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**Place of employment and host institution:** UCL Great Ormond Street Institute of Child Health, United Kingdom and Steno Diabetes Center Copenhagen

**Host principal investigator:** Dr. Gregers Andersen, Steno Diabetes Center Copenhagen

**Title of project:** Developing an Evolutionary Approach to Typ 2 and Gestational Diabetes

#### **ABSTRACT**

Diabetes represents a cluster of conditions that have in common the inability to regulate blood glucose levels, leading to serious morbidity and risk of death. This application focuses on forms of diabetes closely associated with environmental factors, namely Type 2 (T2DM) and Gestational (GDM) Diabetes Mellitus. A major challenge to prevention of these conditions is that diabetes risk emerges cumulatively through the life-course, and many individual risk factors are embedded in axes of behavioural and physiological plasticity that do not in themselves manifest as overtly pathological. An evolutionary 'life history' approach may shed new light on how such plastic responses predispose to disease. Over the last decade, I have been developing such a framework, focused on how variability in key diabetes risk traits is shaped by ecological stimuli and stresses over short- and long-term timescales. During the fellowship, I aim to apply this framework to epidemiological resources steered by Danish researchers based at Steno Diabetes Center Copenhagen (SDCC) and University of Copenhagen (UC), working in the fields of diabetes prevention and public health nutrition. My first aim is to support research on the life-course aetiology of T2DM risk in the Inter99 cohort of older Danish adults, exploring factors that modify the association of ageing with T2DM and its risk traits. My second aim is to support research on the DANLIFE cohort of younger Danish adults, testing the hypothesis that exposure to adversity/stress in childhood/adolescence impacts GDM risk traits in younger adults, as well as size at birth in the next generation. My third aim is to support research on the developmental trajectory of cardiometabolic risk traits in healthy and under-nourished populations of children in low-income countries, namely the healthy iABC cohort (Ethiopia) and the MAGNUS cohort of undernourished children (Kenya). My fourth aim is to support research on birth cohorts and adult cohorts in Greenland, in order to understand how cardiometabolic risk traits at different ages may have been shaped by adaptation to arctic climatic conditions. Collectively, this work will enable substantial progress in applying an evolutionary life history framework to T2DM and GDM risk, and is intended to lead to a comprehensive review article on this topic, co-authored with Danish colleagues, for a high-impact journal.