Australian Scientists awarded $2.5m in support of ground-breaking research into Alzheimer's Disease and Leukaemia

- **Full profiles, photos, HD footage available: www.scienceinpublic.com.au/CSL**
- **Award presentation: 16:00 AEDT (Melbourne time) 11 October**
  Treetops Room; Melbourne Museum

Two Australian scientists have each been awarded an AUD$1.25 million, five-year, CSL Centenary Fellowship to further research that aims to help patients beat leukaemia and examine the origins of memory to better understand Alzheimer's disease.

Prof Geoff Faulkner and Assoc Prof Steven Lane are the inaugural Fellows in a $25 million program established by CSL in its Centenary year to support Australia's best and brightest biomedical researchers—fostering excellence in medical research by supporting mid-career scientists to pursue world-class research at an Australian institution.

Professor Geoff Faulkner from the University of Queensland thinks long-term memory might be stored in our brain's DNA and he'll test his theory in brains affected by Alzheimer's.

It's a bold idea. Geoff has already shown that the DNA in our brains is different to that in the rest of our bodies, and that it changes as we learn. He's proposing that these changes are associated with how we store our long-term memories. With the CSL Centenary Fellowship he'll test the idea on brain tissue donated by Alzheimer's patients to determine if DNA is involved in memory formation, and what the implications of this might be for people living with Alzheimer's.

His research is moving us closer to an understanding of conditions like Alzheimer's and hopefully towards a cure for this chronic and devastating disease.

Associate Professor Steven Lane from the QIMR Berghofer Medical Research Institute wants to tailor leukaemia treatments to reduce relapse rates in older patients.

Today, 85 per cent of children with leukaemia can be cured, but the outlook for patients over 60 is bleak, with only 10 per cent surviving beyond one year as their cancer adapts to weather the storm of standard chemotherapy treatments. Steven wants to change that outlook.

He has developed a method to rapidly profile the genetics of leukaemia types and model them in the lab, allowing him to map the effectiveness of chemotherapy treatments against the genomes of individual cancers.

The CSL Centenary Fellowship will support his efforts at tailoring treatments to individuals. Specifically, he'll use the Fellowship to identify new drug pathways and explore repurposing existing drugs to target resistant leukaemia types.

"Australian research punches above its weight on the world stage with an excellent track record in new discoveries to potentially address the world's unmet medical needs," said CSL CEO & Managing Director Paul Perreault.

"At CSL, we are driven by our promise to save lives and protect the health of people around the world. We're extremely proud to support research that holds the potential to save and change many lives. Our Centenary Fellowships honour CSL's long legacy of contributing to innovative medicines, particularly for patients suffering serious diseases."

CSL Chief Scientific Officer Andrew Cuthbertson says Geoff and Steven are the embodiment of what these Fellowships are about.

"Innovation is one of the core values that guide CSL's significant investment into medical science, so it is fitting that the Centenary Fellowships seek to foster the best scientists in Australia who will shape the next century of critical breakthroughs."

"Growing skills and expertise through well-funded, long-term support is essential in order to help the Australian research community continue to thrive," Andrew says.

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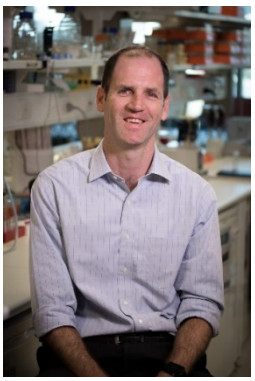
Improving survival for patients with acute leukaemia



Steven Lane— QIMR Berghofer Medical Research Institute

Leukaemia is one of Australia's deadliest types of cancer. However, as Steven Lane knows, it's not just one type—it's hundreds of different types, each with its own genetic fingerprint.

This variation means some types of leukaemia are treatable, whereas others quickly develop resistance. Today, 85 per cent of children with leukaemia can be cured, but the outlook for patients over 60 is bleak—only 10 per cent survive beyond one year.

Steven wants to change that outlook. Together with his team at the QIMR Berghofer Medical Research Institute in Brisbane he has developed the capacity to rapidly profile the genetics of leukaemia types and model them in the lab.

He's been awarded an inaugural CSL Centenary Fellowship to begin tailoring treatments to individual patients. Specifically, he'll use the support to identify new drug pathways and explore repurposing existing drugs to target resistant leukaemia types.

Resistance to standard chemotherapy treatments occurs in most patients with AML, and it is particularly common in those patients over 60 years of age. Steven's previous research discovered that rare leukemic stem cells allow the cancer to weather the storm of treatment then later grow out, driving the relapse in these patients.

The problem is, new treatments for leukaemia are usually tested in clinical trials. These trials may exclude patients who show resistance and therefore fail to deliver treatments that work for them. This is often the case with older patients, whose health may be affected by other factors that could bias a trial.

To get around this, Steven is using primary AML cells derived from human patients with resistant cancers. These are grown in the lab before being tested against novel chemotherapies. This allows Steven to work with many leukaemia types simultaneously, providing a cheaper, faster and more accurate model of AML that reflects the different genetic fingerprints.

