

Are cellular treatments for MS coming of age?

Cell-based therapies are the new research frontier for many different diseases from cancer to autoimmune diseases and beyond.

While there has been great hope and hype for the regenerative potential of stem cells, researchers are now exploring the role that stem cells and other cells can play in changing the environment inside the body, for example to carry a medical cargo, target a specific troublesome cell type, or support the survival and growth of cells already present in the body.

Excitingly, the new technologies being developed for one disease can often be adapted and adjusted for other diseases. In particular, scientists are now turning to these technologies to tackle progressive forms of MS.

One such cell technology, initially developed to target certain cancers caused by the Epstein Barr Virus (EBV) is being tested in progressive MS in research funded by MS Research Australia in partnership with the MS Society of Queensland.

EBV is thought to play a role in driving MS progression. Researchers at the Queensland Institute of Medical Research are trialling this method to remove a person's own immune cells, retrain them to enhance their EBV-fighting skills and then re-introduce them into the body like 'heat-seeking missiles' to remove EBV-infected cells.

This research, while showing promise, is still in the early stages of testing the safety of the treatment in people with primary and secondary progressive MS. A biotechnology company is now also trialling an 'off-the-shelf' version of this treatment

using engineered T cells which could provide a more uniform treatment regime without the complex step of growing the patient's own cells in the laboratory.

Another experimental cell therapy being trialled in progressive MS internationally is mesenchymal stem cells (MSCs). MSCs are found in bone marrow and fat tissues. As stem cells, they have the potential to turn into a range of cell types including brain cells. However, rather than physically re-growing tissue, it has become clear that the therapeutic potential of MSCs lies in the chemicals they secrete. These chemicals can calm the immune system and may create an environment that is more supportive for self-repair.

“Excitingly, the new technologies being developed for one disease can often be adapted and adjusted for other diseases.”

The media has recently covered a trial of MSCs in progressive MS underway at the Hadassah Medical Center, Israel. An interview with Hadassah's Professor Ben-Hur is available on our YouTube channel. Early indications suggest that MSCs are safe and may slow MS progression. Further small trials of MSCs are also ongoing which will pool their results to



obtain a more statistically powerful result.

As stem cells have the natural ability to multiply continually, one of the major obstacles with cell-based therapies is controlling the growth of the cells once they are transplanted into a person. Dr Natalie Payne, a MS Research Australia-funded scientist is investigating ways to make cellular therapies safer by engineering fail-safe mechanisms into the genes of the cells to control their growth.

Autologous hematopoietic stem cell therapy (AHSCT) is another treatment that uses chemotherapy to wipe out the immune cells and then uses hematopoietic stem cells to rebuild the immune system. As such AHSCT is primarily an immunosuppressive chemotherapy treatment for relapsing MS, rather than a cellular therapy, but is encouraging for some people with active relapsing MS. More information is available on our website.

It is exciting to see all of this research into cell therapies for progressive MS going on in Australia and around the world. Together, we hope it will lead to fast and safe progress towards further cell-based clinical trials.

For more information on clinical trials of cell-based therapies and other MS trials please visit www.mstrials.org.au



\$2 Million in new funding for 2018 grants

MS Research Australia is delighted to announce over \$2 million in research funding for grants commencing in January 2018.

A WORD FROM OUR CHIEF EXECUTIVE OFFICER

You might have noticed that our newsletter has had a name change, now called the MS WIRE, but please rest assured the research content will remain unchanged.

In order to increase our digital presence and maximise staff resources, we have decided to consolidate our two publications, the monthly e-newsletter (MS WIRE) and the quarterly newsletter (NEXT). For those who receive the newsletter in the mail you will notice a difference except for the name of the publication. For those that have been receiving both publications via email you will now only receive one newsletter every month.

This month we will also be launching the first of many Research Reports. Our new Research Report project will include information videos where we will be introducing you to a number of MS research hot topics, researchers and their projects as well as providing details on research trends and techniques. Our first video is with Professor Tamir Ben-Hur from Hadassah, Israel who talks about his trial using mesenchymal stem cells. All of the videos we produce can be found on our website, social media channels and our YouTube channel, so be sure to subscribe to receive the alerts.

