Blood tests may hold clues to pace of Alzheimer's disease progression

October 4 2011

(Medical Xpress) -- A team of scientists, led by Johns Hopkins researchers, say they may have found a way to predict how quickly patients with Alzheimer's disease (AD) will lose cognitive function by looking at ratios of two fatty compounds in their blood. The finding, they say, could provide useful information to families and caregivers, and might also suggest treatment targets for this heartbreaking and incurable neurodegenerative disorder.

Past research has shown that cognitive function declines at different rates in AD patients, with roughly one-third not declining at all in five years, one-third declining at a moderate rate, and the other third declining quickly. Accurately predicting the pace of cognitive decline would help patients and caregivers better prepare and, if treatments are developed, help doctors aggressively target those whose descent into dementia is likely to be accelerated. Currently there are no predictably effective treatments that prevent, slow or stop AD, though the researchers caution that more studies need to be done before their blood fat test proves its value.

"We're confident there's a relationship between these lipids and AD progression, but this work is not yet ready to be used clinically," according to Michelle Mielke, Ph.D., adjunct assistant professor of psychiatry at the Johns Hopkins University School of Medicine and lead author of an article about the work published in the *Journal of Alzheimer's Disease*.

Mielke's team analyzed data from 120 probable Alzheimer's patients at the Alzheimer's Disease and Memory Disorders Center at Baylor College of Medicine in Texas, measuring a variety of fats found in the patients' blood, as well as conducting cognitive assessments during an average of 4.2 visits over 2.3 years. The researchers found that the higher the level of plasma sphingomyelins and the lower the level of ceramide — two types of fat found in cells throughout the body — the slower the progression of the dementia of Alzheimer's disease.

Although the researchers emphasize that the link between the fats and AD is not well understood, ceramides are involved in inflammation and cell death. If there are fewer of these cell-killing ceramides circulating — which in turn may be killing off fewer important brain cells — the result may be slower disease progression, Mielke says. Meanwhile, a previous study by Mielke and her team showed that higher ceramide levels were associated with greater shrinkage of the brain's memory center over one year in patients with mild cognitive impairment. Basic science data has also linked ceramide levels and levels of the protein amyloid beta, the accumulation of which has been tied to Alzheimer's disease.

If the blood fat ratios do turn out to be important, Mielke says there may be ways to use this discovery to slow cognitive decline. For example, an enzyme known as sphingomyelinase metabolizes sphingomyelins into ceramides. It is possible, she says, that if a sphingomyelinase inhibitor were used to slow down the process of breaking down sphingomyelins into ceramides, the progression of the disease could be interrupted.

Though much research has been done to find ways to halt Alzheimer's, so far the only approved therapy treats symptoms of cognitive decline in some patients for a short period of time. It does nothing to alter the course of the disease.

“And none of the other compounds in clinical trials to date are showing any benefits,” says Mielke, who is also an associate consultant in the division of epidemiology at the Mayo Clinic. “Perhaps we need to shift our focus. The answers could be in these lipids, which can be measured in the blood.”

Provided by Johns Hopkins University