Researchers create an artificial tactile skin that mimics human tactile recognition processes

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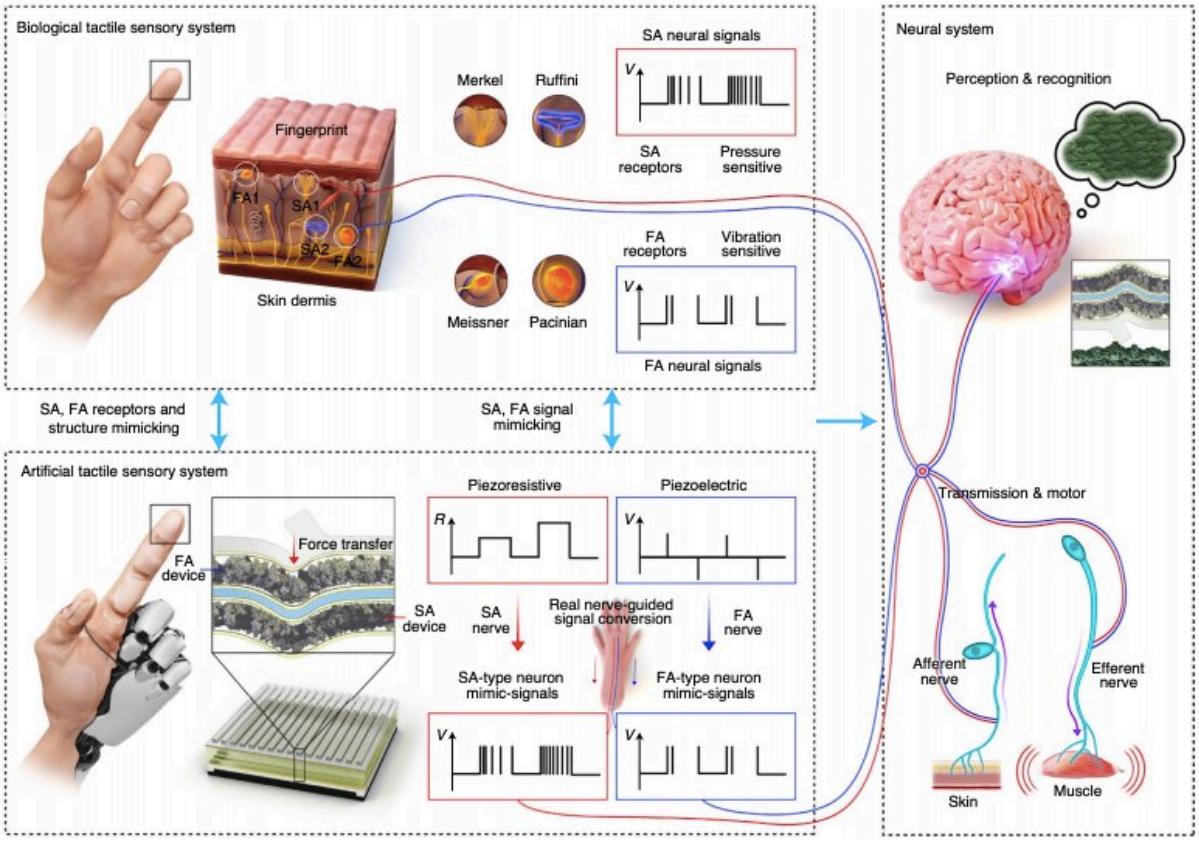

Figure explaining how an artificial tactile sensing system mimicking the human sense of touch works. Credit: Chun et al.

Over the past few decades, roboticists and computer scientists have developed artificial systems that replicate biological functions and human abilities in increasingly realistic ways. This includes artificial intelligence systems, as well as sensors that can capture various types of sensory data.

When trying to understand properties of objects and how to grasp them or handle them, humans often rely on their sense of touch. Artificial sensing systems that replicate human touch can thus be of great value, as they could enable the development of better performing and more responsive robots or prosthetic limbs.

Researchers at Sungkyunkwan University and Hanyang University in South Korea have recently created an artificial tactile sensing system that mimics the way in which humans recognize objects in their surroundings via their sense of touch. This system, presented in a paper published in *Nature Electronics*, uses sensors to capture data associated with the tactile properties of objects.

"We report an artificial neural tactile skin system that mimics the human tactile recognition process using particle-based polymer composite sensors and a signal-converting system," Sungwoo Chun and his colleagues wrote in their paper.

Biological sensory systems convert tactile stimuli into action potentials through a process known as somatosensory transduction. Subsequently, they transmit these signals to the brain via afferent nerves.

To emulate the human tactile system, the artificial neural tactile skin created by Chun and his colleagues utilizes sensors that respond to pressure and vibration, replicating the function of slow adaptive and fast adaptive mechanoreceptors in the human skin. The data they collect resembles information gathered by human sensory neurons; thus they

ultimately produce signals that look like human tactile nerve signals.

The system created by the researchers is made up of T-skin films with conductive piezoresistive and piezoelectric particles arranged in an elastic polymer matrix. The films are ultrathin (