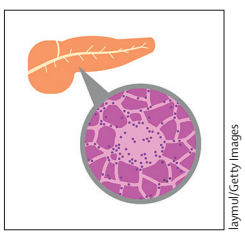
Importance of residual insulin secretion in type 1 diabetes



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Finland has the highest incidence of type 1 diabetes in the world, which has led to many important studies of type 1 diabetes in the Finnish population and to the formation of several study groups. In *The Lancet Diabetes & Endocrinology*, Minna Harsunen and colleagues[1] present longitudinal and cross-sectional analyses of random C-peptide (an index of insulin secretion and β-cell function) measurements in three Finnish cohorts: 957 newly diagnosed patients seen at Helsinki University Hospital, in collaboration with the Finnish Pediatric Diabetes Registry (FPDR), for the longitudinal analysis; and 3984 study participants from the FinnDiane study group and 645 from the DIREVA regional diabetes registry in western Finland for the cross-sectional analysis. Data from these studies were used to examine which parameters were associated with residual insulin secretion.

Several important observations were made. First, several factors—age at diagnosis, genotypes (particularly HLA), and autoantibodies—affected the rate of decline of random C-peptide. Others have also reported relationships with age at diagnosis,[2] genetics,[3] and autoantibodies[4] with regard to the evolution of β-cell function, as assessed by C-peptide. In this regard, age at diagnosis is particularly compelling, with the slowest decline in those who were 10–15 years of age at diagnosis, the fastest decline in those less than 5 years of age at diagnosis, and an intermediate rate of decline in those 5–9 years of age at diagnosis. Second, Harsunen and colleagues observed better glycaemic control in people with residual random C-peptide, as has also been reported by the Type 1 Diabetes Exchange β-Cell Function Study Group.[5] Third, perhaps the most important finding in this study is that residual insulin secretion is associated with lower HbA_{1c}, lower blood pressure, lower cholesterol, and decreased frequency of retinopathy and nephropathy. This is hugely important and expands on similar observations made in other studies,[6–9] including the Diabetes Control and Complications Trial (DCCT)[5] and its long term follow-up study the Epidemiology of Diabetes Interventions and Complications (EDIC),[7,8] and the Scottish Diabetes Research Network Type 1 Bioresource (SDRNT1BIO) cohort.[9] Yet, those studies only observed an effect on hypoglycaemia and retinopathy, whereas the FinnDiane cohort also showed an effect on nephropathy and cardiovascular risk factors. Fourth, these studies used random C-peptide measurements, which might be particularly important for real-world clinical practice,[10] in contrast to most studies of C-peptide which have used either fasting or stimulated C-peptide.

The authors note that because residual C-peptide secretion is associated with favourable clinical outcomes, there is potential benefit from interventions aimed at preserving β-cell health and function. Most such ongoing studies have been conducted in patients with recent-onset type 1 diabetes using immune intervention, strategies to improve β-cell function, or both. The persistent C-peptide secretion in the current study was seen even decades after diagnosis. The authors therefore suggest that interventions to improve β-cell function could even be initiated later in the course of the disease. Hopefully, regulatory agencies also will recognise the importance of residual insulin secretion in their consideration of disease-modifying drugs for type 1 diabetes.

I declare no competing interests.

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