

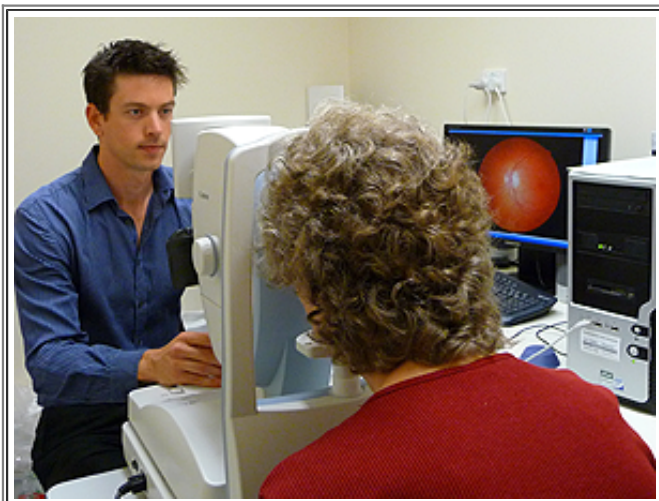
## Blood Vessels in the Retina May Reveal Alzheimer's Disease

Fran Lowry

July 17, 2011 (Paris, France) — In providing an early diagnosis of Alzheimer's disease (AD), the eyes may have it.

Preliminary findings from a study that looked at retinal vascular parameters as a biomarker for AD indicate that there is a relation between those parameters and neocortical plaque load, an early harbinger of AD.

Although most AD-related pathologies occur in the brain, the disease has been reported to affect the eye, which is more accessible for imaging than the brain, according to Shaun Frost, MSc, a PhD candidate at the Commonwealth Scientific and Industrial Research Organization's Australian e-Health Research Center, in Perth, Australia.



Shaun Frost

The researchers presented their findings here at the Alzheimer's Association International Conference 2011.

### Retinal Photographs

"Today, there is no single method for detecting Alzheimer's until the disease is well advanced," he said. Current positron emission tomography (PET) and magnetic resonance imaging scans can detect some brain changes, but can be expensive and technically challenging, so are impractical for testing in large populations.

The retina is positioned close to the brain, and the tissues of the retina are very representative of the tissues in the brain, Mr. Frost told a press conference. "Our study has observed changes in the retina in Alzheimer's disease that

might help us to detect the disease much earlier," he noted.

In this small pilot study, Mr. Frost and his team examined retinal photographs of 13 people with AD, an equal number of individuals with mild cognitive impairment, and 110 healthy participants from the Australian Imaging, Biomarker and Lifestyle (AIBL) Flagship Study of Ageing.

Retinal photographs were collected and analyzed using semiautomated software to examine a variety of parameters, including the width of retinal vessels. The researchers calculated the central retinal arterial and venular equivalent thickness and arteriolar-venular ratio (AVR) for each participant. All had amyloid plaque burden measured using PET Pittsburgh compound B (PiB) imaging as part of the AIBL study protocol.

They found the AVR was higher in patients with AD ( $P = .001$ ) and that veins were thinner ( $P = .01$ ). "Now that we've separated the healthy controls into those who test positive and those who test negative for elevated plaque burden, you see a difference in the retina between those groups," Mr. Frost explained. The latter patients are considered to have preclinical AD.

"In summary, these findings indicate a relationship between Alzheimer's disease, changes in the retina, and plaque burden in the brain," Mr. Frost said. "The trends are in people with very early stages of Alzheimer's disease, indicating that they are a specific and early indication of Alzheimer's disease."

The test would not likely be used alone, but rather in conjunction with blood biomarkers, he noted.

The study is ongoing and continues to accrue participants, he told *Medscape Medical News*. Research is looking at other changes in the eye that might relate to AD, including supranuclear cataracts and other molecular

changes.

### **Inexpensive Exam, Promising Tool**

Maria Carrillo, PhD, senior director of medical and scientific affairs at the Alzheimer's Association, in Chicago, Illinois, told *Medscape Medical News* that this study indicates a potential for changes in the vasculature of the eye early in AD.

"An eye test is a very inexpensive exam and is a tool that eye doctors already have. This study shows that it is a very promising tool for early detection," Dr. Carrillo said.

Press conference moderator William E. Klunk, MD, from the Western Psychiatric Institute and Clinic at the University of Pittsburgh, Pennsylvania, pointed out that the test is completely noninvasive, and "correlates very well with the pathology in the brain, although not completely." Despite not correlating as well as the PET scans they were compared with, the retinal scans are cheaper, more widely available, and don't require radiation, he said.

"If you look at the spread of the data, it looked like about half the people who had pathology in their brain showed up positive on this test. So right away, you can pick half of the people in the population who perhaps one day should be getting a PET scan or a lumbar puncture."

More data are needed though. All of the subjects with mild cognitive impairment in this study had Alzheimer's pathology, he noted. He'd like to see future studies include control subjects with mild cognitive impairment, some of whom have and some of whom do not have AD pathology, "because that'll be the first group that we're trying to separate before we get to cognitively normal people."

*Mr. Frost and Dr. Carrillo have disclosed no relevant financial relationships. Dr. Klunk is coinventor of the PiB technology that is licensed to GE Healthcare by the University of Pittsburgh.*

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