

A non-invasive way of monitoring diabetes

April 16 2020

Saliva could be used instead of blood to monitor diabetes in a method proposed in research involving the University of Strathclyde.

The test has been developed as an alternative to the current prevalent practice of monitoring [blood glucose](#), which can be invasive, painful and costly.

Lab tests of the saliva process had an accuracy rate of 95.2%. The research shows promising results for monitoring diabetes, which affects an estimated 425 million people worldwide—around half of them undiagnosed.

The research has been published in the journal *PLOS ONE*. It also involved partners at the Federal University of Uberlandia in Minas Gerais, Brazil, the University of Vale do Paraíba in Sao Paolo, Brazil and the University of Saskatchewan in Canada.

Dr. Matthew Baker, a Reader in Strathclyde's Department of Pure and Applied Chemistry and lead researcher in the project, said: "Frequent monitoring of diabetes is essential for improved glucose control and to delay clinical complications related to the condition. Early screening is also paramount in reducing these complications worldwide.

"Blood analysis for screening, monitoring and diagnosing diabetes is widely practised but is quite invasive and painful. The constant need of piercing the fingers several times daily for most patients may lead to the development of finger calluses, as well as difficulty in obtaining [blood](#)

[samples](#); furthermore, not everyone would want to give [blood](#) and there are circumstances in which it could be dangerous.

"Saliva reflects several physiological functions of the body, such as emotional, hormonal, nutritional and metabolic, and so its biomarkers could be an alternative to blood for robust early detection and monitoring. It is easy to collect, non-invasive, convenient to store and requires less handling than blood during clinical procedures, while also being environmentally efficient. It also contains analytes with real-time monitoring value which can be used to check a person's condition."

Dr. Robinson Sabino-Silva, an associate professor at Federal University of Uberlandia (UFU) and a partner in the research, said: "The present protocol used in the infrared platform is able to detect spectral biomarkers without reagents. The combination of a non-invasive salivary collection and a reagent-free analysis permit us to monitor diabetes with a sustainable platform classified as [green technology](#)."

The lab tests used a scientific system known as Attenuated total reflectance Fourier transform infrared (ATR-FTIR) spectroscopy. This has been used in the diagnosis of several diseases, although its applications in the monitoring of diabetic treatment have begun to emerge only recently. Samples were assessed in three categories—diabetic, non-diabetic and insulin-treated diabetic—and two potential diagnostic biomarkers were identified.

The researchers are hopeful that the process they have developed could be used for both Type 1 and Type 2 [diabetes](#), although further study will be required to confirm this.

More information: Douglas C. Caixeta et al, Salivary molecular spectroscopy: A sustainable, rapid and non-invasive monitoring tool for diabetes mellitus during insulin treatment, *PLOS ONE* (2020). [DOI](#):

[10.1371/journal.pone.0223461](https://doi.org/10.1371/journal.pone.0223461)

Provided by University of Strathclyde, Glasgow

Citation: A non-invasive way of monitoring diabetes (2020, April 16) retrieved 8 May 2024 from <https://medicalxpress.com/news/2020-04-non-invasive-diabetes.html>

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