Press information

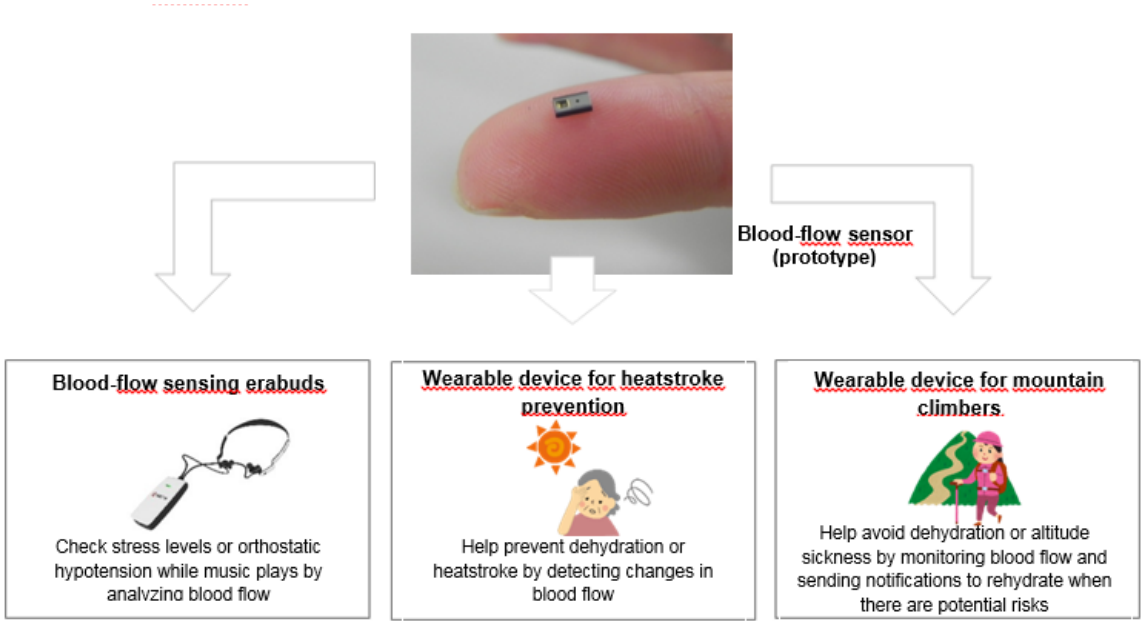
KYOCERA Optical Blood-Flow Sensor is Among World's Smallest for Wearable Devices, Smartphones

Potential mHealth applications utilize earbuds and other devices to sense stress levels, help prevent dehydration and avoid altitude sickness

Kyoto, Japan/Neuss, Germany, January 12, 2017. Kyocera Corporation announced that it has developed one of the smallest known optical blood-flow sensors, which measures the volume of blood flow in subcutaneous tissue. With the sensor, Kyocera is researching a variety of mobile health (mHealth) applications such as monitoring stress levels or preventing dehydration, heatstroke and altitude sickness by studying trends or changes in blood-flow volume as alerts for these conditions and developing algorithms for detection.

Leveraging Kyocera's expertise in miniaturization, the sensor — only 1mm high, 1.6mm long and 3.2mm wide — is designed for use in small devices such as mobile phones and wearable devices. The company will offer sensor module samples starting April 2017, and aims to commercialize the technology as a device by March 2018.

Potential mHealth Applications in Research & Development



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Development Background

The wearable device market has expanded substantially in recent years, focused primarily on health and fitness. New mHealth applications are being developed for a wide range of healthcare applications including chronic diseases, eldercare and wellness. Global shipments of healthcare wearables are expected to rise from 2.5 million units in 2016 to 97.6 million units in 2021*1.

Kyocera, which provides a wide range of components for smartphones and wearables, has been developing slimmer, smaller products to support higher functionality in more compact devices. The company developed this sensor as an integrated module, incorporating the laser diode and photodiode into a single ceramic package, based on its established expertise in miniaturization technologies.

