Overview of a Novel Sensor for Continuous Glucose Monitoring

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Abstract

The core element of a continuous glucose monitoring (CGM) system is the glucose sensor, which should enable reliable CGM readings in the interstitial fluid in subcutaneous tissue for a period of several days. The aim of this article is to describe the layout and constituents of a novel glucose sensor and the rationale behind the measures that were used to optimize its performance. In order to achieve a stable glucose sensor signal, special attention was paid to the sensor materials and architecture, i.e., biocompatible coating of the sensor, limitation of glucose flux into the working electrode, low oxidation potential by use of manganese dioxide, and a tissue-averaging sensor design. A series of in vitro and in vivo evaluations showed that the sensor enables stable and accurate glucose sensing in the subcutaneous tissue for up to 7 days. Parallel measurements with four sensors in a single patient showed a close agreement between these sensors. In summary, this high-performance needle-type glucose sensor is well suited for CGM in patients with diabetes.


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Abbreviations: (BG) blood glucose, (CGM) continuous glucose monitoring, (ISF) interstitial fluid

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