This year we will be keeping the focus and pressure on our local and global researchers and encouraging stronger collaborations where possible to reduce replication and allow cross-fertilisation of ideas all with the goal of developing new and better treatments, identifying the causes and finding the cure or cures for MS.

Thank you for your continual support, together we can continue to fund and facilitate the best research in Australia and look forward to the discoveries 2018 will bring.

Dr Matthew Miles, CEO

The twenty new grants will run for the next one to three years and include innovative pilot studies on novel areas of research funded through our small Incubator Grants, as well as major bodies of work supported by larger Project Grants. Several scholarships, fellowships and travel awards will help develop the skills and collaborations of young researchers and clinicians while also allowing them to delve deep into the unsolved problems of MS.

Covering the breadth of scientific enquiry into MS, the grants range from studies into the fundamental genetics and immunology of MS, through to myelin repair and symptom management and rehabilitation.

As always, these grants were selected following a rigorous external expert review of applications which is overseen by our Research Management Council.

Each year the number and quality of the applications received continues to grow and MS Research Australia and the Research Management Council work incredibly hard to ensure that the strongest applications are funded.

Our goal is to support Australian researchers in the areas where they have the greatest strengths to contribute to the global efforts to solve MS. We do not, as yet, know exactly where the much hoped for cure for MS will come from. So continuing to explore a range of different avenues provides us with the strongest chance of reaching that ultimate goal. Along the way

these projects will also reveal new ways to improve the treatment and management of MS.

Progressive MS, one of the greatest areas of unmet need with currently only limited treatment options, is the focus of several of these grants. Two projects are exploring potential new drug approaches to protecting nerve cells to halt the progression of MS. Repairing myelin, with the goal of reversing the effects of MS,

“Our goal is to support Australian researchers in the areas where they have the greatest strengths to contribute to the global efforts to solve MS.”

is another strong area of research in Australia – we have funded a number of projects that are pursuing promising methods to achieve this.

Reaching these goals takes time, so in the meantime identifying the best, evidence-based methods to help people manage the symptoms of MS cannot be neglected. We have funded several projects that address key symptoms of MS, including heat sensitivity, mood and thinking problems as well as rehabilitation for balance and swallowing.

We are incredibly grateful to all of our donors and supporters, and our funding partners, including the Trish MS Research Foundation and the National Health and Medical Research Council, for making it possible to fund these amazing researchers as they chase down every lead in the hunt for a cure for MS.

We have featured just a few of these projects in this newsletter and you can read about all 44 of the new and ongoing grants on our website www.msra.org.au/projects



RESEARCH AUSTRALIA

SNAPSHOT

PROJECTS STARTED IN 2018 FUNDED BY MS RESEARCH AUSTRALIA

IDENTIFYING THE TRIGGERS FOR MS



NEUROBIOLOGY

Menzies Institute for Medical Research, TAS
Dr Yuan Zhou will study genes on the X chromosome and may discover why more females than males develop MS.

Menzies Institute for Medical Research, TAS
Dr Bennet McComish will look across all genes in people from families with MS.

Westmead Institute for Medical Research, NSW
Dr Lawrence Ong will investigate if vitamin D can switch genes on or off in immune cells in children, which may prevent the development of MS.

University of Sydney, NSW
Dr Todd Hardy will travel to the USA to investigate a specific severe form of MS called Balo's disease.

GENETICS & EPIDEMIOLOGY

DEVELOPING BETTER TREATMENTS

University of Melbourne, VIC
Associate Professor Peter Crouch will begin preclinical trials of a copper based therapy for progressive MS.

RMIT University, VIC
Associate Professor Sarah Spencer will investigate how the antibiotic minocycline affects immune cells called microglia to delay the onset of MS.

University of Melbourne, VIC
Associate Professor Justin Rubio will study the DNA from single cells in the brain to better understand progressive MS.

University of Melbourne, VIC
Dr Ai-Lan Nguyen will research different methods for scanning the brain to determine if they can predict changes in disability.

