



Introductory Remarks to Symposium 7

Short-term adaptation in early auditory processing: from synaptic depression to focal perception

Michael Pecka and Andrea Lingner, Martinsried

The sensory conditions surrounding us fluctuate constantly. Likewise, the relative relevance of particular stimuli in the environment can change at any moment. To remain informative and reflect these transient changes, neural systems and their processing must be constantly updated. To this end, processing can adapt to the sensory environment on a short time scale by matching neuronal sensitivity to the stimulus range that is concurrently most likely to occur.

In the auditory system, such adaptations in the dynamic range of neuronal coding to stimulus statistics can be found on every level from cochlea to cortex. This symposium brings together recent advances on the topic of short-term stimulus (or context-) specific adaptation on all these levels. We will provide an overview on our current understanding how diverse mechanisms ranging from synaptic depression to dedicated feedback circuits can facilitate neuronal sensitivity to prevalent stimulus statistics. We will furthermore report on the newest insight into the involvement of such mechanisms on the earliest auditory levels in predictive processing and how they might influence psychophysical performance. Matthew Xu-Friedman will describe synaptic mechanisms that determine the magnitude and temporal profile of stimulus history dependent short-term adaptation in the auditory nerve. Henrike von Gersdorff will report on a novel and unconventional form of short-term adaptation in inhibitory brainstem synapses. Elisa Krächan will describe a novel form of plasticity that may enable efficient computation of repetitively occurring stimuli. Jörg Encke will talk about efficient adaptation in brainstem circuits to the concurrent spatial statistics that enhances sound source resolution. Andrea Lingner will report on the effects and time course of perceptual short-term adaptation for spatial hearing. Finally, Israel Nelken will present new insight into neural processing underlying stimulus-specific adaptation, which is the reduction in the response to a common stimulus that does not generalize, or only partially, to other rare stimuli.

Symposium 7

Thursday, March 21, 2019
11:30 – 13:30, Lecture Hall 8

Chairs: Michael Pecka and Andrea Lingner,
Martinsried

- 11:30 **Opening Remarks**
- 11:35 Matthew Xu-Friedman, Buffalo NY, USA
REGULATION OF AUDITORY NERVE SYNAPTIC
FUNCTION BY ACTIVITY (S7-1)
- 12:00 Henrike von Gersdorff, Portland, USA
BUILDING FAST AND RESILIENT INHIBITORY
SYNAPSES WITH Ca^{2+} NANODOMAINS AND
MICRODOMAINS (S7-2)
- 12:25 Elisa Krächan, Kaiserslautern
NOVEL FORM OF SYNAPTIC PLASTICITY:
REBOUND EFFECT AT MNTB-LSO INPUTS (S7-3)
- 12:35 Jörg Encke, Garching
ADAPTATION TO STIMULUS STATISTICS EN-
HANCES THE SEPARABILITY BETWEEN INTER-
AURAL LEVEL DIFFERENCES ON A POPULATION
BASIS (S7-4)
- 12:45 Andrea Lingner, Martinsried
TIME COURSE OF STIMULUS-HISTORY DEPEND-
ENT ADAPTATION OF AUDITORY SPATIAL
PERCEPTION (S7-5)
- 13:05 Israel Nelken, Jerusalem, Israel
CORTICAL MECHANISMS UNDERLYING
STIMULUS-SPECIFIC ADAPTATION AND
DEVIANCE DETECTION (S7-6)