

## Reducing the Brain Burden with Exercise

### What is the problem?

Vascular brain burden is the greatest determinant of late-life cognition. People with stroke are at increased risk of cognitive decline and dementia, and yet are usually excluded from intervention studies. We need to target high-risk populations to reduce dementia risk and identify genetic and protein markers for post-stroke cognitive decline.

### About this research translation project

There are no current therapies to prevent post-stroke dementia. Exercise may prevent cognitive decline and brain volume loss after stroke, possibly via its positive effects on microbiome composition. In the Post Ischaemic Stroke Cardiovascular Exercise Study (PISCES), we will examine whether an 8-week cardiac-rehabilitation style exercise intervention will preserve brain volume and cognition in 100 stroke participants within the first 12 months post-stroke.

We will initiate sample storage for a stroke biobank. Blood samples will be collected at three time-points (before and after the intervention, and at 12 months post-stroke) for biomarker analyses, and a stool sample at one time-point so we can analyse the entire microbiome. This will allow us to examine relationships between inflammatory markers in serum (blood), genetic factors (blood, stool), and microbiome composition (stool) and cognitive and brain volumetric outcomes at 12 months post-stroke.

Our goal is to identify genetic and protein markers for post-stroke cognitive decline. The numbers within PISCES limit the description of definitive gene-behaviour associations; however, participation in larger consortia will allow greater power.

### What will be the impact?

The assembly of a stroke genetic biobank with both blood and microbiome samples will allow for pooled analyses among research groups in Australia and internationally. With greater power to examine gene-behaviour relationships, we may be able to identify risk factors for post-stroke cognitive and brain volume decline, and ultimately, dementia.



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