

Regenerating brain cells

The need

Brain disorders that affect mood, memory and cognition, long thought to be due to chemical imbalance, are now recognised as having a cellular origin. Extensive research is beginning to reveal how impairments to the production of neurons from stem cells in the brain can trigger a wide range of illnesses, including anxiety, depression, dementia and trauma-based disorders. Collectively, these disorders come with high impact for affected individuals and their families as well as staggering healthcare costs and lost productivity. There are many lingering questions about how new nerve cells can regulate brain function. Finding the answers could lead to new treatments and benefit millions of Australians.

The projects

Unravelling the complexities of the brain has been a lifelong pursuit for Professor Perry Bartlett. Back in 1982, he predicted the presence of stem cells in the brain, a promise he delivered in a world first a decade later. His discovery overturned a previously-held belief that the brain was a static organ, incapable of regeneration or repair.

The age of the plastic brain had begun. But, it turns out the brain has more than one kind of stem cell. In 2015, Bartlett and Dr Dhanisha Jhaveri – once a postdoctoral fellow of Bartlett's at the University of Queensland who has since established an independent lab – identified two distinct populations of stem cells within the hippocampus, the region of the brain responsible for mood, memory and spatial awareness. In 2017, Jhaveri identified a third population in the amygdala, an adjacent region of the brain. The findings help explain why this region of the brain is capable of managing several different functions. Determining strategies to encourage these cells to repair damage, or stay active as we age, is the long-term goal of these researchers.

Bartlett's team have also shown that the brain's immune cells, microglia, respond to exercise by stimulating production of new neural cells. This link between exercise and improved memory in mice is an extremely promising finding.

The impact

A clinical trial, based on the Bartlett team's finding, is now underway. It will follow 300 people aged between 65 and 85 to determine the optimal amount, intensity and type of exercise required to stimulate cognitive improvements in the brain. Additionally, identification of molecules that control the different neural stem cells, as well as the microglia, offer a new path for developing and testing drugs for the treatment of dementia and mood-related disorders.

At a glance

Stem cells found in regions of the brain could offer possible treatments for age- and mood-related disorders.



Professor Perry Bartlett



Dr Dhanisha Jhaveri

