

Dr. Mike Murphy Group leader MRC Mitochondrial Biology Unit *Cambridge, UK*

"USING MITOCHONDRIA TARGETED ANTIOXIDANTS AND PROBES IN VIVO"

Biography

Mike Murphy received his BA in chemistry at Trinity College, Dublin in 1984 and his PhD in Biochemistry at Cambridge University in 1987. After stints in the USA, Zimbabwe, and Ireland he took up a faculty position in the Biochemistry Department at the University of Otago, Dunedin, New Zealand in 1992. In 2001 he moved to the MRC Mitochondrial Biology Unit in Cambridge, UK (then called the MRC Dunn Human Nutrition Unit) where he is a group leader. His research is concerned with all aspects of mitochondrial function and dysfunction. Currently his special interests are in targeting small molecules such as antioxidants to mitochondria, and in understanding how modifications to the thiol status of mitochondrial proteins contributes to oxidative damage and redox signalling.

Abstract

Over the past few years myself and collaborators have developed antioxidants such as MitoQ and nitric oxide donors such as MitoSNO that selectively block mitochondrial oxidative damage. In parallel we have recently developed a mitochondria-targeted mass spectrometry probe called MitoB to measure mitochondrial hydrogen peroxide and peroxynitrite. The efficacy of these molecules is based on targeting them to mitochondria, which are thought to be a major source of oxidative stress in mammalian cells. This was achieved by covalent attachment of the antioxidant to a lipophilic cation. Due to the large mitochondrial membrane potential, these cations accumulate several hundred fold within mitochondria, protecting them from oxidative damage far more effectively than untargeted antioxidants. I will report on the use of mitochondrial antioxidants and redox probes in investigating and treating pathologies involving mitochondrial oxidative stress.

14 December 2012, Friday / 3.00pm / Centre for Life Sciences (CeLS) Seminar Room 2 Convenor: Dr Jan Gruber