

Early signs in young children predict type 1 diabetes

26 February 2015

New research shows that it is possible to predict the development of type 1 diabetes. By measuring the presence of autoantibodies in the blood, it is possible to detect whether the immune system has begun to break down the body's own insulin cells.

"In the TEDDY study we have found that autoantibodies often appear during the first few years of life", said Professor Åke Lernmark from Lund University, who is leading the study in Sweden.

The TEDDY study, funded by the US National Institutes of Health (NIH), involves 8 600 children from Sweden, the US, Germany and Finland. The children have an increased hereditary risk of [type 1 diabetes](#), detected at birth through tests on blood from the umbilical cord. TEDDY stands for "The Environmental Determinants of Diabetes in the Young".

Antibodies are part of the body's immune system and the presence of antibodies in the blood is a sign that the immune system has reacted to an intruder such as a virus or a bacteria. Sometimes, the immune system mutinies and attacks the body. Autoantibodies are a sign of an autoimmune disease and form markers indicating that an attack is underway, for example on the body's own [insulin](#) cells.

The new findings from the TEDDY study have been published in the journal *Diabetologia* and show that there are three ways to predict the development of type 1 diabetes.

Three ways to predict development of type 1 diabetes:

1. If the autoantibody first discovered attacks insulin (IAA)

In Sweden this usually takes place at the age of 18 months. However, in the study as a whole most

babies affected were less than a year old.

"If a second autoantibody is detected later, then the person will get diabetes – but it may take up to 20 years", said Åke Lernmark.

2. If the first autoantibody targets GAD65 (GADA), a protein inside the insulin-producing cells

In Sweden this usually happens at the age of two and half, whereas in the study as a whole it was most common at the age of two.

3. If both autoantibodies are first found together

"In TEDDY, 40 per cent of these children had already developed diabetes", said Åke Lernmark

Of the participating children, 6.5 per cent had their first autoantibody before the age of six.

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- In 44 per cent of cases, they only had an autoantibody against insulin (IAA). Most of them had this by the age of 1–2.
- žIn 38 per cent of cases, GAD65 autoantibodies (GADA) were detected. The numbers increased until the age of two and then remained constant.
- žIn 14 per cent of cases both autoantibodies were found at the same time, with a peak at the age of 2–3.

The hereditary risk of type 1 [diabetes](#) determined which [autoantibody](#) the children had. However, it is still not known what causes the [immune system](#) to start attacking the body's own insulin cells to start with. One theory is that a viral infection could be the trigger.

"It is possible that there are two different diseases involved. Perhaps one virus triggers the

autoantibodies against insulin and another one the autoantibodies against GAD65", said Åke Lernmark.

More information: "The 6 year incidence of diabetes-associated autoantibodies in genetically at-risk children: the TEDDY study" *Diabetologia*, February 2015

Provided by Lund University

APA citation: Early signs in young children predict type 1 diabetes (2015, February 26) retrieved 12 October 2022 from <https://medicalxpress.com/news/2015-02-early-young-children-diabetes.html>

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