

University of Leicester - PhD project

Funding Source: Self-funded / applicant's own Sponsor

Proposed start date: negotiable

Closing date for applications: open until filled

Eligibility: UK/EU/International

Tuition fees for overseas: 2025/26 academic year: £23,650 - £38,300 per year

Department/School: Population Health Sciences / DRC

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Project Title: Evaluating the ethnic differences of physical activity on blood glucose

Project Description:

Aim: To develop an algorithm to recommend duration and intensity of exercise to respond to raised glucose levels in people with diabetes

Background:

Previous studies have shown that bouts of exercise both prior to, and after breakfast led to decreases in glucose levels over short (2 hours) and longer (24 hour) durations (1-3). These benefits have been seen in those living with obesity, pre-diabetes, and type 2 diabetes. Whilst we understand that exercise is beneficial to reduce post-prandial glucose, there isn't information on the duration or intensity (volume or dose) of exercise is required to produce a desired reduction in post-prandial glucose. It is also not clear how this relationship changes with age or ethnicity. Given the higher prevalence of type 2 diabetes, as well as greater insulin resistance, in those from a south Asian background, exercise to lower post-prandial glucose may be of particular use in this population (4, 5). Therefore, this PhD project aims to develop an algorithm that may drive a bio-behavioural feedback loop to determine the volume (duration and intensity) of physical activity required to produce a reduction in glucose levels.

Methods:

Chapter one will comprise a literature review, and potential meta-analysis, to summarise the effect of different intensities, durations, and modalities of exercise on post-prandial glucose concentrations. Chapter two will utilise experimental medicine methods to compare the post-prandial glucose response to various exercise intensities, durations, and modalities. The sample will be stratified by ethnicity to investigate ethnic differences in responses to exercise. In chapter three, participants will be asked to wear a continuous glucose monitor and Fitbit device. Exercise "bouts" will be determined

from the Fitbit steps data and the effect of these on post-prandial glucose levels in the real-world will be assessed.

Expected outcomes and impact:

This project will quantify the effect of exercise bouts on post-prandial glucose levels and use this to develop a bio-feedback loop that may advise the duration and intensity of exercise required to reduce glucose. This could take the form of advice such as “if you were to take a 15-minute walk, you could reduce your insulin bolus by X”.

References:

1. Gillen JB, Little JP, Punthakee Z, Tarnopolsky MA, Riddell MC, Gibala MJ. Acute high-intensity interval exercise reduces the postprandial glucose response and prevalence of hyperglycaemia in patients with type 2 diabetes. *Diabetes Obes Metab.* 2012;14(6):575-7.
2. MacLeod SF, Terada T, Chahal BS, Boule NG. Exercise lowers postprandial glucose but not fasting glucose in type 2 diabetes: a meta-analysis of studies using continuous glucose monitoring. *Diabetes Metab Res Rev.* 2013;29(8):593-603.
3. Aqeel M, Forster A, Richards EA, Hennessy E, McGowan B, Bhadra A, et al. The Effect of Timing of Exercise and Eating on Postprandial Response in Adults: A Systematic Review. *Nutrients.* 2020;12(1).
4. Chandalia M, Lin P, Seenivasan T, Livingston EH, Snell PG, Grundy SM, et al. Insulin resistance and body fat distribution in South Asian men compared to Caucasian men. *PLoS One.* 2007;2(8):e812.
5. Sattar N, Gill JMR. Type 2 diabetes in migrant south Asians: mechanisms, mitigation, and management. *The Lancet Diabetes & Endocrinology.* 2015;3(12):1004-16

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.

Application advice:

To apply please refer to <https://le.ac.uk/study/research-degrees/research-subjects/health-sciences>

With your application, please include:

- CV
- Personal statement explaining your interest in the project, your experience, why we should consider you in addition to confirmation of how you will pay your fees.
- Degree Certificates and Transcripts of study already completed and if possible transcript to date of study currently being undertaken
- Evidence of English language proficiency if applicable

- In the reference section please enter the contact details of your two academic referees in the boxes provided or upload letters of reference if already available.

In the funding section please specify that you wish to be considered for **Self funded Choudhary project**

In the proposal section please provide the name of the supervisors and project title (a proposal is not required)

Project / Funding Enquiries: Pratik Choudhary Pratik.choudhary@leicester.ac.uk

Application enquiries to cls-pgr@le.ac.uk