

## Theme: Prevention of diabetes and obesity / Acute and late-stage diabetes complications

### 1. 'Epigenetic Control and the Circadian Clock: Turning Back Time on Diabetes Pathogenesis', DKK 60 million

Main applicant: Juleen Zierath, Professor and Scientific Director, Novo Nordisk Foundation Center for Basic Metabolic Research, University of Copenhagen; and Karolinska Institutet, Stockholm, Sweden

Co-applicants:

Paolo Sassone-Corsi, UC Irvine, CA, USA

Harriet Wallberg-Henriksson, Karolinska Inst, SE

John A. Hawley, ACU, Victoria, Australia

Brief description:

Physical activity has a documented positive effect in preventing and treating type 2 diabetes. But does it make a difference when we exercise? This is one question international collaboration will address by examining the extent to which and how the body's circadian rhythm influences the ability of muscles to take up and metabolize sugar from the blood and the effects of exercise in relation to type 2 diabetes. The project will map the body's biological clock, which controls the body's circadian rhythm, to develop innovative physical activity and dietary strategies to improve prevention and treatment of type 2 diabetes.

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## **2. ‘Novel Receptor Targets in the Prevention and Treatment of Diabetes and Obesity’, DKK 60 million**

Main applicant: Thue W. Schwartz, Professor and Scientific Director,  
Novo Nordisk Foundation Center for Basic Metabolic Research,  
University of Copenhagen

Co-applicants:

Stefan Offermanns, Max Planck, Bad Neuheim, GE

Gerard Gradwohl, IGBMC, Illkirch, FR

Guilleme Montoya, NNF CPR, KU, DK

Brief description:

The body’s metabolism is regulated somewhat by hormones produced by cells located in the gut wall that detect both the nutrients present in the gut and components that circulate in the blood. This project proposes international collaboration to examine how these cells register and react to external components with the goal of being able to influence cells’ hormone production and the body’s metabolism as a result. These methods will be used in important ways for both prevention and treatment within diabetes and obesity.

D. S. GILLIS

### **3. 'International Diabetic Neuropathy Consortium (IDNC)', DKK 60 million**

Main applicant: Troels Staehelin Jensen, Clinical Professor,  
Department of Clinical Medicine, Aarhus University

Co-applicants:

Henning Andersen, Neurology, AUH, DK

Henning Beck-Nielsen, Endocrinology, OUH, DK

David L.H. Bennett, Clinical Science, U Oxford, UK

Brian Callaghan, U Michigan, Ann Arbor, MI, USA

Morten Charles, Public Health, AU

Eva Feldman, Neurology, U Michigan, Ann Arbor, MI, USA

Nanna B. Finnerup, Danish Pain Research Center, AU, DK

Jan Frystyck, Endocrinology, AUH, DK

Reimar W. Thomsen, Epidemiology, AUH, DK

Søren H. Sindrup, Neurology, OUH, DK

Leif Østergaard, Neuroimaging, CFIN, AU, DK

Brief description:

Diseases of the nervous system that result in pain symptoms, nerve damage, numbness and often amputation comprise some of the most significant personal and economic complications associated with diabetes. This project investigates the mechanisms that cause these diseases and how to prevent and treat them in relation to diabetes. The project uses patient databases and compares these with experimental data generated with the aim of developing methods to assess a given patient's risk of developing these complications and to develop better methods of treatment. The project is interdisciplinary and includes many co-applicants in both Denmark and abroad.

Christina D.

#### **4. 'PROTON – Personalizing Treatment of Diabetic Nephropathy', DKK 60 million**

Main applicant: Peter Rossing, Senior Principal Investigator and Head of Complications Research, Steno Diabetes Center

Co-applicants:

Andrzej Krolewski, JDC, HMS, Boston, MA, USA

Per-Henrik Groop, Clinical Medicine, U Helsinki, FIN

Dick de Zeeuw, Medical Sciences, U Groningen, NL

Brief description:

Diabetes is often associated with impaired kidney function, a complication that can develop into kidney failure. No effective treatment has been discovered so far. The project proposes international collaboration on state-of-the-art screening of many biological markers in blood, urine and gut flora taken from patients with impaired kidney function. Comparing these with samples from healthy individuals in large international databases will enable the risk of disease to be predicted and assessed on an individual basis and thereby enable much more targeted and personalized treatment, probably with vastly improved effectiveness.

D. S. J. P. C.