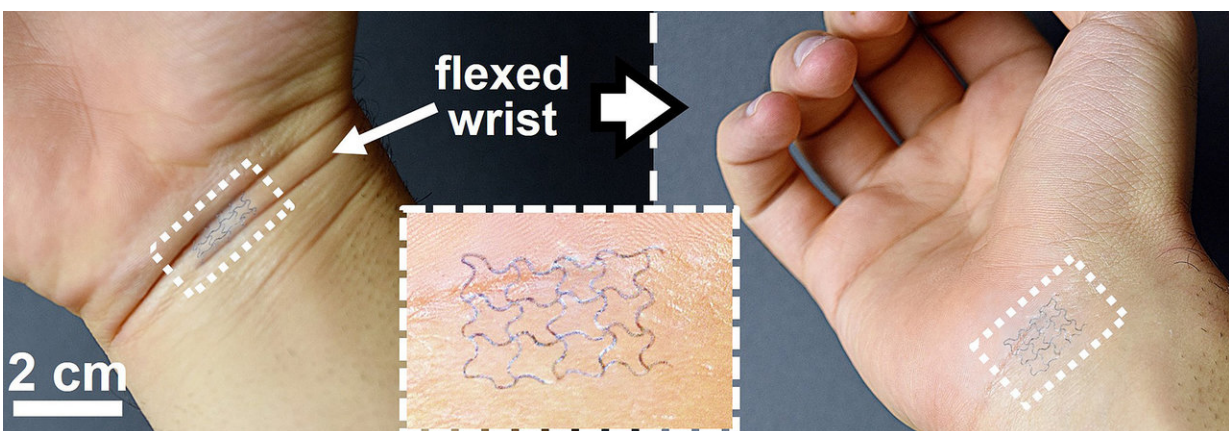


Simple stickers may save lives of heart patients, athletes and lower medical costs for families

October 16 2018



Purdue University researchers have created wearable electronic devices that someone can easily attach to their skin. The devices are made out of paper to lower the cost of personalized medicine. Credit: Purdue University

Heart surgery can be traumatic for patients. Having to continuously monitor your status without a doctor when you are back home can be even scarier. Imagine being able to do that with a simple sticker applied to your body.

Purdue University researchers have advanced a sticker solution moving it several steps closer to reality. The research was recently published in

ACS Advanced Materials and Interfaces.

"For the first time, we have created wearable electronic devices that someone can easily attach to their skin and are made out of paper to lower the cost of personalized medicine," said Ramses Martinez, a Purdue assistant professor of industrial engineering and biomedical engineering, who led the research team.

Their technology aligns with Purdue's Giant Leaps celebration, acknowledging the university's global advancements made in [health](#) as part of Purdue's 150th anniversary. This is one of the four themes of the yearlong celebration's Ideas Festival, designed to showcase Purdue as an intellectual center solving real-world issues.

The "smart stickers" are made of cellulose, which is both biocompatible and breathable. They can be used to monitor physical activity and alert a wearer about possible health risks in real time.

Health professionals could use the Purdue stickers as implantable sensors to monitor the sleep of patients because they conform to internal organs without causing any adverse reactions. Athletes could also use the technology to monitor their health while exercising and swimming.

These stickers are patterned in serpentine shapes to make the devices as thin and stretchable as skin, making them imperceptible for the wearer.

Since paper degrades fast when it gets wet and human skin is prone to be covered in sweat, these stickers were coated with molecules that repel water, oil, dust and bacteria. Each [sticker](#) costs about a nickel to produce and can be made using printing and manufacturing technologies similar to those used to print books at high speed.

"The low cost of these wearable devices and their compatibility with

large-scale manufacturing techniques will enable the quick adoption of these new fully disposable, wearable sensors in a variety of health care applications requiring single-use diagnostic systems," Martinez said.

More information: Behnam Sadri et al. Wearable and Implantable Epidermal Paper-Based Electronics, *ACS Applied Materials & Interfaces* (2018). [DOI: 10.1021/acsami.8b11020](https://doi.org/10.1021/acsami.8b11020)

Provided by Purdue University

Citation: Simple stickers may save lives of heart patients, athletes and lower medical costs for families (2018, October 16) retrieved 21 April 2024 from <https://techxplore.com/news/2018-10-simple-stickers-heart-patients-athletes.html>

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