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MEDIA RELEASE

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Pioneering AI Promises Revolutionary Advancements in Multiple Sclerosis Treatment

30 AUGUST 2023: New research exploring cutting-edge Artificial Intelligence (AI) technology to better analyse MRI scans of patients with multiple sclerosis (MS) could unlock crucial insights into disease progression and pave the way for improved treatment of people living with the condition.

The research, led by Dr Heidi Beadnall from the University of Sydney, was announced as one of four recipients of MS Australia's latest round of new innovative Incubator Grants, totalling $92,565, which support ground-breaking projects exploring new frontiers of MS research.

Dr Beadnall's team will explore, with the use of AI technology, whether brain lesion number, lesion volumes and brain volumes can be efficiently calculated from routine magnetic resonance imaging (MRI) scans using automated imaging analysis.

In MS, MRI plays a pivotal role in visualising the brain and spinal cord, aiding in diagnosis, prognosis, and monitoring disease activity and treatment response.

AI-driven analysis can eliminate the time-consuming manual process and enable the extraction of significantly more information from MRI scans.

"In the clinic, people with MS (as well as their families, friends and carers) often ask questions like 'How many MS lesions do I have?', and 'Do I have brain atrophy (shrinkage)?

"Currently these questions cannot be answered accurately, due to clinicians not having rapid access to quantitative MRI data in the real-world clinical setting. This project addresses this unmet need by making this data available to clinicians," says Dr Beadnall.

With a strong emphasis on fresh ideas for advancing MS research, this year's Incubator Grants will fund the initial stages of new research and be led by four researchers from three leading Australian Universities.

Among the other funded projects, two will target repairing myelin, the protective sheath around nerves damaged in MS, with the potential to halt and reverse MS-caused disability — the Holy Grail of MS research. The fourth project aims to improve the diagnosis and management of MS by monitoring MS flare-ups using brain tracers that target specific proteins.

MS Australia Head of Research, Dr Julia Morahan says this novel research, made possible through MS Australia's Incubator Grants, demonstrates MS Australia's commitment to innovative research in its mission to create a world free of MS.

“We are facing accelerating numbers of MS in Australia, so we are more determined than ever to explore every possible avenue to find solutions. These grants exemplify that commitment,” Dr Morahan said.

“The complexity of MS means that it’s absolutely crucial we support trailblazing ideas from our brightest minds, with the ultimate goal of unearthing new and better strategies to combat this condition effectively."

"These grants are not only an investment in research but also the researchers themselves. Each of these projects and the dedicated teams behind them showcase Australia's position at the forefront of MS research."

MS Australia President, Associate Professor Desmond Graham, congratulated the successful researchers, saying the standard of applications was exceptional and reflected the high calibre of science underway in Australia.

"Research serves as our beacon of hope. I eagerly await the research outcomes as they have the potential to bring us closer to our goal of revealing cures for MS,” Associate Professor Graham said.

“These grants are only possible thanks to the generosity of our state and territory Member Organisations and a generous Australian community who are as passionate and dedicated to making a difference for people living with MS.”

Dr Heidi Beadnall and her team from The University of Sydney, are dedicated to improving diagnostic tools for MS, using the latest advances in imaging technology and AI – to assist neurologists in determining the effectiveness of treatments and enable early intervention if necessary. The team will also determine which factors can contribute to management and treatment decisions, with findings from this study providing valuable information for tailored care for people living with MS.

- Meet the Researcher
- Project Summary

Dr Mohammad Haskali and his team from The University of Melbourne, will be developing new methods to monitor flare-ups in MS. Using brain tracers for specific proteins on brain cells, the researchers hope to accurately visualise and monitor inflammation occurring in real time, in order to improve the diagnosis, monitoring, and management of MS. Their overall aim is to facilitate better treatment strategies for people with MS.

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One of the studies investigating the activity of myelin-producing cells in MS will be undertaken by **Ms Natalie King and her team from the Menzies Institute for Medical Research at The University of Tasmania.** The research will help to uncover the mechanisms that hinder myelin repair in MS and understand which factors can guide cells towards generating new myelin. With this knowledge, the researchers hope to find ways to promote brain repair in people with MS, leading to new therapeutic options for MS.

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Associate Professor Simon Murray and his team at The University of Melbourne, will gain knowledge into how myelin is formed and maintained throughout life. This work from Associate Professor Murray and his team could contribute to the development of new targeted therapies that could promote myelin repair. In addition, these new therapies may have a positive effect on learning, memory, and overall brain health as people age.

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The full details of all new research projects funded in 2023 can be found here.

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About MS

MS is the most common acquired chronic neurological disease affecting young adults, often diagnosed between the ages of 20 to 40 and, in Australia, affects three times more women than men. As yet, there is no cure. There is no known single cause of MS, but many genetic and environmental factors have been shown to contribute to its development.

In MS, the body's own immune system mistakenly attacks and damages the fatty material – called myelin – around the nerves. Myelin is important for protecting and insulating nerves so that the electrical messages that the brain sends to the rest of the body, travel quickly and efficiently.

As the myelin breaks down during an MS attack – a process called demyelination – patches of nerves become exposed and then scarred, which renders the nerves unable to communicate messages properly and at risk of subsequent degeneration. This means that the brain cannot talk to other parts of the body, resulting in a range of symptoms that can include a loss of motor function (e.g., walking and hand and arm function, loss of sensation, pain, vision changes and changes to thinking and memory).

About MS Australia

MS Australia is Australia's national multiple sclerosis (MS) not-for-profit organisation that empowers researchers to identify ways to treat, prevent and cure MS, seeks sustained and systemic policy change via advocacy, and acts as the national champion for Australia's community of people affected by MS.

MS Australia represents and collaborates with its state and territory MS Member Organisations, people with MS, their carers, families and friends and various national and international bodies to:

- Fund, coordinate, educate and advocate for MS research as part of the worldwide effort to solve MS
- Provide the latest evidence-based information and resources
- Help meet the needs of people affected by MS.