

Australian funded study may pave the way for a new progressive MS treatment

10th May, 2017



Australia once again is on the cutting edge of MS research. Professor Michael Pender from the University of Queensland and Professor Rajiv Khanna from QIMR Berghofer Medical Research Institute, have released encouraging preliminary results from a trial of a new treatment for progressive MS, called EBV-specific adoptive immunotherapy.

These are preliminary results and more research is needed, however the results are very promising. This phase I clinical trial was designed to test the safety of this novel therapy - which has been developed by Professor Khanna and his team at QIMR Berghofer on a small number of people. The results from the first six patients (out of a total of 10) will be presented to the American Academy of Neurology's Annual Meeting in Boston USA this month.

The study investigates the relationship between MS and the Epstein-Barr virus (EBV). EBV is a herpes virus that is extremely common. Previous research shows that close to 100% of people with MS have been infected by this virus often without any obvious symptoms.

Typically, once a person is infected with EBV they carry it in a type of immune cell, called B cells, for the rest of their life. Normally, another type of immune cell called T cells manage to keep the infected B cells under control. However, in people with MS there seems a defective T cell response, allowing the EBV infected B cells to accumulate in the brain. There they produce antibodies that attack and destroy myelin, the protective layer that insulates nerves in the brain and spinal cord. The scientists have hypothesized that the elimination of the EBV-infected B cells may reduce the destruction of myelin in MS, and therefore reduce the symptoms and progression of MS.

Dr Matthew Miles, CEO of MS Research Australia said 'MS Research Australia is proud to have supported Professor Pender and his team since 2005 on a number of projects studying the effect of the EBV in MS. We have awarded over \$1.2 million to this group over a decade which has culminated in this very encouraging clinical trial tackling the toughest problem in MS- progressive disease.' Information on the previous research can be [found here](#).

The epicentre of the phase 1 trial is the MS Clinic at the Royal Brisbane and Women's Hospital. MS Queensland CEO, Lincoln Hopper said that "having jointly established the MS Clinic with Professor Pender more than 20 years ago and funded annual operations there ever since, it is deeply satisfying to see our longstanding collaboration at work through this clinical trial".

In this trial, which has been supported by MS Queensland, MS Research Australia, QIMR Berghofer Medical Research Institute and Perpetual Trustee Company Limited, T cells from each of the patients were extracted and grown in QIMR Berghofer's cell manufacturing facility Q-Gen Cell Therapeutics and exposed to an EBV vaccine. This strengthens the T cells enabling them to more effectively kill EBV infected B cells. The T cells were then reintroduced to the patients by intravenous infusion. They tested this strategy on six people with progressive MS and then followed them for 26 weeks to ensure no adverse effects arose.

While this very initial study was to test the safety, the researchers found that three of the participants showed improvement, starting two to eight weeks after the first infusion.

'One person with secondary progressive MS showed striking improvement,' Professor Pender said. 'This participant had a significant increase in ambulation from 100 yards with a walker at the start of the study, and over the previous five years, to three quarters of a mile, and was now also able to walk shorter distances with only one side assistance. Lower leg spasms that had persisted for 20 years resolved.'

Professor Pender said another participant with primary progressive MS showed improved colour vision and visual acuity. All three responding participants had improvements in fatigue and ability to perform daily activities.

The main aim of this phase of the study was to determine side effects. None of the six participants had serious side effects, paving the way for the next stage of clinical trials if the remaining participants are similarly unaffected.

'Of course, much more research needs to be done with larger numbers of participants to confirm and further evaluate these findings but the results add to the mounting evidence for a role of the Epstein-Barr virus infection in MS and set the stage for further clinical trials.' said Professor Pender.

The study is a collaboration between the QIMR Berghofer Medical Research Institute, Royal Brisbane and Women's Hospital and The University of Queensland in Brisbane, Australia.