Imagining the next 100 years of diabetes

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An attack on insulin-producing beta cells is central to all types of diabetes.

Pancreas (1)

Islets of Langerhans (~1,000,000)

Insulinproducing beta cells (~1,000,000,000)

Glucose

Type 2 diabetes
- Metabolic factors
- Genetics
- Ageing

Dysfunction and slow reduction in cells

Type 1 diabetes: Autoimmunity
- Genetics

Rapid destruction of cells
Therapeutic strategies in the future: focus on beta cells

The three musketeers for beta cell health

Prevention

Protection

Regeneration or replacement
What if most beta cells are already lost?
Treatment of type 1 diabetes in the past 100 years....

Boerhaave Museum of Medical History, Leiden, Netherlands

2021: Still insulin
If most beta cells are already lost (type 1 diabetes)...

The future of treatment in severe beta cell failure (type 1 diabetes)

Prevention

Protection

Regeneration or replacement
Growing human mini-pancreas in a dish – more insight into regeneration
Patient with severe beta cell failure (type 1 diabetes)

Replacement of insulin producing cells: the only treatment to normalize glucose levels without risk of hypoglycemia

Organ donor

Pancreas transplantation

Islet transplantation

< 0.01 % of patients
The impact of not having type 1 diabetes anymore

- Female patient, late 50s
- Islet transplantation 3 months earlier
- Approximately 800,000 islets
- Uncomplicated
- Result: No more insulin after >50 years of having diabetes, enormous improvement in well-being

But: Life-long treatment with drugs suppressing the immune system

Shortage of organ donors (so for very few patients)
Towards beta cell replacement therapy for many patients with severe beta cell failure (Type 1 diabetes)

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First generation cell-therapy

Communication and collaboration

Next generation cell-therapy

Pipeline to patients

https://isletproject.eu/