1. GENETIC AND ENVIRONMENTAL INTERACTIONS

PROJECT:
Epidemiology in a dish: using human iPSC to discover common and genotype-specific molecular signatures of the multi-step hypothesis of MND

PROJECT LEAD:
Associate Professor Anthony Cook
University of Tasmania, TAS

This project aims to discover how interactions between an individual's genetics and the environment in which they live contribute to their risk of developing MND. Investigators will use human stem cells to make motor neurons that contain gene errors linked with MND and expose them to a variety of environmental risk factors for the disease, including pesticides, cholesterol and cyanotoxins such as blue-green algae. The team will search for key changes and deterioration in the structure, activity, function and health of motor neurons containing the MND gene errors as they engage with "risk-environments".

KEY HIGHLIGHTS:
A/Prof Cook is a first-time recipient of research support from FightMND. The project will provide new insights into the causes of MND and identify new targets that direct the design and development of therapeutics aiming to treat MND more effectively.

AMOUNT INVESTED BY FIGHTMND IN THIS RESEARCH PROJECT:
$999,981

Q&A:
What problem are you trying to solve with this project?
We don't fully understand how genetic risk and environmental risk combine to cause motor neurons to die but there is evidence that several steps are involved. This has made studying the role of genes and the environment in ALS difficult. By studying neurons with different combinations of genetic risk factors, and comparing their responses to exemplar environmental risk factors associated with increased risk of ALS, we anticipate our research will take a significant step to bridging this knowledge gap.

Above: Associate Professor Anthony Cook | Below: Primary Investigator Associate Professor Anthony Cook, co-investigator Professor Anna King, and co-investigator Dr Andrew Phipps examining microscope data at the University of Tasmania
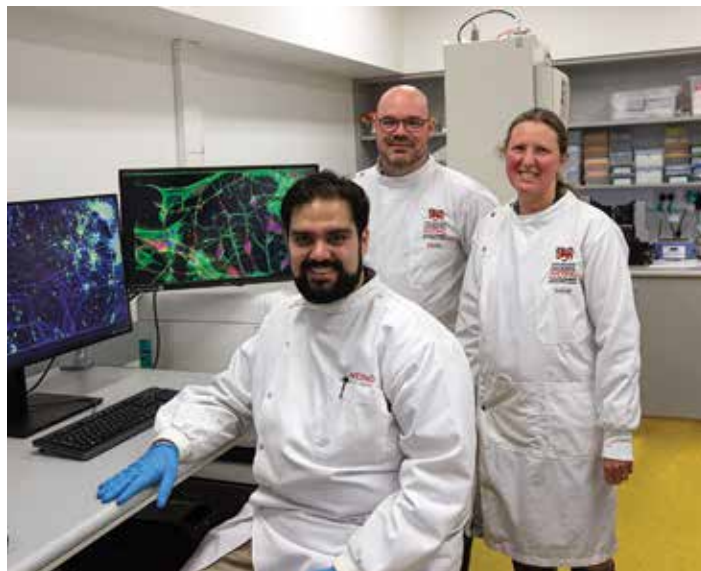
"This project is the first to systematically dissect how combinations of genetics and a variety of environmental exposures promote motor neuron degeneration." – **Associate Professor Anthony Cook**

FIGHT MND.