Howard Florey Institute
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Schizophrenia improved by mental and physical exercise

Scientists at Melbourne's Howard Florey Institute have shown that mental and physical exercise can improve behavioural deficits in schizophrenia and repair damaged chemical transmitter pathways in the brain.

Dr Anthony Hannan, along with Dr Caitlin McOmish, Emma Burrows and colleagues, characterised a genetically altered mouse and discovered that it had schizophrenia-like behaviours, including learning and memory problems, the inability to process complex information, and abnormal responses to particular sensory stimuli.

The scientists found the mouse's condition significantly improved by simply giving them enhanced mental and physical exercise – putting running wheels in their cages, plus interesting items to smell, see and touch.

Not only did the mouse's schizophrenia-like symptoms ease through this environmental enrichment, but a specific chemical transmitter pathway found to be abnormal in the cerebral cortex of the mice was selectively rescued.

An anti-psychotic drug used by humans also improved the mouse's condition, indicating that this mouse is a valid model for schizophrenia in humans.

Dr Hannan said this discovery could pave the way for the development of better treatments for schizophrenia.

"Through our research, and that of others, we hope a new class of therapeutic drugs will be developed that mimic the effects of environmental enrichment in the brain to treat various brain disorders, possibly including schizophrenia," Dr Hannan said.

"Pharmaceutical approaches may not be the sole answer for a given brain disease. People may still need optimal levels of physical and mental activity, as well as a healthy diet, plus the right drugs.

"We have already identified specific molecules that could be targets for what I call 'enviromimetics' and these may have relevance for other brain diseases.

"However, there are obviously major differences between mice and men, and large-scale clinical trials are needed to identify the most beneficial drugs," he said.

Schizophrenia is a brain disorder that is brought on through a complex and largely unknown interaction of genes and environment.

There is a nature-nurture aspect to schizophrenia because in human identical twins, if one twin develops schizophrenia, there is only a 50% chance the other twin, who has identical genes, will develop the illness.

Dr Anthony Hannan's ground-breaking environmental enrichment studies have previously shown that a combination of mental and physical exercise could delay the onset and progression of Huntington's disease. As well as movement problems (e.g. chorea) and cognitive deficits (culminating in dementia) this disease has psychiatric symptoms, which can include depression and psychosis.

At only 37 years of age, Dr Hannan is internationally recognised for his Huntington's disease research and was awarded a $1 million Pfizer Australia Senior Research Fellowship to fund his ongoing environmental enrichment studies.

This research, which also involved collaboration with scientists from the Mental Health Research Institute of Victoria, is currently an advanced online publication of the international journal *Molecular Psychiatry.*

For information about schizophrenia, visit the Florey's website:
http://www.florey.edu.au/index.php?id=50

The Howard Florey Institute is Australia's largest brain research centre. We continue to grow as we embark on a bold journey that will see us join forces with the Brain Research Institute, National Stroke Research Institute to form the Florey Neuroscience Institutes. Our united effort will result in a critical mass of skilled researchers from different disciplines focused exclusively on the brain. This will accelerate discoveries to benefit those affected directly and indirectly by brain disorders. The Florey's research areas cover a variety of brain and mind disorders including Parkinson's disease, stroke, motor neuron disease, addiction, epilepsy, multiple sclerosis, and dementia.

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For more information contact:
Merrin Rafferty
Public Relations Manager
Howard Florey Institute
Ph: (03) 8344 1658 M: 0400 829 601
Email: merrin.rafferty@florey.edu.au
Web: www.florey.edu.au