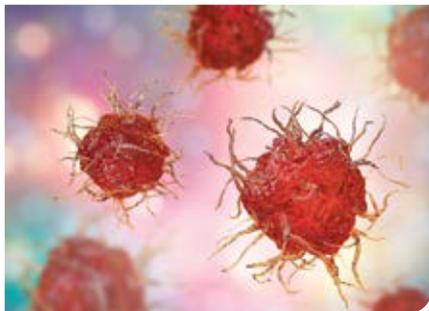


University of Sydney, NSW
Professor Georges Grau is determining the types and numbers of different immune cells during times of remission in MS.

Westmead Institute for Medical Research, NSW
Dr Fiona McKay is researching the role of immune cells called NK cells in MS.

Westmead Institute for Medical Research, NSW
Ms Nicole Fewings will be examining how to improve the function of specific immune cells called NK cells to reduce the severity of MS.

IMMUNOLOGY



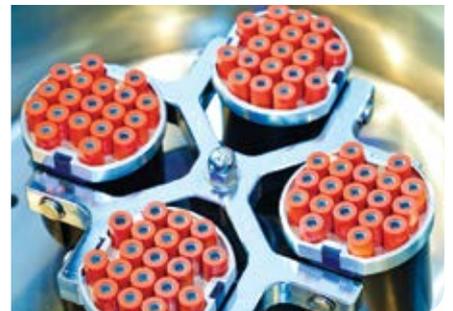
A CURE FOR MS VIA REPAIR OR REGENERATION OF CELLS

Florey Institute of Neuroscience and Mental Health, VIC
Professor Trevor Kilpatrick will investigate how a protein called Tryo3 affects the formation of myelin.

Monash University, VIC
Dr Steven Petratos is testing a drug that could stop and potentially reverse progressive MS.

Menzies Institute for Medical Research, TAS
Dr Carlie Cullen will determine if memory tasks can repair the damage caused by MS.

Menzies Institute for Medical Research, TAS
Dr Kimberley Pitman will travel to Germany to learn a technique for studying progressive MS in the laboratory.



SOCIAL & APPLIED RESEARCH



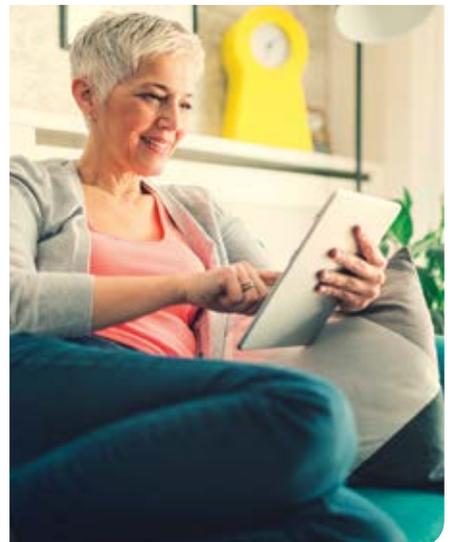
University of Sydney, NSW
Associate Professor Ollie Jay will investigate ways to reduce heat-related fatigue in people with MS.

Monash University, VIC
Mr Daniel Merlo will study if a web based program can measure changes in thinking abilities.

University of Sydney, NSW
Ms Amy-Lee Sessel will develop and evaluate an online program to reduce some symptoms of MS.

University of Sydney, NSW
Dr Hans Bogaardt will determine if electrical stimulation of muscles can help improve swallowing.

Neuroscience Research Australia, NSW
Professor Stephen Lord will develop a training program to help people with MS improve recovery from slips or trips to prevent falls.



KEY

- PROJECT GRANT
- FELLOWSHIP
- SCHOLARSHIP
- INCUBATOR GRANT
- TRAVEL AWARD

Funding for new wave genetic research in MS

MS Research Australia's latest grant funding round has committed funding to a number of projects aimed at developing better treatments to prevent the immune system from damaging the brain and spinal cord.

Over 200 genes have been linked to the risk of developing MS. Research is now turning to whether genes also play a role in other aspects of MS such as the fact that more women than men are affected by MS and the progression of the disease. MS Research Australia is proud to be supporting research in this area with three new grants commencing in 2018.



