





DZNE German Center for Neurodegenerative Diseases within the Helenholtz Association EINSTEIN CENTER Neurosciences Einstein Center for Neurosciences Berli

Neuroscience Colloquium

Winter-Semester 2019/2020

Lectures are held Thursdays, 5 p.m. Venue: Paul-Ehrlich Lecturehall, Virchowweg 4, next to CCO

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Motor Control of Singing Behaviour in Crickets

Singing behaviour in crickets has been in the focus of neurobiological research for a long time. Stimulation experiments by F. Huber and D. Otto indicated that singing is controlled by the brain, and that different command systems may exist for the different song types. As the command neuron for calling song has been identified, it now allows eliciting fictive singing by driving the system with microinjections of cholinergic agonists.

Micro-lesions in the CNS, like cutting different connectives, pointed towards the mesothoracic ganglion housing the central pattern generator for singing. However, recent systematic lesions of the CNS indicate a modular organisation of the singing-CPG along the abdominal nerve cord. Whereas the anterior abdominal ganglia are involved in controlling the pulse pattern, the posterior ganglia seem to control the chirp structure. No cricket has been observed singing, once the thoracic ganglia are isolated from the abdominal ganglion chain. This organisation of singing behaviour has been confirmed in in several species, and it is now tested for the different song types.

Intracellular recordings within the abdominal ganglia identified interneurons, which project towards the thoracic ganglia. By modulating their activity, it can be shown that they specifically control the pulse pattern or the chirp pattern. Especially the abdominal-opener interneuron in A3 seems to be crucial for the control of singing. The recordings also indicate, that there is an excitatory feedforward coupling between singing-CPG neurons and the ventilation-CPG. *Supported by the BBSRC.*



White eyed male cricket (*Gryllus bimaculatus*) in singing position, together with an outline of the central nervous system.

 Location:
 Paul Ehrlich-Hörsaal, Charité – Universitätsmedizin Berlin, Campus Mitte Virchowweg 4, next to CCO

 Date:
 Thursday, November 28th, 5 p.m.

 Host:
 James Poulet

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DZNE e.V. German Center for Neurodegenerative Diseases; **Einstein Center** for Neurosciences Berlin; Cluster of Excellence **NeuroCure; SFB 1315**. Organized by NeuroCure: Christian Rosenmund; contact: heidi.pretorius@charite.de