FIGHT MND.

Researcher.

DR MARY-LOUISE ROGERS

IMPACT Project.

USING BIOMARKERS TO ADDRESS MND HETEROGENEITY AND IMPROVE DETECTION TO BENEFIT CLINICAL TRIALS

Priority Area.

DISEASE BIOMARKERS AND HETEROGENEITY

Dr Mary-Louise Rogers

Where do you work?

Flinders University, Adelaide, South Australia. I am in the Neuroscience area of the Flinders Health & Medical Research Institute in the College of Medicine & Public Health.

Can you summarise your research experience and background?

I have a PhD in growth factors from the University of Adelaide (2003). I moved to Flinders University as a postdoctoral scientist to work on growth factors in the nervous system (until 2011). In 2011 I became independent, setting up the only dedicated MND Research Laboratory in South Australia.

Why did you begin your research into MND?

After going to the International ALS/MND Symposia in Sydney (2011), I decided to dedicate my career to developing a cure for MND. I met an inspirational Japanese MND researcher who had MND himself. I thought, if he could be inspired to work on a cure, I would like to be working towards treatments for this terrible disease.

Which of your scientific findings do you value most?

Describing urinary p75ECD as a biomarker of MND progression and prognosis, that can be used to measure effectiveness of MND treatments tested in clinical trials.

In your project you are using two biomarkers unique to MND. What are they and what do they measure?

The first is urinary p75ECD – this measures motor neuron degeneration – and increases over disease progression.

The second is urinary Neopterin – which measures inflammatory changes in MND.

Can you comment on the influence that Precision Medicine is having on MND?

Precision medicine allows us to determine the right drug for the right patient based on each patient's biochemistry to predict and tailor treatment options for individual patients for the first time.

What will this funding allow you to achieve?

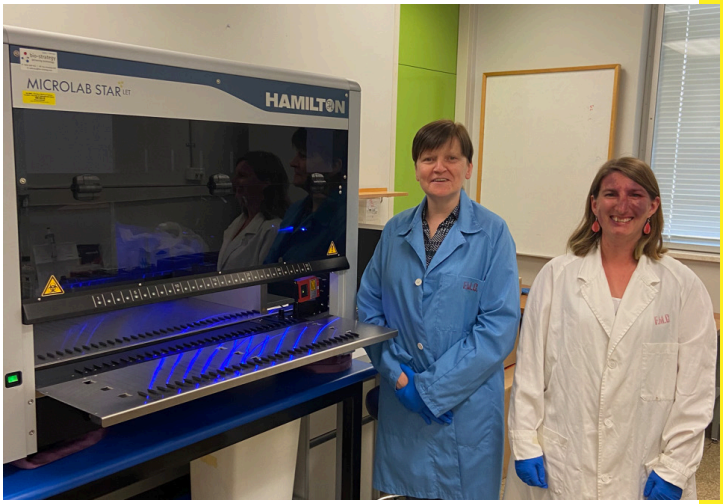
This FightMND IMPACT project will be used to determine how urine-based biomarkers can be used to evaluate heterogeneity in disease severity, progression and response to treatments for MND. We will validate that Neopterin, a new biomarker we have recently identified, can accurately measure MND progression and evaluate the efficacy of treatments in a clinical trial setting. The project will also determine if Neopterin and p75ECD can be used to identify and group patients with a similar rate of decline and severity of MND in clinical trials, to increase their chance of identifying effective treatments.

FIGHT MND.

The IMPACT Project

Key barriers to developing treatments for MND are the highly variable rate of disease progression and severity among patients. A disease biological marker, or 'biomarker', is a measurable marker that changes its appearance with disease progression. Biomarkers can be used to help diagnose patients, predict the rate of disease progression, create sub-groups of patients, or provide a measurable readout that a drug is providing benefit in clinical trials. This research team has previously identified a protein in urine of people with MND called p75ECD, that can track the progression of MND. This was a significant break-through, with p75ECD being used as a validated biomarker to track treatment effect in many MND clinical trials. The team has also recently identified another potential urinary biomarker for MND, called Neopterin, that measures immune system activation. Early results indicate that levels of urinary Neopterin are elevated in patients with MND, compared to healthy people.

This project investigates how the two urinary biomarkers can be used to evaluate variability in the severity and progression of MND among patients, and the variable response of MND patients to treatment. The team will utilise the Ian Davis Flinders University Biomarker Facility, a new high-through-put facility that enables large numbers of patient samples from clinical trials to be assessed for MND biomarkers rapidly and effectively. These novel urinary biomarkers will be used to measure the rate of MND progression and response to treatment in a clinical trial setting.



Dr Mary-Louise Rogers and Dr Stephanie Shepheard alongside the robotics workstation at the Ian Davis Flinders University Biomarker Facility (Flinders Health & Medical Research Institute), used to assess MND patient samples obtained during clinical trials.

OBJECTIVES

- Assess levels of urinary Neopterin in 54 MND patients and 45 control subjects over time, to determine if its levels change as disease progresses, and evaluate its prognostic value.
- Validate the accuracy of Neopterin to measure MND progression and prognosis through comparisons with the well-established p75ECD biomarker.
- Evaluate if treating MND patients influences levels of Neopterin and p75ECD. Urine samples will be obtained from MND patients participating in two separate clinical trials.

OUTCOMES

- Validation of two biomarkers that accurately measure progression of MND, prognosis and benefit of treatment for patients.
- An improved ability to identify and group patients with similar speed and severity of MND, to help with clinical trial patient recruitment and increase the chance of identifying effective treatments in clinical trials.