

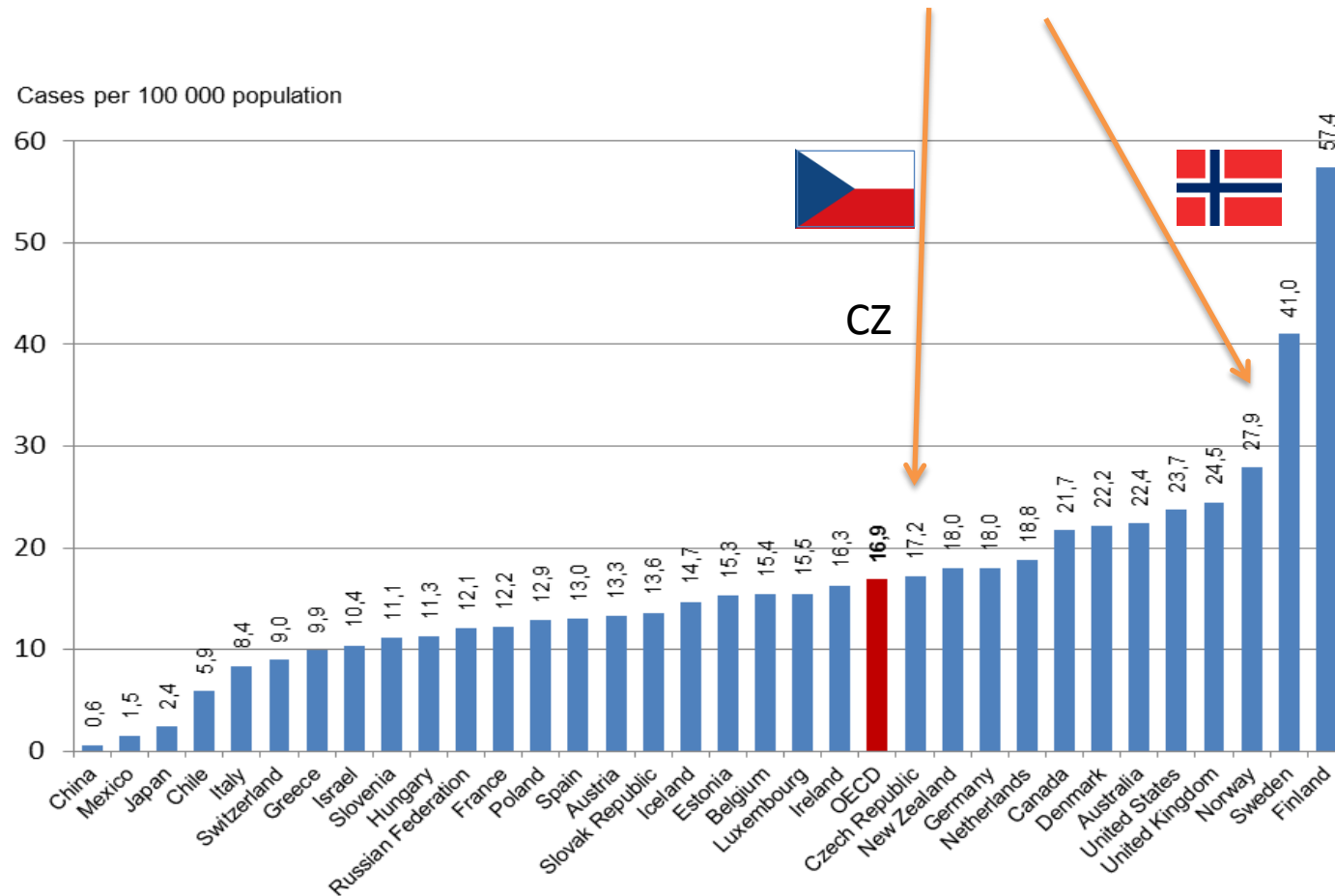
# **Pancreatic islet transplantation in the treatment of type 1 diabetes: improvement of the islet isolation yield and pre-transplant conditioning**

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**Priority research area: Health**

# Incidence estimates of Type 1 diabetes, children aged 0-14 years

Both Czech Republic and Norway belong to countries with a high incidence of type 1 diabetes

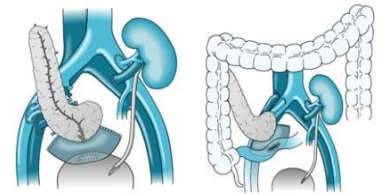


# Medical therapy of diabetes has been still failing, because:

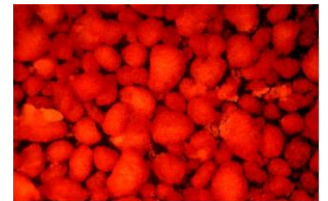
- Diabetes remains the leading cause of :
  - vision loss in working-age
  - End Stage Renal Disease
  - non-traumatic lower limb amputations
- Current medical approaches cannot provide sufficient blood glucose control to prevent microvascular damage
- Intensive medical therapy has increased risk of severe hypoglycemia

