MedicalXpress

Specialized proteins may be detected in blood of people with Alzheimer's disease

June 10 2015

Specialized brain proteins that are involved in the removal of damaged nerve cell materials may be detected in the blood of people who were diagnosed with mild cognitive impairment or dementia due to Alzheimer's disease. In a select group of people who later developed dementia, the levels of the lysosomal proteins were abnormal while the people still had no problems with memory or thinking skills, according to a study published in the June 10, 2015, online issue of *Neurology*, the medical journal of the American Academy of Neurology.

"These proteins are in very tiny nerve cell-derived blood particles called exosomes. Abnormal levels of the proteins may be useful biomarkers that could help us study early treatments to limit or reverse the damage to brain cells and even prevent the development of the full-blown disease," said study author Edward Goetzl, MD, a Professor of Medicine with the University of California, San Francisco, a researcher at the National Institute on Aging, and a scientist of NanoSomiX, Inc., a California-based biotechnology company that provided a grant for method development for the study. "The results also show us that there are major abnormalities in how these proteins function in brain cells, which could potentially provide a new target for treatments."

For the study, blood samples were taken from 20 people who later developed Alzheimer's disease up to 10 years before they were diagnosed and then after they were diagnosed. Blood was also taken once from 26 people with Alzheimer's disease and 16 people with frontotemporal dementia, which leads to changes in personality or

behavior, and also may affect the memory. In addition, blood samples were taken from 46 healthy people who did not have any problems with thinking or memory skills as a control group.

The researchers looked at four proteins in blood exosomes that come from lysosomes. Lysosomes act as a sort of recycling and disposal center for cells. In each case, the level of protein was significantly different for the healthy controls than for those with dementia—both before and after symptoms developed. For three of the proteins, the people with dementia had significantly higher levels, for one of the proteins the people with dementia had significantly lower levels. For example, for many proteins with a ubiquitin "tail," or unfolded portion, the healthy controls had average levels of 200 picograms per millileter, while the people with Alzheimer's disease had average levels of about 375 picograms per millileter.

"These results may help improve our understanding of how lysosomes function in Alzheimer's disease and may help us understand how the brain responds to the developing disease," Goetzl said. "However, this is an early study with a small number of patients—these results need to be confirmed with larger studies."

Provided by American Academy of Neurology