

Continuous biomarker monitoring for personalised medicine

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Nicolas Plumeré (left) and Tobias Vöpel receive a Proof of Concept Grant from the European Research Council. Credit: RUB, Kramer und Marquard

Similar to blood sugar, various biomarkers could in future be identified using just a few drops of blood. Researchers at Ruhr-Universität

Bochum are developing a multi-analyte test strip for this purpose that will open up new potentials in personalized medicine by facilitating the continuous measurement of various parameters. Combined with big-data analyses, the new measurement technology could help to detect health problems at an early stage or to better predict the course of disease. For the development of the test strip, Professor Nicolas Plumeré and Dr. Tobias Vöpel from the Molecular Nanostructures research group will be awarded a Proof of Concept Grant by the European Research Council (ERC) amounting to 150,000 euros. The project "Establishing continuous biomarker monitoring for big data in fitness and healthcare", E-Confidence for short, runs for one and a half years.

Precise analyses calibrate wearables

"Our vision is to register the smallest deviations in the biomarker profile and use them for personalized medicine," says Nicolas Plumeré, member of the Cluster of Excellence Ruhr Explores Solvation. "To this end, our technology will not only be combined with [big-data](#) analysis, but also with rapidly advancing technologies such as wearables, for example smart watches or fitness trackers." The researchers want to ensure continuous precise data acquisition by combining these non-invasive sensor techniques with minimally invasive methods to calibrate the wearables.

"Ideally, the combination of these techniques could even help prevent [health problems](#)," says Tobias Vöpel. "For example, if the sensors were linked to a smartphone, it could prompt the wearer to see a doctor in time."

Blood sugar and lactate measurement

In the ERC project, Nicolas Plumeré and Tobias Vöpel plan to develop

[test](#) strips for the simultaneous measurement of blood sugar and lactate levels. They also intend to find out for which other biomarkers the technology would be suitable.

Lactate measurement is not only relevant for medical doctors, enabling them to better assess the health status of their patients, but also for athletes who wish to adapt their training to their individual requirements. "With our multi-analyte test strip, it will be possible to accurately determine the [blood sugar](#) and lactate levels in a tiny drop of blood without having to carry out a lengthy test in the laboratory," explains Nicolas Plumeré.

Plumeré and Vöpel have already developed a method for [blood](#) glucose measurement in the ERC Starting Grant "Redox Shields", for which they have applied for a patent. The measurement is based on so-called oxidases as sensor enzymes, which, however, suffer from interferences by oxygen, making the measurements inaccurate. Using the technique developed by Tobias Vöpel and Nicolas Plumeré, the interfering oxygen is removed from the test strip.

Spin-off for marketing

Both researchers also plan to work with partners from the healthcare industry in order to find out how the data obtained using their method can help determine an individual's state of health.

The grant will also help the researchers to carry out a market analysis, test the new technology and prepare a [business plan](#) for a spin-off company that could be responsible for marketing the test strips in the future.

Provided by Ruhr-Universitaet-Bochum

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