**Transplantation of insulin producing tissue is currently the only method able to induce long-term normal glucose control in type-1 diabetic patients and has the potential to be used in type-2 diabetes as well**

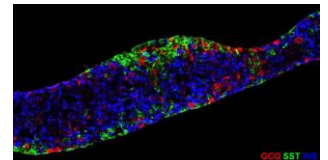
**Whole pancreas transplantation:** very efficient, major surgery



**Transplantation of isolated pancreatic islets:** effective, much safer for the patient



**Transplantation of insulin-producing cells from alternative sources:** in progress



# Previous cooperation between IKEM, Prague and Riskhospitalet, Oslo

- Pancreas transplant programs in Prague and Oslo started both in 1983
- In 1990, cooperation between the Prague and Oslo pancreas transplant groups was initiated and more than 12 researchers from both countries participated in an exchange program.

Vladimír Bartoš  
Leader of the  
Czech group



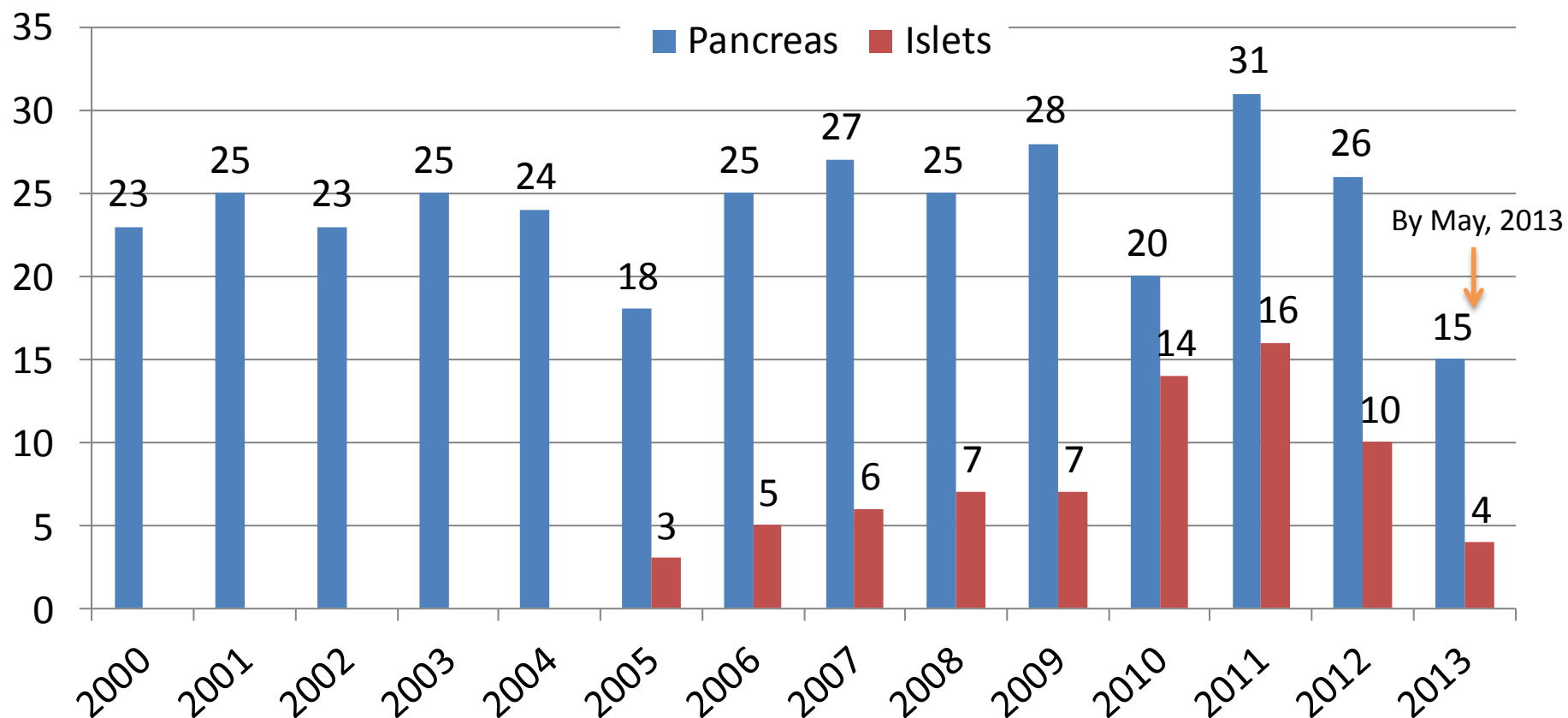
Inge Brekke  
Leader of the  
Norwegian group

- This scientific cooperation helped the Czech transplant team to join the international pancreas and pancreatic islet transplant community and later to become one of the European leaders in this area.



