Study suggests treatment with antiviral drugs could preserve beta cell function in children newly diagnosed with type 1 diabetes

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New research to be presented at this year's Annual Meeting of the European Association for the Study of Diabetes (EASD) in Hamburg, Germany (2-6 October), and pubished in the journal *Nature Medicine* shows that, among children newly diagnosed with type 1 diabetes (T1D), treatment with antivrial drugs could help preserve the function of the insulin-producing beta cells of the pancreas, which normally malfuction and die during this condition.

The study is by Dr Ida Maria Mynarek, and Principal investigator is Professor Knut Dahl-Jørgensen, Oslo University Hospital, Oslo, Norway, and colleagues. The study is affiliated with the INNODIA consortium (www.innodia.eu)

Type 1 diabetes (T1D) is normally diagnosed during childhood, although there are also many reports of it being diagnosed across adulthood. What is thought to be an autoimmune 'cascade' means the body attacks its own beta cells and destroys its capacity to produce insulin – leaving people with the condition dependent on insulin for the rest of their lives. No cure exists for T1D.

Previous epidemiological studies have shown a clinically significant association between enterovirus infection and onset of clinical diabetes and this research team from Oslo and laboratory partners have detected a low-grade enterovirus infection in the pancreatic islets of patient with newly diagnosed T1D. The aim of this study was to determine the effect of antiviral treatment with the combination of pleconaril and ribavirin on beta cell function in children and adolescents from onset of T1D.

In this phase-II, placebo-controlled, double-blind, parallel-group trial, 96 children (6-15 years) were randomly assigned to receive oral antiviral treatment (pleconaril and ribavirin) (n=47, 19 females) or placebo (n=49, 21 females) for 6 months, started less than 3 weeks after diagnosis of T1D (baseline).

The primary endpoint was residual endogenous insulin production at 12 months, measured by area under the concentration-time curve (AUC) for C-peptide level in response to a 2-hour mixed-meal tolerance test (MMTT). C-peptide levels exactly mirror the insulin production in the pancreas.

At 12 months, C-peptide AUC was significantly higher in the antiviral group than in the placebo group. The level decreased 24% in the placebo group, and only 11% in the treatment group. The data showed that 86% of the participants in the treatment group and 67% in the placebo group had maximal C-peptide > 0.2 pmol/mL (p=0.04) at 12 months. Levels above this cut-off signify a residual insulin production being important because it makes it easier to treat the patient with insulin. It has also been shown to reduce long term complications of diabetes."

There were no significant differences regarding glycated haemoglobin (a measure of blood sugar control), glycated albumin, insulin dosage, severe hypoglycaemic events or adverse events at 12 months. The treatment was safe and no severe events occurred.

The authors say: **"**Among children with newly diagnosed type 1 diabetes, a 26-weeks course with two antiviral drugs partially preserved stimulated C-peptide secretion 12 months after

diagnosis and a higher proportion of participants with clinically relevant preserved C-peptide secretion than placebo.

“These results provide a rationale to find optimal antiviral drugs to be used alone, or as part of combination treatment regimens, to rescue insulin producing beta-cells at diagnosis of type 1 diabetes. Further studies should be done at an earlier stage in the disease process to evaluate whether antiviral treatment could delay the progression of beta-cell damage leading to clinical type 1 diabetes. This study supports that a low-grade persistent virus infection is an underlying disease mechanism, and that type 1 diabetes may be prevented by development of new vaccines.”

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The authors declare no conflict of interest.

This press release is based on oral presentation 105 at the European Association for the Study of Diabetes (EASD) Annual Meeting in Hamburg, 2-6 October. All accepted abstracts have been extensively peer reviewed by the congress selection committee. The paper is being published in *Nature Medicine* at the embargo time above.

Prof Dahl-Jørgensen will also take part in the embargoed press conference taking place at 1200H Noon CEST Hamburg time on Tues 3 Oct, in the Vienna Hall.

For full embargoed paper in *Nature Medicine*, click here

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