Master student: Sorin Draga

Period of your training stay: 1-31 May 2015

Host lab: Eero Castrén group, Neuroscience Center, University of Helsinki, Finland

Home lab: Neurophysiology of Pain Group, Department of Anatomy, Animal Physiology and Biophysics, Faculty of Biology, Bucharest, Romania

In professor Castrén's laboratory I had the opportunity to accustom myself with various wet-lab techniques used by his team (Western Blotting- focusing on the expression level of BDNF in relation to antidepressant administration, in-situ hybridization and confocal microscopy, to asses the effects of chronic fluoxetine treatment on the structure, connectivity and plasticity of cortical interneurons, as outlined in *Guirado el al, 2014* and neuronal cell cultures), all of which are used at my home university.

I also became accustomed to more recent techniques, that we hope will be available in the near future, such as intrinsic optical imaging and various surgical procedures, used for long-term, high-resolution imaging of the mouse neocortex, through a chronic cranial window or skull thinning, following a modified version of the protocols described in *Hooltmaat et al 2012* and *Svoboda el al, 2009.*

My training stay held a twofold benefit: it has increased my confidence and skill in regard to techniques such as western blotting, in-situ hybridization, confocal microscopy and whole-cell patch clamp, skills that I was able to readily use upon my return, and gave me the possibility accustom myself with new techniques such as intrinsic optical imaging and animal surgeries.

Intrinsic optical imaging is based on the concept that when the brain is illuminated, neuronal activity causes changes in the intensity of the reflected light from the brain. By measuring the reflectance patterns from the tissue, patterns of evoked activity can be detected and measured.

These changes, that can be evoked by various stimuli, are referred to as intrinsic signals. What is even more interesting is that the intrinsic signals originate from activity-dependent changes in several brain parameters: oxygen consumption, that affects hemoglobin oxygen saturation (oxygenated vs deoxygenated hemoglobin), changes in blood volume and flow affecting tissue light absorption and changes light scattering of the tissue, related to physiologic changes correlated to neuronal activity such as ion movement, changes in the volume of cell bodies and neurotransmitter exocitosis (*Grinvald et al, 2005*).

Receiving a NENS Travel Grant gave me the opportunity to expand my research horizons and meet exceptional people, of which I would like to thank professor Eero Castrén for his excellent advice and availability, Ramon Guirado for organizing my stay, Marina Tibeykina and Anna Steinzeig for the lessons in animal surgeries and intrinsic optical imaging and Dina Popova for her wonderful advice and patch-clamp tutorials.