RIKSHOSPITALET

# Pancreas and islet transplantation in IKEM, 2000 - 2012

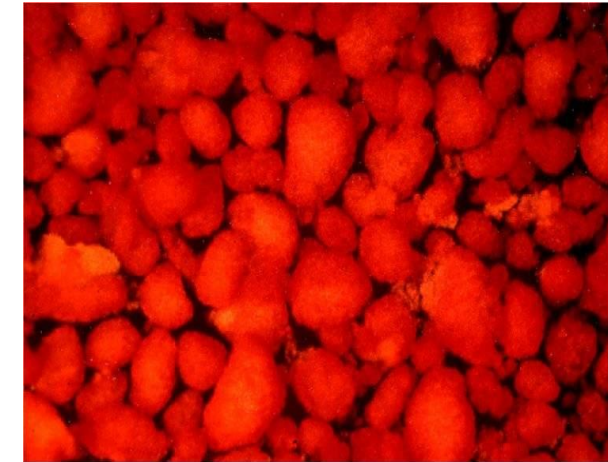
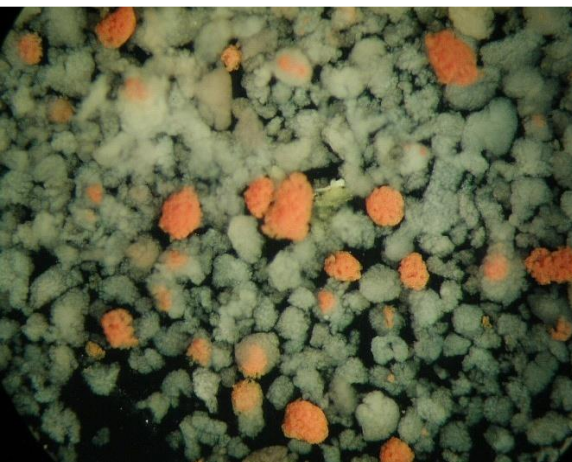
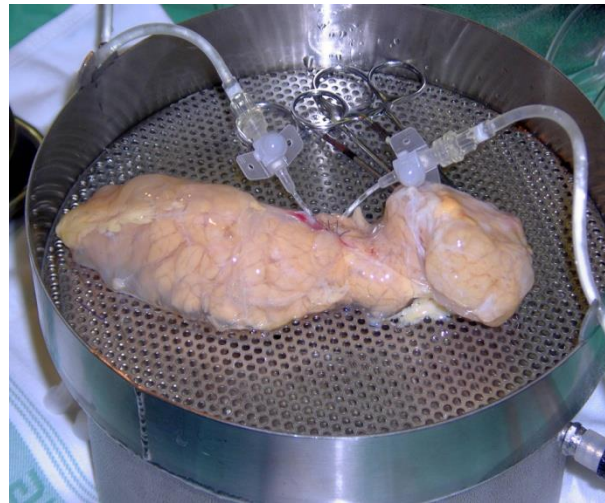


# Aims of the project

- To enhance availability of pancreatic islet transplantation for treatment of type-1 diabetes by
  - Development of more efficient techniques for isolation of pancreatic islets from human pancreas
  - Development of novel strategies to improve the function of isolated pancreatic islets by pre-transplant conditioning and post-transplant care
- To establish direct transfer of experience and best practices between IKEM and Nordic Network in the area of pancreatic islet transplantation



# Isolation of insulin producing pancreatic islets from a human pancreas



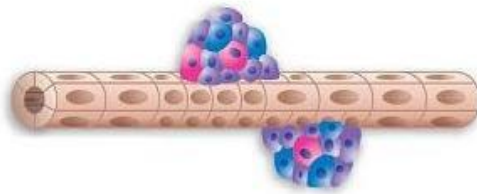




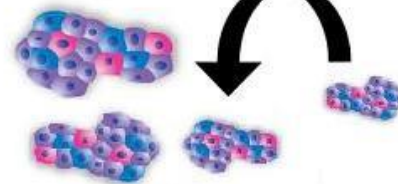
**Islet transplantation under local anaesthesia**

# Bioengineering of pancreatic islets

Differentiation of pancreatic progenitors



Differentiation of stem cells



Transdifferentiation of exocrine cells

Beta-cell replication