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MEDIA RELEASE

Suite 3.01, 18 Flour Mill Way, Summer Hill NSW 2130
media@msaustralia.org.au | www.msaustralia.org.au

Scientists take major step toward changing the course of multiple sclerosis

4 March 2026: Australian researchers can study more than 100 genetic risk factors for multiple sclerosis (MS) together, a breakthrough that brings scientists closer to understanding how the disease develops and to improving quality of life for people living with MS.

The project, led by Dr Hamish King at WEHI and funded through MS Australia's latest $2.8m research grant round, addresses a long-standing gap in MS genetics.

Over the past two decades, large genetic studies have identified hundreds of small DNA changes linked to increased MS risk. However, most of these changes do not alter genes directly.

Instead, they affect how genes are switched on and off inside immune cells, making it difficult to understand exactly how they contribute to disease.

Until now, understanding how these genetic risk factors linked to MS act together to drive disease has been a major challenge for researchers.

Dr King's team will now introduce and test these genetic risk factors in human immune cells, measuring how they alter gene activity and immune behaviour both individually and in combination.

Dr King said understanding how networks of risk genes operate together could help enable more precise treatments and, ultimately, better long-term outcomes for people living with MS.

"For more than 20 years, we've known that there are many genetic markers linked to risk of developing MS, but we haven't been able to fully explain how they alter immune cell behaviour," Dr King said.

"MS can arise from many small genetic differences acting together, and this platform will allow us to study those changes collectively and connect them to the specific genes and pathways they affect."

MS is an immune-mediated condition in which the body mistakenly attacks the brain and spinal cord, damaging myelin, the protective coating around nerve fibres.

The disease can affect mobility, vision, cognition and energy levels.

In 2025, more than 37,700 Australians are living with MS, a 77.4 per cent increase since 2010. The total economic burden of the disease reached $3b in 2024.

As the number of Australians living with MS continues to rise, accelerating research across the full spectrum of the disease is increasingly urgent.

MS Australia's Head of Research, Dr Tennille Luker, said projects like Dr King's are helping researchers close a critical gap between genetic discovery and real-world impact.

"Identifying risk was only the beginning. Understanding how those genetic changes actually drive disease is what allows us to change its trajectory."

"Alongside this work, we are investing in research that slows progression, manages symptoms and improves quality of life. These projects strengthen our response to MS today while laying the scientific foundation for prevention and cures," Dr Luker said.

In addition to MS Australia's core funding, the generous support of the Browne Family has funded a Postdoctoral Fellowship, awarded this year to Dr James Hilton at the University of Melbourne to develop new compounds to protect nerve cells in progressive MS.

Over more than two decades, MS Australia has invested more than $60m in MS research.

CEO Rohan Greenland said sustained national investment in research is essential to delivering real progress for people living with MS.

"Research is hope, and it reminds people living with MS that progress is possible, and that better treatments and prevention are within reach."

"None of this would be possible without the passion and commitment of our state and territory Member Organisations, our donors and the broader MS community. Together, we are accelerating the discoveries that will bring us closer to a world without MS," Mr Greenland said.

The research grants will be formally launched at Parliament House in Canberra on 4 March at MS Australia's Advancing MS Research in Australia event, with speakers including Dr Monique Ryan MP and Ms Renee Coffey MP, highlighting the importance of sustained national commitment to MS research.

Featured projects:

Sensory shoe insoles to improve balance in MS
Associate Professor Anna Hatton, The University of Queensland, QLD

Associate Professor Anna Hatton is developing sensory shoe insoles designed to enhance foot sensation and improve balance in people living with MS. The project will test whether the insoles improve upright stability, with the goal of reducing fall risk, supporting mobility, independence and everyday confidence.

"Our research is testing innovative 'Vibrotexture' shoe insoles that boost the signals the feet send to the brain, helping the body react faster and stay steady.

"The goal is to develop a clinically ready insole that can be used worldwide, making everyday life safer for people with multiple sclerosis and shaping future treatments that focus on foot sensation," Associate Professor Hatton said.

Protecting brain blood flow to slow MS progression
Professor Kaylene Young, Menzies Institute for Medical Research, University of Tasmania, TAS

Professor Kaylene Young is investigating how changes in brain blood vessels may contribute to MS progression. Using stem cell models, her team will examine how genetic differences affect blood flow, inflammation and nerve cell survival, with the aim of identifying drug targets that protect myelin and slow disability.

"We also expect to identify druggable targets on the blood vessels that can be modified to improve brain blood flow regulation for people with MS.

"We predict that even after MS develops, targeting and improving blood vessel health could be critical for supporting brain remyelination and preventing nerve cell death," Professor Young said.

Investigating how common viruses may trigger MS
Mr Alex Eisner, The Florey Institute of Neuroscience and Mental Health, the University of Melbourne, VIC

Mr Alex Eisner is examining how Epstein-Barr virus and other common herpesviruses may influence MS by associated antibody, including autoantibody, response and by altering how human genes are switched on and off (epigenetic programming). Alex's project, in collaboration with major Australian

studies, aims to clarify the molecular mechanisms underlying the viral infections that affect MS risk, progression and response to treatment.

“We are beginning to understand that viruses such as Epstein-Barr virus may shape the immune system in ways that contribute to MS.

“If we can deepen this understanding by examining the interplay between viral activity and immune response, together with a person’s genetic and epigenetic profile, we can uncover the pathways through which viruses may increase MS risk and develop new treatment and prevention strategies,” Mr Eisner said.

Investigating whether copper disruption links key MS risk factors
Dr Brittney Lins, Curtin University, WA

Dr Brittney Lins is exploring whether disrupted copper levels in the brain may connect major MS risk factors, including Epstein-Barr virus infection, vitamin D deficiency and gut health. The project will examine whether copper imbalance contributes to myelin damage, with the aim of identifying new prevention and treatment strategies.

“Copper is a trace nutrient that we get through food, and though it is present in very low levels in the body, it plays a critical role in energy utilisation and antioxidant defences.

“If copper use is disrupted, myelin may be more vulnerable to inflammation and autoimmunity. I think copper could be the missing link that ties together multiple MS risk factors,” Dr Lins said.

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MEDIA CONTACTS:
media@msaustralia.org.au
Lisa Montague – 0412 002 544
Jayme Markus – 0401 944 905