



Future of Precision Medicine Symposium 2021

Programme for the hybrid symposium

novo nordisk **fonden**
Benefiting people and society

EFSD European Foundation
for the Study of Diabetes

Welcome

On behalf of the European Foundation for the Study of Diabetes and the Novo Nordisk Foundation we have the pleasure of welcoming you to the 1st Future of Precision Medicine Symposium, arranged to honor and celebrate the discovery of insulin one hundred years ago.

This two-day hybrid symposium will feature lectures and panel discussions on precision diagnostics, precision prevention, pediatric precision medicine, clinical implementation, health disparities, the power of big data, perspectives of people with diabetes, policy and implementation, with a focus on the opportunities and barriers for the implementation of precision medicine in research and practice.

The symposium will be also the occasion to celebrate the winner of the European Foundation for the Study of Diabetes and Novo Nordisk Foundation Precision Diabetes Medicine Award. The award has been created to celebrate the discovery of insulin and to accelerate translational research in diabetes care. The award honors innovative research in clinical and basic sciences and their attempts to minimize the future burden of diabetes and other chronic disease.

The European Foundation for the Study of Diabetes and the Novo Nordisk Foundation both have a longstanding tradition of not only supporting science of the highest quality, but also of bringing researchers and clinicians of the highest calibre together. This symposium will be no exception and the hybrid format will allow scientist and colleagues from all over the world to join in and contribute to a constructive two working days.



Stefano del Prato
President, European
Foundation for the Study
of Diabetes



Martin Ridderstråle
Senior Vice President,
Novo Nordisk Foundation

Next steps towards the future of precision medicine

Precision medicine has great potential to help reduce the burden of diabetes worldwide. Precision medicine is best viewed as an evolution rather than a revolution in medicine, as it is unlikely to replace contemporary medicine, yet may substantially enhance it.

Over the past four years, the EASD (European Association for the Study of Diabetes) in partnership with the ADA (American Diabetes Association) established the Precision Medicine in Diabetes Initiative. In the first EASD/ADA Consensus Report on Precision Diabetes Medicine, published in *Diabetologia* in 2020, the EASD and ADA outlined six key “pillars” of precision medicine: diagnostics, prediction (of the primary disease), prevention (of the primary disease), treatment, prognostics (prediction of secondary disease), and monitoring (of behaviour, risk exposure, treatment response, and disease progression).

The Novo Nordisk Foundation has built on this to develop a framework to promote the translation of discovery science into clinical practice; this framework builds on conventional evidence-based medicine and includes precision medicine (often through stratification of populations into subgroups of similar characteristics to improve disease-related predictions), personalised medicine (the use of a person's data and/or samples to gauge the efficacy and/or tolerability of therapeutics), and individualised medicine (the tailoring of medical decisions to the person's needs, preferences, circumstances, and capabilities).

For precision medicine to fulfil its potential, a well-functioning eco-system is also required, comprised of multiple stakeholders such as patients, scientists, clinicians, health educators, health economists, funders, innovators of medicines and other technologies, regulators, and policy makers. Large-scale, well-curated, and accessible health databases that contain high-quality multidimensional data are also required; so too are powerful computing infrastructures to ensure data are appropriately and rapidly analysed; new prospective studies, designed to generate high-value hypotheses, and clinical trials, designed to test these hypotheses, will also be needed. These are some of the key areas that the Novo Nordisk Foundation will focus on during the coming years in order to help bring the vision of precision diabetes medicine into clinical practice.



Paul W. Franks
Professor, Scientific Director
Novo Nordisk Foundation



Programme

Monday, 22 November

(CET) Programme

09.00-10.00 Informal network: Coffee & Croissants

Official opening

10.00 – 10.20 **Welcome and opening remarks**

Senior Vice President Martin Ridderstråle, the Novo Nordisk Foundation

President Stefano Del Prato, the European Foundation for the Study of Diabetes

Theme I: Precision prevention

10.20-10.40 **Genetic subclassification of obesity in diabetes prevention**

Speaker: Professor Ruth Loos, University of Copenhagen

10.40-11.00 **Precision nutrition in diabetes prevention and management**

Speaker: Professor Eran Segal, Weizmann Institute of Science

11.00-11.20 **Q&A**

Facilitated by Professor Juleen Zierath, Karolinska Institutet and University of Copenhagen

11.20-11.35 Short break

Monday, 22 November

(CET) Programme

Theme II: Precision diagnostics

11.35-11.55 **Using genetic aetiology to guide treatment: lessons from monogenic subtypes for precision diabetes**

