Multiple Sclerosis Research Programme, Malaghan Institute of Medical Research

Multiple sclerosis (MS) is a chronic autoimmune disease that is thought to be the primary cause of neurological disability in young New Zealanders. The disease causes nerve degeneration via a process of demyelination – damage to the myelin sheath around the nerves – and results in a gradual loss of feeling and movement. Cells of the immune system target the brain and central nervous system causing this demyelination and nerve degeneration, and our research focuses on a multi-functional immune cell, the macrophage, which is a key mediator of inflammation. The goal of our work is to identify immune pathways that inhibit MS in the hopes that these pathways will provide much-needed new therapeutic targets to inhibit or reduce the severity of MS.

MS is a highly variable disease in terms of how it affects each patient. In general, there are 3 main forms of the disease, relapsing-remitting, primary progressive, and secondary progressive MS. At any given time, about half of New Zealand's MS patients have the relapsing-remitting form while the remaining patients have one of the two progressive forms. There is no cure for the disease, and current disease-modifying therapies treat only the relapsing-remitting stage. Thus, there is an urgent need for therapies that target the progressive forms of MS. To address this need, we are involved in finding alternative therapies to treat MS and in particular, to target the progressive forms. Recently, we have identified several agents, which modify the immune system and are effective at reducing the severity of attacks. One of these agents, MIS416 was developed by Innate Immunotherapeutics, a New Zealand biotech company. This novel microparticle is currently undergoing clinical trials to determine its effectiveness in progressive MS while our group has been identifying the mechanism by which it works to reduce disease.

A second new therapeutic avenue we are investigating is the potential of the anti-psychotic agents clozapine and risperidone to treat MS. Clozapine, first released in the 1970s, and risperidone are used internationally to treat schizophrenia and bipolar disorder. In collaboration with Associate Professor Bronwen Connor, a neuroscientist at the University of Auckland, we have shown that these agents have the potential to treat MS and by a mechanism that is distinct from how they treat psychosis. Our studies showed positive changes in the central nervous system, particularly with clozapine in the relapsing-remitting disease, and preliminary work in the progressive disease model is very promising. We are now preparing for a small clinical trial to look at safety and acceptability for patients with progressive MS.

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