UNIVERSITY OF
INSPIRING
RESEARCH
WESTMINSTER

Project title: **Deciphering the genetic pathways of cardiac hypertrophy and heart failure**

Studentship Code: FST2

Dysregulation of calcium handling, mitochondrial function and reactivation of foetal genes are hallmarks of cardiovascular disorders (cardiac hypertrophy, heart failure, arrhythmias and stroke). Mitochondrial dynamics and metabolism influence the susceptibility of the heart to ischemia reperfusion (I/R). We have identified a cardiac-enriched gene named STARS that plays a pivotal role in heart function. STARS knockdown (KD) in zebrafish resulted in dilated cardiomyopathy, decreased ventricular function and abnormal heart rhythm [1]. Cardiac-specific STARS KD in *Drosophila* flies rendered the heart arrhythmic [2]. Over-expression of STARS in cardiac myoblasts led to hypertrophy and activation of foetal genes [3]. STARS is epigenetically regulated and controlled by the pivotal cardiac factor GATA4 [4]. This demonstrates that STARS is a novel and essential nodal point in cardiac cell survival and remodelling and an attractive therapeutic target however the mechanism of STARS action is still unclear.

In this project, the scholar will use established *in vitro* and *in vivo* approaches, coupled with disease model systems, to elucidate the mechanism of STARS in cardiac remodelling. In collaboration with the "Applied Biotechnology" research group, we will use novel biomaterials for gene delivery into cardiomyocytes. The metabolic and mitochondrial phenotype of STARS KD in cardiomyocytes will be examined in collaboration with the "Research Centre for Optimal Health". We will use next generation sequencing to completely decipher the mechanistic pathways of STARS in cardiac disease states (in collaboration with Department of Biomedical Sciences). The role of STARS in cardiac disorders will be examined further using established in vitro and in vivo disease models.

This is a multi-disciplinary project utilising the strengths at Westminster and collaborations (Leicester, Nottingham). The scholar will gain practical experience in animal model systems with state-of-the-art molecular and cellular techniques and bioinformatics analysis to delineate gene networks and pathophysiology. They will acquire knowledge in cutting edge research (heart failure, metabolism, biomaterials, genomics) and encouraged to present at high-profile national/international conferences.

The scholar will become a member of the "Cell Communication" research group and participate in the University's' "Doctoral Researcher Development Programme" (based on the "Vitae's" Researcher Development Framework), which is designed to support the scholars' research and academic progress and enhance their professional and career development. The doctoral researcher will also have the opportunity to obtain a Postgraduate Certificate in teaching and learning.

Related publications

1] Chong NW et al (2012) PloS one 7: e40966; [2] Beaumont KL, Rosato E, and Chong NW (2011) European Heart Journal 32, 812.; [3] Koekemoer AL, Chong NW et al (2009) FEBS Lett 583, 2964-2967.; [4] Ounzain S et al Chong NW (2012) Mol Cell Biol 32, 1830-1843

Contact

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For details of how to apply

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