Dementia Australia™ Research Foundation

2020 Dementia Grants Program

Project Grants*

LEAD INVESTIGATOR	PROJECT TITLE	INSTITUTION
AAG Research Trust – Dementia Australia Research Foundation RM Gibson Research Fund Grant		
Dr Aisling Smyth^	Developing a sleep intervention for caregivers of people living with dementia	Edith Cowan University
Bondi2Berry & Bondi2BlueMtns Project Grant		
Dr Janet Van Eersel	Preclinical development of specific tau-binding compounds to target underlying disease mechanisms for the treatment of dementia	Macquarie University
Dementia Australia Research Foundation Project Grant		
Dr Dhanisha Jhaveri	Cholinergic regulation of adult hippocampal neurogenesis and cognitive functions	The University of Queensland
Dr Lei Qian	Mechanism and potential treatment of obstructive sleep apnoea induced Alzheimer's pathology	The University of Queensland
Dementia Australia Research Foundation – Norma Beaconsfield Project Grant		
Dr Arne Ittner	A neuroprotective signalling axis in Alzheimer's disease	Flinders University
Dementia Australia Research Foundation – Victoria Project Grant		
Dr Marianne Coleman	Breaking down barriers to accessing dementia-friendly eyecare	University of Melbourne
Dementia Centre for Research Collaboration – Dementia Australia Research Foundation Pilot Grant		
Dr Deborah Brooks	Bridging the support void. Can the Residential Care Transition Module improve the psychological health of family carers during the residential care placement process in Australia?	Queensland University of Technology
Dr Leander Mitchell	Developing culturally appropriate assessments for people with dementia living in the Torres Strait	The University of Queensland
Dr Kirsten Moore	Creative caring: promoting a balanced view of caring for someone with dementia	National Ageing Research Institute
Dr Suraj Samtani	A novel social cognition intervention for older adults with cognitive impairment: Co-design and pilot study	UNSW Sydney
Dr Linda Steele	Redressing neglect and abuse of people living with dementia in residential aged care	University of Technology Sydney
Hazel Hawke Research Grant in Dementia Care		
Dr Simone Reppermund	Self-harm in people with dementia – using big data to improve outcomes and inform strategies to prevent self-harm and suicide	UNSW Sydney
Scientia Professor Henry Brodaty Project Grant		
Dr Sonam Parakh	Defining the role of nuclear proteostasis in the pathogenesis of frontotemporal dementia (FTD)	Macquarie University

* Valued at $75,000 over 1-2 years. Funding commences in 2021; ^ Valued up to $7,000 over 1.5 years.

Post-doctoral Fellowships*

LEAD INVESTIGATOR	PROJECT TITLE	INSTITUTION
Race Against Dementia – Dementia Australia Research Foundation Post-doctoral Fellowship & Dementia Advocates Award		
Dr Adekunle Bademosi	Understanding the dynamics of TDP-43 aggregation in FTD using advanced imaging tools	The University of Queensland
Race Against Dementia – Dementia Australia Research Foundation Post-doctoral Fellowship		
Dr Andrew McKinnon	Delineating relationships between sleep-wake disturbances, brain changes, dementia risk factors and the accumulation of dementia pathology	The University of Sydney

* Valued at $405,000 over 3 years. Funding commences in 2021.

Project Grant Summaries

AAG RESEARCH TRUST - DEMENTIA AUSTRALIA RESEARCH FOUNDATION RM GIBSON RESEARCH FUND GRANT

Dr Aisling Smyth, Edith Cowan University

Developing a sleep intervention for caregivers of people living with dementia

Sleep is a physiological requirement which impacts the function of every cell, tissue and organ. Sleep is also pivotal in maintaining psychological wellbeing. Poor sleep quality and reduced sleep quantity have tangible effects on mental and physical wellbeing. However, sleep complaints are prevalent amongst caregivers of people living with dementia. They have been associated with increased risk of institutionalisation of the person they are caring for, increased sense of burden and poorer psychological health. This study will be a feasibility pilot project which will develop and test a sleep optimisation program for caregivers of people living with dementia. The project aims to develop an intervention which will help equip caregivers with the knowledge and skills to improve their sleep. The sleep intervention will be delivered once a week, for four weeks, with sleep and psychological wellbeing being assessed before and after the intervention. Sleep interventions are easily implementable, cost-effective means of maintaining and improving caregivers physical and mental wellbeing. By ensuring we optimise the health of the caregiver, we allow them to thrive in their caregiving capacity which has a positive impact on both the caregiver and the person living with dementia.

