

Monitoring lithium in blood

I-Micronews

Lithium is an important treatment for the 50 per cent of psychiatric patients suffering from manic depression and bipolar disorders but has a narrow therapeutic window. If the concentration is too low, it has no effect but if it's too high it is toxic. Therefore monitoring its levels in the blood is crucial for effective treatment. Previous methods required complex work-up procedures that had to be carried out by trained personnel. Now, Albert Van Den Berg and colleagues at the University of Twente have developed the Medimate Multireader® which could allow patients to monitor their blood lithium levels at home with the same ease that diabetes patients check their blood glucose levels.

Van den Berg's device consists of a handheld reader and a disposable glass chip and is very simple to use. A drop of blood is put into a cartridge containing the microfluidic chip and this is inserted into the reader for measurement. The method of operation is not new but until now electrophoretic separation has not been employed in point-of-care devices. The chip is pre-filled with everything required to carry out the analysis and also uses an on-chip miniaturisation vessel containing an air bubble to avoid leakage from the cartridge due to liquid expansion resulting from higher temperatures.

'It is an important step in lab-on-a-chip devices and is the future for monitoring medication,' says **Van Den Berg**. 'The device could also be of great use to Pharma companies in the development of personalised medication.'

Andreas Manz, an expert in microchip technology at the Korea Institute of Science and Technology in Europe, Saarbrücken, Germany, says it *'is an ambitious project, and they have come up with a smart chip design that seems to work very well.'*

Apart from extending the use of the chip to other important metabolites, next the team plans to look into developing an iPhone application which would provide both the electrical and computing power necessary to perform the measurements as well as communication means. Adapting the device to cell phones would also make the technology more accessible to developing countries where even though the infrastructure is not as advanced, there is an abundance of people with cell phones, adds Van den Berg.

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