SFB 665 „Entwicklungsstörungen im Nervensystem“

Verwaltung: Charité–Universitätsmedizin Berlin
AG Rosenmund
Neurowissenschaftliches Forschungszentrum

Charitéplatz 1
10117 Berlin

Lecture will be held Tuesday, March 21, 5 p.m.
Venue: Paul-Ehrlich Lecture Hall, Virchowweg 4, next to CCO

Samuel Pfaff

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Characterization of spinal cord motor circuitry

Even basic motor behaviors, such as walking or withdrawing the limb from a painful stimulus, rely upon integrative multimodal sensory circuitry to generate appropriate muscle activation patterns. Classical studies of movement and the influence of sensory stimuli have found that the spinal cord contains circuitry for generating motor commands that are modulated by sensory information from pain, touch, and muscle (proprioception) to produce limb movements that are appropriate for the environmental conditions. However, both the cellular components and the molecular mechanisms that instruct the assembly of the integrative circuit nodes for motor commands are poorly understood. Here we describe a discrete sub-population of inhibitory spinal relay neurons transiently marked by Satb2 (ISR^{Satb2}) that receive inputs from multiple streams of sensory information and relay their outputs to motor command layers of the spinal cord. *Satb2* encodes a special AT-rich sequence binding protein that is mutated in Glass Syndrome, a human genetic disorder associated with intellectual disability. Targeted deletion of *Satb2* from developing ISR^{Satb2} cells perturbs their position, molecular profile, and pre- and post-synaptic connectivity. Accordingly, the influence of painful mechanical, chemical, and thermal signals on limb positioning is perturbed in *Satb2* mutants. Our findings indicate that Satb2 is necessary for establishing sensorimotor circuitry that governs how multimodal sensory commands influence motor behaviors.

Levine, A.J., Hinckley, C.A., Hilde, K.L., Driscoll, S.P., Poon, T.H., Montgomery, J.M., Pfaff, S.L. (2014) Identification of a cellular node for motor control pathways. ***Nature Neurosci.*** *17(4), 586-593. PMID: 24609464.*

Hilde, K.L., Levine, A.J., Hinckley, C.A., Hayashi, M., Montgomery, J.M., Gullo, M., Driscoll, S.P., Grosschedl, R., Kohwi, Y., Kohwi-Shigematsu, T., Pfaff, S.L. (2016). Satb2 is required for the development of a spinal exteroceptive microcircuit that modulates limb position. ***Neuron*** *17:763-76. PMID: 27478017.*

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

Date: **Tuesday, March 21st , 5 p.m.**

Host: Victor Tarabykin

Supported by:
SFB 665 “Developmental Disturbances in the Nervous System”;
Organized by SFB 665, Speaker: Christian Rosenmund; Contact: heidi.pretorius@charite.de