KI – Novo Nordisk Workshop

Wednesday November 13th, 2019

Biomedicum Lecture Hall, Solnavägen 9
Karolinska Institutet Solna

Organized by the Novo Nordisk Postdoctoral Fellowship Programme at KI
Website: ki.se/en/srp-diabetes/novo-nordisk-fellowships
Seminar Program

10:30-10:40  Juleen Zierath  
             (Chair Steering Committee, KI)  
             Welcome remarks

10:40-11:25  John Hawley  
             (Australian Catholic University, Australia)  
             A time to eat, a time to fast: Time-restricted feeding to improve metabolic regulation.

11:30-12:00  Martin Ridderstråle  
             (Corporate Vice President, Clinical Pharmacology & Translational Medicine, Novo Nordisk)  
             Peptide hormone pills – oral semaglutide - who would have thought?

12:05-12:35  Martijn van de Bunt  
             (Head of Bioinformatics & Data Mining, Global Research Technologies, Novo Nordisk)  
             From Oxford to Novo Nordisk – adventures in data science.

13:30-14:15  Peter Stenvinkel  
             (CLINTEC, KI)  
             Biomimetics – nature’s roadmap to insights and solutions for human health and disease.

14:20-14:50  Christian Broberger  
             (Neuro, KI)  
             Anger management: Brain control of aggression in males and females.

14:55-15:15  Lucile Dollet  
             (FYFA, KI)  
             Adipose tissue response to exercise in diabetic patients, a role for secreted proteins?

15:40-16:10  Michael Nyberg  
             (Cardiovascular Specialist, Global Drug Discovery, Novo Nordisk)  
             Treating atherosclerotic plaque of tomorrow: Venturing beyond lipid lowering.

16:15-16:35  Alastair Kerr  
             (MedS, KI)  
             Delineating the clinically relevant, functional long non-coding RNA in white adipocytes.

16:40-16:50  Stephan Bouman  
             (Fellowship Project Manager, Novo Nordisk)  
             Closing remarks

Lunch break, sandwiches served outside Lecture hall. Poster presentations by Fellows.

Break, coffee served outside lecture hall.

Novo Nordisk Postdoctoral Fellowship Programme at KI

Novo Nordisk is funding this prestigious fellowship programme at Karolinska Institutet for basic science postdoctoral researchers. The programme is focused in the research areas of diabetes and its comorbidities, endocrinology and metabolism. It aims to support the development of a new generation of exceptional young early career diabetes researchers, who will become future leaders in the field, while further developing scientific excellence within diabetes and ultimately improving the lives of patients.

The fellowship programme was initiated in 2015 and five annual recruitments have been carried out thus far where outstanding researchers have been selected for the fellowship in competition with hundreds of applicants. See brief scientific biographies of the current fellows in this booklet.

Based at Karolinska Institutet, Fellows will undertake a cutting edge research project, supervised by world-leading researchers in the field of diabetes from Karolinska Institutet and in addition the fellows will have a mentor from Novo Nordisk. It is offered to the fellows during the course of the fellowship to spend approximately 3 months in the research laboratories at Novo Nordisk in Copenhagen. Thus, Fellows will gain insight into research conducted in both academia and industry. In order to increase coherence around the Fellowship Programme, a number of events will be held throughout the year such as high profile lectures, symposia, etc. which the fellows will attend, both at Karolinska Institutet and at Novo Nordisk in Copenhagen.

- The postdoctoral research fellowships are aimed at early career researchers with a basic science background.
- Fellowships are fully funded for a 3 year period and will provide salary and travel allowance for the fellow.
- These prestigious fellowships are open to outstanding candidates of any nationality.
I studied Pharmacology at the University of Bristol, carrying out my master’s project within the Heart Failure department at GlaxoSmithKline in Philadelphia. I obtained my DPhil at the University of Oxford, focusing on novel molecular therapies for the treatment of Familial Hypercholesterolaemia. Here, I worked on the pre-clinical development of a non-viral gene therapy approach and a small molecule approach to deliver and upregulate functional copies of the low-density lipoprotein receptor respectively. Through this work, I became interested in lipid dysregulation and its role in the development of cardiometabolic disease. I started my Novo Nordisk Fellowship in November 2016 joining the Lipid Laboratory under the supervision of Associate Professor Ingrid Dahlman. During the 3-year fellowship I will be investigating the role of long non-coding RNA in adipose tissue function and its contribution to the development of insulin resistance and type-2 diabetes. The long non-coding RNA transcriptome and its relation to defining white adipose tissue dysfunction is completely unexplored. In the Lipid Laboratory we will apply -omics technologies and high throughput gene manipulation, together with sensitive non-coding RNA transcriptome and its relation to defining white adipose tissue dysfunction is completely unexplored. In this translational approach findings in cell models will be validated in large clinical cohorts.

