

More brain research suggests 'use it or lose it'

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Queensland Brain Institute (QBI) scientists have found another important clue to why nerve cells die in neurodegenerative diseases, based on studies of the developing brain.

Neuroscientists at The University of Queensland have just published findings, which add more weight to the "use it or lose it" model for brain function.

QBI's Dr Elizabeth Coulson said a baby's brain generates roughly double the number of nerve cells it needs to function; with those cells that receive both chemical and electrical stimuli surviving, and the remaining cells dying.

In research published in the *Journal of Neuroscience*, Dr Coulson and her colleagues have identified a crucial step in the cell-death process.

"It appears that if a cell is not appropriately stimulated by other cells, it self-destructs," Dr Coulson said.

This self-destruct process is also known to be an important factor in stroke, Alzheimer's and motor neuron diseases, leading to the loss of essential nerve cells from the adult brain.

"We know that a lack of both chemical and electrical stimuli causes the cells to self-destruct," Dr Coulson said.

"But we believe that nerve cells will survive if appropriate electrical stimuli are produced to block the self-destruct process that we have identified."

The researchers' next step is to test whether dying cells receiving only electrical stimulation can be rescued.

More than three years' research has gone into understanding these crucial factors regulating nerve cell survival, but it is a major step in the long process of discovery needed to combat neurodegeneration.

QBI Director, Professor Perry Bartlett said the research is an extremely exciting finding because it also provides the missing piece of information as to how the brain likely keeps alive the new neurons it generates in some brain areas as an adult.

"Combining this with our knowledge of how to stimulate new neurons in the brain of adults following to disease processes such as stroke, it provides new mechanisms for the treatment of a variety of diseases from depression to dementia," he said.

Established in 2003, the Queensland Brain Institute is one of Australia's leading centres for research in fundamental brain function.

QBI researchers investigate the mechanisms that regulate brain function in the knowledge that a better understanding of how the brain works will lead to the development of improved treatment options for a wide range of mental and neurological disorders.

Source: University of Queensland

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