CURRICULUM VITAE

Panna Hegedüs

Date of birth: 13 June, 1994

Place of birth: Nyíregyháza

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Education:

2012- Semmelweis University, Faculty of Medicine, Budapest
(from 2012 to 2015, member of Frigyes Korányi College of Advanced Studies)

2006-2012 Kossuth Lajos Grammar School, Sátoraljaújhely

Memberships:

2015 MENSA HungarIQa (National Mensa group of Hungary)
Kerpel-Fronius Ödön Talent Development Program of Semmelweis University

2010-2012 Member of the Hungarian Student Research Association

Language proficiency:

2010 Advanced, complex (C1) language examination in english (TELC)

Professional Experience:

2015- Institute of Experimental Medicine of the Hungarian Academy of Sciences, Lendület Laboratory of Systems Neuroscience, supervised by Balázs Hangya Ph.D.

2011-2015 Institute of Experimental Medicine of the Hungarian Academy of Sciences, Workgroup of Quantitative Functional Neuroanatomy, supervised by Gábor Nyiri Ph.D

2010-2011 Semmelweis University, LINK-group, supervised by Prof. Péter Csermely

Conferences and competitions:

2017 **Brain Conference, Copenhagen,** poster (Basal forebrain neurons respond to reinforcement in pavlovian conditioning)

2015 **Multinational Congress on Microscopy,** poster (N-acetyl cysteine treatment rescues cellular deficits in an animal model of schizophrenia)

Conference of Semmelweis University's Student Research Association-1st prize (co-author) (Presentation: Cellular-level deficits in the dentate gyrus caused by schizophrenia-related G72 gene)

National Conference of Student Research Associations-participation(co-author) (Presentation: Cellular-level deficits in the dentate gyrus caused by schizophrenia-related G72 gene)

Scientific Forum of Korányi Frigyes-2nd prize (Presentation: Positive effects of N-acetyl-cysteine in an animal model of schizophrenia)

XVth Conference of Hungarian Neuroscience Society –poster (N-acetyl cysteine treatment rescues cellular deficits in the animal model of schizophrenia)

2014 **Conference of Semmelweis University's Student Research Association** - 2nd prize (Presentation: Synapse-specific distribution of Neuroligin-2 in the hippocampus) and 3rd prize (co-author) (Presentation: Positive effects of N-acetyl-cysteine in an animal model of schizophrenia)

Semmelweis University's Immunology competition, 3rd prize

IBRO Workshop –poster (Ultrastructural changes in the Hippocampus of G72 Gene-expressing Animal Model of Schizophrenia)

Joint Meeting of the FEPS and the Hungarian Physiological Society -poster (Synapse-specific distribution of Neuroligin-2 in the hippocampus)

2013 **Congress of the Hungarian Anatomists' Society, 2013** –poster (Synapse-specific distribution of Neuroligin-2 in the hippocampus)

Scientific Forum of Korányi Frigyes, presentation (Synapse-specific distribution of Neuroligin-2 in the hippocampus)

2012 **International Conference of Young Scientists,** presentation (Morphology of hippocampal granule cell dendrites in an animal model of schizophrenia)

XII. National Conference of Student Research Associations, presentation (Morphology of hippocampal granule cell dendrites in an animal model of schizophrenia)

National Biology Competition, 9th prize

2011 **IXth Essay Competition of the Hungarian Student Research Association** , national 1st prize (Network module changes in the nervous system of *C. elegans*, the cat and human neural network models)

2010 **XI. Regional Conference of Student Research Associations,** presentation (Network module changes in the nervous system of *C. elegans*, the cat and human neural network models)

Publications:

Pósfai B, Cserép C, Hegedüs P, Szabadits E, Otte DM, Zimmer A, Watanabe M, Freund TF, Nyiri G Synaptic and cellular changes induced by the schizophrenia susceptibility gene G72 are rescued by N-acetylcysteine treatment. Translational Psychiatry (2016) 6, e807; doi:10.1038/tp.2016.74 IF: 5.538

Scholarships, awards:

2017 **Stephen W. Kuffler Research Scholarship**

2016 **Hungarian State Scholarship**

New National Excellene Program Scholarship

2015 **Hungarian State Scholarship**

Research Interest:

The basal forebrain plays an important role in reinforcement learning. It was recently found that cholinergic basal forebrain neurons respond with fast phasic activity to reinforcement (reward or punishment) and also to the reinforcement predicting cues. GABAergic neurons of the area were shown to have similar tuning, however, with very different kinetics.

During reinforcement learning animals develop an expectation about the reinforcement probability predicted by diffenetial cues. Therefore, the abundance of reinforcement-related signals in the basal forebrain raises the possibility that the the area participates in mediating the influence of outcome expectations on cortical circuits. However, whether parametric manipulations of outcome probabilities impact reinforcement signals in the basal forebrain is not known.

In order to tested whether basal forebrain neurons encode reinforcement *expectation* or merely report the presence of a reinforcer, we trained mice on an auditory pavlovian task. Mice listened to two different tones, one predicting likely reward (a drop of water) and the other predicting likely punishment (an airpuff). Mice gradually developed a difference in anticipatory licking after the auditory cues according to the predicted probability of reward, indicating that they have learned the outcome contingencies of the task. We recorded multiple single units of the basal forebrain while mice were performing the task.

We found that putative basal forebrain neurons responded to different states of the task: the LED light indicating the start of the trial, the reinforcement predicting cue and the reinforcement itself. We also found that some of the recorded neurons showed differential firing rate after the two types of predictive cues. This indicates a possible mechanism for encoding reinforcement expectation by the basal forebrain. Our future aim is to characterize these expectation coding neurons, determine their firing properties, cell type and their inputs.