I got my Bachelor’s degree in Health Biosciences and Master’s degree in Drug development at University of Turku, Finland. During my PhD at Turku PET Centre, I focused on positron emission tomography (PET) imaging of inflammation in atherosclerosis. The evaluated PET radiotracers were targeted to macrophages in atherosclerotic lesions. I also studied the use of PET imaging for the assessment of therapy responses. I started my Novo Nordisk Fellowship in October 2017 in the group of Stephen Malin and Göran K Hansson in Department of Medicine, Solna. Raised blood cholesterol levels are strongly linked to cardiovascular disease and type 2 diabetes. We are studying what kind of molecular, inflammatory and metabolic effects are initiated in the transition to dyslipidemic state and how do these changes contribute to the development of atherosclerotic lesions. Other aim of the project is to study whether these changes be reversed by cholesterol lowering. The studies are conducted in mouse models that permit induced changes in blood cholesterol levels. Finally, the aim is to translate the concept to human disease by evaluating samples from patients with familial hypercholesterolemia.

After my graduation in Human Feeding and Nutrition Sciences at the University of Perugia, I joined Karolinska Institutet as Ph.D. student in the Growth and Metabolism Group (Dept. of Molecular Medicine and Surgery, MMK), focusing on cell and mitochondrial metabolism during hyperglycemia in human primary cells. In the last part of my doctoral studies I relocated to the Helmholtz Zentrum München working on the primary cilium and its link with cellular metabolism before to finalize my thesis “Interplay between mitochondria, primary cilium, diabetes and its complications”. During the last year, I worked as a Quality Control and Data Management Consultant in the biotech image analysis company Definiens AG (Munich).

In October 2017, I came back to Karolinska as Novo Nordisk Postdoctoral Fellow in the section of Signal Transduction (MMK) as part of Ingo Leibiger’s group. The project I’m involved in is focusing on understanding the development and progression of beta cell insulin resistance and failure in diabetic mouse models to identify novel target and strategies for treatment of T2DM. Moreover, we will study the insulin receptor A and B isoforms using aptamers as tools to selectively activate/inactivate these receptors and thus study their biological significance in cells and tissues.
I completed my PhD in the group of vascular physiology at the department of Experimental Medicinal Science at Lund University Sweden in February 2017. My main research focus has been on the host defence peptide LL-37 and its effects on human cell viability. During my PhD and subsequent employment, I have also investigated cytotoxic and immunomodulatory properties by a number of other proteins and small molecules. My earlier academic background lies primarily in chemistry, where I worked with semi-synthesis and isolation/structure elucidation of natural products. I began my Novo Nordisk fellowship in January 2018, working with Hjalmar Brismar and Anita Aperia at the Pediatric Cell and Molecular Biology lab of the Department of Women’s and Children’s Health. Diabetic nephropathy is a common complication for diabetic patients which often results in chronic kidney disease. I investigate an early event in the nephropathy pathogenesis in which glucose and/or albumin triggers apoptosis of mesangial and proximal tubular cells. Additionally, a Na,K-ATPase-signaling cascade which attenuates cell death is being investigated, in order to gain mechanistic understanding of the apoptosis and its medical significance.

