Under the Skin, a Tiny Laboratory

I-Micronews

Humans are veritable chemical factories - we manufacture thousands of substances and transport them, via our blood, throughout our bodies. Some of these substances can be used as indicators of our health status. A team of EPFL scientists has developed a tiny device that can analyze the concentration of these substances in the blood. Implanted just beneath the skin, it can detect up to five proteins and organic acids simultaneously, and then transmit the results directly to a doctor's computer. This method will allow a much more personalized level of care than traditional blood tests can provide. Health care providers will be better able to monitor patients, particularly those with chronic illness or those undergoing chemotherapy. The prototype, still in the experimental stages, has demonstrated that it can reliably detect several commonly traced substances. The research results will be published and presented March 20, 2013 in Europe's largest electronics conference, DATE 13.

Some cubic millimeters of technology

The device was developed by a team led by EPFL scientists Giovanni de Micheli and Sandro Carrara. The implant, a real gem of concentrated technology, is only a few cubic millimeters in volume but includes five sensors, a radio transmitter and a power delivery system. Outside the body, a battery patch provides 1/10 watt of power, through the patient's skin – thus there's no need to operate every time the battery needs changing.

Information is routed through a series of stages, from the patient's body to the doctor's computer screen. The implant emits radio waves over a safe frequency. The patch collects the data and transmits them via Bluetooth to a mobile phone, which then sends them to the doctor over the cellular network.

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