

Tattoo-like skin health monitor needs no batteries

August 4 2016, by Bob Yirka



An image of the lighting red LED of the pulse rate monitoring device mounted on skin. Credit: Kim et al.

(Tech Xplore)—An international team of researchers has developed an ultra-thin health monitoring device that affixes to the skin like a patch and looks somewhat like a tattoo. As they note in their paper published in the journal *Science Advances*, the tiny device is able to monitor skin temperature, UV exposure, heart rate, changes in skin color and blood oxygen level.

Fitbit and other devices like it have become popular over the past few years as people look to take control over their health in new and novel ways. But such devices are typically worn as bracelets, which means their use can be limited. As the researchers of this new effort note, most personal health monitoring devices have been handicapped by their batteries. The researchers found a way to build the new monitor, which has yet to be officially named, without the need for any sort of battery at all.

The key to powering the new device was capturing the small amount of energy that is emitted by a smartphone or tablet that makes use of near-field communications (NFC)—a type of technology that employs electromagnetic induction between antennae inside of portable devices. Radio frequencies are used to transmit information, which, as the researchers discovered, could be used as an energy source, making the use of a battery unnecessary.

Getting rid of the battery allowed the team to create a device that is no thicker than an ordinary decal—it is flexible and adheres to the skin, collecting information about the body that is then transmitted wirelessly to a nearby device.

The device has LEDs situated on the skin side that shine into and onto the skin—the light reflected back is used to measure [heart rate](#), changes to [skin color](#) and oxygenation levels. It also has a dye-based light sensor for measuring ultraviolet light and another sensor for monitoring [skin](#)

[temperature.](#)

One major drawback of the monitor is the requirement that the phone or tablet providing the NFC power be just a few inches away—such as carried in a shirt pocket. Another option involves using a dedicated NFC device that offers more power. The researchers believe that their monitoring [device](#) would prove useful in health-care facilities and eventually to the population at large.

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