

Study shows skin autofluorescence can predict type 2 diabetes, cardiovascular disease and death

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New research published in *Diabetologia* (the journal of the European Association for the Study of Diabetes [EASD]) shows that non-invasive

measurement of skin autofluorescence (SAF) can predict future risk of type 2 diabetes, cardiovascular disease (CVD) and mortality, independent of other measures such as measuring blood glucose levels.

This quick, non-invasive technique could be potentially used in non-medical settings or public locations such as supermarkets, pharmacies or drug stores as a first estimate of risk of these conditions, says study lead author Professor Bruce Wolffenbuttel, Department of Endocrinology, University of Groningen, University Medical Center Groningen, Netherlands, and colleagues.

The worldwide prevalence of type 2 [diabetes](#) is increasing rapidly; it is predicted to be close to 650 million in 2040. Cardiovascular complications are the main drivers of increased morbidity and premature mortality in diabetes. Several risk factors, such as obesity and fasting blood glucose, predict the development of type 2 diabetes and CVD.

More recent research has shown that patients with type 2 diabetes have higher levels of chemicals called advanced glycation end-products (AGEs). Such patients also exhibit higher levels of skin autofluorescence, due to the build-up of some AGEs that fluoresce in the skin. In this study, the authors assess whether SAF was able to predict the development of type 2 diabetes, CVD and mortality in the general population.

For this prospective analysis, the authors included 72880 participants of the Dutch Lifelines Cohort Study, who underwent baseline investigations between 2007 and 2013, had validated baseline skin autofluorescence values available, and were not known to have diabetes or CVD.

Individuals were diagnosed with incident type 2 diabetes by self-report or by a fasting blood glucose ≥ 7.0 mmol/l or HbA1c ≥ 48 mmol/mol ($\geq 6.5\%$) at follow-up. Participants were diagnosed as having incident

CVD by self-report. CVD includes myocardial infarction, coronary interventions, cerebrovascular accident, transient ischaemic attack, intermittent claudication or vascular surgery. Mortality was ascertained using the Dutch Municipal Personal Records Database.

The AGE Reader has a [light source](#) which illuminates the tissue of interest. This light excites fluorescent moieties in the tissue, and these will reflect the light with a different wavelength as a result. In the wavelength band used for this study, the major contribution in fluorescence comes from fluorescent AGEs. The emitted light was detected with the use of a spectrometer or photodiodes.

After a median follow-up of 4 years (range 0.5-10 years), 1056 participants (1.4%) had developed type 2 diabetes, 1258 individuals (1.7%) were diagnosed with CVD, while 928 (1.3%) had died. Baseline skin autofluorescence was higher in participants with incident type 2 diabetes and/or CVD and in those who had died compared with individuals who survived and remained free of either disease.

As a single measurement, a 1-unit higher skin autofluorescence was associated with a 3-fold increase in risk of type 2 diabetes or CVD, and a five times increased risk of death. The predictive value of skin autofluorescence for these outcomes was independent of several traditional [risk factors](#), such as obesity, metabolic syndrome, glucose and HbA1c, and, after adjustment for these factors, a 1-unit higher SAF was associated with a 26%, 33% and 96% increased risk for T2D, CVD and mortality, respectively.*

The authors say: "This is the first prospective study to examine SAF as a predictor for type 2 diabetes, CVD and mortality in the general population."

They add: "Our study supports the clinical utility of SAF as a first

screening method to predict type 2 diabetes, CVD and mortality. Other risk indicators, such as presence of the [metabolic syndrome](#), require more extensive measurements...The quick, non-invasive measurement of [skin](#) autofluorescence may even allow use in non-medical settings or public locations such as supermarkets, pharmacies or drug stores as a first estimate of risk."

More information: Robert P. van Waateringe et al. Skin autofluorescence predicts incident type 2 diabetes, cardiovascular disease and mortality in the general population, *Diabetologia* (2018). DOI: [10.1007/s00125-018-4769-x](https://doi.org/10.1007/s00125-018-4769-x)

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