

Lithium monitor could improve lives of people suffering from bipolar

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Bipolar disorder is characterized by transitions between depression and mania. Credit: Wikipedia

It is estimated that bipolar disorder affects one in 100 people and lithium remains the most effective long-term therapy for the condition. It is incredibly important to monitor lithium intake as it has a narrow therapeutic range and can be toxic once levels elevate above it.

In a new study published by *Biosensors and Bioelectronics*, researchers from the University of Surrey, in collaboration with the University of Bath, detail how they have built on their ground-breaking research by developing extraction fibres to draw [lithium](#) from under the skin. They combined lithium extraction with a lithium sensor fibre and reference fibre to create a miniaturised and flexible potentiometric cell—a [wearable](#) monitor that can be used by patients without the need to be "primed" in solution.

The researchers demonstrated that their monitor was able to detect lithium and, through their lab tests, they found that their device could also determine the lithium concentration levels and potentially give a warning signal that high levels had been reached. The team is now looking to understand and investigate whether it is possible for these devices to be sensitive enough to detect extremely narrow therapeutic ranges of lithium.

Many physical wearable sensors have been developed to monitor people's temperature, [heart rate](#) and respiration rate and, while wearable glucose monitors are currently on the market, there are few other commercial wearable chemical sensors that exist. It is believed that using wearable chemical sensors at home, instead of a traditional clinical setting, for screening or follow up care would help to reduce the burden on health professional's time.

Dr. Carol Crean, Senior Lecturer in Physical and Material Chemistry at the University of Surrey, said: "We are incredibly excited by the potential of this proof-of-concept study, which has shown that wearable fibre-based lithium [sensors](#) are viable and potentially life changing for the many living with bipolar disorder. Importantly, these devices could also save valuable time for [health professionals](#) because most of the monitoring of the therapeutic drug can be done at the patient's convenience."

More information: Mona N. Sweilam et al. Textile-based non-invasive lithium drug monitoring: A proof-of-concept study for wearable sensing, *Biosensors and Bioelectronics* (2019). [DOI: 10.1016/j.bios.2019.111897](#)

Provided by University of Surrey

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