

## **ATP** is a key to feel warm temperature

October 8 2009

A Japanese research group led by Prof. Makoto Tominaga and Dr. Sravan Mandadi (National Institute for Physiological Sciences: NIPS) found that ATP plays a key role in transmitting temperature information from skin keratinocytes to afferent sensory neurons. Their findings were presented in the *Pflugers Archiv European Journal of Physiology* published on October 1, 2009.

Hazardous temperatures (extreme hot or cold) are known to be detected by the temperature-activated <u>ion channels</u> (thermoTRPs) expressed in free sensory nerve endings. On the other hand, ambient innocuous warm temperatures are sensed by different thermoTRPs, TRPV3 and TRPV4 expressed in skin keratinocytes. Interesting question is, therefore, how our nervous system recognizes the warmth information sensed by the non-excitable epithelial cells.

In a co-culture system, heat-evoked response in DRG neurons was secondary to that in skin keratinocytes, and the DRG responses were diminished by the <u>ATP</u> receptor antagonists. ATP release from keratinocytes was confirmed by 'a bio-sensor system' in which a cell expressing ATP receptors was placed in close proximity to keratinocytes. Warmth-activated TRPV3, rather than TRPV4, was found to be predominantly involved in the ATP release upon heating.

Dr. Tominaga said, "Our findings for the first time explains how ambient temperature information can be sent from skin to <u>sensory</u> <u>nerves</u>. Our results also support the emerging concept of ATP-mediated information transmission in the non-synaptic connections."



## Source: National Institute for Physiological Sciences

Citation: ATP is a key to feel warm temperature (2009, October 8) retrieved 28 April 2024 from https://medicalxpress.com/news/2009-10-atp-key-temperature.html

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