Speaker: Professor Andrew Hattersley, University of Exeter

11.55-12.15 **Subclassification of diabetes based on genetics**

Speaker: Assistant Professor Miriam S. Udler, Harvard Medical School

12.15-12.35 **Q&A**

Facilitated by: Professor Jose Florez, Harvard Medical School

12.35 – 13.15 Lunch

Theme III: Clinical implementation

13.15-13.35 **Beyond genetics: optimization of diabetes therapy**

Speaker: Professor Ewan Pearson, University of Dundee

13.35-13.55 **Genetics in the treatment of obesity**

Speaker: Professor Sir Stephen O'Rahilly, University of Cambridge

13.55 – 14.15 **Q&A**

Facilitated by Scientific Director Paul Franks, the Novo Nordisk Foundation

14.15 - 14.30 Short break

Monday, 22 November

(CET) Programme

Theme IV: Pediatric precision medicine

14.30-14.50	Is there a pediatric endotype in T1D? Speaker: Director Carla Greenbaum, Benaroya Research Institute
14.50-15.10	Precision medicine in early life Speaker: Associate Professor Marie-France Hivert, Harvard Medical School
15.10-15.30	Q&A Facilitated by Project Director Arne Astrup, the Novo Nordisk Foundation
15.30-15.45	Short break
Panel discussion: Precision medicine in society: possibilities and challenges	
15.45-16.20	Theme based on key points raised during day 1 lectures with focus on science Panelists: <ul style="list-style-type: none"> • Professor Andrew Hattersley, University of Exeter • Professor Chantal Mathieu, Katholieke Universiteit Leuven • Professor Jose Florez, Harvard Medical School • Professor Juleen Zierath, Karolinska Institutet and University of Copenhagen • CEO Kari Stefansson, deCODE • CEO Mads Krosgaard Thomsen, the Novo Nordisk Foundation Facilitated by: Senior Vice President Martin Ridderstråle, the Novo Nordisk Foundation
16.20-16.35	Short break

Monday, 22 November

(CET) Programme

16.35 -16.55	Diabetologia – Precision Publishing in Diabetes Research Speaker: Editor-in-chief of Diabetologia, Professor Hindrik Mulder, Lund University
Award Ceremony The EFSD and the Novo Nordisk Foundation Precision Diabetes Medicine Award 2021	
16.55-17.10	Chair: President Stefano Del Prato, the European Foundation for the Study of Diabetes
17.10-17.40	Prize Lecture: Optimising the timing of infusion set replacement in insulin pump therapy using tissue flow resistance monitoring Speaker: Professor Thomas Pieber, Medical University of Graz
Dinner for in-house attendees and speakers	
17.40-18.30	Bus transportation from The Novo Nordisk Foundation to Langelinie Pavillinen
18.30	Pre-dinner lecture Speaker: Dr. Giles Yeo, University of Cambridge
19.00	Dinner at Langelinie Pavillionen, Copenhagen

Tuesday, 23 November

(CET)	Programme
09.00-10.00	Informal network: Coffee & Croissants
Runner-up Awardees The EFSD and the Novo Nordisk Foundation Precision Diabetes Medicine Award 2021	
10.00-10.30	Chair: Professor Michael Roden, Chairperson EFSD Scientific Board Runner-up lecture: Glucagon secretion and action in the pathogenesis of iatrogenic hypoglycaemia in HNF1A-MODY Speaker: Group leader Caroline Bonner, Institut Pasteur de Lille
10.30-11.00	Runner-up lecture: Epigenetic biomarkers for precision medicine in type 2 diabetes Speaker: Professor Charlotte Ling, Lund University
11.00 -11.15	Short break
Theme V: Global partnerships in precision diabetes medicine	
11.15-11.35	The ADA/EASD Precision Medicine in Diabetes Initiative Speaker: Professor Louis H. Philipson, University of Chicago
11.35-11.55	Global Partnerships in precision health Speaker: Professor Sir John Bell, Chairman of the Office for the Strategic Coordination of Health Research
11.55-12.15	Panel discussion Panelists: <ul style="list-style-type: none"> • Professor Maria Gomez, Lund University • Professor Jose Florez, Harvard Medical School Facilitated by Paul Franks, Novo Nordisk Foundation
12.15-13.00	Lunch

