

RCoA Research, Education & Travel Grants 2016

Award: The Belfast Fund

Applicant: Dr Helen McKenna

Project Title: *Presentation of original work (relationship between mitochondrial dysfunction and mortality in critically ill patients) at an international workshop on high-resolution respirometry, in Austria*

Project Description:

I wish to apply for financial support to participate in an international workshop on a novel experimental technique for determining dynamic indices of mitochondrial function in living tissue: high-resolution respirometry. The aim is to present my original work to experts in this field and to develop collaborations to facilitate this growing programme of translational research in perioperative medicine.

Background

I am anaesthetic trainee, self-funding my MD(Res) degree at UCL Division of Surgery, through working as a Clinical Fellow in Intensive Care. I am currently pioneering the use of respirometry in critically ill patients in a pilot observational study investigating the potential relationship between skeletal muscle mitochondrial function and mortality in this cohort. I was co-applicant on grant recently awarded by the BJA/RCoA to extend this work into investigating the influence of mitochondrial function and oxidative stress on the development of post-operative complications in high-risk surgical patients. This new programme of translational research has generated collaboration between cell physiologists (based at University College London and Cambridge University) and the clinical departments of Intensive Care and Anaesthesia at the Royal Free Hospital. There is increasing demand, both in the field of cell physiology and in our own clinical speciality, to reliably quantify mitochondrial function (beyond traditional methods of quantifying static concentrations of metabolites or protein in frozen tissue samples) in order to further our understanding of how bioenergetics influences clinical outcomes. I wish to extend our use of the technique to other tissues relevant to the perioperative period, such as liver tissue at the time of transplant.

Aims

This workshop, held annually over a 7-day period, represents a unique opportunity to formally present my work to a group of international experts, who are currently using and refining this complex technique in complementary contexts, including animal models of critical illness and human studies of diseases relevant to the perioperative period, such as coronary ischaemia. Disparate scientists can share expertise and methodological and conceptual perspectives on respirometry. There are few groups using this technique in the fields of anaesthesia and critical care medicine, and this meeting would allow me to promote research in our specialty, and highlight the work of the NIAA (who have supported our investigation of mitochondrial dysfunction during the perioperative period) at an international level. I will seek feedback on our data and forge new collaborative links with related groups across the world, which will be particularly valuable at this early stage of building a programme of translational research. It will allow me to practice, under supervision, newly-developed experimental protocols (which increase the information yield from

my own experiments) and apply the technique to different tissue types, which will facilitate planning of future studies to elucidate how mitochondrial function influences outcomes in the perioperative period. I am responsible for using this technique in three studies at my centre, and it is now necessary for me to train others in its use. The education and practical support from this workshop will improve my ability to do this effectively.