Danish Diabetes Academy

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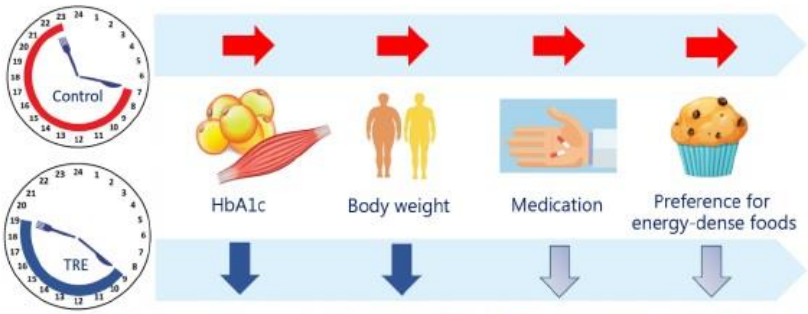
Title of project: Time-restricted eating and food reward in type 2 diabetes

ABSTRACT

Background: Obesity is associated with preferences for foods high in fat and sugar and with reward in response to food cues. Such foods tend to be eaten in larger amounts during evening and nighttime hours. Small brain imaging studies suggest altered activity in central reward-related regions in response to visual food stimuli in individuals with type 2 diabetes (T2D) compared to healthy controls, but there is a need for larger studies confirming whether T2D is associated with alterations in food preferences and reward. A growing body of evidence suggests that it is not only the type and quantity of foods consumed that matters with regards to obesity and cardiometabolic health but also the timing of food intake. Time-restricted eating (TRE), an intermittent fasting regimen, has been put forward as a novel lifestyle modification. TRE interventions are promising because they do not directly modify the type or quantity of food but alter timing of food intake, for example eliminating late-evening/night-time eating and snacking episodes. This allows food reward to normalise around an earlier meal pattern, and accordingly healthier food preferences may develop. Indeed, TRE interventions have shown promising effects on body weight and cardiometabolic health in individuals at high risk of T2D, but the effects of TRE on food reward and the longer-term effects and feasibility of TRE in the treatment of T2D are unknown.
The overall objective of this proposal is to address the need for effective and feasible lifestyle changes in T2D in relation to food preferences and reward by including a TRE regimen designed together with the target group. **The first study** includes three phases: 1) needs assessment including focus group interviews with users, their relatives, and healthcare professionals; 2) development, pilot testing, evaluation, and modification of a TRE-based intervention; and 3) a 1-year randomized controlled trial investigating the effectiveness of the TRE-based intervention on weight loss, glycaemic control, medication, food reward, and patient-reported outcomes in 260 individuals with T2D. **In a second concurrent study**, we will determine food preferences and reward in 100 individuals with T2D and investigate whether their food preferences and food reward differ from 100 individuals with normal weight and 100 individuals with overweight/obesity. Food preferences and reward will be measured in the fasting state using a unique computer task displaying images of foods varying in taste and fat content and concomitant biometric measurements (eye tracking, galvanic skin response, and facial expression). **Impact:** These studies may inform future recommendations and treatment strategies for individuals with T2D.



Graphical abstract Expected effects of time-restricted eating (TRE) in individuals with type 2 diabetes on HbA1c and body weight (co-primary outcomes) and use of antidiabetic medication and food preferences (secondary outcomes).