Australian National University

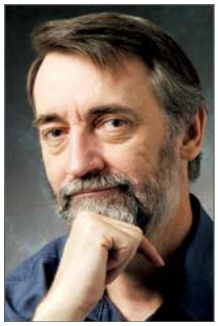
PUBLIC SEMINAR

A 'No-Brainer' Studying brain disease in a simple microbial model

Thursday 4 October 2012 1pm

Professor Paul R. Fisher Department of Microbiology, La Trobe University

Slatyer Seminar Room RN Robertson Building (46), ANU



Almost all eukaryotic cells contain mitochondria and lysosomes, membrane bounded organelles that serve central roles in the provision of cellular energy, the uptake of nutrients and the recycling of waste. Genetic defects in important proteins in either organelle can accordingly affect any tissue or organ, but surprisingly often they present clinically as neurological and neurodegenerative diseases. Even in brain diseases that are not overtly mitochondrial or lysosomal in origin, these organelles seem to play important cytopathological roles. Mitochondria and lysosomes, their important component proteins and their central cellular functions arose at the beginning of eukaryotic evolution and are highly conserved. Because of this, we have been able to use a genetically tractable eukaryotic microbe, the cellular slime mould or social amoeba *Dictyostelium discoideum*, to study the cytopathological pathways involved in a variety of brain diseases including mitochondrial disease, Parkinson's, Alzheimer's, Motor Neurone and Batten Disease as well as Mucolipidosis. The results reveal cytopathological roles for the dysregulation of interconnected signalling pathways involving the energy-sensing protein kinase AMPK, the nutrient-sensing protein kinase TOR and the actin-binding scaffolding protein filamin.

Professor Paul Fisher holds Honours and Masters degrees from the University of Queensland and a PhD from the Australian National University. He spent five years conducting postdoctoral studies at the Max Planck Institute for Biochemistry near Munich, after which he joined La Trobe University. He is currently Associate Dean (Research) in the Faculty of Science, Technology and Engineering at La Trobe University where he also holds the Chair in Microbiology. His main research interest is the molecular genetics of signalling pathways in mitochondrial and neurodegenerative diseases. He uses a simple microbial model to study them - the cellular slime mould or social amoeba, Dictyostelium discoideum. His group conducts research on the cytopathological signalling dysregulation that occurs in Dictyostelium models for mitochondrial, Alzheimer's, Parkinson's, Motor Neurone and Batten diseases as well as Mucolipidosis.

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