

What your sweat says about your health

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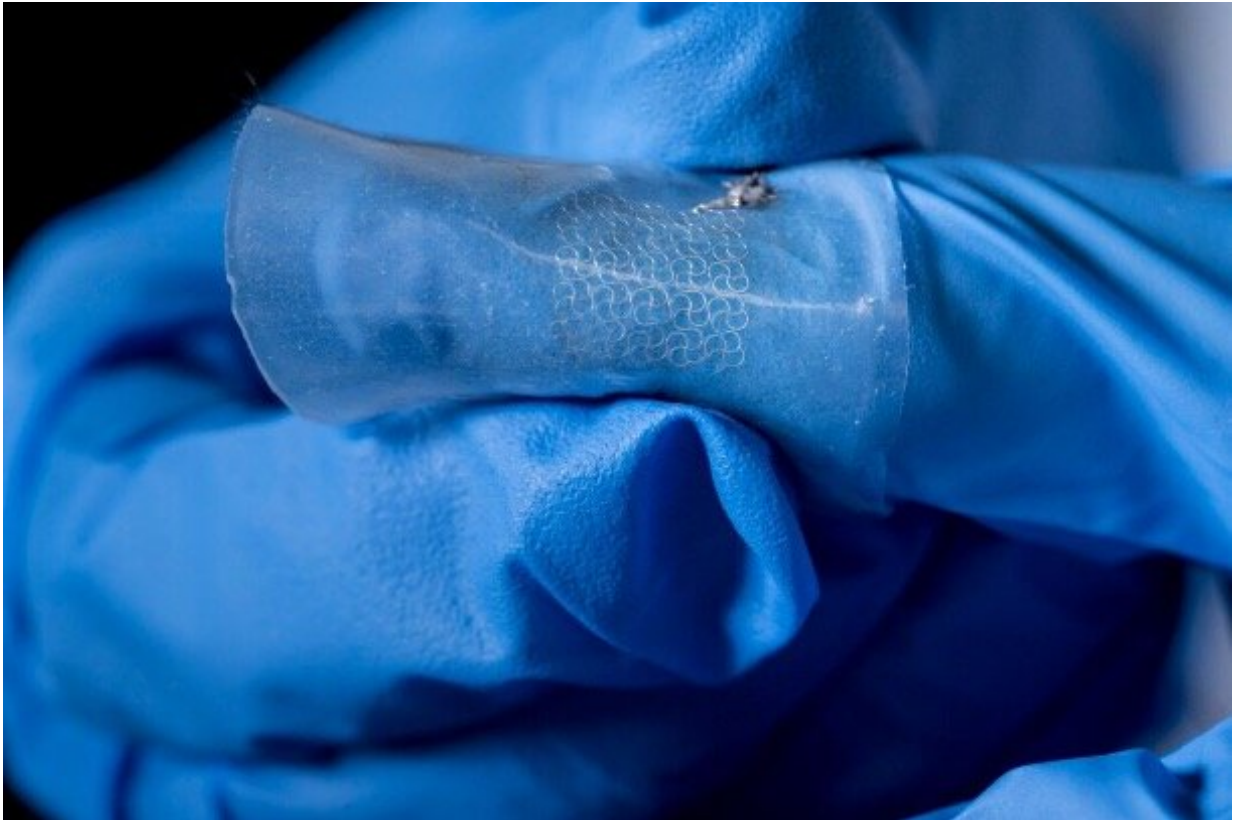


Image of sensor being developed at SFU that is made of rubber fabricated with 3D-printed electrodes. Credit: Simon Fraser University

Sweating it out through exercise may be a New Year's resolution but it could also help to provide new insights into the state of your health, according to new sensing technology being developed at Simon Fraser University.

SFU researcher Woo Soo Kim is part of an international research team that is developing a low-cost, 3-D-printed wearable sweat sensor. The research is being carried out in SFU's Additive Manufacturing Lab in collaboration with researchers from Zhejiang University. The team recently published a sweeping review of sweat sensor advances in the journal *Bio-Design and Manufacturing*.

According to Kim, innovation in technology design over the past decade has seen the rapid development of wearable [sensors](#)—including sweat sensors. These wearable sensors can assess an individual's health by analyzing the chemicals and other [health information](#) contained in sweat.

Unlike collecting and testing other biofluids such as saliva or blood, the method is non-invasive and does not require assistance. These sweat sensors can monitor human biochemical information during exercise, including ions or lactate levels, which can serve as indicators of hydration and overall physiological and psychological wellness. The data collected can also play a role in assessing various health factors, including stress and nutrition.

"The [chemical composition](#) and physical information derived from sweat are of great value in terms of how it reflects human health status," says Kim. "Direct sweat collection from the [skin surface](#) is an easy-to-perform, straightforward method that avoids privacy concerns in physical implementation. These features mean that sweat has the potential to become a widely accessible sample type that can be monitored in a non-invasive manner."

While there is a growing range of low-cost wearable sensors that can collect and analyze sweat to assess a person's health, Kim's 3-D printable model integrates mechanically flexible electro-chemical sensors and wireless communication functions.

Typically, sensors can be attached to the skin using a [flexible material](#) such as foam, fabric, flexible plastics or rubber and ideally, be powered by wireless chargers.

Sweat metabolites can provide important information that can effectively be used to evaluate the wearer's overall health condition, notes Kim. However, he cautions that further research is needed to verify the correlation between information from [sweat](#) and blood, using in-vivo validation tests to advance meaningful bio-medical applications.

More information: Wenzheng Heng et al, Emerging wearable flexible sensors for sweat analysis, *Bio-Design and Manufacturing* (2021). [DOI: 10.1007/s42242-021-00171-2](#)

Provided by Simon Fraser University

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