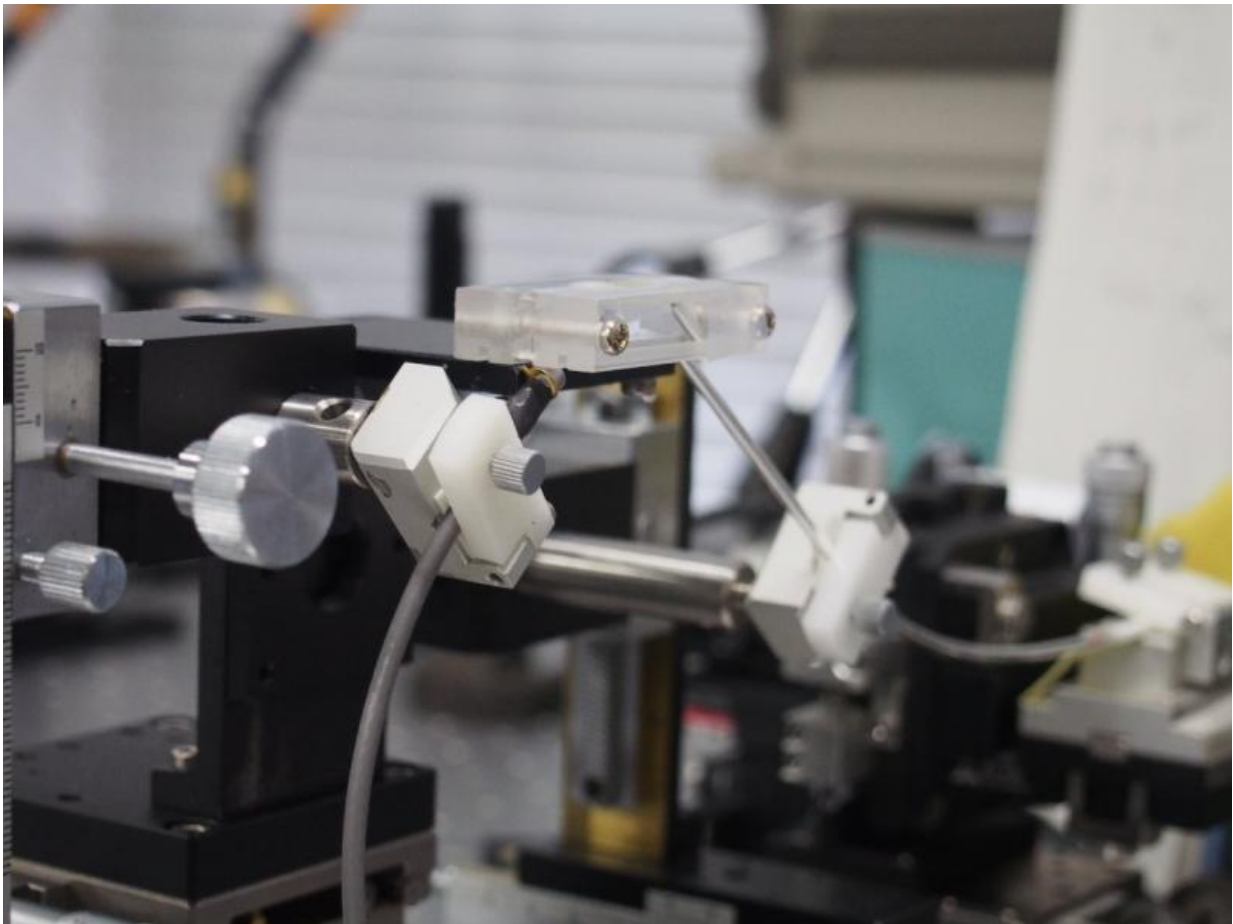


Invasive measurement of blood glucose no longer necessary

February 4 2016



Researchers have developed a method of measuring blood glucose using far infrared light. Credit: Yuji Matsuura

