Scientists uncover new clues in the early diagnosis of Alzheimer's

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(Medical Xpress) -- Scientists in Nottingham have found abnormal levels of seven different proteins in spinal fluid could act as markers for detecting Alzheimer's disease.

The study, which was part-funded by Alzheimer's Research UK, the UK's leading dementia research charity, could lead to the development of a new test to detect the disease in its early stages.

Researchers at The University of Nottingham's Human Genetics department and Nottingham Trent University's John van Geest Cancer Research Centre studied samples of cerebrospinal fluid (CSF) to look for potential markers of Alzheimer's. They compared CSF samples from 33 people with Alzheimer's disease, 20 healthy older people and ten people with mild cognitive impairment (MCI) — a condition that causes problems with memory and thinking, but not to an extent that interferes with daily life.

Prof Kevin Morgan of The University of Nottingham, who co-authored the study, said: “Our results have given us a new lead for improving early diagnosis of Alzheimer’s disease. An early diagnosis would not only help people prepare for the future, but would also enable people to be involved in clinical trials at a much earlier stage, when new treatments are more likely to have a positive effect.

“It will also be important to investigate what causes these specific proteins to change as Alzheimer’s develops. If we can understand the biochemical changes that occur during Alzheimer’s, we stand a better chance of developing new treatments that can tackle the disease. Dementia can only be defeated through research, and I hope these findings could take us a step closer to that goal.”

Disease markers

The scientists first analysed each CSF sample to build a profile of the proteins it contained, and looked for patterns that could distinguish between people with Alzheimer’s and healthy people. They found people with the disease tended to have higher levels of four specific proteins, and lower levels of three other proteins, suggesting that together they could act as markers for the disease.

One protein in particular, called SPARCL1, was the strongest predictor for the disease. When the CSF samples were tested for changes in SPARCL1 alone, the researchers were able to detect whether a person had Alzheimer’s disease with 65 per cent accuracy. When they checked for abnormal levels of all seven proteins, accuracy improved to 95 per cent. The discovery of SPARCL1, amongst other proteins, resulted from the application of technologies developed at the John van Geest Cancer Research Centre.

The scientists then tested their findings on a new set of CSF samples,

taken from 32 healthy people and 30 Alzheimer's patients. All seven markers taken together were able to detect Alzheimer's within this new cohort with 85 per cent accuracy.

The researchers now plan to use their results, published online in the Journal of Alzheimer's Disease, to help develop a blood test that could diagnose Alzheimer's in its earliest stages.

Professor Robert Rees, the Director of the John van Geest Cancer Research Centre, said: "The results of this study were obtained using analytical techniques to generate complex protein profiles from patient and control samples, coupled with advanced data analysis. We believe these findings will prove extremely important in allowing us to gain further insight into this disease."

Vital tool for research

Dr. Marie Janson, Director of Development at Alzheimer's Research UK, said: "Improving diagnosis of Alzheimer's disease is a key target for scientists, and these important findings have opened up a new avenue for research. Alzheimer's can be difficult to diagnose in the clinic, as memory problems on their own can be due to a variety of reasons. This study has the potential to help create a vital tool for doctors to identify patients that need further investigation – but these results must now be followed up in order to achieve that goal.

"Currently 820,000 people are affected by dementia, yet for many people a diagnosis comes too late. If we are to improve diagnosis for future generations, we must invest in research now."

The study was supported by Alzheimer's Research UK, the Big Lottery Fund and the EU FP6 Program through BIOPATTERN.