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Australia develops test to accurately predict mood disorders

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The test is based on the levels of a specific protein found in the brain



Scientists at the University of South Australia (UniSA) have developed the world's first test to accurately predict mood disorders in people, based on the levels of a specific protein found in the brain.

Links between low levels of mature brain-derived neurotrophic factor (mBDNF) and depression are well known but, until now, it hasn't been possible to distinguish between the three forms of the BDNF protein in blood samples.

The mature form promotes the growth of neurons and protects the brain, but the other two BDNF forms – its precursor and the prodomain of BDNF – bind to different receptors, causing nerve degeneration and inflammation.

An assay kit developed by researchers from UniSA can now precisely distinguish between these proteins, unlike other commercial kits in the market.

In a study of 215 people in China, including 90 patients with clinical depression and 15 with bipolar disorder, researchers found clear links with low levels of mBDNF in their blood. The more severe the depression, the lower the mBDNF level.

Mature BDNF levels in patients not on antidepressants was also lower than patients treated with antidepressants.

Surprisingly, there was no difference in mBDNF levels between 14 people with a history of suicide attempts and the control group of 96 people.

“As mature BDNF and proBDNF have different biological activities, working in opposition to each other, it is essential that we can distinguish between these two proteins and detect changes in their levels,” Prof Zhou says. “The kit we have developed has an accuracy rate of 80-83 per cent.”

The researchers say serum mBDNF levels less than 12.4 ng/ml could be used as a cut off point to diagnose depression and bipolar disorder.

“Growing evidence indicates that inflammation in brain cells is linked with depressive behaviours and proBDNF seems to activate the immune system. Interestingly, our recent studies in animals showed that proBDNF injected in both the brain and muscle can directly trigger depressive behaviours,” Prof Zhou says.

The next step is to examine whether imbalances between proBDNF and mature BDNF can be restored in electric convulsion therapy. This project will be led by UniSA Associate Professor Larisa Bobrovskaya in collaboration with University of Adelaide psychiatrists Associate Professor Dennis Liu and Dr Oliver Schubert.