Tuesday, 23 November

(CET)	Programme
Theme VI: Diversity and disparity	
13.00-13.10	Introduction to research in Greenland Speaker: Chief Medical Officer Michael Lyng, Steno Diabetes Center Greenland
13.10-13.30	Lessons in precision diabetes medicine from Greenland's Inuit Speaker: Professor Torben Hansen, University of Copenhagen
13.30-13.50	The many faces of diabetes and why each deserves to be seen Speaker: Professor Ronald Ma, Chinese University of Hong Kong
13.50-14.10	Q&A Facilitated by Professor Marit Eika Jørgensen, Steno Diabetes Center Greenland
14.10-14.25	Short break
Theme VII: Strength in numbers	
14.25-14.40	Data lakes, data mountains, and data mining Speaker: Professor Soren Brunak, University of Copenhagen
14.40-14.55	The future of genomic and precision medicine Speaker: CEO Kari Stefansson, deCODE
14.55-15.10	Q&A Facilitated by Scientific Director Paul Franks, The Novo Nordisk Foundation

Tuesday, 23 November

(CET)

Programme

Panel discussion: Precision medicine in society: possibilities and challenges

15.10-15.45

Theme based on key points raised during day 2 lectures with focus on policy

Panelists:

- CEO Bettina Lundgren, Danish Genome Center
- Person with diabetes Christian Collins
- Professor Daniel Witte, Steno Diabetes Center Aarhus
- CEO Henrik Ullum, Statens Serum Institut
- Professor Maria Gomez, Lund University
- Person with diabetes Tina Blichfeldt

Facilitated by journalist Nynne Bjerre Christensen

Official closing

15.45 -16.00

Closing remarks

Senior Vice President Martin Ridderstråle,
the Novo Nordisk Foundation

President Stefano Del Prato,
the European Foundation for the Study of Diabetes

Introduction to the prize:

The European Foundation for the Study of Diabetes and Novo Nordisk Foundation Precision Diabetes Medicine Award

The European Foundation for the Study of Diabetes and the Novo Nordisk Foundation have decided to celebrate the 100th anniversary of the discovery of insulin in 1921 by creating a research award: the European Foundation for the Study of Diabetes and Novo Nordisk Foundation Precision Diabetes Medicine Award.

The Award recognizes innovative research from both clinicians and basic scientists in precision diabetes medicine that can see into and seek solutions for the future. The winners will describe novel precision-profiled projects that will benefit people with diabetes, and investigators may already have an established track record within the field.

The projects receiving the Award are expected to accelerate important fields of translational research and to improve the speed of implementing innovation in diabetes care.

Three research proposals will be awarded grants annually and will comprise one winner, receiving DKK 2 million, and two runners-up, receiving DKK 500,000 each.

The Award will be open for applications three years running, celebrating the discovery of insulin in 1921, its first use for humans in 1922 and its first Nobel Prize in 1923.

Awardees of the Future of Precision Medicine Symposium 2021

Winner 2021

Professor Thomas R. Pieber, Medical University of Graz

Optimising the timing of infusion set replacement in insulin pump therapy using tissue flow resistance monitoring

The concept of precision medicine is expected to transform cancer research and patient care. As exciting as the advent of precision medicine is, it is not entirely new. For instance, 100 years ago the introduction of insulin very early pointed towards the need individualized therapies that take individual variability into account. Despite substantial progress in insulin formulations and novel diabetes technology, complete normalization of glycaemic control remains elusive for many patients. In our project we will substantially improve insulin pump therapy and reduce its costs by individually determining the longest possible duration of use of an infusion set. In preliminary studies, we have observed that the tissue flow resistance (TFR) at the insulin infusion site (i.e., the resistance exerted by the tissue on the infused insulin solution) progressively increases with the duration of infusion site use, and that this increase in TFR is strongly correlated with a reduction in insulin absorption.

The overall objective of the project is to evaluate TFR as an indicator of the extent of insulin absorption during prolonged use of an insulin infusion site. This will lead to a novel, easy to use “traffic light” indicator for the maximum safe wear time of insulin infusion sets.

Biography

Thomas Pieber is Professor of Medicine, Chair of the Division of Endocrinology and Diabetology at the Department of Internal Medicine at Medical University of Graz in Austria. He is also Director of the Institute of Biomedicine and Health Sciences at Joanneum Research in Graz and founder of CBmed, a competence centre for biomarker research. Thomas Pieber and his group have developed and tested several new therapeutic concepts for the type1 and type 2 diabetes, from new pharmacological interventions to innovative medical devices; and from strategies for disease prevention to research in the field of integrative care and outcome research. Thomas Pieber was and currently is principal investigator (PI) in several international study groups and multicenter trials funded by the EU Commission and foundations such as JDRF and LRA in the USA. In basic research he and his team investigate the role of metabolism in aging and β -cell resilience.

Professor Pieber has written more than 450 original papers and reviews in peer-reviewed journals. He is a member of the International Working Group on the Diabetic Foot and a member of the Cochrane Review Group “Endocrine and Metabolic Diseases”. Furthermore, he serves as reviewer or advisor for international journals and funding organizations.



