Health research for diabetes

Diabetes Mellitus (DM) is a chronic metabolic disease characterised by high levels of glucose in the blood. There are different types of diabetes resulting from defects in the secretion, action or both of insulin, the hormone that regulates the level of sugar:

- Type 1 DM (T1D) is characterised by deficient insulin production by the pancreas, requires the administration of external insulin, and has an early-onset in life.
- Type 2 DM (T2D), which accounts for more than 90% of all cases of diabetes, typically appears at adult age and is characterised by the body's ineffective use of insulin, usually treated with oral medication.

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Gestational DM occurs in women that develop high blood sugar levels during pregnancy.

The common symptoms of diabetes include increased thirst, increased urination, and increased hunger. A severe drop in the blood sugar levels can provoke unconsciousness. When not properly managed, diabetes can lead in the long term to severe and fatal complications, including diabetic retinopathy (a leading cause of blindness), neuropathy (damage in the sensory and motor nerves), foot ulcers, cardiovascular disease, stroke, and kidney failure.

Diabetes mellitus and its complications are a major global public health problem. In 2017, there were 427 million adults estimated with diabetes across the world1, of which 58 million people in the European Region. It is expected to reach 629 million people in 2045. Noteworthy, one in two adults with diabetes is undiagnosed.

Overweight/obesity, unhealthy habits and inappropriate physical activity, and an ageing global population, are the major risk factors for diabetes. Therefore, prevention and early and appropriate interventions are indispensable measures to reduce the prevalence and complications of diabetes.

Research and innovation on Diabetes and related factors as obesity, has been a longstanding priority for the EU. In the last decade, over EUR 1, 25 billion have been devoted to support research: 375 projects worth EUR 838 million in FP7, 229 projects funded with EUR 411 million in Horizon 2020.

The funding has been provided on a competitive basis to comprehensively cover basic and clinical translational research, training and mobility programmes, support for the SMEs, innovative development of new prevention and diagnostic approaches, healthcare, therapies and medical devices, including mHealth technologies.

For example, EUR 30 million contribution to the Global Alliance for Chronic Diseases is funding research associated to implementation and scaling-up of interventions in low- and middle-income countries and/or in vulnerable populations in high income countries. This initiative for the prevention and/or management of diabetes addresses the fact that 80% of people suffering from diabetes live in low and middle-income countries.

Overview of revelant projects

Feel4Diabetes is a successful intervention at schools in six European countries aiming to promote healthy lifestyle and tackle obesity and obesity-related metabolic risk factors for the prevention of type 2 diabetes among families from vulnerable groups.

iHealth-T2D brings together institutions from India, Pakistan and Sri Lanka in order to provide evidence about the implementation of intensive lifestyle modifications, involving physical activity, dietary change and weight loss is associated with reduction in the incidence of T2D amongst people at high risk.

SMART2D aims to strengthen for prevention of T2D and expand capacity for T2DM prevention and management in vulnerable populations through care networks of community-based peer support groups at three different settings in Uganda, South Africa and Sweden.

KidsAP evaluates the biomedical, psychosocial, and cost effectiveness of novel individualised artificial pancreas in young children aged 1 to 7 years with type 1 diabetes. Results will inform national and international treatment guidelines making the artificial pancreas widely acceptable as the state-of-art treatment modality in young children.

TANDEM has provided basic knowledge on the link between tuberculosis (TB) and DM, as well as on prevention, therapeutic management and prognosis of TB-DM in countries that have a high TB incidence and growing DM prevalence. The results have helped to develop guidelines for care and control of TB and DM.

NEXT has pioneered the development of nanostructured biomaterial for bioengineering pancreatic islets that can be transplanted as an alternative treatment for T1D. The project has developed techniques and methods that are already marketable scientific products underpinning its innovation potential.

RESOLVE combined the expertise of biologists, clinicians and engineers to develop computer models which predict and monitor the progression of metabolic syndrome and its associated diseases. The ultimate aim is to identifying drug targets for controlling the levels of lipid, glucose and cholesterol in patients' bloodstreams to prevent development of metabolic diseases.

EMIF aims to develop a common information framework of patient-level data that will link up and facilitate access to diverse medical and research data sources, opening up new avenues of research for scientists. The project is funded by the Innovative Medicines Initiative.

RHAPSODY aims to improve diabetes prevention and treatment by adding to our understanding of the factors that drive the progression of pre-diabetes to diabetes, and the deterioration of the condition of people with diabetes. The project is funded by the Innovative Medicines Initiative.

DynaHEALTH will contribute to implementing a dynamic model for early Gluco-Psychosocial Axis (GPA) risk identification and validation, allowing development of prevention tools and policies that will help to inform policy makers on the best periods to invest in cost-effective and sustainable healthcare strategies. GPA concerns the interplay of factors determining glucose metabolism and insulin sensitivity and the neuroendocrine response resulting from exposure to psychosocial stress.

More information:

www.ec.europa.eu/research/health