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DISPATCH · DIABETES IMPLANTS · 2 MIN

# Wireless implant oxidises blood glucose, restoring sugar control in diabetic mice

A Science study describes a wirelessly powered implant that converts blood glucose into gluconate, restoring glucose control within an hour in type 2 diabetic mice without drugs.

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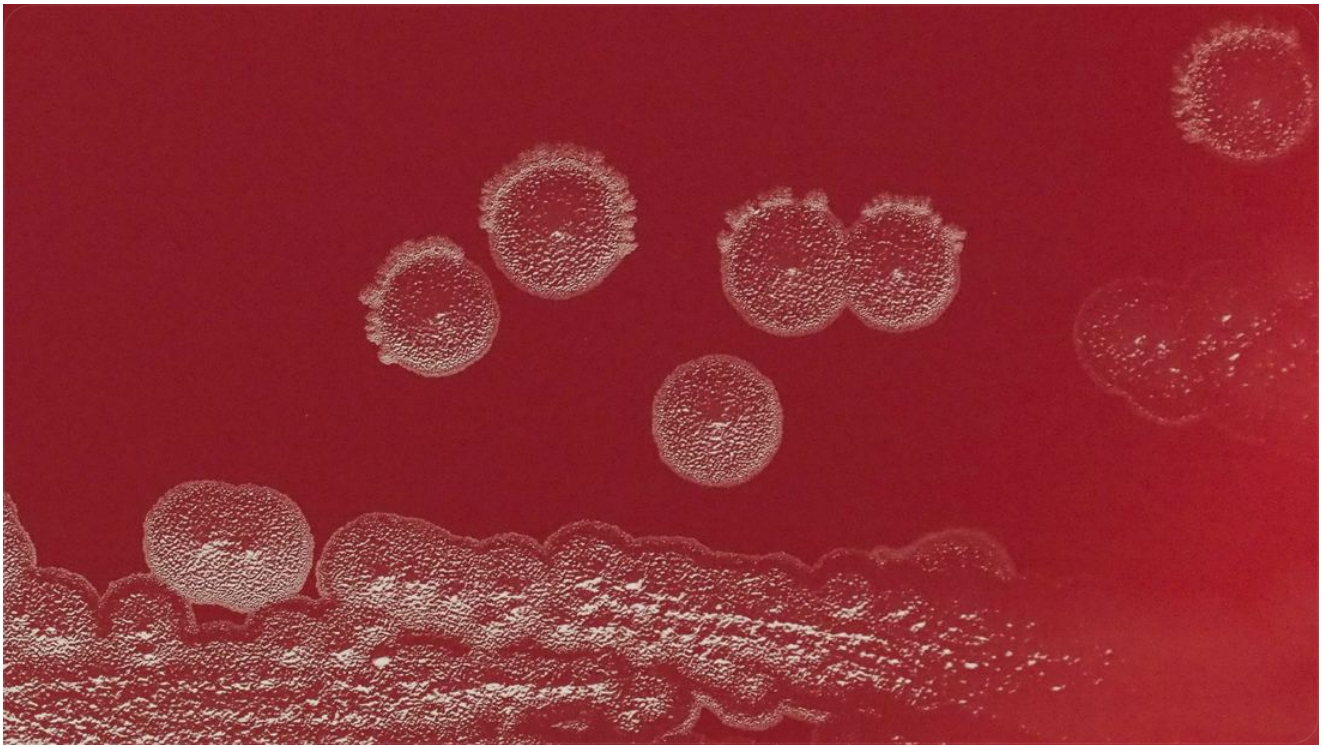


Photo: Masakazu Sasaki

Most treatments for type 2 diabetes work through the body's own chemistry. Drugs or injected insulin persuade cells to absorb more glucose or make less of it. A team from ETH Zurich and the University of Basel, with colleagues at the Instituts Universitaires de Technologie, has tested a different idea in mice: taking glucose out of the blood directly, using electricity. Their device, described in Science in 2026, is called ECHO, short for electrocatalytic closed-loop health optimisation.

Electrocatalysis means using a material that speeds up a chemical reaction when a voltage is applied to it. In ECHO the catalyst is made of tiny clusters of gold atoms decorated with platinum and embedded in graphite felt, a porous carbon fabric. When the implant is switched on, it oxidises glucose in the blood into gluconate, a closely related compound that the kidneys clear from the

body. The authors describe the reaction as selective, meaning it targets glucose, and electrically tunable, meaning its strength can be adjusted through the power supplied. That power is delivered wirelessly.

In mice with type 2 diabetes, the authors report that activating the implant at 0.75 volts and 10 milliamperes, which they describe as low power, restored glucose homeostasis, the body's normal regulation of blood sugar, within 1 hour. Over 6 weeks of treatment, the animals' metabolism is reported to have shifted from relying on glucose towards using fat. Body weight and triglycerides, a type of fat carried in the blood, went down. Circulating free fatty acids and ketone bodies, fuels the body produces when it breaks down fat, went up. The authors say they detected no hypoglycaemia, the dangerously low blood sugar that can accompany diabetes treatment. They also found no adverse physiological, inflammatory or behavioural effects over the treatment period.

The team then linked ECHO to a commercial continuous glucose monitor, a wearable sensor that reads sugar levels around the clock. In this set-up the implant responded to the sensor's readings on its own, under smartphone control. This closing of the loop between measurement and treatment is what lets the authors call the system autonomous. They present it as drug-free management of what they term diabesity, type 2 diabetes combined with the obesity that often accompanies it. According to the paper, the two conditions together affect more than 2.5 billion people and cost nearly $3 trillion a year in health care.

This is an animal study, and the abstract reports results in mice over six weeks only. It does not say how the device would perform in larger animals or in people, how long the catalyst stays active once implanted, or how the approach behaves over longer periods. The authors themselves describe what they managed as experimental diabesity, and the work is best read as a demonstration in a mouse model rather than a treatment.


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| PAPER | *Wireless electrocatalytic closed-loop system for drug-free management of diabesity* |
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