Professor Thomas R. Pieber,
Medical University of Graz

Runner-up 2021

Dr Caroline Bonner, Institut Pasteur de Lille

Glucagon secretion and action in the pathogenesis of iatrogenic hypoglycaemia in HNF1A-MODY

Hepatocyte nuclear factor-1-alpha (HNF1A) is a homodimeric transcription factor expressed in a variety of metabolic tissues and organs including the pancreas, intestine, liver, and kidney. Mutations in HNF1A results in impaired dimerization, metabolic gene dysfunction, and Maturity-Onset-Diabetes-of-the-Young (HNF1A-MODY). HNF1A-MODY is characterized by early-onset (< 25 years of age) and is a slowly progressive disorder resulting in beta-cell failure and hyperglycemia, with high penetrance (> 95% by the age of 55 years).

Glycosuria in HNF1A-MODY has been linked to reduced renal sodium-glucose-co-transporter-2 (SGLT2) function. The first-line therapy is low-dose sulfonylureas (SUs), which act downstream of the genetic defect and increase insulin secretion via a glucose-independent mechanism. However, with time, there is a progressive decline in beta-cell function and patients have a higher risk of developing iatrogenic hypoglycemia, which raises insulin concentrations and lowers plasma glucagon and glucose levels. Symptoms include irritability, impaired concentration, neurological deficits, seizures, coma, and death. Collectively, these data underscore that HNF1A-MODY has an unfavorable evolution. Although postprandial hyperglucagonemia and endogenous glucose production have been reported, little is known about the defective glucagon-producing cells (alpha and L cells) in HNF1A-MODY.

We found that HNF1A mutant carriers on/off SUs have below normal fasting glucagon values. Whether defective glucagon secretion is caused by HNF1A mutations alone, or chronic SU treatment, or both are unknown. Therefore, we propose (1) to investigate the effects of HNF1A deficiency on pancreatic islet and intestinal cellular function with regards to glucose transport and hormone secretion, and (2) to study and compare the chronic effect of SU treatment vs. GLP1R agonists in islets and intestinal organoids lacking HNF1A vs. controls. We expect these findings to contribute to the design of large clinical studies to define the best treatment option for these often-young patients.

Biography

Dr. Caroline Bonner completed her Ph.D. studies in 2009 from the Royal College of Surgeons in Dublin, Ireland, which focused on the differentiation and regeneration of pancreatic beta cells using genetic models of Maturity onset-diabetes of the young (MODY). She pursued a post-doctoral fellow in translational medicine in the same laboratory (2009-2011), focusing on the discovery and validation of serum biomarkers (microRNAs and secreted proteins) in MODY patients as well as in type 1 diabetic and type 2 diabetic subjects. In 2012, she joined Inserm unit 1190 - Translational Research for Diabetes, at The University of Lille, on a post-doctoral fellowship to pursue an independent research project on insulin-independent regulation of glucagon secretion with and without current drug therapies using human islets ex-vivo and mouse models of diabetes. She is currently a group leader at Institut Pasteur de Lille continuing in deciphering the mechanisms by which antihyperglycemic drugs regulate glucose homeostasis and normalize pancreatic hormone secretion in both monogenic and polygenic forms of diabetes.

Runner-up 2021

Professor Charlotte Ling, Lund University

Epigenetic biomarkers for precision medicine in type 2 diabetes

Type 2 diabetes (T2D) is an epidemic and a leading cause of death through its vascular complications. High glucose affects the risk for complications, which increases suffering for patients and costs for society. It is hence important that T2D patients receive an optimal therapy from the beginning that lowers blood glucose. Metformin is the first-line therapy for T2D but ~30% of T2D patients do not respond to metformin. Currently, there are no biomarkers used in the clinic that predict glycemic response to metformin. We identified blood-based epigenetic biomarkers that could discriminate between glycemic responders/non-responders to metformin in drug-naïve T2D patients.

This epigenetic tool may be developed to help T2D patients receive an optimal therapy and may be used for precision medicine. Although our initial study included one discovery and replication cohorts, these cohorts were of limited size and additional validations are needed before these biomarkers can be brought to the clinic. Alternative drugs should be prescribed to T2D patients in case of non-response to metformin, which can be determined by novel biomarkers. Our goal is therefore to further develop our epigenetic tool in order to help T2D patients receive an optimal therapy which better controls blood glucose.

