NENS Report

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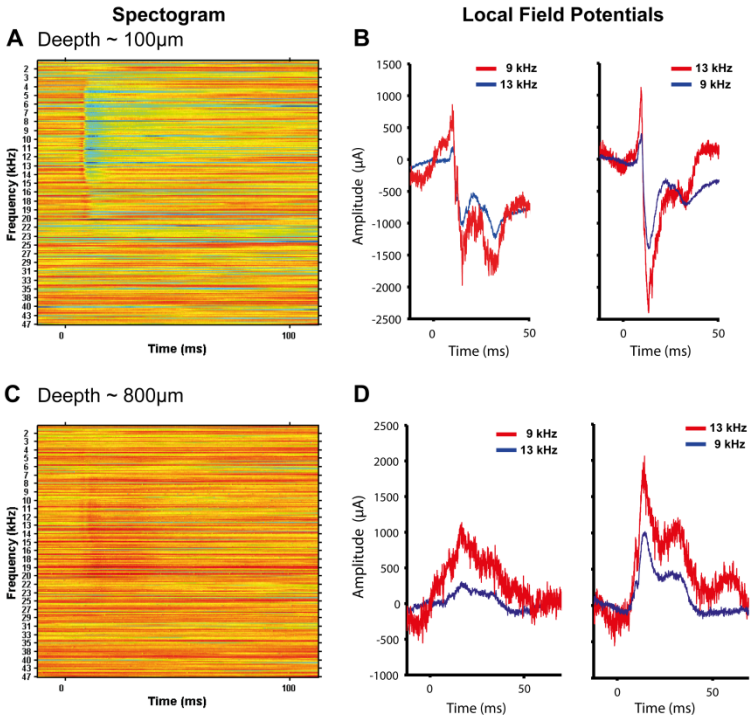
My training stay at the Cognitive Neurophysiology Laboratory in the Max Planck Institute of Experimental Medicine was a fruitful and an enjoyable experience. The group led by professor Livia de Hoz studies the interaction between sensation and cognition by recording neuronal responses to behaviourally relevant auditory stimuli at different levels within the auditory system. The methods that I learned during my stay in Göttingen were electrode implantation for chronic recording and behavioral training. We implanted silicon probes with sixteen or thirty-two recording channels in the inferior colliculus, a major midbrain auditory center that integrates bottom-up and top-down information, of the mouse. The implantation of silicon probes allows us to record local field potentials and spikes from multiple sites simultaneously within the same neuronal structure in the behaving animal. Currently, we are performing electrophysiological recordings in awake animals at my home-lab in the Institute of Neuroscience of Castilla y León. We study the phenomenon called Stimulus-Specific Adaptation (SSA) in the auditory system which is a specific reduction in the responsiveness of a neuron to a common or repetitive sound while the neuron remains highly sensitive to rare sounds. One of our current research aims has been to explore how the neuronal inhibition affects SSA. Since inhibition is known to be very sensitive to the level of anesthesia, recording in awake animals will allow us to validate our results obtained in the anaesthetized model. Also, the implementation of behavioral methodologies in future studies will broaden the questions to be addressed, for example, how the environmental context affects SSA. Personally, getting a NENS stipend represented an opportunity to broaden my research experience by working with other research groups that share common interests among a highly dynamic and creative environment.



Neuronal activity recorded in the inferior colliculus of awake mouse. The responses recorded through two different channels at the most superficial area (A-B) and center (C-D) of the inferior colliculus on a coronal plane are illustrated. **A,C:** Spectra of frequencies to which the neurons respond to. **B,D:** Local field potentials evoked by the presentation of two pure tones (9 and 13 kHz at 70 dB SPL, duration of 30 ms) which were alternated in an oddball paradigm that is used to study Stimulus-Specific Adaptation. The response to the tones when they were the deviant stimulus (red traces) is stronger than the activity evoked by the tones when common (blue traces). The frequency sensitivity as well as the response pattern to 9 and 13 kHz changed along the dorso-ventral axis of the inferior colliculus.