Scientists at École Polytechnique Fédérale de Lausanne (EPFL) have developed a tiny, portable personal blood testing laboratory. A miniature device implanted under the skin provides an immediate analysis of substances in the body, and an external patch transmits the data via Bluetooth to a smartphone which sends the results to a doctor over the cellular phone network.

### A Blood Lab under the Skin

Wireless, implantable medical devices are set to transform predictive medicine

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**SKIN**

**EXTERNAL PATCH**

- Powers the chip via an inductive link
- Collects and transmits data via Bluetooth to smartphone or iPad

**IMPLANTABLE CHIP**

- Embedded in tissue under skin
- 14 mm long (~9/16")
- 5 electrochemical and molecular sensors measure up to 5 parameters
- The chip’s sensors detect human metabolites in the body and send measurements to the external patch

**MEASURING METABOLITES**

- Detecting metabolites in the bloodstream is a key element of predictive medicine. The presence of metabolites in the bloodstream can indicate an impending crisis - such as when troponin is released by the heart hours before an impending heart attack.

**BENEFITS**

- Enables predictive medicine.
- Monitors patients from far away.
- Facilitates monitoring of patients with chronic conditions.
- Can detect and predict imminent crises hours earlier.
- Can potentially predict a heart attack hours before it happens by detecting key metabolites such as troponin in the blood.

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The healthcare provider receives data from the patient’s smartphone or iPad and monitors the patient’s condition remotely.