



Reducing the risk of dementia by keeping gut microbiome healthy



in the early stages of disease. While there are several risk factors for dementia we can't change, such as our age and genetics, maintaining healthy gut microbiology can reduce our risk by preventing inflammation, which is present in all age-related neurodegenerative disorders, including Alzheimer's disease.

Gut microbiome is the trillions of microorganisms that live inside the gastrointestinal tract. It consists of good and bad bacteria, fungi and viruses. A nutritious diet and regular exercise positively impact the health of our microbiome. This is important because an imbalance in this important ecosystem may lead to systemic and neuronal inflammation.

Dr Shoubridge's previous research identified a link between changes in intestinal microbiology, impaired immunity and an increased risk of dementia. He hopes the results of this latest project can be used to develop a simple and inexpensive screening tool that identifies at-risk individuals before they develop symptoms. This will allow health practitioners to employ microbiome-targeted interventions to prevent or delay disease.

What is the focus of the research?

To determine whether profiling intestinal microbiome composition can identify people at risk of dementia before symptoms appear.

Why is it important?

Dementia has a devastating impact on families and carers. Unfortunately, we can't identify people at risk of developing dementia, or those



How will this happen?

Stage 1: participants to undergo clinical and neuropsychological assessment, blood biomarker and genetic testing, and brain imaging. Cerebrospinal fluid, blood and stool samples will also be collected.

Stage 2: analyse blood and stool samples to create microbiome and inflammation dementia risk profiles unique to each participant.

Stage 3: based on the results, determine any causative relationships between the variables and dementia pathology.

Stage 4: use those results to explore further study into utilising blood and stool samples to develop a dementia screening tool.



What will this mean for the future?

- Improved ability to prevent or delay dementia.
- Identification of at-risk people before disease onset.
- Targeted prevention and risk-reduction strategies.
- Effective public health messaging aimed at prevention.



Why does inflammation matter?

Systemic inflammation occurs when the immune system is 'stuck' in defence mode, due to infection or disease. This inflammation can break down the protective blood-brain barrier and damage the brain.

Neuronal inflammation is the brain and spinal cord's inflammatory response to injury, infection and disease. If research can identify unhealthy microbiome and which modifiable risk factors are the cause, early intervention can prevent or reduce inflammation, reducing the risk of microbiome-related dementia.



By developing a simple microbiome screening tool, we may be able to prevent or delay dementia.

— Dr Andrew Shoubridge



Who's undertaking the research?

Dr Andrew Shoubridge, South Australian Health and Medical Research Institute

Dr Shoubridge is an early career postdoctoral researcher in microbiology and neurobiology. He received his PhD in neuroscientific medical research investigating childhood-onset dementia at the University of Adelaide and was awarded the Dean's Commendation for Doctoral Thesis Excellence.

During his PhD, Dr Shoubridge secured multiple awards and scholarships, and was accepted into the internationally recognised Australian Course in Advanced Neuroscience. He has since transitioned into the microbiology field to focus on the rapidly growing area around microbiome-gut-brain interactions. Dr Shoubridge has multiple first-author publications and is leading several grant-funded projects to expand our knowledge in this area.

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The title of Dr Shoubridge's project is *Targeting of host-microbiome interactions to achieve precision in dementia risk reduction.*