BONDI2BERRY & BONDI2BLUEMTNS PROJECT GRANT

Dr Janet Van Eersel, Macquarie University

Preclinical development of specific tau-binding compounds to target underlying disease mechanisms for the treatment of dementia

Alzheimer's disease and frontotemporal dementia are two of the most common causes of dementia. Unfortunately, there is currently no effective treatment or cure for either of these disorders. Therefore, the development and testing of new therapies is urgently required. Although these two dementias are quite distinct from one another, in both conditions, a protein known as tau is thought to play a central role in the disease process. One mechanism by which tau is thought to be involved, is via excessive interactions with another protein known as Fyn. Together, Fyn and tau set off a cascade of events that lead to overstimulation of neuronal brain cells, eventually causing cell death. We postulate that if interactions between tau and Fyn could be disrupted or reduced in the brains of dementia patients, this would provide therapeutic benefits. Therefore, the research project aims to identify compounds that can disrupt interactions between tau and Fyn by utilising a cutting-edge technology that can screen up to 14 billion compounds at once. Identified hits will then be tested in cell culture models to determine their potential usefulness. This will lay the groundwork for pre-clinical testing and, hopefully in the future, clinical trial testing in patients.

DEMENTIA AUSTRALIA RESEARCH FOUNDATION PROJECT GRANT

Dr Dhanisha Jhaveri, The University of Queensland

Cholinergic regulation of adult hippocampal neurogenesis and cognitive functions

Early pathogenic events in Alzheimer's disease include a progressive loss in brain's capacity to generate new neurons (i.e. neurogenesis) in the area important for learning and memory and degeneration of cells that produce a neurochemical, acetylcholine that is vital for cognitive functions. However, whether and how these two processes are linked remains an open question. In this project, we will investigate a direct link between these two cellular processes and cognitive functions and explore whether these deficits can be rescued by stimulating a select receptor that we have identified boosts the production of new neurons. Using a multi-modal approach involving animal models to monitor and manipulate specific neuronal populations, together with assessing cognitive functions, our research will provide the experimental evidence establishing the role of cholinergic neurons and a select cholinergic receptor in regulating adult neurogenesis and neurogenesis-dependent cognitive functions. The outcomes of this study may provide the mechanistic basis for the development of a new approach harnessing therapeutic potential of brain's endogenous neuroplasticity mechanism to delay the onset or slow the progression of dementia.

Dr Lei Qian, The University of Queensland

Mechanism and potential treatment of obstructive sleep apnoea induced Alzheimer's pathology

Obstructive sleep apnoea is a severe sleep disorder that can lead to a repeated lack of oxygen (intermittent hypoxia) in the brain during sleep. Studies have found that patients with this condition also have an increased risk of developing dementia (Alzheimer's disease). To study this link between sleep apnoea and dementia, we have created a mouse model, which has the sleep disorder and develops dementia due to the repeated lack of oxygen in the brain during sleep. We have previously shown that this repeated lack of oxygen causes the loss of a specific type of brain cell (cholinergic basal forebrain neurons). The aims of this study are therefore 1) to test if treating these mice with existing drugs will prevent brain cell death and protect them from dementia and 2) to understand the specific mechanism of how lack of oxygen leads to brain cell death. Overall this project will lead to knowledge about the molecules involved in causing and preventing brain cell death as a consequence of repeated lack of oxygen. This knowledge is necessary for the development of prophylactic drugs that protect the brain and reduce the risk of dementia in obstructive sleep apnoea patients.