He's also genetically engineered mice to develop human leukaemia. Once identified, the mouse cancer cells and their genes can be targeted for treatments and tracked closely to see how they respond. This means Steven can map the effectiveness of individual chemotherapy treatments against the genomes of individual cancers.

It's a powerful suite of techniques that's led Steven to suspect the unique genomes of leukemic stem cells that drive resistance might also hold the clues to unravelling their treatment. In fact, his lab has already developed and piloted a novel treatment in mice, finding substantial improvements in survival that were predicted by the cancer's own genes.

He now wants to enhance this predictive power. He'll use his Fellowship to focus on two key aims: identifying recurrent pathways of chemotherapy resistance and improving

understanding of a new type of treatment called hypomethylating agents that are particularly useful in older patients with leukaemia.

The CSL Centenary Fellowship solidifies Steven Lane's reputation as one of Australia's most innovative haematologists. His career in medicine began at the University of Queensland, followed by a fellowship at Harvard Medical School in Boston, USA and a PhD supervised at UQ.

Steven now spends a third of his time seeing patients in clinic, which is more than enough motivation to ensure this work succeeds. As always, his goal is to generate new laboratory findings from models that can be successfully trialled and integrated into patient care.

Hopefully, with the support of CSL, he'll soon have better news to bring from his bench to the bedside.

Are memories stored in DNA?

Geoff Faulkner— Mater Research Institute-University of Queensland (MRI-UQ) and Queensland Brain Institute (QBI)

Geoff Faulkner is testing a bold idea— he thinks long-term memory might be stored in our brain's DNA. If he's right, it will revolutionise both our understanding of life's blueprint and how we manage diseases like schizophrenia and Alzheimer's.

There's DNA in every human cell called 'junk' or 'non-coding' DNA because our bodies don't use it to generate proteins, the building blocks of life.

The strange thing is, this DNA makes up over 98 per cent of our genome. Surely it must do something. The question is: what?

Geoff Faulkner has been studying this question for years with his team from the MRI-UQ. Now, working with the Queensland Brain Institute (QBI), Geoff's inaugural CSL Centenary Fellowship will help him delve deeper, using brains bequeathed by Alzheimer's patients.

The research will focus on genetic components that can move and replicate during cell division. They're called L1 retrotransposons and make up 17 per cent of our genome. Geoff has already proven the amount of L1 movement is higher in brain neurons than other body cells and that we might acquire more L1 movements in the brain as we age.

More recently, he's linked the amount of L1 movement to the function of genes in the hippocampus, the part of the brain that controls memory and spatial navigation, and has been implicated in memory loss with ageing, schizophrenia and Alzheimer's disease.

By studying brains from Alzheimer's patients, Geoff will be paying tribute to their generosity in donating post-mortem brain tissue by looking for answers as to why this devastating condition develops.

Firstly, Geoff is looking to define the mobilisation of L1 in the brain, including its distribution and impact within the hippocampus. Then he'll assess whether L1 movement is modulated

by environmental stimulation and plays a role in memory formation. Finally, he hopes to establish the significance of reduced L1 abundance in Alzheimer's patients.

These efforts may move us toward therapies that help restore cognitive function. They also build on a long history of cutting-edge neuroscience research in Australia, including the career of 2015 CSL Florey Medal winner and inaugural QBI Director Professor Perry Bartlett, whose revolutionary discoveries changed our understanding of stem cells, dementia and the human brain.

Geoff's own research career began as an undergraduate at the University of Queensland. He's since gone on to attract over $28 million in research funding, publish over 45 papers and win a series of fellowships and awards. His biggest achievement to date was a seminal paper in the journal Nature describing L1 movements in the human brain, which was called the 'joint No. 1 research advance of 2011' by the US National Institute of Mental Health.

The CSL Centenary Fellowship puts Geoff in the strongest position of his career to answer the fundamental question of how changes to DNA during life affects how the brain functions.

About the Fellowships

The CSL Centenary Fellowships for mid-career medical researchers are high-value awards available to Australians who wish to continue a career in medical research in Australia. Two individual, five-year fellowships will be awarded each calendar year. The total value of each award is AUD$1.25 million, which is paid in annual instalments of AUD$250,000 to the Fellow's employing university or medical research institute.

The CSL Centenary Fellowships are competitively selected grants offered to mid-career (3-8 years post-doctoral) medical researchers. The Fellowships are primarily awarded for discovery and translational research with a focus on rare and serious diseases, immunology, and inflammation.

More at: www.csl.com.au/centenary/fellowships

About CSL

CSL (ASX:CSL) is a leading global biotherapeutics company with a dynamic portfolio of life-saving innovations, including those that treat haemophilia and immune deficiencies, as well as vaccines to prevent influenza. Since our start in 1916, we have been driven by our promise to save lives using the latest technologies. Today, CSL — including our two businesses CSL Behring and Seqirus — operates in over 30 countries with more than 15,000 employees. Our unique combination of commercial strength, R&D focus and operational excellence enables us to identify, develop and deliver innovations so our patients can live life to the fullest.