Scientists match disease symptoms with changes in the brain

Having a human brain bank on the doorstep has helped researchers make huge strides towards understanding neurodegenerative diseases.

"This 'unique' resource, combined with support of the families who have bequeathed brains, has led to a number of important breakthroughs in the past year," says Professor Richard Faull.

He and his team at the University of Auckland have been working to connect the symptoms of Huntington's disease with cell death in the brain.

In a study of 35 cases with Dr Henry Waldvogel and the research team, they have shown an "unexpected and precise" correlation between how symptoms such as mood changes relate to areas of change in the brain. They are looking at the chemical changes that take place to see if there are ways to treat it and stop the disease progression.

"Huntington's is caused by a single gene but there is a lot of variation in people's symptoms. If you can understand why this is happening in Huntington's then you can also relate it to other diseases such as Parkinson's and Alzheimer's," said Professor Faull.

"We were only able to do this because of our close contact with the families," said Professor Faull.

"We are in a unique position. The families are like our research partners; and we closely interact with them, conveying the latest results of our research. Most of the work done previously was on rodents, so you can see how valuable it is to be able to work directly on the human brain with the very special support of families."

"Now we can look at subtle changes and subtle changes are what is important in understanding disease progression," said Professor Faull.

The work was carried out alongside Professor Mike Dragunow who has been refining software to speed-up the technical process of looking at precise patterns of changes in the human brain.

Analysis techniques he has developed have allowed Professor Faull and his team to view, at the touch of a button, images showing the progression of cell death in the Huntington's brain. These methods form part of a major publication coming out soon in Nature Reviews Neuroscience detailing the use of this technology.

Furthermore, with post-doctoral fellow Dr Hannah Gibbons and others, he is developing new ways to grow, maintain and study adult human brain cells taken from the brain bank.

"It has been five years of hard work," he said. "But now that we can grow various adult brain cells, the exciting thing is we can start to work out their properties and find out what is different about the cells in people who have neurodegenerative disease."

This research is funded by the Health Research Council of New Zealand.

Professor Richard Faull (centre) with Dr Maurice Curtis and Dr Monica Kam

Key words:
- Neurodegenerative diseases, human brain bank, Huntington's, Parkinson's, Alzheimer's

Key facts:
- Creation of human brain bank invaluable in analysing subtle changes in the brain and disease progression
- Correlation between disease symptoms and chemical changes in the brain
- Software development has refined process of viewing imagery showing progression of cell death in the Huntington's brain

Aims of this research:
- To create a connection with the symptoms of Huntington's disease with cell death in the brain
- To look at the chemical changes that take place in the brain
- To work closely with families to gain a profile of patients' symptoms during the course of the disease
- Development of new ways to grow, maintain and study adult human brain cells from the brain bank

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