Three out of every four people with MS are women. **Dr Yuan Zhou** from the Menzies Institute for Medical Research in Tasmania has been awarded a three-year post-doctoral fellowship to determine whether genes are playing a role in why more women than men develop MS. Part of his project will focus on the genetics of the X chromosome in MS, an area that has not received a lot of research attention in the past. Since females have two X chromosomes and males only one, changes to the genes on the X chromosome may provide clues about how MS develops.

Dr Zhou aims to create a mathematical formula to better predict the course the disease will take in individuals with MS. This formula will take into account both genetic and environmental risk factors and identify how they work together to influence the severity and progression of MS. Interest in the role of environmental risk factors is high since these can potentially be modified and may improve the long term outcomes for people with MS. If we can better predict the likely course of the disease in individuals, then it could help identify the most appropriate treatments and lifestyle modifications to improve outcomes for every individual.



Dr Bennet McComish also from the Menzies Institute for Medical Research in Tasmania, has been awarded an incubator grant to investigate short tandem repeats in MS.

Short tandem repeats, also known as microsatellites, are short sequences of DNA that are repeated many times in a row. They are a normal part of our DNA. However, abnormally long stretches of short tandem repeats have been associated with the development and severity of other diseases.

Incubator grants are specifically designed to help get promising new ideas off the ground and Dr McComish will use this funding to investigate for the first time whether these DNA repeats play a role in families where a number of individuals have MS.

The Menzies team have collected DNA from several families with MS, and Dr McComish will determine if there is any variation in the number of repeats between family members that have MS, and those without the disease. He will also investigate whether the number of repeats is associated with the age of onset or the severity of MS. This novel method for investigating familial MS may provide clues about why the severity and progression of the disease is so diverse in all people with MS, and may open the way to a new area to be studied in people with MS.



MS Research Australia and the Trish MS Research Foundation have partnered to award a two-year project grant to **Associate Professor Justin Rubio** from the University of Melbourne. He will be investigating whether genetic changes in the brain contribute to the progression of MS. Genetic changes were thought to play a large role in why some people with MS progress and others remain relatively stable, however, genetic studies using DNA taken from blood cells of people with MS have been unable to find any link between genes and progression.

Associate Professor Rubio will instead look at single brain cells taken from the tissues of people who had MS during life, to determine whether genetic changes might have accumulated in brain cells over a person's lifetime. Even though the cells in our bodies start off all containing the same DNA, individual cells can develop genetic mutations as we age. These mutations in individual cells may influence the way those cells act and function – for example influencing the way they respond to damage in MS. These types of genetic changes could explain why some people develop progressive MS and others don't. Associate Professor Rubio will use the cutting-edge Next Generation DNA Sequencing techniques that are only now allowing these types of studies to be conducted.

Funding to help reach everyone across Australia

In the 2018 funding round, two up-and-coming researchers have been funded to use web-based programs to study MS. Ms Amy-Lee Sesel from the University of Sydney, and Mr Daniel Merlo from Monash University, have both been awarded PhD scholarships.

Web-based services and treatments for people with MS are highly attractive since they can be delivered at a lower cost and are able to reach people regardless of their location. This means people based in more remote locations or those with limited mobility due to their MS will also have the potential to benefit from these services and treatments.



Ms Amy-Lee Sesel is a provisionally registered psychologist who will investigate depression and anxiety in people with MS. It is known that people with MS are more likely to suffer from depression and anxiety than the rest of the community. Previous research by Ms Sesel has shown that mindfulness is likely to be an effective treatment for these conditions for people with MS.

With the support of a two year NHMRC-MS Research Australia co-funded PhD scholarship Ms Sesel will now develop an online mindfulness program specifically for people with MS. She will first conduct focus groups in order to tailor the web-based program to their specific needs. She will then design a new online mindfulness tool based on this information and test whether it works via a clinical trial. Ms Sesel hopes to be able to reduce fatigue, pain, depression and anxiety in people with MS.



