

Fluorescent hydrogel sensors for continuous glucose monitoring

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Continuous glucose monitoring system (CGMS) with implanted sensors allows diabetic patients to effortlessly recognize changes in blood glucose concentration and signals a warning in the case of high and low blood glucose concentrations, even when diabetic patients are sleeping. Thus, CGMS can effectively prevent diabetic complications that are caused by high and low blood glucose concentration. But, their full potential has yet to be realized. We immobilized the fluorescent-glucose-sensors in a polyacrylamide hydrogel fiber with polyethylene glycol (PEG). The fiber-shaped sensor was injected under the skin, and remained in an implantation site. In addition, the fibers were removed after use to minimize potential side effects. PEG-bonded sensors under the skin induced mild inflammation and glowed through the skin longer compared to sensors without PEG. The implanted sensors under the ear skin of mice transdermally glowed, and the fluorescence intensity of the sensors tracked the change in blood glucose levels for up to 140 days after implantation, showing the potential of CGM for people with diabetes.