3 Year PhD Studentship available for September 2019

Department:  Leicester Precision Medicine Institute / Leicester Biomedical Research Centre / Diabetes Research Centre

Supervisors:  Prof Tom Yates  ty20@leicester.ac.uk
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Eligibility:  UK/EU applicants only

Project Title:  Reducing sedentary behaviour for improved physical function in type 2 diabetes

Project Description:

Type 2 diabetes mellitus (T2DM) is one of the most prevalent and costly chronic diseases globally affecting close to one in ten adults. Management strategies for T2DM focus on glycaemic control and cardiovascular disease (CVD) prevention. However, T2DM also represents a model of biological aging, physical deconditioning and risk of frailty which are further accelerated when combined with sedentary lifestyles. This project will investigate whether exercise interventions to break prolonged sitting can be used to improve physical function and reverse the physical deconditioning associated with T2DM.

The project will utilise both epidemiology and experimental research methodologies ensuring the student receives training across multidisciplinary aspects of quantitative research. For epidemiological investigation, the student will undertake secondary data analysis using the large regional and national datasets that are available within the Diabetes Research Centre. For the experimental investigation, the student will work with the NIHR Leicester Biomedical Research Centre (BRC) to undertake a clinical trial investigating whether an intervention to reduce prolonged sitting improves measures of functional ability and metabolic health in T2DM. The student will be based at the Leicester Diabetes Centre, Leicester General Hospital, and embedded within a vibrant community of postgraduate lifestyle researchers.

Background

Type 2 diabetes mellitus (T2DM) affects 387 million people globally, projected to increase to 592 million by 2035, representing 10% of the population. In the UK, T2DM incurs a direct costs of £8.8 billion and indirect costs of £13 billion. Management strategies for T2DM focus on glycaemic
control and cardiovascular disease (CVD) prevention. However, T2DM also represents a model of accelerated biological aging, physical deconditioning and risk of frailty. Physical deconditioning is further accelerated in T2DM with unhealthy lifestyle practices, particularly high levels of sedentary behaviour and inactivity. Therefore due to etiological processes associated with T2DM and the high levels of sedentary behaviour that characterise the behavioural phenotype of T2DM, those with T2DM have levels of physical frailty and deconditioning expected in those that are two decades older.

Based on ongoing and completed BRC funded research, interventions to break time spent in prolonged sitting with short bouts of light movement have been shown to improve glucose regulation in individuals with dysglycaemia whilst also having longer-term benefits in occupational settings [1-4]. However, it is currently unknown how such intervention can be optimised to improve metabolic health whilst also reversing physical deconditioning.

**Clinical context**

Within the past 12 months, new national and international consensus statements have been published for the management of T2DM with frailty (5,6). Furthermore, as part of revisions to the Quality Outcomes Framework (QoF), NICE have added indicators that include T2DM management targets by frailty status to inform negotiations for the 2019-20 GP contract. Therefore, it is highly likely that all adults with T2DM will routinely have their frailty status coded nationally within primary care. However, management guidelines have predominantly focused on medicines management, with a lack of focus on developing and implementing interventions aimed at reversing impaired physical function in T2DM.

**Hypothesis**

We hypothesise that interventions which focus on breaking prolonged sitting with regular short bouts of light resistance exercises can be used to promote improved metabolic health and physical function in those with T2DM.

**Experimental Methods and Research Plan**

The project will encompass a multi-disciplinary approach providing training and research activity across different disciplines, combining both observational research and an experimental trial. The observational study will utilise large datasets with accelerometer measured physical activity and physical function with the aim of identifying patterns of breaking prolonged sedentary behaviours that are optimally associated with physical function in T2DM and the general population. The student will be trained in accelerometer data processing and in undertaking regression modelling. The experimental phase of the project will involve designing and undertaking a randomised controlled trial. The trial will investigate whether an 8 week intervention designed to promote the adoption of regular short bouts of light resistance exercise throughout the day can be used to improve glucose regulation (mixed meal test), physical function (incorporating measures of cardiorespiratory fitness along with muscle strength and endurance) and increase lean body mass (measured by DXA). Secondary outcomes will include continuous blood glucose monitoring.
References:


Funding details:

This project is in competition for a LPMI/BRC College of Life Sciences (CLS) PhD Studentship. The Studentships are for three years, starting September 2019, and offer tuition fees at UK/EU rates and a Stipend at UK Research Council rates.

Entry requirements:

Applicants are required to hold/or expect to obtain a UK Bachelor Degree 2:1 or better in a relevant subject. The University of Leicester English language requirements apply where applicable.
How to apply:

You should submit your application using our online application system.

Apply for a PhD in Health Sciences

In the funding section of the application please indicate you wish to be considered for a LPMI/BRC studentship

In the proposal section please provide the name of the supervisor and project you want to be considered for.

You do not need to submit a proposal but please include a personal statement detailing your interest in this project

Project / Funding Enquiries:  Prof Tom Yates  ty20@leicester.ac.uk

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Application enquiries to pgradmissions@le.ac.uk

Closing date for applications  27th January 2019