Mr Daniel Merlo will be designing a new way to measure changes in thinking abilities due to MS. Up to 65% of people with MS experience changes in their thinking, such as memory loss, difficulties with problem solving and a slowing of the speed at which they can think. These changes can dramatically effect a person's ability to perform everyday tasks and maintain employment. Currently, it is difficult to detect and measure changes in these areas and is usually done via face-to-face testing in a clinic which can take several hours to complete.

During his three-year scholarship, Mr Merlo will determine if brief, web-based programs are able to accurately detect changes in thinking abilities in people with MS. The program has the potential to provide a very rapid tool to test changes in thinking and allow people with MS to complete the testing themselves at a time and location that is convenient for them.

Mr Merlo also plans to investigate the factors that may influence changes in thinking abilities in MS, such as employment, education level or other life events and medication use.

These studies have the potential to provide great flexibility in the way that health professionals can track and manage the symptoms of MS, and allow people with MS access to these services regardless of their mobility and where they live.

Thank you Dr McDonald!

We would like to express our deepest gratitude to Dr Elizabeth McDonald as she steps down from her role as Chair of the Social and Applied Research Sub-Committee of the MS Research Australia Research Management Council.

Dr McDonald has served on the Australian MS research grant review panels for well over 20 years following an original invitation from John Studdy, the Chairman of the then National MS Society of Australia. When the Society's National MS Research Foundation became incorporated as the independently run MS Research Australia, she continued on to the new organisation's Research Management Council (RMC).

Dr McDonald's expertise in the care and management of people with MS and her enormous commitment to ensuring the best quality research is funded in Australia has been absolutely invaluable in building Australia's capacity for MS research – particularly in the areas of rehabilitation, allied health and symptom management for people with MS.

Dr Elizabeth McDonald is a specialist in Rehabilitation Medicine and served as the Medical Director for MS Limited (ACT/NSW/VIC/TAS) for many years. In addition, she also served as an Australian representative on the International Medical and Scientific Board of the MS International Federation (MSIF), providing her expertise on the Editorial Board of MSIF's regular publication "MS In Focus". Her own research interests have focussed

on the impact of MS, including physical impairments, the role of exercise, sexuality, quality of life and the economic burden of MS.

Dr Matthew Miles, CEO of MS Research Australia said, "Dr McDonald's expertise and wise counsel has ensured that we have maintained a social and applied research grant review panel with the correct expertise to review the diverse applications we receive in this area. She has led this team with great strength and integrity to ensure these applications receive a thorough and fair review to select the strongest applications with the greatest potential to make a difference for people living with MS."

Dr McDonald will continue to serve as the Chair of the Steering Committee of MS Research Australia's longest running collaborative research platform, the Australian MS Longitudinal Study. Long-term member of the Social and Applied Research Sub-Committee of the RMC, Associate Professor Jennifer McGinley, will replace Dr McDonald as Acting Chair.

Thank you Liz for your incredible service, your warmth and your passion for supporting people with MS through research!



Dr Elizabeth McDonald with CEO Matthew Miles (left) and our previous CEO Jeremy Wright

2017 KISS GOODBYE TO MS HIGHLIGHTS



\$1,165,000
for MS research



205
brand new
fundraisers



Increasing support
from individuals aged
18-24



Fundraising ratio
81 cents
in the \$
goes to fund research



Meet Kiss Goodbye to MS Ambassador Mez Gallifuoco

Mez has been involved with Kiss Goodbye to MS since the campaign began. Over the years we have wondered, many times, how she does it all. She has a science degree, is a director in a successful business, is a blogger, she's a Kiss Goodbye to MS Ambassador and she still has time to be our in-kind expert digital consultant.

Diagnosed with MS when she was 18, she handles her illness with grace. She is honest about the scary times, telling us last year that sometimes thinking about her future causes a whole host of emotions.

"I fluctuate with how I feel about my future. Sometimes I'm very confident about it and positive. And there are times when that becomes difficult to maintain."

Being involved with Kiss Goodbye to MS has been a huge factor in maintaining a positive approach to living well with MS. Mez puts her trust in research, that with increased funding we will find the answers for MS. Which is why she chooses to be involved with Kiss Goodbye to MS, raising funds for ongoing research into MS.

