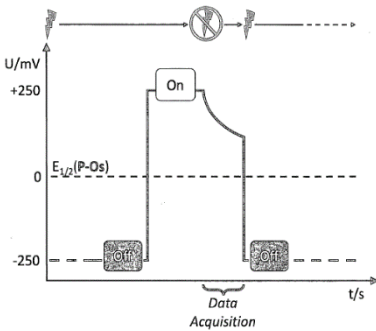


Implantable glucose sensor

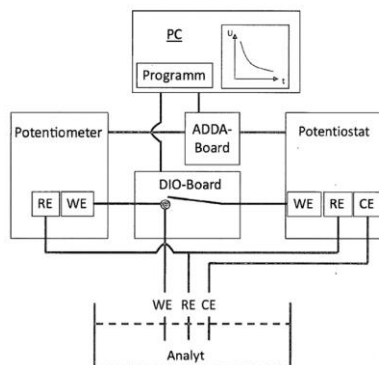
Enzyme-based long-term blood sugar measurement

Invention

Blood sugar monitoring is crucial for those with diabetes or other metabolic disorders. Blood sugar that is too high or too low can cause serious health problems, including cardiovascular disease, nerve damage, and even coma. A safe continuous blood sugar monitoring method that is also easy for patients involves an implanted sensor. Scientists at Ruhr University Bochum have developed a sensor that works reliably in the body despite encapsulation following foreign body reaction. It uses an enzyme-catalyzed detection reaction combined with a measurement at concentration equilibrium.



The sensor's measurement cycle that can be repeated as often as necessary



Schematic sketch of the prospective biosensor for glucose measurement in blood sugar

Relevant Publications

A. Lielpetere, K. Jayakumar, D. Leech, W. Schuhmann, ACS Sens. 8 (2023) 1756-1765. Cross-linkable polymer-based multi-layers for protecting electrochemical glucose biosensors against interferences and biofouling

K. Jayakumar, A. Lielpetere, D. A. Domingo-Lopez, R. E. Levey, G. P. Duffy, W. Schuhmann, D. Leech, Biosens. Bioelectron. 219 (2023) 114815. Tethering zwitterionic polymer coatings to mediated glucose biosensor enzyme electrodes can decrease sensor foreign body response yet retain sensor sensitivity to glucose

A. Muhs, T. Bobrowski, A. Lielpetere, W. Schuhmann, Angew. Chem. Int. Ed. 61 (2022) e202211559. Catalytic biosensors operating under quasi-equilibrium conditions for mitigating the changes in substrate diffusion. Angew. Chem. 134 (2022) e202211559. Quasi-Gleichgewichtsbedingungen verringern den Einfluss der Substratdiffusion bei katalytischen Biosensoren

An invention from Ruhr University Bochum.

Among the sensor's components are a microelectrode coated with a bioactive catalytic film and an oxygen-resistant enzyme as an active site. The enzymatic reaction is initiated with a short voltage pulse.

Commercial Opportunities

Continuous glucose measurement systems relieve patients of the responsibility of constant blood sugar level monitoring, which is automated. Since the sensor is implanted, patients can avoid the unpleasant sensation of their skin being pierced. The prospective biosensor for automated blood sugar measurement has the advantage of delivering very reliable results. It requires no recalibration, even when encapsulated after a foreign body reaction.

Current Status

It has been registered with the German Patent and Trade Mark Office, and a PCT patent has been applied for. Patents for other nations can be applied for by the relevant deadlines. On behalf of Ruhr University Bochum, we are offering interested companies the opportunity to license this technology and jointly refine it.

Competitive Advantages

- High measurement frequency
- Easy patient use
- Sensor encapsulation for high precision
- Resistance to environmental changes

Technology Readiness Level

123456789

Technology validated in lab

Industries

- Medical technology
- Biotechnology

Ref. No.

6372

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