Fellow: Dr. Daniel Svensson, Email: Daniel.Svensson.1@ki.se
Supervisors: Associate Professor Hjalmar Brismar and Professor Anita Aperia
Project title: A novel concept for origin and treatment of diabetic nephropathy
Affiliation at Ki: Department of Women’s and Children’s Health
Mentor at Novo Nordisk: Dr. Anil Karihaloo

After my graduation from the Saint-Petersburg State University, I studied as a PhD student at the Institute of Experimental Medicine in Saint-Petersburg, Russia. My main research focus has been on the genes involved in atherosclerosis development. I have studied the influence of pro- and anti-atherosclerotic stimuli on the expression of various genes (such as C3, apoA-I and ABCA1) as well as protein production in human hepatoma cells and human macrophages. During the project I have discovered signaling cascades and characterized new protein complexes between important metabolic transcription factors, involved in these processes. I will begin my Novo Nordisk fellowship in September 2018 in a project led by Dr. Peder Olofsson in Department of Medicine. The project will focus on the role of TGF-β cells in human vascular atherosclerosis, as well as their function in integrating immune and nervous systems. To this end, TGF-β cells will be identified in lesions and markers for their isolation will be found. This will allow us to isolate human TGF-β and functionally characterize them. The next step of the project will involve unveiling mechanisms of TGF-β differentiation and activation. Regulation of ChAT expression will be studied. The low resolution undirected network representation of the differentially expressed ChAT T-cell genes and their most frequent interactors will be identified and used to test for potential disease relevance.

Fellow: Dr. Vladimir Shavva, Email: Vladimir.Shavva@ki.se
Supervisor: Professor Peder Olofsson
Project title: Neural regulation of inflammation in atherosclerosis.
Affiliation at Ki: Department of Medicine, Solna
Mentor at Novo Nordisk: Dr. Michael Nyberg

I studied biology at the University of Cologne and started to work as an electrophysiologist during my diploma thesis where I analyzed ion channels of interneurons in the antennal lobe of the cockroach Periplaneta Americana. During my PhD studies, I took the opportunity to work in the field of the neuronal control of energy homeostasis. Specifically, I am interested in the intrinsic mechanisms, which define the excitability of neurons in the hypothalamus controlling food intake and energy expenditure and how these are altered by neuromodulation or by chronic alterations, i.e. when animals are exposed to a high-fat-diet and subsequently develop diet-induced obesity. I found that the activity of satiety signaling POMC neurons is decreased in obese animals, in part as a consequence of changes in Ca2+ handling in these cells. Further, I could identify the catecholamine noradrenaline as new modulator of cells in the hypothalamus controlling energy homeostasis. After my PhD I stayed as a postdoc in Cologne and continued and expanded my research in this particular system. In the beginning of 2019 I started in the lab of Christian Broberger after being awarded with a Novo Nordisk postdoctoral fellowship. Particularly, we aim to characterize somatostatin expressing neurons in the periventricular nucleus of the hypothalamus, a population that has not been described in detail yet. Since these cells are major components of the growth hormone axis we want unravel the contribution to glucose metabolism specifically and energy homeostasis in general. To this end, we will use electrophysiological tools in-vitro and in-vivo combined with behavioral analysis and assessment of metabolic parameters in mice. The knowledge obtained within this project helps to further understand the central regulation of metabolism and may open new targets and strategies in the pharmacological treatment of metabolic disorders and obesity.

Fellow: Dr. Lars Paeger, Email: Lars.Paeger@ki.se
Supervisor: Professor Christian Broberger
Project title: The central control of growth hormone release – electrophysiology and functional role of neuroendocrine somatostatin neurons
Affiliation at Ki: Department of Neuroscience
Mentor at Novo Nordisk: Dr. Dorte Holst

I am a Clinician Scientist working on adipocytokine crosstalk linking obesity and diabetes mellitus with cardiometabolic complications. I graduated from Medical School at the University of Leipzig, Germany and obtained my M.D. in 2010. In my research, I have focused on the effects of adipose tissue-secreted proteins especially on diabetic kidney disease using human studies, as well as animal experiments. In 2018, I finished my Habilitation thesis on adipocytokines as predictors of cardiometabolic diseases.

In 2019, I started my Novo Nordisk Fellowship at Karolinska Institutet in the Division of Renal Medicine at the Department of Clinical Sciences, Intervention and Technology (CLINTEC). I work in the group of Peter Stenvinkel and Annika Wernerson investigating novel genes and proteins that are involved in development and progression of chronic kidney disease and its vascular complications. In more detail, we focus on the identification of pathways contributing to early vascular ageing frequently observed in patients with chronic kidney disease. The overall aim of my work is to establish potential therapeutic targets aiming on treatment of chronic kidney disease but also its cardiometabolic and vascular comorbidities and complications.

