Researchers characterize Meissner corpuscles in mice

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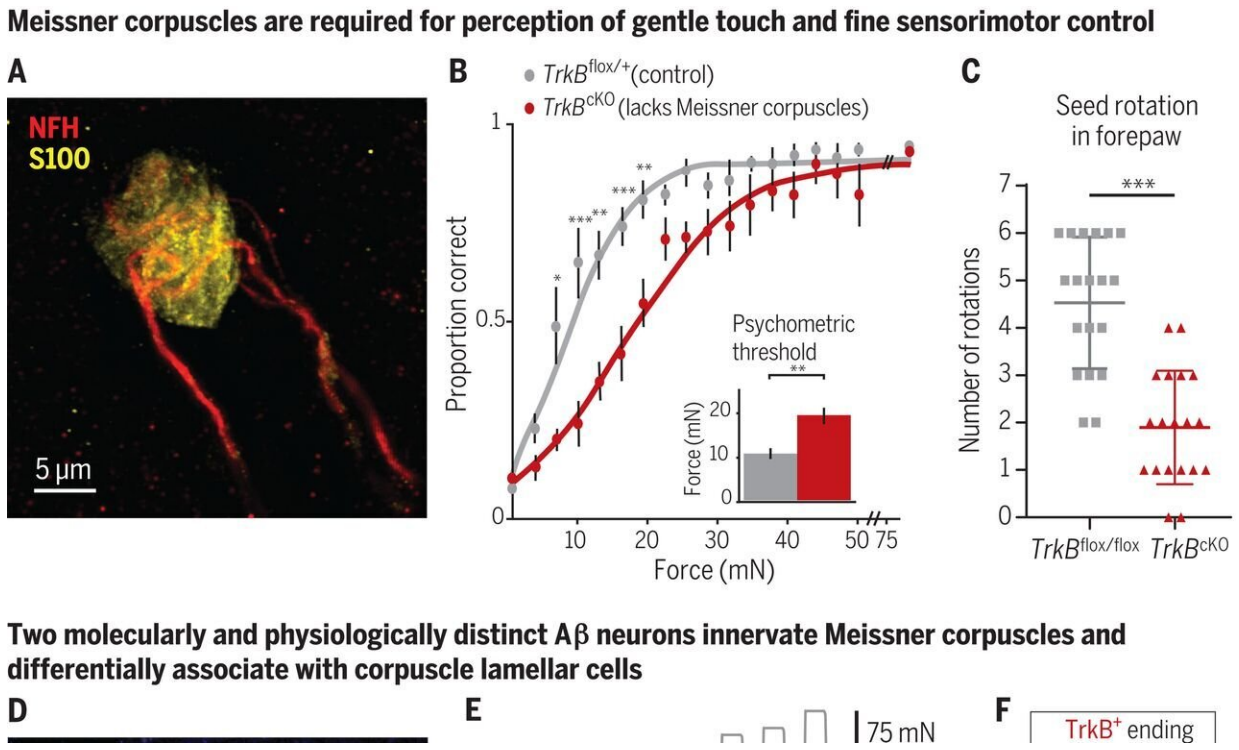

Anatomy and physiology of Meissner corpuscles required for tactile behavior. (A to C) Meissner corpuscles and their Aβ afferents (A) were required for normal tactile sensitivity (B) and fine sensorimotor control (C). (D) TrkB+ and Ret+ Aβ neurons both innervated Meissner corpuscles. (E and F) TrkB+ Meissner afferents were more sensitive (E) and had more lamellar cell wrappings [(F), arrows indicate axons wrapped with lamellar processes] compared with Ret+ Meissner afferents. In (A), S100 and NFH are antibodies used to visualize Meissner corpuscles and their afferents, respectively. In (B) and (C), error bars represent SEM, and *p Science (2020). DOI: 10.1126/science.abb2751

A team of researchers from Harvard Medical School and Stanford University has learned more about the role Meissner corpuscles play in sensing touch in mice. In their paper published in the journal *Science*, the group describes the novel ways they tested responses to changes in mouse skin biology and what they learned about the role Meissner corpuscles play in the sense of touch in mammals. Kara Marshall and Ardem Patapoutian, with the Scripps Research Institute, have published a Perspective piece in the same journal issue outlining the history of the study of Meissner corpuscles and the work done by the team on this new effort.

Meissner corpuscles are mechanosensory end organs found in glabrous (hairless) skin in all mammals. In humans, they are found in the fingertips, though until now, their function has been mostly a mystery to medical scientists. To better understand their function, the researchers studied Meissner corpuscles in mice, which express Meissner corpuscles in their fingertips and palms.

The work involved studying the organs up close with an electron microscope and disabling them in the fingertips of lab mice. The scientists then tested the mice to see if doing so resulted in any behavioral differences.

The close-up view of the organs showed that each Meissner corpuscle was made up of a pair of neurons, which had differences in their stimulus thresholds. Disabling the organs in mouse fingertips was just the first part of testing for behavioral differences. The researchers also had to teach each of the mice to respond differently to different gentle touches prior to disabling their Meissner corpuscles—that allowed them to determine differences in touch sensitivity.

The researchers found that without their Meissner corpuscles, the mice were less able to detect gentle indentations in a material, and they were

also much less adept at prying opening sunflower seeds. These observations provided evidence that Meissner corpuscles play a role in the sense of touch, and are indispensable in providing a full spectrum of sensations. The researchers plan to continue their research—next up will be locating the ion channel and trying to understand the reason for a duel nerve structure.

More information: Nicole L. Neubarth et al. Meissner corpuscles and their spatially intermingled afferents underlie gentle touch perception, *Science* (2020). DOI: 10.1126/science.abb2751