Basic Principle and Main Features

Devices equipped with this new sensor will be able to measure blood-flow volume in subcutaneous tissue by placing the device in contact with an ear, finger or forehead*2. When light is reflected on blood within a blood vessel, the frequency of light varies — called a frequency or Doppler shift — according to the blood-flow velocity. The new sensor utilizes the relative shift in frequency (which increases as blood flow accelerates) and the strength of the reflected light (which grows stronger when reflected off a greater volume of red blood cells) to measure blood-flow volume.

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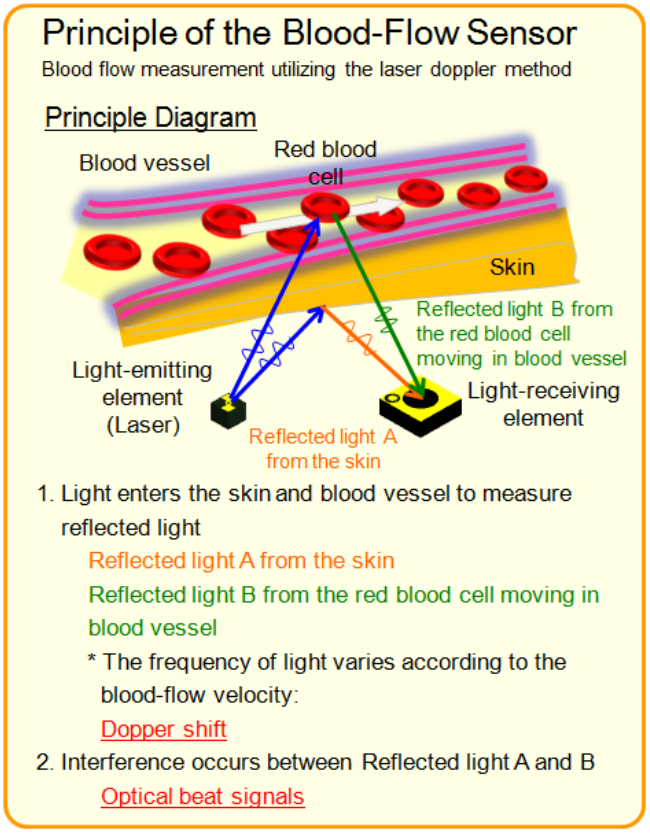
Featuring a high signal-to-noise ratio (S/N), small size and low power consumption (output: 0.5mW), the sensor can be easily integrated into a smartphone or wearable device for mHealth applications.



*1 Based on information issued by Tractica LLC in April 2016

*2 The sensor targets capillaries for measurement and cannot be utilized on all parts of the body; measurement site may depend on monitoring applications.

For more information on Kyocera: http://global.kyocera.com

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About Kyocera

Headquartered in Kyoto, Japan, Kyocera Corporation is one of the world's leading manufacturers of fine ceramic components for the technology industry. The strategically important divisions in the Kyocera Group, which is comprised of 235 subsidiaries (as of March 31, 2016), are information and communications technologies, products which increase quality of life, and environmentally friendly products. The technology group is also one of the oldest producers of solar energy systems worldwide, with more than 40 years of experience in the industry.
The company is ranked #531 on Forbes magazine's 2016 "Global 2000" listing of the world's largest publicly traded companies. With a global workforce of over 69,000 employees, Kyocera posted net sales of approximately €11.59 billion in fiscal year 2015/2016. The products marketed by the company in Europe include printers, digital copying systems, microelectronic components, and fine ceramic products. The Kyocera Group has two independent companies in the Federal Republic of Germany: Kyocera Fineceramics GmbH in Neuss and Esslingen and Kyocera Document Solutions in Meerbusch.
The company also takes an active interest in cultural affairs. The Kyoto Prize, a prominent international award, is presented each year by the Inamori Foundation — established by Kyocera founder Dr. Kazuo Inamori — to individuals and groups worldwide who have contributed significantly to the scientific, cultural, and spiritual betterment of humankind (converted at approximately €360,000 per prize category).

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