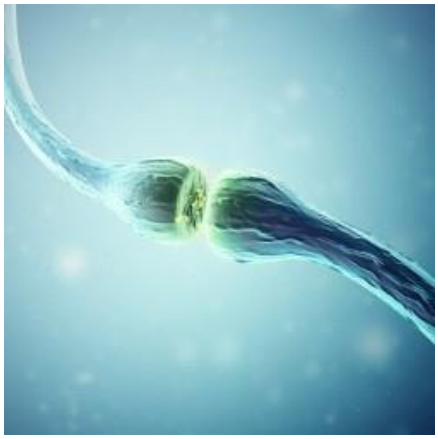
New funding for repair and regeneration of myelin

6th March, 2017



MS results from the damage and loss of myelin, the conductive layer around nerve fibres in the brain and spinal cord. Myelin can be repaired following attacks of MS, but in progressive MS repair is incomplete, causing irreversible damage.

In the recent MS Research Priorities Survey, finding a cure for MS (via repair and regeneration of cells) was confirmed as a top research priority for the MS community. In our latest round of funding, we are building on our commitment to this field of research by supporting several new projects investigating repair and regeneration of cells, promoting myelin re-growth and restoring lost function.

Dr Tobias Merson's team at the Australian Regenerative Medicine Institute, Monash University, VIC, has previously shown that increasing the electrical activity of nerve fibres in brain tissue unaffected by MS enhances the formation of myelin on these nerve fibres. Others have also discovered that blocking electrical activity in MS brain lesions reduces the brain's ability to repair lost myelin. To further this research, Dr Merson will use laboratory models of MS to investigate whether electrical activity within nerve cells alters the ability of myelin producing cells to generate new myelin.

Dr Kaylene Young's team at the Menzies Institute for Medical Research, TAS, has recently established a noninvasive technique, known as repetitive transcranial magnetic stimulation, which can increase the amount of myelin that brain cells can make. In this new project, Dr Young and her team will test this technology in laboratory models of MS to see if it can increase the number of myelin making cells and lead to re-wrapping of nerve fibres with myelin. This magnetic stimulation is safe for human use and is already being used for the treatment of other nervous system disorders. Therefore, it is hoped that a successful outcome from this project can rapidly lead to clinical trials of much needed therapeutic options for progressive MS.

Associate Professor Richard Hughes at the University of Melbourne, VIC, will continue developing myelin repair drugs based on the brain chemical Brain Derived Neurotrophic Factor (BDNF). BDNF is a protein that controls the growth of myelin during development and is able to repair myelin after it has been damaged. However, BDNF is a large protein that is broken down by the body, and therefore cannot be used directly as a treatment. Associate Professor Hughes' team are building on research previously funded by a MS Research Australia incubator grant to synthesise smaller molecules which mimic the function of BDNF and might be a suitable therapy for MS.

Investigations into repair and regeneration are also ongoing around the world, and it is important that Australian researchers maintain close collaborations with international researchers to ensure efficient research progress. To achieve this, **Dr Michael Lovelace** from St Vincent's Centre for Applied Medical Research, NSW, will travel to Professor Antel's laboratory at McGill University, Canada. Dr Lovelace will learn how to isolate human myelin producing cells from other brain cells. Tests on these cells will determine if certain toxic chemicals produced during inflammation can be inhibited to enhance the brain's capacity to repair myelin lost in MS.

Determining new ways to enhance repair in the MS brain will hopefully lead to new therapeutic options for the progressive phase of MS. However, in order for these therapies to be tested in clinical trials we need to develop reliable methods to measure myelin repair and reversal of disability in real-time during clinical trials. Some of the other projects we are funding in this round will do just that, including Dr Joshua Barton, who will be developing new ways to track brain changes using tablet technology, and Dr Peter van Wijngaarden who will be developing a model to measure repair in the optic nerve.