ICFO

INSIGHT SEMINAR: 3D architecture and mechanism of touch detection in the Pacinian corpuscle

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September 18, 2025
12:00 to 13:00
Seminar Room

Pacinian corpuscles are specialized mechanoreceptors that detect high-frequency vibration in the skin of many vertebrates, enabling texture discrimination and precise tactile tasks. Corpuscles comprise a multilayered outer core surrounding an inner core, which contains lamellar Schwann cells and a neuronal afferent terminal. The spatial organization and functional roles of these components remain poorly understood. Using Focused Ion Beam Scanning Electron Microscopy (FIB-SEM), we determined the high-resolution 3D architecture of an entire Pacinian corpuscle and utilized in situ electrophysiology to reveal the contributions of its cellular component to touch detection. We show that, contrary to the prevailing model, the outer core plays a minimal role in the sensory tuning of corpuscles to high-frequency vibration. Instead, this tuning arises from the inner core, where the afferent

terminal acts as the primary touch sensor, detecting vibrations due to its sensitivity to stimulus velocity. Mechanosensitive lamellar Schwann cells also detect touch and enhance the afferent's sensitivity to mechanical stimuli. We present a new model, in which the functional tuning of Pacinian corpuscles to vibration is enabled by an interplay between mechanosensitive lamellar Schwann cells and the afferent terminal in the inner core.
Hosted by: Prof. Dr. Michael Krieg