While having MS isn't easy, embedding herself in the positive community that is Kiss Goodbye to MS has made all the difference. Since being diagnosed with MS 12 years ago her life has had a layer of complexity that most 20-somethings don't have to deal with. But while she has her down moments, most of the time she is inspiring and empowering other people who are living with MS.

Mez has wisdom well beyond her years. She articulates that the hardest thing about having MS is the loss of power, the sense of having no control over your body. A sentiment echoed by many people who have MS. For Mez, supporting Kiss Goodbye to MS is her way of doing something to control how her future will look – that by raising funds, more MS research will be able to be undertaken. For Mez, arming herself with knowledge is her answer to controlling this uncontrollable disease.

"I learned all I could about not only my disease, but how to become resilient in the face of such a thing."

Kiss Goodbye to MS not only raises more than \$1 million for MS research each year, it is a community that supports and uplifts each other. We are inundated with messages of thanks to all of our fundraisers and donors on Facebook, and we often receive emails of gratitude directed to our researchers. Mez feels the same.

"When I hear about the work being done by fundraisers for Kiss Goodbye to MS I feel so much gratitude for them."

And the feeling is mutual. We are so grateful for all of our community who not only raise funds but also volunteer, donate and support us on social media! Join us in 2018 to help us raise \$1.3 million for MS Research Australia, we have a feeling it will be our biggest year ever.

Register here www.kissgoodbyetoms.org/register/

Donating shares rather than cash

Australia has one of the highest levels of share ownership in the world and each year, shareholders are looking to leverage their portfolio as part of their legacy. A fraction of ASX's current market capitalisation of around \$1.5 trillion would easily generate a huge shift in philanthropic funding in Australia.

MS Research Australia has recognised the need to diversify and attract fundraising across a variety of sources. One such alternative is ShareGift Australia. This organisation is the only service of its kind in Australia and is based on the model of ShareGift UK. Since the organisation's establishment in 2007, they have distributed over \$1.6 million to more than 470 charities.

To achieve this, they work with stockbroking partners to facilitate the share sale without charging brokerage, so if you are an Australian shareholder you can claim a tax deduction for the share's full market value.

Shareholders can nominate MS Research Australia as the recipient charity where the share sale donation exceeds AUD\$100. Alternatively, you can elect to pool your donation and allow ShareGift Australia to make donations to several charities. 100% of all donated share proceeds are used for charitable purposes.

ShareGift Australia can be used as a great vehicle to support MS Research Australia now or factored in as a bequest later. Whilst we recommend consulting with your accountant, utilising a service such as ShareGift Australia can be a more tax-effective



ShareGift Australia

way to make a donation, creating the potential for larger charitable bequests or a greater amount left over for other beneficiaries.

Consider this simple example. There are circumstances in which assets such as shares can be directly bequeathed to a charity. These assets may have significant capital gains attached to them. If the charity has zero tax status then these assets can be transferred without tax being incurred on the capital gains. Compare this to the situation where all the assets of the estate are sold down: capital gains will be incurred, and the amount of money that can be distributed amongst beneficiaries, including the charity, is smaller.

To find out more in plain, simple language, visit the ShareGift Australia website www.sharegiftaustralia.org.au.

By Jillian Kingsford Smith



HELP MS RESEARCH AUSTRALIA FIND A CURE FOR MS

Donate (Donations over \$2 are tax deductible)

To support MS Research Australia's vital work I would like to:

- Make a one off donation of \$
- Make a monthly donation of \$
- Learn more about leaving a bequest in my Will
- I have already made a bequest to MS Research Australia in my Will

Contact details

Title: First name:
Surname:
Address:
Suburb: State: Postcode:
Phone: Mobile:
Email:

Payment method:

Cheque (made payable to MS Research Australia)

Direct Debit Request (copy of service agreement can be provided on request)

Financial institution: ABN 34 008 581 431

BSB number:

Account number:

Account holder's name:

Credit Card

Mastercard Visa Amex

Credit card number:

Exp: CVV:

Name on card:

Signature:



ABN 34 008 581 431