

Neurons in human skin perform advanced calculations

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Andrew Pruszynski's lab. Credit: Mattias Pettersson

Neurons in human skin perform advanced calculations, previously believed that only the brain could perform. This is according to a study from Umeå University in Sweden published in the journal *Nature Neuroscience*.

A fundamental characteristic of neurons that extend into the skin and record touch, so-called first-order neurons in the tactile system, is that they branch in the skin so that each neuron reports touch from many highly-sensitive zones on the skin.

According to researchers at the Department of Integrative Medical Biology, IMB, Umeå University, this branching allows first-order tactile neurons not only to send signals to the brain that something has touched the skin, but also process geometric data about the object touching the skin.

"Our work has shown that two types of first-order tactile neurons that supply the [sensitive skin](#) at our fingertips not only signal information about when and how intensely an object is touched, but also information about the touched object's shape" says

Andrew Pruszynski, who is one of the researchers behind the study.

The study also shows that the sensitivity of [individual neurons](#) to the shape of an object depends on the layout of the neuron's highly-sensitive zones in the skin.

"Perhaps the most surprising result of our study is that these peripheral neurons, which are engaged when a fingertip examines an object, perform the same type of calculations done by neurons in the cerebral cortex. Somewhat simplified, it means that our touch experiences are already processed by [neurons](#) in the [skin](#) before they reach the brain for further processing" says Andrew Pruszynski.

More information: "Edge-orientation processing in first-order tactile neurons." J Andrew Pruszynski & Roland S Johansson. *Nature Neuroscience* (2014) [DOI: 10.1038/nn.3804](https://doi.org/10.1038/nn.3804). Received 27 June 2014 Accepted 08 August 2014 Published online 31 August 2014

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