



PROBING THE EFFECTS OF EARLY LIFE EXPOSURE ON SOUND INTENSITY PERCEPTION

Project Background

The ability of the auditory system to process sounds is shaped by experience during developmental windows, known as critical periods, where the neuronal plasticity is particularly enhanced. Whereas it has been observed that these periods affect how the auditory system processes sounds, whether they are able to influence the perception of sounds is yet to be clarified. Our lab recently identified a critical period for amplitude modulated sounds (AMS) which affects how the auditory cortex, the most complex region in the auditory pathway, encodes intensity modulation. This observation led us to hypothesize that this critical period crucially shapes how the auditory cortex discriminates between sounds with constant sound intensity (non-amplitude modulated sounds; NAMS), and those where the intensity is modulated (AMS).

Master Project

The master project is composed of two parts, the first where we ask whether the auditory cortex is involved in the discrimination between AMS and NAMS, and the second where we probe the effect of the critical period on this. To answer the first question, we designed a behavioral experiment in which mice are trained to discriminate AMS from NAMS. Once the mice will have learned the task, we will shut down the auditory cortex using optogenetics and quantify how this manipulation affects behavioral performance. To answer the second question, we will compare the behavioral performances of control mice with those of mice exposed to AMS during the critical period. Both experimental groups will be subjected to i-vivo electrophysiological recordings in order to characterize neuronal activity and identify neuron subtypes involved in the process.

Candidate

The selected candidate will have the opportunity to perform behavioral experiments coupled with optogenetic manipulation, in-vivo electrophysiology, and data analysis. The candidate will also be integrated in other lab activities, such as the weekly team meeting where progresses of the project will be discussed in a dynamic environment.

Contact

The project will take place in the Brain and Sound Lab (for more info please see <http://www.brainsoundlab.com/>) directed by Prof. Tania Rinaldi Barkat at the University of Basel under the supervision of Tommaso Zeppillo. If you are interested, please send your CV and a motivation letter to Prof. Tania Rinaldi Barkat (tania.barkat@unibas.ch) and Tommaso Zeppillo (tommaso.zeppillo@unibas.ch).