

## Neuroscience Seminar

**Tuesday 11 May 2021**

**15:00 – 16:00**

### Online via Zoom

Please find Zoom link via the Outlook calendar invitation. If you have not received this, please write an e-mail to Katrine: [karasmus@dandrite.au.dk](mailto:karasmus@dandrite.au.dk)



### Dr. Sarah Melzer

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### Peptidergic modulation of cortical circuits in fear memory

Inhibitory neurons throughout the mammalian cortex are powerful regulators of circuit excitability and plasticity and allow for the adaption of cortical processing to changing environments and experiences. However, how the activity of inhibitory neurons in the cortex is regulated is only partially understood. The differential expression of neuromodulator receptors in different types of inhibitory neurons suggests that each circuit motif is controlled by distinct neuromodulatory systems that are recruited in a context- and experience-dependent manner and thus allow for adaptive cortical processing by differentially shifting the activity levels of distinct cortical circuit motifs.

We found that the bombesin-like neuropeptide gastrin-releasing peptide (GRP) serves as such a regulator of cortical circuit activity through selective targeting and activation of one specific neuronal cell type. Using a newly developed genetically-encoded peptide sensor and rabies-based trans-synaptic tracing we reveal local and long-range neurons that are putative contributors to GRP signaling in the cortex. In vivo imaging and CRISPR/Cas9-mediated knockout of the GRP receptor (GRPR) in auditory cortex revealed how GRP modulates cortical circuits in vivo and how this in turn regulates sensory processing and behavior. Our data establish cell type-specific peptidergic regulation of cortical microcircuits as a mechanism to regulate auditory fear memories.

Host: Poul Henning Jensen, Professor and Group Leader at Dept. of Biomedicine, Aarhus University.