Biography

Dr. Charlotte Ling is a Professor at Lund University and a principle investigator of the Epigenetics and Diabetes Unit at Lund University Diabetes Centre (LUDC), Sweden. She obtained her PhD in Endocrinology at University of Gothenburg, Sweden in 2002. After a postdoc at Lund University, where she studied genetics of type 2 diabetes, she dedicated her research to the study of epigenetic mechanisms causing type 2 diabetes and metabolic disease. Her research group has over the last 17 years pioneered the field of epigenetics in type 2 diabetes. They have made numerous groundbreaking discoveries such as genome-wide epigenetic modifications in pancreatic islets, skeletal muscle, adipose tissue and the liver from patients with type 2 diabetes compared with non-diabetic controls.

Dr. Ling's group has also shown that genetic and non-genetic factors such as SNPs, exercise, diet, obesity and age alter the genome-wide epigenetic pattern in key human tissues affecting type 2 diabetes. Dr. Ling is frequently invited to write review papers and book chapters and give lectures (e.g. ADA, IDF, Keystone and Endocrine Society) on the topic 'Epigenetics and Type 2 Diabetes'. Dr. Ling has been awarded numerous research grants and awards from for example the Swedish Research Council, European Commission (ERC and H2020), Novo Nordisk Distinguished Investigator Grant and EFSD/NNF Precision Diabetes Medicine runner up award. She has published 117 original publications, 18 invited review papers and 8 book chapters since 1999 including papers in Cell Metabolism, Nature Communications, Science Translational Medicine, JCI, PNAS and Diabetes Care.



The European Foundation for the Study of Diabetes was created by the European Association for the Study of Diabetes to provide funding initiatives in all areas of diabetes research. The aims of the European Foundation for the Study of Diabetes are to encourage and support research in the field of diabetes, to rapidly diffuse acquired knowledge and to facilitate its application.

The European Foundation for the Study of Diabetes operates on a strictly non-profit basis under the control of the relevant authorities for charity and taxation to support diabetes research.

Since its inception, the European Foundation for the Study of Diabetes has committed more than €100 million to diabetes research in Europe by various funding means. In the past 5 years, the Foundation has become a significant European funding agency for diabetes research and is continually striving to enhance awareness in Europe of the severity and magnitude of this devastating disease.

The European Foundation for the Study of Diabetes and Novo Nordisk Foundation Precision Diabetes Medicine Award Programme is administered by the European Foundation for the Study of Diabetes, including the application, review and yearly evaluation processes. In addition, the Future of Precision Medicine Symposium 2021 is jointly hosted by the Novo Nordisk Foundation and The European Foundation for the Study of Diabetes.

Diabetologia

Diabetologia is the official journal of the European Association for the Study of Diabetes (EASD). Diabetologia publishes original clinical, translational and experimental research on all aspects of diabetes research and related subjects, provided they have scientific merit and represent an important advance in knowledge.

The goals of Diabetologia are to attract and publish the best research and the most lively and informative opinion about diabetes; to serve as a forum for debate about science, clinical care and public health issues relating to diabetes; to further the interests of the diabetes research community within Europe and around the world and to facilitate the translation of scientific advance into clinical benefit for people with diabetes.

In that spirit, Diabetologia has created a special issue dedicated to Precision Diabetes Medicine, collecting views and information from key opinion leaders in the field.

novo nordisk fonden

Benefiting people and society

The Novo Nordisk Foundation awards grants for projects based on applications it receives in open competition and for projects for which the Foundation takes the initiative. The aim is to improve people's lives by improving health, education and developing a knowledge-based, sustainable society. With Denmark as its center of gravity, the Foundation's focus is to improve the lives of people through better health, education and the development of a knowledge-based sustainable society.

The Novo Nordisk Foundation dates back to 1922, when Nobel laureate August Krogh returned home from the United States and Canada with permission to produce insulin in the Nordic countries. This marked the beginning of the development of world-class diabetes medicine and a subsequent Danish business and export venture. It also led to the establishment of several foundations that, many years later, merged into today's Novo Nordisk Foundation.

The symposium and the EFSD and the Novo Nordisk Foundation Precision Diabetes Medicine Award are funded by the Novo Nordisk Foundation.

Practical information

Format

Hybrid symposium, online and in-person attendance.

Access the virtual FPM symposium 2021 platform



novonordiskfonden.dk/da/events/future-of-precision-medicine-symposium-2021/

For in-person attendees

WiFi access at the Novo Nordisk Foundation

Internet	Novo Guest Access
Password	NovoVipGuest

Dinner on Monday 22 November 2021

For in-person attendees will be held at Langelinie Pavillonen, Langelinie 10, DK-2100 København Ø

Bus transportation from The Novo Nordisk Foundation to Langelinie Pavillonen.