

Leibniz Lecture – Prof. Dr. Michael Brecht

Neurophysiology/Cellular Neuroscience
Bernstein Center for Computational Neuroscience Berlin and Humboldt University Berlin

Sex, Touch & Tickle - the Cortical Neurobiology of Physical Contact

SAVE THE DATE

São Paulo
24th April 2018 at 15:00

FAPESP Auditorium
R. Pio XI, 1500 - Alto da Lapa

Rio de Janeiro
26th April 2018 at 18:00

Instituto D'Or
R. Diniz Cordeiro, 30 - Botafogo

Abstract

The cerebral cortex is the largest brain structure in mammalian brains. While we know much about cortical responses to controlled, experimenter imposed sensory stimuli, we have only limited understanding of cortical responses evoked by complex social interactions. In my lecture I will focus on response patterns evoked by social touch in somatosensory cortex in interacting rats. We find that social touch evokes stronger responses than object touch or free whisking. Moreover, we find prominent sex differences in responsiveness. We observe a modulation of cortical activity with estrus cycle in females, and in particular a modulation of fast-spiking interneurons by estrogens. The prominent sex differences are unexpected, since the somatosensory cortex is not anatomically sexually dimorphic. Recently, we confirmed the absence of anatomical sex differences in somatosensory cortex by an analysis of somatosensory representations of genitals. Despite the marked external sexual dimorphism of genitals, we observed a stunning similarity of the cortical maps representing the clitoris and penises, respectively. In the final part of my presentation I will discuss the involvement of somatosensory cortex in ticklishness. In these experiments we habituated rats to be tickled and found that animals respond to such stimulation with vocalizations. Importantly, rats seem to enjoy tickling and seek out such tactile contacts. In the physiology we observed in trunk somatosensory cortex numerous cells that were either inhibited or excited by tickling. Most interestingly, excitatory or inhibitory responses to tickling predicted excitatory or inhibitory cortical response patterns during play behavior. Microstimulation of deep layer neurons in the somatosensory cortex evoked vocalizations similar to those evoked by tickling. Thus, stimulation and recording data suggest a critical role of somatosensory cortex in mediating ticklishness and the control of playful behaviors.



About Prof. Brecht

The Leibniz Prize for Michael Brecht honours a scientist whose original research approaches and innovative methods have broken new ground in neurobiology. Brecht is particularly interested in the question of how neuronal activity triggers behaviour. He has arrived at foundational answers using the “in vivo whole-cell” method, developed by him, which allows precise measurements in freely moving animals. With it, Brecht has demonstrated that even the stimulation of one nerve cell can trigger motor behaviour.

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