

MENTAL AND PHYSICAL EXERCISE IMPROVES GENETIC MENTAL IMPAIRMENT

Australian scientists have shown that mental and physical exercise can improve coordination and movement problems in Rett syndrome, a devastating genetic brain development disorder that primarily affects females.

Using a mouse model of Rett syndrome developed by the Children's Medical Research Institute in Sydney, researchers from the Howard Florey Institute in Melbourne found these mice responded positively to the effects of environmental enrichment.

A/Prof Anthony Hannan from the Howard Florey Institute said the onset and severity of coordination and movement problems was reduced by giving the Rett syndrome mice a range of mazes, toys and exercise equipment to stimulate them both mentally and physically.

"Mari Kondo in my laboratory discovered that environmental enrichment significantly improved the ability of the Rett syndrome mice to learn and maintain tasks that required coordinated movements," A/Prof Hannan said.

"We also found that a special brain chemical called BDNF, which plays a role in the birth and survival of new neurons as well as modifying connections in the brain, was at similar levels in both normal mice and the enriched Rett syndrome mice.

"The Rett syndrome mice that did not receive environmental enrichment had lower levels of BDNF and performed poorly on movement and coordination tasks.

"This discovery shows that gene-environment interactions may be important for all brain diseases, including those caused by an inherited gene mutation.

"The next step is for us to look at the effects of environmental enrichment on anxiety and cognition in the mice, as these are common problems in Rett syndrome," he said.

Developer of the Rett syndrome mouse model, Prof Patrick Tam of the Children's Medical Research Institute, said for the past seven years his research team, and especially Dr Gregory Pelka, had been investigating Rett syndrome genetics.

"We have already found a number of genes that may be linked to the development of Rett syndrome," Prof Tam said.

"More research in this area is urgently needed as Rett syndrome is the second most common form of severe mental disability in girls after Down syndrome in Australia," Prof Tam added. Prof John Christodoulou from the Children's Hospital at Westmead also contributed his clinical expertise to the team.

This research was published today in the *European Journal of Neuroscience* and is the first published paper on the effects of environmental enrichment in a Rett syndrome model.

This study was a collaboration between scientists from the Howard Florey Institute, the Children's Medical Research Institute, the Children's Hospital at Westmead, the University of Melbourne and the University of Sydney.

RETT SYNDROME FACTS

- Rett syndrome is predominantly caused by a sporadic mutation in the *MECP2* gene on the X chromosome.
- The syndrome becomes apparent from around six months of age when development stagnates and acquired skills, such as coordination, speech, communication skills and cognitive function deteriorate. Other problems can include, breathing, cardiac function, chewing, swallowing, and digestion.
- Rett syndrome has often been misdiagnosed as cerebral palsy, and shares some similarities with autism. A blood test, as well as symptoms and clinical history, helps to diagnose the disorder.
- The average life expectancy of a girl with Rett syndrome is less than 50 years and she will require maximum assistance with every aspect of daily living.
- In Australia, Rett syndrome affects about 1 in 8,500 females by the age of 15 years.

For more information about the Howard Florey Institute or to donate to the Florey's brain research visit <http://www.florey.edu.au>

For more information about the Children's Medical Research Institute or to donate to the Jeans for Genes campaign visit <http://www.cmri.org.au>

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A/Prof Anthony Hannan from the Howard Florey Institute in Melbourne is available for interviews on 19 June 2008. To arrange an interview contact:

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