DEMENTIA AUSTRALIA RESEARCH FOUNDATION – NORMA BEACONSFIELD PROJECT GRANT

Dr Arne Ittner, Flinders University

A neuroprotective signalling axis in Alzheimer's disease

Alzheimer's disease is the most common form of dementia and neither an effective treatment nor a cure are currently known. This is partly due to a gap in knowledge on how brain cells deteriorate in Alzheimer's disease. The last decades of research have established that amyloid and tau, two factors that are common in Alzheimer's disease, work together in damaging brain cells. Whether there are protective factors that reduce this damage remained largely unknown. Recently, we have found a protective signal that targets tau and reduces damage to brain cells and memory. This project aims to understand how this protective signal works in detail, how it helps maintain healthy brain function, and how it can be boosted to prevent memory loss associated with Alzheimer's disease. This study employs latest technologies in assessing brain molecules and their function, brain activity, and strength of memory performance. As a result, we will better understand how protective factors in the brain are connected and how they can be activated and harnessed to reduce brain damage and memory loss in Alzheimer's disease.

DEMENTIA AUSTRALIA RESEARCH FOUNDATION – VICTORIA PROJECT GRANT

Dr Marianne Coleman, University of Melbourne

Breaking down barriers to accessing dementia-friendly eyecare

Having poor eyesight makes living with dementia harder. Regular eye tests are vital to detect and treat poor eyesight. If not adapted to accommodate their needs, eye tests can be challenging or distressing for people with dementia, and caregivers supporting them. Our research aims to improve the experience of receiving eyecare (having an eye test and following eyecare advice), for people with dementia and family caregivers supporting them. Having good eyesight helps people with dementia maintain their independence, and live at home for longer. We will speak with people with dementia, family caregivers (both supported by a skilled interviewer) and eyecare professionals. This captures views of receiving, supporting and delivering an eye test. The research lasts two years. 60 people will take part, including 20 people with dementia. People with dementia and caregivers will guide our research, ensuring information we provide and questions we ask are relevant and clear. We will share our findings with them, to identify key messages informing:

- Information cards about dementia-friendly eye tests and eyecare, for people with dementia and caregivers, available at dementia cafes and day centres.
- Training for eyecare professionals, about delivering dementia-friendly eyecare. This makes it easier to seek and receive dementia-friendly eyecare.

DEMENTIA CENTRE FOR RESEARCH COLLABORATION – DEMENTIA AUSTRALIA RESEARCH FOUNDATION PILOT GRANT

Dr Deborah Brooks, Queensland University of Technology

Bridging the support void. Can the Residential Care Transition Module improve the psychological health of family carers during the residential care placement process in Australia?

Many people with dementia eventually move into residential care. Making this decision and coping with admission processes can be stressful and distressing. These feelings may be heightened by the COVID-19 pandemic if families are not able to visit care facilities due to lockdown and/or are concerned about transmission. However, carers report that formal supports to help families cope during this time are lacking. This study aims to test delivery of a telephone/video counselling intervention during the residential care placement process to help reduce stress and distress for family carers. The Residential Care Transition Module (RCTM) consists of six telephone or video-link counselling sessions delivered to family carers over 12 weeks by a trained health or social care professional. It includes education about dementia and residential care facilities, dementia-specific grief counselling, stress reduction techniques, and referral to support networks. The proposed pilot study will test whether delivery of the RCTM following Aged Care Assessment Team approval for residential care is feasible and potentially beneficial in reducing family carer stress, anxiety, depression, guilt, and grief, and improving social support during the course of placement. This may help carers to better cope and adjust once their relative has been admitted into residential care.

