In Vivo Near-Infrared Spectroscopy of Rat Skin Tissue With Varying Blood Glucose Levels

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Technology description

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Researchers at the University of Iowa have developed a net analyte calibration model that serves to decrease background noise present in an infrared absorption or reflection spectrum. This method has been shown to effectively remove non-specific signals from an infrared spectrum, thus providing a less-distorted reading for the target analyte in a mixed solution. This technology has been applied to the in vivo measurement or near-infrared rat skin absorption in the 4000 - 5000 cm-1 spectral range to detect glucose-specific spectral data. Using this device, investigators were able to conclusively identify changes in glucose concentration ranging from 10mM to 30mM.

Background

The accurate, reproducible, real-time measurement of specific analytes present in biological fluids would provide physicians with the most-relevant and useful information on which to base treatment decisions. This type of analysis would prove particularly valuable for the measurement of glucose, important in diabetes maintenance, but could also be applied to other physiologically-relevant compounds, such as urea, lactate, triglycerides, cholesterol, etc.

Advantages

PHYSIOLOGICALLY-RELEVANT. The calibration established eliminates the signal noise that is associated with biological systems and has hampered the development of this type of technology for medical applications.

IMPROVED SPECIFICITY OF SIGNAL. This process eliminates much of the signal noise associated with sensitive analyte detection in unknown solutions. The result is a substantially improved specific analyte measurement.

REAL-TIME MEASUREMENT. The infrared-based reading enabled by this method, provides up-to-second analyte data.

APPLICABLE TO MANY ANALYTES. The background spectra can be specifically eliminated for the detection of most any medically-important analyte.

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