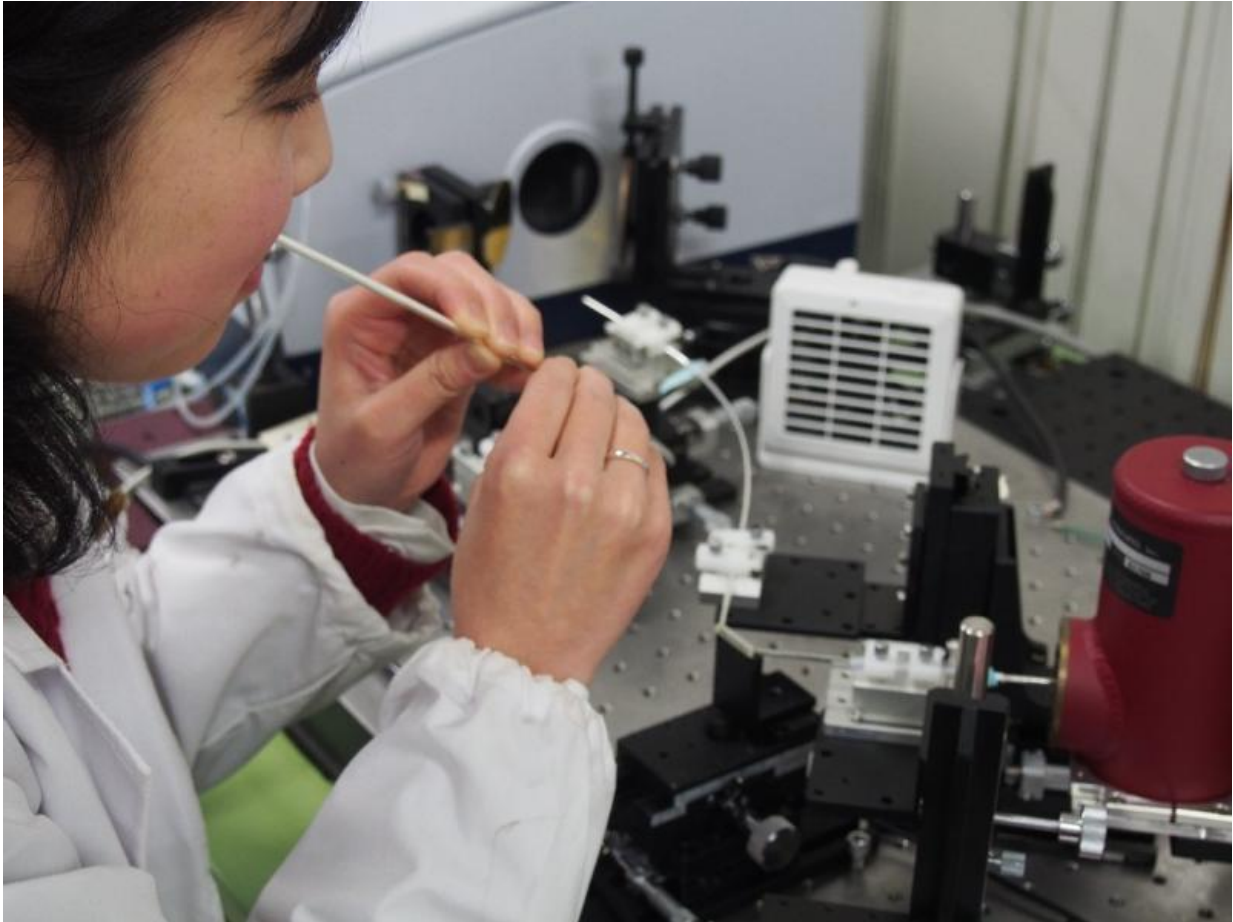
A group of researchers, led by Prof. Yuji Matsuura of Tohoku University's Graduate School of Biomedical Engineering, has developed a method of measuring blood glucose using far infrared light, which is both harmless and non-invasive.

Diabetes patients traditionally monitor their daily [blood glucose](#) levels by using a conventional meter which requires blood sampling from the finger tips. The discomfort of pain and risk of infection can sometimes be a source of great stress and concern.

To address that, other researchers have proposed and developed non-invasive methods for glucose measurement using near infrared light. This [method](#) works on the premise that near infrared light of some specific wavelengths are selectively absorbed by glucose in the blood.

However, accurate and stable measurement using this method has proven difficult because the near infrared light is not only weakly absorbed by glucose, but also by water, protein and hemoglobin.

In contrast, far infrared light with wavelengths of around 10 micron is strongly absorbed by glucose, making it possible, in theory, for patients to get more sensitive and accurate measurements. However, the problem faced by researchers, is that far-infrared light penetrates only a few microns from the skin's surface, which makes the detection of blood glucose difficult.



Using a small prism, it is possible to irradiate the oral mucosa of inner lips.
Credit:

Prof. Matsuura's team has thus developed a new measurement technique that consists of a small prism attached to the ends of flexible hollow-optical fibers to radiate far [infrared light](#). By using this method, it is possible to irradiate the oral mucosa of inner lips that, unlike skin, have no thick horny layer.

Results from experiments show [blood glucose levels](#) sensitively detected and accurately measured with a less than 20% margin of error, which Prof. Matsuura believes is good enough for clinical uses.

Diabetes is a serious problem that affects millions of people worldwide. By combining the new method with far infrared lasers that have recently been developed, Prof. Matsuura expects compact and low-cost blood glucose measurement systems to soon be widely used in clinical fields.

Provided by Tohoku University

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