

## Fully-funded Ph.D. studentship - University of Roehampton

### ***Cross-talk between skeletal muscle and pancreatic $\beta$ -cells - The contribution of $\beta$ -cell dysfunction to the progression of type 2 diabetes***

The University of Roehampton is now well placed for its next REF submission in 2021 and is aiming to invest in its long-term research culture. Recent grant success within the Sport & Exercise Sciences Research Centre has resulted in a fully-funded Ph.D. studentship being made available in partnership with NHS England Health Innovation Network (SW London), linked with the National Diabetes Prevention Programme (NDPP).

#### **Project Background**

Insulin resistance precedes  $\beta$ -cell dysfunction in the progression of type 2 diabetes (T2D) (Stumvoll et al., 2005), and peripheral insulin resistance has received a great deal of scientific attention owing to the glucose storage capacity of skeletal muscle. Despite  $\beta$ -cell failure being a core defect in the transition from prediabetes to diabetes, less research has been conducted assessing *in vivo* pancreatic  $\beta$ -cell function in humans in comparison with studies of insulin resistance. As both pathological states (peripheral insulin resistance and  $\beta$ -cell dysfunction) influence each other and synergistically exacerbate diabetes, it is important to quantify  $\beta$ -cell function in living humans. One method used in our labs to do this is the disposition index (DI) (Mackenzie et al., 2011; Naufahu et al., 2018), which gives a measure of  $\beta$ -cell function from the relationship between insulin sensitivity and insulin secretion.

Although skeletal muscle and the pancreas are recognised as crucial mediators of glucose control, very little is currently known about the extent to which interaction or crosstalk between these two tissues occurs. Accumulating research in recent years has demonstrated that skeletal muscle acts in an endocrine fashion by producing and releasing factors into the bloodstream in response to stresses such as exercise. These factors include proteins referred to as myokines, as well as metabolites and exosomes (Barlow and Solomon, 2018). These muscle-derived factors may provide a mechanism whereby muscle is able to communicate with other tissues within the body to promote improvements in whole-body homeostasis, such as recovery in  $\beta$ -cell function post-exercise.

This Ph.D. studentship will investigate cross-talk between skeletal muscle and pancreatic  $\beta$ -cells to help improve our understanding of the pathophysiology of pre-diabetes and type 2 diabetes. Furthermore, it will monitor whether this tissue crosstalk is modified over time and examine a range of myokines as potential biomarkers for deterioration of  $\beta$ -cell function. This Ph.D. project will provide students with the opportunity to develop a range of skills including: stable isotope tracer methodologies; liquid chromatography-mass spectrometry; and immunofluorescence microscopy.

Potential candidates can come from a variety of backgrounds including biomedical sciences, human physiology, nutrition, and exercise science. This programme is a three-year, full-time, doctoral research studentship and will come with a full bursary, in addition to a full tuition fee waiver and consumable costs. **Start date October 2019**

Full time bursary students are expected to be available for the equivalent of up to 6 hours a week over 40 weeks a year for teaching or teaching-related work. Where the student undertakes teaching or teaching-related work, the time for preparation, marking, and related administration shall be included in those six hours maximum per week. The hours may be

deployed in blocks or regularly throughout the 40 weeks depending on opportunities available and what is practical.

For more details, contact Dr Richard Mackenzie ([Richard.mackenzie@roehampton.ac.uk](mailto:Richard.mackenzie@roehampton.ac.uk); Tel: 020 8392 3562) or Dr Nicholas Hurren ([Nicholas.Hurren@roehampton.ac.uk](mailto:Nicholas.Hurren@roehampton.ac.uk); Tel: 020 8392 4495). Closing date for applications is 26<sup>th</sup> July 2019. Interviews will take place in the week beginning 5<sup>th</sup> August 2019

Applications must be made via the Roehampton Online portal  
<https://www.roehampton.ac.uk/graduate-school/degrees/>