Non-invasive device for measuring compounds and dissolved gasses in biological tissue using infrared absorption/reflection spectroscopy

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Technology description

Researchers in the Department of Electrical Engineering and the MIRTHE Research Center, Princeton University have developed an eye-safe device that allows for non-invasive measurements of dissolved gasses and compounds in a patient¿s blood and tissue. Operating similar to a pulse-oximeter, health care practitioners (and patients in-home) can monitor biological compounds and gasses such as carbon dioxide, acetone, and potentially glucose. Current methods of monitoring such compounds rely on the drawing and analysis of blood samples. This device uses eye-safe lasers and a portable package to monitor concentrations of these important compounds quickly and inexpensively.
Similar to a pulse oximeter, the device can be made hand-held for home, outpatient, or hospital use. This technology is robust, and can be used to measure multiple other compounds and gasses including dissolved sugars and ammonia. Present technologies do not allow for the measurement of the concentration of dissolved gasses in the blood. Pulse-oximeters only measure the ratio of oxygenated to deoxygenated hemoglobin in the blood. The ability to measure exact concentrations of dissolved gasses will provide physicians with additional information when analyzing patients' health. This inexpensive and fast method of monitoring could decrease the cost and increase the effectiveness of home glucose monitoring.
Currently no existing commercial technologies can provide non-invasive sensitive and selective measurements of dissolved blood gasses. A prototype device using quantum cascade laser light sources tuned on and off the CO2 resonance has been built and is being characterized and tested.

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