

Non-Invasive, Low Cost, Portable Glucose Monitoring System

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Technology description

Methods and apparatus for creating a portable non-invasive glucose monitoring system, which includes a sensing solution containing specially-designed nanoparticles sensitive to very minute changes in glucose level.

Researchers at the University of Central Florida have designed a non-invasive method of sensing glucose in bodily fluids. Diabetes mellitus is the sixth-leading cause of death in the U.S. It is a medical disorder characterized by persistent variable hyperglycemia (high blood sugar levels), resulting from inadequate secretion of the hormone insulin, inadequate response by the body's cells to insulin, or a combination of both of these factors. In the past few decades, many different glucose sensors have been developed. Current glucose sensors and methods include near-infrared spectroscopy, optical rotation, enzymatic assays, fluorescence detection, and many others. However, none of these sensors is fully non-invasive, most requiring a blood sample.

Technical Details

The invention provides a non-invasive method of sensing glucose in bodily fluids. Such fluids include blood, saliva, urine, and tears. The sensor determines glucose concentration based upon the interaction of the bodily fluids with nanoparticles and metal salts present in the sensing solution. This solution is stored in a small cell (sample container), into which the bodily fluid is introduced. The absorbance spectrum of this mixture is then measured using a UV spectrometer, which can be as small as a cell phone. The fluid's interaction with the sensing solution produces a change in the solution's absorption spectrum, which can then be correlated to the glucose levels present in the blood.

Application area

Highly sensitive monitoring of glucose levels in the various bodily fluids

This sensing solution in conjunction with an extremely small, portable detector provides a simple, low-cost and non-invasive means of monitoring glucose levels in the blood. In addition, by using this method, potential diabetic problems can be detected before diabetes has been diagnosed.

Advantages

Non-invasive, non-painful means of monitoring glucose levels in the blood

Reliable method requiring small samples for monitoring, such as a few tears

Low-cost portable detector

Institution

[University of Central Florida](#)

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