

Simple, cheap C-peptide helps patients get the right diabetes diagnosis and treatment

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A simple and inexpensive test to measure the body's insulin levels is helping clinicians to determine what type of diabetes a patient has, meaning many people with diabetes can change treatment.

This test has meant many more patients with diabetes are getting the right diagnosis of the type of diabetes they have, and is the focus of sessions at the Diabetes UK Professional Conference in Liverpool on Thursday, March 7.

Researchers at the University of Exeter Medical School have developed simple and inexpensive ways to measure C-peptide and have demonstrated that this test can show what [treatment](#) will be most effective for people with diabetes. Clinicians at the Western General Hospital in Edinburgh have used the new test on every person thought to have type 1 diabetes for over three years in their clinic and shown that some actually have other types of diabetes and can stop insulin treatment.

C-peptide is produced at the same time and in the same quantities as the insulin that regulates our [blood sugar](#). By measuring C-peptide levels, doctors can now tell how much insulin a person is producing themselves, even if they are taking insulin injections as treatment.

The Exeter team has developed a new urine test for C-peptide, and shown that a simple blood test when a person is seen in clinic can also accurately measure C-peptide, replacing previous methods which were expensive and time-consuming. These tests are now available in nearly every hospital in the UK, and cost as little as £10.

The team demonstrated how urine and blood C-peptide can be used to robustly identify what type of diabetes a person has, and help identify what treatment will work for them. This is crucial to getting the right treatment, education and follow-up care. By offering this test to people thought to have Type 1 diabetes in their clinic, the Edinburgh researchers have shown that many have high C-peptide, raising the possibility of other types of diabetes. Some of these patients have been able to stop insulin and switch to tablet treatment. This testing also

revealed that in some of these patients, the diabetes had a genetic cause, which is important both for treatment and for other people in their families.

The [new test](#) is already available in most NHS trusts, and is now offered to everyone diagnosed as Type 1 diabetes for at least 3 years in Glasgow and Edinburgh.

Professor Mark Strachan, from Western General Hospital, Edinburgh, said: "We have now measured C-peptide in over 750 people with a clinician-diagnosis of Type 1 diabetes, attending our clinic at the Western General Hospital. So far, we have made a new diagnosis of genetic diabetes in eight people, and changed the diagnosis to Type 2 diabetes in 28 other people. This has allowed us to make changes to treatment in many of these individuals and in 12 people we have actually been able to stop insulin therapy."

Dr. Tim McDonald, of the University of Exeter Medical School, said: "Getting the right diagnosis in diabetes is absolutely key to achieving the best treatment outcomes and avoiding complications. We've shown that C-peptide is cheaper, more accurate and easier to use than previous methods. It's really gratifying to see this making a difference to improving patient health already. My lab alone has received 7,000 test samples in the past 12 months."

Dr. Angus Jones, from the University of Exeter Medical School, said: "It can be highly challenging for clinicians to differentiate between type 1 and type 2, and a number of genetic sub-types of diabetes. Up to 15 per cent of insulin treated patients are misdiagnosed. This figure soars to 40 per cent of people developing type 1 diabetes after age 30, as identifying type 1 diabetes at this age is very difficult. Treatment for these is very different, which is why being able to confirm if a person has the right diagnosis is so important. For example people with type 1 diabetes need

lifelong insulin injections and become very unwell without this treatment, but most people with type 2 and genetic subtypes of diabetes can be effectively treated with tablets. By measuring C-peptide in a person receiving insulin treatment we can make sure they have the right diagnosis, and therefore the best treatment for them."

Dr. Emily Burns is Head of Research Communications at Diabetes UK. She said:

"Getting the right diagnosis of diabetes is so important, it means people will receive the right treatment for them and could avoid serious complications. But different forms of diabetes can be difficult to accurately diagnose. Researchers at the University of Exeter are leading the way in improving how we diagnose diabetes, and in making tests more widely available, to make sure as many people as possible can benefit."

The team's research also shows that C peptide testing is practical in clinics. They identified optimal storage conditions for the samples, which were previously thought to be unstable, so sample collection is now much easier. They showed that using a specific preservative means that blood C-peptide is stable for more than 24 hours. For the first time, this means it is viable to conduct a test to be measured in primary care and outpatient clinics. This evidence together removed crucial barriers to implementation that had previously blocked widespread adoption of this test in routine clinical care.

The group also demonstrated how urine and blood C-peptide can be used to robustly identify the correct sub type of diabetes, which is crucial to getting the right treatment and follow-up care. They have shown that C-peptide can be used as a cheap and convenient test to identify children and young adults with a genetic form of diabetes that requires expensive genetic testing to confirm the diagnosis.

The team has undertaken clinical studies to show that C-peptide is an important predictor of how well a drug works in individual patients to specific diabetes drugs. C-peptide is able to stratify response to an expensive therapy in insulin-treated diabetes meaning the [test](#) can identify individuals who will not benefit from this drug.

The research also demonstrated that low C-peptide is associated with higher glucose variability, meaning a greater risk of hypoglycaemia in patients with [insulin](#)-treated type 2 [diabetes](#).

Provided by University of Exeter

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