

Catching Alzheimer's in the act

July 22 2011, By Morgan McCorkle

(Medical Xpress) -- Like a thief hidden in the brain, the neurodegenerative disease called Alzheimer's steals away memory as it gradually destroys brain cells, changing personalities and disrupting lives in the process.

Because the risk of Alzheimer's disease increases as people grow older, it is typically associated with old age -- but the disease is not a normal part of aging. The blurry distinction between Alzheimer's and typical symptoms of aging is one factor that contributes to late diagnoses of the disease, says Oak Ridge National Laboratory's Nancy Munro.

"A lot of people get into their 60s, and they start seeing changes in their memory -- like not remembering somebody's name," Munro said. "If they go to their doctor and ask whether it's normal aging or Alzheimer's, the doctors have no easy way to answer that question. Right now, the doctors say it's probably normal and that these senior moments happen. But it might not be the case."

Munro is collaborating with fellow scientists at ORNL and the universities of Kentucky and Tennessee on a method that could help primary care doctors detect Alzheimer's in patients during the early stages of the disease. An early diagnosis is considered critical because medications currently available are most effective if they are used in the very early stages of Alzheimer's. Medications may be even more helpful if they are used when a patient has mild cognitive impairment, a condition that frequently progresses into Alzheimer's [dementia](#).

"In a general or [family practice](#) environment, people aren't being screened early enough," Munro said. "Patients are usually only called to the attention of the family doctor when they're so far along into dementia that the memory medications aren't helpful anymore."

The team conducted a [pilot project](#) to identify preclinical Alzheimer's using a technique called electroencephalography. Although neuroimaging methods like MRIs and [PET scans](#) are successful at recognizing early forms of Alzheimer's, the techniques' expense and inconvenience prohibit their everyday use. In contrast, EEG is a relatively simple test that measures electrical activity from the brain's neurons from electrodes attached to the scalp.

Researchers at the University of Kentucky Medical Center collected EEG data from three groups -- patients with no dementia symptoms, patients diagnosed with [mild cognitive impairment](#) and patients diagnosed with early Alzheimer's -- as the individuals performed a short visual working memory test. Advanced data analysis performed by an ORNL and University of Tennessee collaboration revealed that the EEG tests succeeded in terms of sensitivity, accuracy and specificity in identifying the conditions of the different groups, Munro said.

"Although the sample sizes were relatively small, the results are highly encouraging," Munro said.

The team hopes to expand upon its initial study by increasing the sample size of the groups to validate and improve the screening abilities of EEG analysis. Ultimately, the goal is to develop a simple, efficient device that could provide real-time analysis in a general practice or a community hospital setting.

The need for an early screening tool may become more pressing as the number of Alzheimer's patients steadily increases. It is estimated that 35

million people worldwide suffer from the disease, and the number is expected to reach 115 million by 2050. Although scientific understanding of the condition is expanding, no cure exists. Munro emphasizes that for now, prevention, particularly in the form of exercise, is deemed to be the best tool for staving off the onset of Alzheimer's.

"Regular exercise helps you repair and replenish the neurons that are important for an intact memory," Munro said. "The risk factors for cardiovascular disease are similar for Alzheimer's, so controlling diet, weight and cholesterol levels is good for both your heart and your brain."

Provided by Oak Ridge National Laboratory

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