Breakthrough discovery in cause of motor neurone disease and dementia

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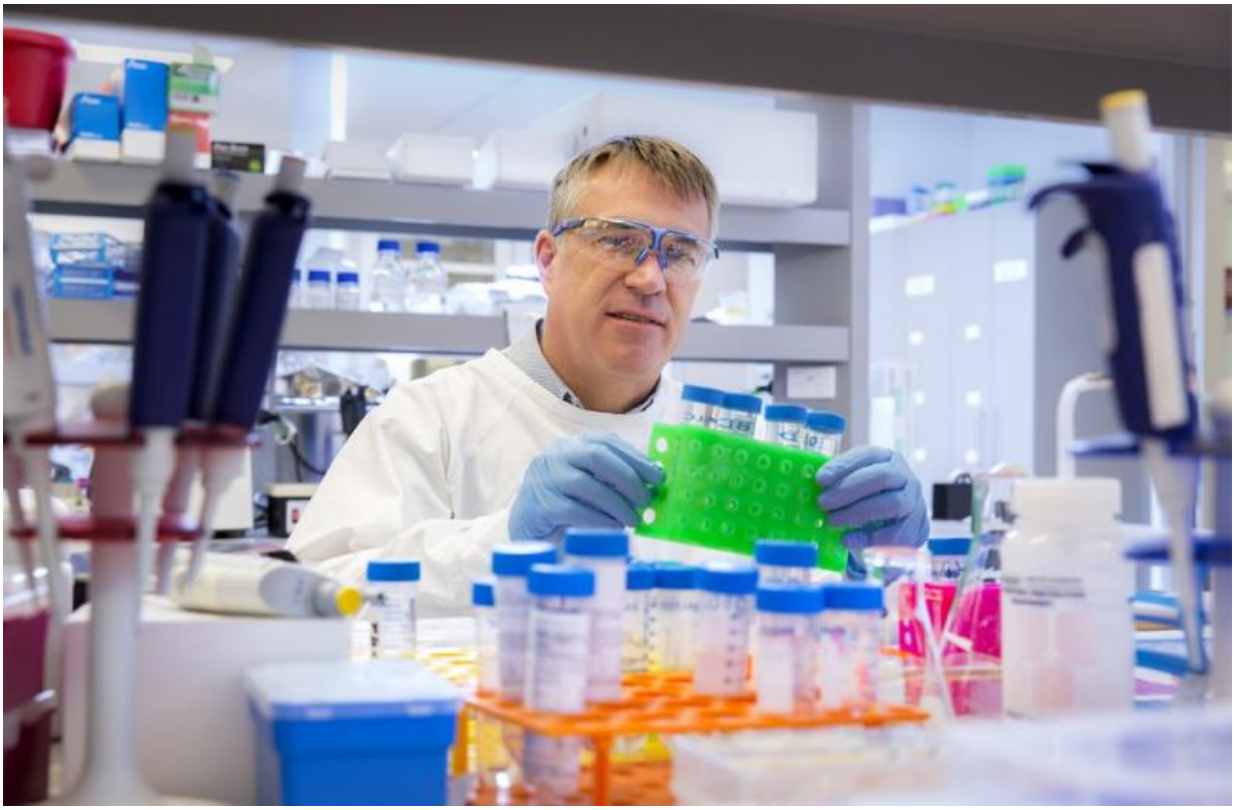

Associate Professor Ian Blair. Credit: Paul Wright

In an international study led by Dr Kelly Williams and Associate Professor Ian Blair from the Faculty of Medicine and Health Sciences at Macquarie University, researchers have linked the cause of two seemingly unrelated diseases: motor neurone disease (MND) and

frontotemporal dementia.

The researchers identified mutations – or variations – in the gene CCNF in a discovery that has significant implications for further studies into the cause of both conditions as well as research into treatment for patients.

The gene variations were initially found in some patients with the inherited form of the diseases, but were also subsequently found in some with the 'sporadic' forms, which are those without a family history of these diseases.

While there was an earlier discovery of another gene implicated in causing these diseases, Macquarie's researchers were able to extend their study by identifying a common pathway by which CCNF mutations seem to cause both diseases.

A hallmark feature of most MND and frontotemporal dementia patients is the presence of abnormal proteins in the dying nerves. A functioning CCNF gene assists in ridding neurones, or nerves, of abnormal or excess proteins. Our research found that the mutations in the gene appear to disrupt this process causing nerve death," said Associate Professor Ian Blair.

Gene variations in CCNF were found in patients from across the world including Australia, Canada, Italy, Spain, Japan, the United States and United Kingdom, with implications for global populations and diagnostics around the world.

"While a relatively small number of patients who have MND or frontotemporal dementia have this abnormal gene, this research points to a pathway of nerve death that may be common among many, if not most patients. It is an important step which represents another 'smoking gun'

to help develop and test therapies and add to diagnostic regimes for these diseases and to the bank of knowledge about their biology," said Associate Professor Blair.

"This discovery means that not only can we now better understand the mechanisms behind the cause of both of these diseases, we can also use this research to replicate the disease in a lab environment to explore the occurrence in both 'inherited' and sporadic forms. This will assist us in identifying potential treatments to slow disease progression, and further down the line, find cures for both,' said Dr Kelly Williams.

More information: Kelly L. Williams et al. CCNF mutations in amyotrophic lateral sclerosis and frontotemporal dementia, *Nature Communications* (2016). DOI: 10.1038/ncomms11253

Provided by Macquarie University