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Without puncturing your finger: laser patch will tell you about your health status during diabetes



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Researchers at the Nanyang Technological University, Singapore (NTU Singapore) have developed an innovative laser patch that can track important health indicators through a person's sweat. This innovation promises to be a non-invasive and effective method of health monitoring for patients with diabetes and others.

Human sweat contains valuable biomarkers such as glucose, lactate, and urea, which can provide important information about various health conditions. Traditionally, patients with diabetes have relied on invasive methods such as finger-stick blood testing to monitor their blood glucose levels – a process that can be painful and uncomfortable. Sensor devices are also available, but they have the disadvantages of being expensive and uncomfortable to wear on the skin for long periods of time.

NTU's research team, led by Associate Professor Chen Yu-Cheng from the School of Electrical and Electronic Engineering (EEE), has integrated microlaser technology into a soft hydrogel film to create a flexible and compact sensor device that looks like a band-aid. It can quickly and accurately determine the level of biomarkers in sweat and provide uninterrupted health monitoring without invasive procedures.

This smart 'band-aid' could help monitor your health without pricking your ...



The NTU team's new device is part of the NTU 2025 plan to implement cutting-edge research for the benefit of society. This patch uses tiny lasers in liquid crystal droplets to detect specific health markers. The different colored dots on the patch represent glucose, lactate, and urea, allowing the device to monitor all substances simultaneously.

During live experiments, the patch demonstrated amazing sensitivity, detecting tiny changes in biomarker levels as small as 0.001 mm, which is 100 times better than existing technologies. This accuracy allows for precise tracking of biomarkers and provides a detailed picture of the user's health, covering both low and high levels.

“ «Our device is capable of detecting both high and low range of biomarker levels. This is particularly useful for patients with diabetes, as existing health monitoring devices focus on tracking only high, not abnormal or low glucose levels, which indicate other health complications,» says Ni Ningyuan, Ph.D., first author of the study.

The research team is looking to expand the device's capabilities to detect additional substances such as drugs and other chemical compounds present in sweat. The study is described in detail in the journal [Analytical Chemistry](https://pubs.acs.org/doi/10.1021/acs.analchem.4c00979) (<https://pubs.acs.org/doi/10.1021/acs.analchem.4c00979>).

Sources: [NTU](https://www.ntu.edu.sg/news/detail/plaster-like-microlaser-device-measures-glucose-levels-in-sweat-accurately) (<https://www.ntu.edu.sg/news/detail/plaster-like-microlaser-device-measures-glucose-levels-in-sweat-accurately>), [Medical Express](https://medicalxpress.com/news/2024-07-scientists-bandage-glucose-microlaser-technology.html) (<https://medicalxpress.com/news/2024-07-scientists-bandage-glucose-microlaser-technology.html>)

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