

# LABORATORY OF ANIMAL & HUMAN PHYSIOLOGY

## MEMBERS

Full name	Position	e-mail	phone
CATERINA PSARROPOULOU	PROFESSOR	cpsarrop@uoi.gr	2651007345
CHARALAMPOS LABRAKAKIS	ASSISTANT PROFESSOR	clabrak@uoi.gr	2651007395
LEFKOTHEA ANDREOU	ASSOCIATE SCIENTIST	l.andreou@uoi.gr	2651007324
MARIA-ELENI EUAGGELAKI	PHD STUDENT	marialenaevan@gmail.com	2651008042
AMALIA NATSI	PHD STUDENT	amalian592@gmail.com	2651008042

## LABORATORY DESCRIPTION

In the research laboratory we use mostly electrophysiological techniques (extracellular, intracellular and patch-clamp).

Undergraduate students are trained in electrophysiological techniques at a simpler level. Practical training associated to theory consists of data acquisition (usually from the students themselves) via PC and subsequent analysis using the Biopack Student Lab package. We also explore the correlation of sensory information to perception in a separate exercise.

## RESEARCH INTERESTS

We study brain function, and in particular the function of specific neuronal networks and specific types of neurons, using mostly electrophysiological techniques. We study basic mechanisms of epileptogenesis, the function-dependent plasticity of immature brain, cellular mechanisms of pain sensation and the role of inhibitory synaptic transmission under normal and pathological conditions. In a different line of research, we investigate the effects of bioactive substances in neuronal synchronization in immature and adult CNS. Themes of interest include the organization of human perception and research in teaching techniques, particularly in science training.

## EQUIPMENT

4 recording set-ups for in vitro preparations, 2 stations for behavioral assessment of nociception and 9 units of undergraduate training sets (Biopack Student Lab).

## RESEARCH PROJECTS in TITLES:

- Seizures during CNS development: neuronal network plasticity, focusing on cholinergic mechanisms (CP).
- Prenatal exposure to ethanol: short and long term effects on neuronal networks, focusing on excitatory, inhibitory and cholinergic mechanisms (CP).
- Effects of bioactive substances (plant extracts mostly) on CNS neurons and neuronal networks (CP).
- Cellular mechanisms of neuropathic pain development (CL).
- Synaptic mechanisms of pain sensation (CL).
- Role of GABA<sub>A</sub> receptors in CNS neuropathology/disorders (CL, CP).

## RECENT PUBLICATIONS:

### Papers

- A.Mikroulis\*, C.-P. Lisgaras\* and C. Psarropoulou. (2018). Immature Status Epilepticus: in vitro models reveal differences in cholinergic control and HFO properties of adult CA3 interictal discharges in Temporal vs Septal hippocampus. *Neuroscience*, v369:386-398. doi: 10.1016/j.neuroscience.2017.11.029. \*equal contribution

- Kouis P.\*, Mikroulis A.\* and Psarropoulou C. (2014). A single episode of juvenile status epilepticus reduces the threshold to adult seizures in a stimulus-specific way (\*Equal contribution) *Epilepsy Research*, v108, pp1564-1571.
- Mikroulis A.\* & Psarropoulou C. (2012). Endogenous ACh effects on NMDA-induced interictal-like discharges along the septotemporal hippocampal axis of adult rats and their modulation by an early-life generalized seizure, *Epilepsia*, 53(5): 879-887.
- Perez-Sanchez J., Lorenzo L.E., Lecker I., Zurek A.A., Labrakakis C., Bridgwater E.M., Orser B.A., De Koninck Y., Bonin R.P. (2017).  $\alpha 5$  GABAA receptors mediate tonic inhibition in the spinal cord dorsal horn and contribute to the resolution of hyperalgesia. *J Neurosci Res.* 95:1307-1318. doi: 10.1002/jnr.2398
- Labrakakis C., Rudolph U., De Koninck Y. (2014). The heterogeneity in GABAA receptor-mediated IPSC kinetics reflects heterogeneity of subunit composition among inhibitory and excitatory interneurons in spinal lamina II. *Front Cell Neurosci.* 8:424. doi: 10.3389/fncel.2014.00424.
- Bonin, R., Labrakakis, C., Eng, D.G., Whissell, P.D., De Koninck, Y. and Orser, B.A. (2011). Pharmacological enhancement of  $\delta$ -subunit-containing GABAA receptors that generate a tonic inhibitory conductance in spinal neurons attenuates acute nociception in mice. *Pain* 152:1317-1326
- Labrakakis C., Ferrini F. and De Koninck Y. (2011). Mechanisms of Plasticity of Inhibition in Chronic Pain Conditions. In " Inhibitory Synaptic Plasticity", Woodin M.A. and Maffei A. (Eds). Springer-Verlag, New York.
- Andreou, L.V., Athanasopoulou, G.\*, Aletra, V.\*, Psarropoulou, C. (2019). Introducing Biology concepts to students in Belgium in the context of a Modern Greek course. In Mafalda Carmo (Ed.), *END2019 Book of Abstracts*, 134-134. Lisbon: WIARS.
- Andreou, L.V., Aletra, V.\*, Athanasopoulou, G.\*, Psarropoulou, C. (2018). Good practices in teaching English for Scientific Purposes to Biology students in Higher Education, *INTED2018 Proceedings*, pp. 7174-7183. DOI: 10.21125/inted.2018.1679
- Andreou, L.V., Griffiths, T.D., and Chait, M. (2015). Sensitivity to the temporal structure of rapid sound sequences - An MEG study. *Neuroimage*, 110, 194-204. DOI: 10.1016/j.neuroimage.2015.01.052

### **Abstracts, proceedings**

- Kleidonas D.\*, Troganis A., Stamatis H. and Psarropoulou C. (2018). Effects of four herbal extracts on the characteristics of epileptiform discharges in CA1 pyramidal cell layer of rat hippocampal slices. 10<sup>th</sup> Panhellenic Meeting of Greek Society of Basic and Clinical Pharmacology, Ioannina 25-27 May 2018.
- Evangelaki M.-E.\*, Papasideri I.\*, Kattan F.-Y.\* and Psarropoulou C. (2018). Prenatal ethanol exposure alters the excitatory and inhibitory control of synchronous epileptiform discharges recorded in juvenile rat hippocampal slices. 10<sup>th</sup> Panhellenic Meeting of Greek Society of Basic and Clinical Pharmacology, Ioannina 25-27 May 2018.
- Karali K\*, Fiaska S\*, Gerou M\* and Labrakakis C. (2017). Transient receptor potential ankyrin 1 (TRPA1) channels on the sciatic nerve contribute to the development of neuropathic pain. 28th Meeting of the Hellenic Neuroscience Society, Athens Greece
- Fiaska S.\* and Labrakakis C. (2015). Activation of TRPA1 channels, localized on rat sciatic nerves, influences nerve metabolic activity. FENS Featured Regional Meeting, Thessaloniki, Greece.

(\*undergraduate students, PhD students, Post-Docs)