



## The Intensive Care Society

Churchill House, 35 Red Lion Square, London WC1R 4SG

Tel: +44 (0)20 7280 4350 Fax: +44 (0)20 7280 4369

E-mail: [admin@ics.ac.uk](mailto:admin@ics.ac.uk) [www.ics.ac.uk](http://www.ics.ac.uk)

Patron: HRH The Princess Royal

### Young Investigator Award Winner

#### **Multi-modality monitoring of the adequacy of organ perfusion during shock states**

Dr Nasirul Ekbal, University College London

The 'holy grail' of monitoring the critically ill patient is the continuous assessment of adequacy of tissue perfusion. At present we rely upon relatively insensitive and non-specific variables such as urine output and conscious level, and global measures such as arterial base deficit and lactate. Though clearly useful, there is a need for better markers where the patient can be identified at an earlier stage and treatment optimally titrated. Oxygen delivery and consumption are key to adequate metabolism. Indeed, >90% of total body oxygen consumption is utilised by mitochondria, primarily for ATP production and this constitutes the predominant energy source in virtually all of the body's cell types. The assessment of tissue oxygenation and mitochondrial status should thus provide a hopefully invaluable means of assessing the adequacy of organ perfusion.

The host lab has already been investigating the use of tissue oxygen probes in different shock states as this reflects the balance to local oxygen supply and demand. I wish to combine this with continuous monitoring of NADH redox status using NADH fluoroscopy. NADH provides electrons to the first part of the electron transport chain and its reduced:oxidized balance will indicate if sufficient oxygen is reaching the mitochondria, or if there is a downstream block.

I plan to investigate this multi-modality tissue monitoring in different short-term shock states in rodents and to also assess the effect of commonly used inotropes. I hope this work may lead to eventual application in patients.