Professor Michael Ryan

Head, Mitochondrial Biology and Disease Laboratory

Monash Biomedicine Discovery Institute
Metabolic Disease and Obesity Program

OTHER PROGRAM AFFILIATIONS

Neuroscience

EMAIL michael.ryan@monash.edu

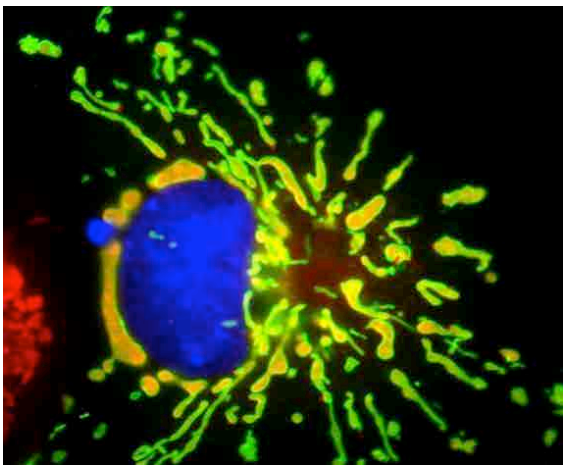
TELEPHONE +61 3 9902 4909

WEB med.monash.edu/biochem/staff/ryan.html

Mitochondria are the powerhouses of our cells. They are also important in other processes including apoptosis, innate immunity and in neurological diseases including Parkinson's. Disorders of mitochondrial energy generation cause degenerative diseases and often lead to infant death. Mitochondria are generally found as a reticulated network radiating from the nucleus with individual mitochondria undergoing fission and fusion for proper distribution, quality control, and stress responses. Our lab investigates biochemical and cell biological processes related to these areas. Research projects are designed to ensure each student encounters a range of techniques and along with weekly lab meetings, will give them expertise for future scientific and non-scientific careers. Example of projects are below.

Research Projects

1. **CRISPR/Cas9 approaches to understand human mitochondrial protein function**
2. **Mitochondrial dynamics & neurodegeneration**



Selected significant publications:

1. Formosa LE, Mimaki M, Frazier AE, McKenzie M, Stait TL, Thorburn DR, Stroud DA, **Ryan MT**. 2015. Characterization of mitochondrial FOXRED1 in the assembly of respiratory chain complex I. *Hum Mol. Genet*. 24, 2952-2965.
2. Stroud DA, Maher MJ, Lindau C, Vögtle FN, Frazier AE, Surgenor E, Mountford H, Singh AP, Bonas M, Oeljeklaus S, Warscheid B, Meisinger C, Thorburn DR, **Ryan MT**. 2015 .COA6 is a mitochondrial complex IV assembly factor critical for biogenesis of mtDNA-encoded COX2. *Hum Mol Genet.* 24, 5404-15.
3. Elgass KD, Smith EA, LeGros MA, Larabell CA, **Ryan MT**. 2015. Analysis of ER-mitochondria contacts using correlative fluorescence microscopy and soft X-ray tomography of mammalian cells. *J Cell Sci.* 128, 2795-804.
4. Richter V, Palmer CS, Osellame LD, Singh A, Stroud DA, Sesaki H, Kvansakul M and **Ryan MT**. 2014. Structural and functional analysis of MiD51, a dynamin receptor required for mitochondrial fission. *J. Cell Biol.* 204, 477-486.
5. Stroud DA, Formosa LE, Wijeyeratne XW, Nguyen TN, **Ryan MT**. 2013. Gene knockout using transcription activator-like effector nucleases (TALENs) reveals human NDUFA9 is essential for stabilizing the junction between membrane and matrix arms of complex I. *J. Biol. Chem.* 288, 1685-1690.