcome two exceptional speakers, Dr Nina Braun (University of Copenhagen) and Dr. Matthias Quick (Columbia University).

Dr. Nina Braun presents recent work, with focus on establishing a high-throughput protocol to conduct functional and pharmacological investigations of non-canonical amino acids (ncAA)-containing hASIC1a (human acid-sensing ion channel 1a) variants in transiently transfected mammalian cells. Incorporation of ncAAs can endow proteins with novel functionalities, such as crosslinking or fluorescence. Function of these variants in ion channels can be studied with great precision using standard electrophysiology, but this approach is typically labor intensive and low throughput. During the study, three different photocrosslinking ncAAs were introduced into 103 positions and the function of the resulting 309 variants was assessed with SyncroPatch 384i automated patch-clamp platform, demonstrating that the approach is efficient and versatile, as it is amenable to assessing even complex pharmacological modulation by peptides. The data show that the acidic pocket is a major determinant for current decay and live-cell crosslinking provides insight into the hASIC1a-psalmotoxin-1 interaction. Overall, this protocol aims to enable future APC-based studies of ncAA-containing ion channels in mammalian cells.

Next, Dr. Matthias Quick is focusing on the study of ion-dependent transporters with special emphasis on $Na^+$ or $H^+$-coupled symporters. Whereas flux studies with radiolabeled solutes use the target protein reconstituted in proteoliposomes provided a wealth of information, the determination of the thermodynamically-coupled solute transport-associated flux of $H^+$ or $Na^+$ has been challenging. By using the SURFE$^2$R N1 SSM platform, his team was able to quickly collect data of solute transport-associated flux of co-transported ions across the membrane of proteoliposomes containing different target proteins. Additionally, with SURFE$^2$R technology it is possible to collect data for a full kinetic characterization of a target protein such as its dependence on substrate and ion concentrations, pH, and potential essential additives, as well as its substrate recognition profile. The SURFE2R system also enables the use of a wide range of substrates that are readily commercially available, avoiding the use of radiolabeled compounds.

**Speakers**
*Nina Braun, Post-Doctoral Fellow, Department of Drug Design and Pharmacology, University of Copenhagen*
*Matthias Quick, Associate Professor of Neurobiology (Psychiatry), Columbia University Medical Center (CUMC)*