Dr Leander Mitchell, The University of Queensland

Developing culturally appropriate assessments for people with dementia living in the Torres Strait

The experience of anxiety and depression can lead to poor mental health and wellbeing. Good measures of these experiences are therefore important to help find out if someone has this type of diagnosis. Unfortunately, measures of anxiety and depression in Aboriginal and Torres Strait Islander (ATSI) populations are limited. This project therefore aims to develop measures of anxiety and depression that will be culturally appropriate, and therefore meaningful, within ATSI populations. To do this, we will hold yarning circles with members of the ATSI population to find out how they define anxiety and depression. We will then use experts in the field to help develop those discussions into a list of questions suitable for a questionnaire. This list will then be given to members of the ATSI population to see what they think and to see how useful the questionnaires are when used with people with anxiety and/or depression. We hope to create measures of depression and anxiety that will do a better job of identifying these diagnoses in members of the ATSI population. Being able to correctly identify these diagnoses will assist in better managing such conditions and in improving the overall wellbeing of members of the ATSI population.

Dr Kirsten Moore, National Ageing Research Institute

Creative caring: promoting a balanced view of caring for someone with dementia

Caring for a family member of friend living with dementia is often portrayed negatively, focusing on depression, burden and chronic stress. While there are negative physical and mental health impacts associated with caring, this is not the full picture. This study will develop a resource that aims to provide a more balanced view of the experience of caring. We will ask carers to share their stories of positive and negative aspects of caring. We will also ask them about the creative ways they manage daily stressors and challenges. The resource may be an animation or other audio-visual medium that will be widely accessible. We will use carers' voices for authenticity and digital systems to measure how often the resource is viewed. The output will be suitable for the general public and go some way towards countering overly negative portrayals of caring for someone living with dementia.

Dr Suraj Samtani, UNSW Sydney

A novel social cognition intervention for older adults with cognitive impairment: Co-design and pilot study

People living with cognitive impairments often experience loneliness and depression. They find it hard not just to remember things, but also talking to others. Many older adults with cognitive impairment have difficulties with recognising emotions and reacting in a socially appropriate way. Most treatments developed for dementia focus on improving memory and language. So far, there is no treatment that helps people recover or maintain social skills as their cognitive abilities decline. We want to change that. We will run focus groups with people living with cognitive impairments and their care partners. Together we will write a social skills training manual specifically designed for older adults with cognitive impairments. We will then run a pilot study to test the effectiveness of the social skills training. Our hope is that people living with cognitive impairments can reconnect with others and experience the joy of socialising once again.

Dr Linda Steele, University of Technology Sydney

Redressing neglect and abuse of people living with dementia in residential aged care

Neglect and abuse of people living with dementia is a systemic problem in residential aged care. It inflicts significant harm on victims/survivors, care partners/families/friends and the broader dementia community. Those affected have been unable to access justice, or healing and closure through the courts. While stopping future neglect and abuse requires reform of legal, regulatory, and funding frameworks, these reforms do not 'redress' in the sense of setting right or fixing the wrongs of past neglect and abuse. Redress practices beyond individual court action (e.g. compensation and psychosocial support, memorials, national apologies, community education) create individual and community benefit by delivering financial, legal and community recognition of experiences through appropriate exposure and analysis of past wrongdoing. It is vital redress is considered by the Disability Royal Commission moving forward. This action research project will explore the need for redress through interviews and focus groups with people living with dementia, care partners/families/close friends and lawyers/advocates. Recommendations will be shared with the Disability Royal Commission, dementia community, government, aged care sector, advocacy organisations and professional associations. Anticipated benefits include a redress framework that can facilitate justice, healing and enhanced wellbeing for victim/survivors and the dementia community, and education and advancement of protections within future aged care and legal systems.

HAZEL HAWKE RESEARCH GRANT IN DEMENTIA CARE

Dr Simone Reppermund, UNSW Sydney

Self-harm in people with dementia – using big data to improve outcomes and inform strategies to prevent self-harm and suicide

Dementia and self-harm represent substantial public health burdens in the older population. Dementia has been identified as a risk factor for self-harm behaviour, particularly in older males. Research is needed to understand factors associated with self-harm in people with dementia to develop appropriate suicide and self-harm prevention programs. As people age, physical and mental health conditions along with social circumstances contribute to self-harm. Although contact with health services in the months before self-harm is common, little is known about these healthcare pathways that might inform prevention strategies. The growing ageing population, along with the high occurrence of dementia and self-harm in older adults, has substantial implications for the planning and equipping of health services to meet the needs of affected individuals. Our study will use linked health data from NSW to understand the health problems and social circumstances of people with dementia who self-harmed and how they have accessed health services before and after self-harm. Understanding the specific health problems and treatment gaps is a critical first step to developing effective preventive measures. This will inform strategies to allow health services to better meet the needs of people with dementia who self-harmed.