Fellow: Dr. Thomas Ebert, Email: Thomas.Ebert@ki.se
Supervisors: Professors Peter Stenvinkel and Annika Wernerson
Project title: Chronic kidney disease – exploration of novel diagnostic, preventive and therapeutic targets for an emerging public health priority
Affiliation at Ki: Department of Clinical Science, Intervention and Technology
Mentor at Novo Nordisk: Dr. Thomas Idorn
I studied biology at the University of Barcelona and conducted my PhD studies in its Cell Biology, Physiology and Immunology department. My research aimed at elucidating the effects of intermittent hypobaric hypoxia and aerobic exercise on the recovery from eccentric exercise-induced muscle damage in trained rats. Specifically, I analyzed the time-course of myofiber histomorphological and metabolic alterations. Moreover, I conducted a pre-doctoral and a post-doctoral research stay at the University of Porto, where I delved into the use of physical exercise as a non-pharmacological tool to counteract mitochondrial dysfunction associated to drug therapies, high-fat diets and Alzheimer’s disease.

In October 2019, I started my Novo Nordisk Postdoctoral Fellowship under the supervision of Professor Juleen Zierath and Professor Anna Krook at the Integrative Physiology group of the Department of Physiology and Pharmacology. Our aim is to unravel the complex regulation of the communication between liver, skeletal muscle and adipose tissue and to understand how these processes are perturbed in Type 2 diabetes. To address that, we will identify novel factors secreted by liver, skeletal muscle and adipose tissue from Type 2 diabetes patients. Subsequently, we will determine whether these candidate factors mediate in the crosstalk between the abovementioned tissues and their impact on whole-body metabolism and insulin sensitivity in Type 2 diabetes by using both in vitro and in vivo models.

I studied Nutrition Sciences (Bsc) at the Christian-Albrechts University (Kiel, Germany) and Molecular Biosciences (MSc) at the University of Southern Denmark (Odense, Denmark). During my PhD fellowship as a Marie Curie Early Stage Researcher at the Academic Medical Center (University of Amsterdam, The Netherlands), I focussed on the diagnosis of genetic metabolic diseases and studied their functional consequences. In particular, I performed functional lipidomics studies in fibroblasts and plasma samples from patients with a peroxisomal disorder, and investigated novel biomarkers for these diseases.

Since I obtained my PhD in December 2017, I translated my research interests into the field of obesity and Type 2 Diabetes (T2D). At Lund University (Sweden), I studied the effect of interventions such as diet and gastric bypass surgery on the plasma metabolome of obese patients, as well as the prediction of future disease using metabolic markers in a prospective cohort study.

I started my Novo Nordisk Fellowship in October 2019 joining a project that focuses on a common, but under-studied form of autoimmune diabetes called Latent Autoimmune Diabetes in Adults (LADA) at the Institute of Environmental Medicine under the supervision of Associate Professor Sofia Carlsson. By using data from large population-based studies, I will investigate factors associated with the risk of developing LADA and T2D in relation to individual lifestyle factors and their interaction with genetic factors. Furthermore, I will study the risk of macro- and microvascular disease in LADA and T2D patients and the prognostic role of treatment and lifestyle, as well as metabolic, clinical, and genetic factors.
Programme Steering Committee

Karolinska Institutet members

Prof. Juleen Zierath, Clinical Physiology
Steering Committee Chairman

Prof. Anders Gustafsson, Academic Vice-President for Research

Prof. Nancy Pedersen, Medical Epidemiology

Prof. Barbara Canlon, Hearing Physiology

Novo Nordisk members

Prof. Peter Kurtzhals, Chief Scientific Advisor

Prof. Martin Ridderstråle, Corporate Vice President, Clinical Pharmacology

Programme Managers

Karolinska Institutet

Dr. Håkan Karlsson
Email: hakan.karlsson.1@ki.se
Tel: +46 73 712 14 37

Novo Nordisk

Dr. Stephan Bouman
Email: sdbo@novonordisk.com
Tel: +45 30 79 47 85