Student stories

A toolbox of ligands to study Acid-sensing ion channels (ASICs)

Tools:
Patchliner
Port-a-Patch

Dr. Elena Budusan
featured by Nanion Technologies

Elena Budusan completed her PhD at the University of Queensland, Australia studying ASIC channels and modulators. During her PhD, Elena spent 2 months at Nanion's headquarters in Munich using the Port-a-Patch and Patchliner to study ligand-gated ion channels in cell lines. After completing her PhD, Elena started a post doctoral research position at the University of Lausanne, Switzerland and still focuses on ASICs.

Can you give us a brief summary of your PhD?

"My PhD project focused on Acid-sensing ion channels (ASICs), crucial sensors for extracellular protons with implications in various physiological and acidosis-related pathological conditions. This makes ASICs a promising new therapeutic target in health and disease for new drug development. During my PhD, I studied ASIC modulating ligands, particularly peptides derived from venomous animals like snakes, funnel-webs, and tarantula spiders. Using two-electrode voltage clamp (TEVC) and automated patch clamp (APC) techniques, I characterized the pharmacological properties of these peptides. Overall, my work expanded the 'toolbox' of ligands to study these interesting ion channels, laying the groundwork for further exploration into their mechanism of action, evolutionary significance of these peptides, and their potential therapeutic applications."

What brought you to Nanion?

"I was interested in learning more about opportunities beyond academia, especially in the field of electrophysiology and ion channel research. I was fortunate to have a supportive PhD supervisor who encouraged me to pursue an industry placement. With his connections to Nanion, he arranged a meeting with Ali and me. A couple of months later, I found myself in Munich, working on the Patchliner and the Port-a-Patch."

What was your project at Nanion?

"During my time at Nanion, I focused on validating different cell lines and channel types on both platforms, the Patchliner and the Port-a-Patch. Specifically, I studied the activation and inhibition of $P2X_{2/3}$ and $P2X_3$ receptors stably expressed in CHO cells on the Patchliner. In a second project, I compared the efficiency of the Patchliner to the Port-a-Patch when recording from Neuro2A cells, which endogenously express ASICs, different voltage-gated sodium channels, and $P2X_7$ receptors. I used different activators and inhibitors of these ion channels to show their expression in Neuro2A cells."

Nanion User Meeting 2022
Elena enjoyed meeting users and interacting with colleagues at the 2022 NUM at Nanion's headquarters in Munich.

"There wasn't a single 'best moment'; rather, there were many great moments that I cherished during my time at Nanion."

Dr. Elena Budusan, University of Lausanne

Was your project work at Nanion related to your PhD?

"Although it wasn't initially planned to be part of my PhD project, after observing ASIC currents expressed in Neuro2A cells, I couldn't resist testing some of my ASIC ligands on them. The results obtained on the Patchliner contributed to a research article that we just recently published (The funnel-web spider venom derived single knot peptide Hc3a modulates acid-sensing ion channel 1a desensitisation)."

Did your project at Nanion accelerate your PhD project?

"Absolutely, it did. Using the Patchliner to study ASIC currents in Neuro2A cells, I was able to quickly and effectively validate my results for one of my spider peptides. This approach allowed me to confirm the activity of this particular peptide in a cell line that endogenously expresses ASICs, complementing my previous findings obtained through TEVC in *Xenopus Laevis* oocytes."

What was your best moment during your time at Nanion?

"There wasn't a single 'best moment', rather, there were many great moments that I cherished during my time at Nanion. These included receiving support and help using the APC instruments, obtaining the first good recordings on the Patchliner and Port-a-Patch, enjoying coffee breaks with colleagues who became friends, and participating in networking events such as the Nanion User meeting. Overall, I thoroughly enjoyed every aspect of my experience there.


Characterization of ion channel currents endogenously expressed in Neuro2A cells using automated patch clamp

Pharmacology of P2X$_3$ and P2X$_{2/3}$ receptors in cell lines and hiPSC-derived neurons: An automated patch clamp study

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Biochemical Pharmacology

The funnel-web spider venom derived single knot peptide Hc3a modulates acid-sensing ion channel 1a desensitisation

ASIC1a recorded from Neuro2A cells and effect of Hc3a. *Elena used some of her time at Nanion to investigate the effect of the spider peptide Hc3a on ASIC1a recorded from Neuro2A cells. Elena gathered enough data for posters presented at the 2022 and 2023 Society for Neuroscience Annual meetings, and contributed to a publication in Biochemical Pharmacology, complementing her previous work using Xenopus laevis oocytes.*