SCIENTIA PROFESSOR HENRY BRODATY PROJECT GRANT

Dr Sonam Parakh, Macquarie University

Defining the role of nuclear proteostasis in the pathogenesis of frontotemporal dementia (FTD)

The major hallmark of frontotemporal dementia (FTD) is the presence of protein clumps or 'aggregates' in affected neurons. These are present in various parts of the cell, including the nucleus, which acts as the cellular 'brain'. Importantly, it is becoming apparent that the nucleus is an important site from where disease is initiated. However, due to the limited availability of appropriate tools, the role of protein aggregates in the nucleus and how this relates to FTD has not been previously studied. This project, using advanced tools and cellular techniques, aims to take an innovative approach to identify how these nuclear aggregates form in affected neurons in FTD. Furthermore, it aims to identify new ways to prevent the formation of these aggregates. We have found that a specific protein prevents the clumping of proteins in the nucleus. It is also protective against several other pathological events linked to FTD. However, similarly, this protein has not been previously studied in FTD. This project will therefore investigate a new cellular pathway in FTD and novel mechanisms to prevent the formation of aggregates. This study may therefore reveal novel therapeutic targets for FTD.

Post-doctoral Fellowship Summaries

RACE AGAINST DEMENTIA – DEMENTIA AUSTRALIA RESEARCH FOUNDATION POST-DOCTORAL FELLOWSHIP

Dr Adekunle Bademosi, The University of Queensland

Understanding the dynamics of TDP-43 aggregation in FTD using advanced imaging tools

Frontotemporal dementia (FTD) is associated with progressive damage to the aspects of the human brain involved in the control of movement, problem solving, memory, social behaviour and other vital functions. Post-mortem sampling of the brains of people who have lived with FTD revealed the presence of large clumps of proteins, which are toxic and damaging to the brain. Researchers are yet to identify why these proteins begin to cluster. The research aims to elucidate why and how these proteins clump. Further, the nerves of the brain have intrinsic protective waste-disposal mechanisms that are normally responsible for clearing up these protein clumps. However, in FTD these protective mechanisms fail. The research will potentially identify where the protein clumping begins, how the clumps overwhelm the brain's waste disposal-recycle machinery for damaged proteins and help identify potential drugs that can halt or reverse the clumping of these proteins. The research has the unique potential of providing an early diagnostic tool prior to the observation of any FTD associated symptoms. Further, it will provide the opportunity to screen the effect of new drugs on the protein clumps prior to commencing clinical trials.

Dr Andrew McKinnon, The University of Sydney

Delineating relationships between sleep-wake disturbances, brain changes, dementia risk factors and the accumulation of dementia pathology

Dementia is the leading cause of disability in persons over the age of 65 in Australia, with Alzheimer's disease alone accounting for more than 40% of all dementia cases. By addressing risk factors for developing dementia including hypertension, depression, and physical inactivity, one-third of Alzheimer's disease cases and up to 40% of all dementia cases may be preventable. Sleep disturbances including poor sleep quality, and shorter sleep duration, as well as sleep disorders such as sleep apnoea are present in up to 60% of older adults over the age of 60, and in up to 70% of those with dementia. These types of sleep problems are emerging as another significant yet modifiable (e.g. treatment with melatonin or CPAP devices) risk factor for dementia. However, to date how these sleep problems relate over time to brain and cognition changes, underlying dementia processes, and other risk factors has not been thoroughly investigated. We will address this gap through comprehensively characterising sleep problems in older adults with early dementia or at risk for dementia. Furthermore, we will develop tools that will provide personalised risk profile reports that can be implemented by clinicians to guide strategies for dementia management and prevention for individual patients.