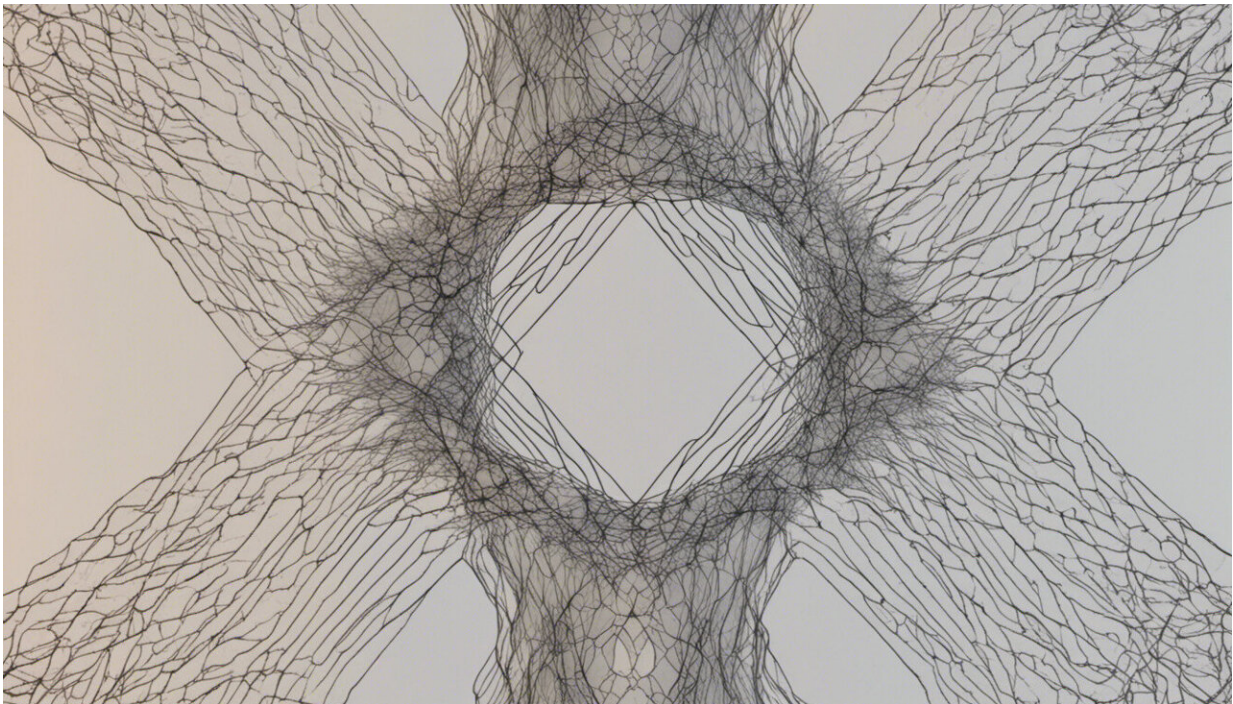# New method identifies type 2 diabetics at risk of early death

March 26 2018, by Laura Kofoed Kjær

Credit: AI-generated image (disclaimer)

When you hear the phrase 'adult-onset diabetes', your first thought might be of excessive blood sugar levels and obesity. Picturing an adult carrying extra weight around his or her waist, and who follows an unhealthy lifestyle.

But adult-onset [diabetes](#), or type 2 diabetes, is also associated with [early death](#) when compared with otherwise healthy people, and with numerous complications that reduce quality of life in later years.

Type 2 diabetics often die of [cardiovascular disease](#). Nothing new about that. For many years, [treatment](#) has focused on [blood sugar levels](#). A common sense approach, but there is a catch—or maybe a few.

Blood sugar is not the best indicator of whether someone suffering from type 2 diabetes is at high risk of an early death due to cardiovascular disease. And controlling blood sugar is just as difficult as keeping your fingers away from the cookie jar.

A [urine sample](#) on the other hand, could reveal what doctors need to know to identify these high risk [patients](#).

A condition report for the body

Our research shows that a new analytical method using a urine sample can identify patients at high risk of an early death by cardiovascular disease and hopefully intercept that patient's treatment.

Our method supplements those already in use in treating type 2 diabetes.

Today, we take a broad approach to treatment, since research has shown that patients are more likely to survive when we tackle a range of factors all at once, and not just one treatment targeted at reducing [blood sugar](#).

This might sound surprising, but remember that type 2 diabetes is a multi-organ disease, which affects both large and small vessels. In particular, the eyes, kidneys, nerves, feet, and heart.

So we need more than one marker in order to fine-tune the treatment.

Some can provide a specific condition report on the various organs; others can provide a whole-body measurement. Our method covers all cells, and the urine analysis gives a kind of condition report for the entire body, including the risk of death.

Credit: AI-generated image (disclaimer)

A urine sample with potential

You may have heard about damaged DNA, but fewer people may have heard of RNA before. RNA is almost a copy of DNA, which is divided in our cells. But RNA is not as protected as DNA.

To start with, it does not have the same defense mechanisms to repair damage and is not protected inside the core of the cell. We think that

this could explain the differences that we observe between DNA- and RNA-oxidation.

Our research shows that damaged RNA is an important factor for mortality in type 2 diabetics. Specifically, oxidative RNA damage, which reflects an altered equilibrium between pro-oxidative and anti-oxidative mechanisms in the cells. Or to put it another way, a disturbance between damaging and protective mechanisms, which includes modification of RNA. We call this increased RNA oxidation.

In our recently published study, we show that patients with increased RNA oxidation die significantly earlier, and that we can identify this in urine samples.

The same was true when we looked specifically at patients that die of cardiovascular disease.

Our previous research shows the same for both patients with newly diagnosed and long-term type 2 diabetes.

From crystal ball to treatment

We hope that this method can help to allocate patients in more targeted treatment groups, where they receive medicine targeted directly for their needs—personalised medicine.

We believe our method is useful precisely because type 2 diabetes is a multi-organ disease, which reflects all of the body's cells to identify high risk patients.

The next step is to find treatments to reduce RNA oxidation so that we can help those patients and not only give them a prognosis of early death in their time horizon.

Our group is already working on randomised trials where we assign patients randomly into two groups: a treatment group and a control. We are measuring RNA oxidation before and after an intervention period and calculate whether there is a difference between the two groups. We do not yet have any results to share, but hopefully it will lead to better treatments than those we can offer today.

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