

New evidence for the role of a specific virus causing type 1 diabetes

October 22 2013

Type 1 diabetes is a disease caused by the destruction of the insulin-producing cells in the pancreas. It is often diagnosed in childhood and requires life-long treatment with daily insulin injections. It is associated with an increased risk for long-term complications which decrease the quality of life and average life-expectancy.

Currently around 15 million people in the world are affected by this disease, and the number of new cases is rapidly increasing. This rapid increase over the last decades indicates that environmental factors must play an important role in the disease process. Viral infections have been among one of the suspected factors, since many viruses cause [diabetes](#) in animals by damaging the insulin-producing cells in the pancreas. Some of them have also been linked to human [type 1 diabetes](#) raising the possibility of developing vaccines against these viruses to prevent some of the new cases of type 1 diabetes.

Recently, considerable progress has been made in studies evaluating the possible role of one virus group, called enteroviruses, which have been connected with human type 1 diabetes in a variety of reports. These viruses are common in children, and more than 100 different enterovirus types have been identified in man. A subset of these enteroviruses can cause serious illnesses such as; myocarditis, meningitis, the hand-food-and -mouth disease as well as paralytic disease such as polio. Although the association between type 1 diabetes and enteroviruses has been observed in various studies, until now it was not known which enterovirus types are most responsible for this effect.

Now, for the first time, a group of collaborating investigators have published results from two studies in the leading scientific diabetes journal *Diabetes* identifying the enterovirus types which are associated with type 1 diabetes. One study is based on children taking part in the Finnish Type 1 Diabetes Prediction and Prevention (DIPP) study, which is a birth cohort study observing children at genetic risk for type 1 diabetes from birth up to [clinical diabetes](#) or 15 years of age.

The other study (VirDiab) included children with newly diagnosed diabetes from five European countries. The results from these studies clearly show that members of the group B coxsackieviruses are associated with the risk of type 1 diabetes while the 35 other enterovirus types tested did not show such a connection. These findings are in line with other recent reports suggesting that group B coxsackieviruses can spread to the pancreas and damage the insulin-producing cells.

This new discovery, funded by multiple groups, opens up novel possibilities for future research aimed at developing vaccines against these viruses to prevent type 1 diabetes. Since the group B coxsackieviruses includes only six enterovirus types it may be possible to include all of them in the same vaccine. Effective vaccines have been available for a long time against another enterovirus group, called polioviruses, which includes three enterovirus types.

There is a clear need for a diabetes vaccine since no preventive treatments are currently available for type 1 diabetes. Based on the recent findings, it is estimated that such a vaccine could have the potential for preventing a significant proportion of new cases with type 1 diabetes. More research is needed however to confirm the causal relationship between group B coxsackieviruses and type 1 diabetes and to find out the underlying mechanisms of how these [viruses](#) can initiate the type 1 diabetes disease process.

Provided by Academy of Finland

Citation: New evidence for the role of a specific virus causing type 1 diabetes (2013, October 22) retrieved 17 April 2024 from <https://medicalxpress.com/news/2013-10-evidence-role-specific-virus-diabetes.html>

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