

NEWS

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*****Studies of brain changes in Alzheimer's disease to begin at UTHSCD.

DALLAS -- The name itself -- Alzheimer's disease -- is terrifying. The disease is untreatable and invariably fatal.

Patients' families watch them lose their memory, their orientation and their ability to take care of themselves. Most families grieve so much during the illness that death comes as a relief.

Alzheimer's disease is the most common single cause of dementia, a disorder of higher brain function most common in older people. Five to 10 percent of the population over 65 have the disease while another five percent have mild impairment with only memory loss.

It's known that the disorder is caused by pathological changes in the brain, says Dr. Charles L. White, assistant professor of Pathology at The University of Texas Health Science Center at Dallas. But it is not yet known what causes those changes, he said at Neurology/Neurosurgery Grand Rounds Jan. 11.

The only way to diagnose Alzheimer's disease for sure is to examine the brain at autopsy. The brain of a patient with Alzheimer's disease has "senile" plaques (composed of abnormal axons around a core of the protein amyloid) in the cortex (the brain's outer layer) and a deficiency in a certain neurotransmitter or chemical messenger, acetylcholine. The more severe the disease is, the more plaques are present and the greater the deficiency of the enzymes that synthesize and break down acetylcholine.

Until White came here in July, he did research at Johns Hopkins School of Medicine, where it was found that brains of Alzheimer's patients have a degeneration of the basal nucleus. This part of the brain is responsible for certain behavioral functions and attention mechanisms. Degeneration of the basal nucleus may be responsible for mood abnormalities such as those that lead to violent behavior in some Alzheimer's patients. Some patients lose up to 90 percent of the cells of the basal nucleus.

It is thought that the degeneration of the basal nucleus leads to the formation of the "senile" plaques.

White and the Johns Hopkins group also found the same loss of basal nucleus cells in demented patients with Parkinson's disease. This provides an important link between the two diseases.

At the health science center White's work on Alzheimer's disease will focus on the degeneration of the basal nucleus and its relationship to other areas of the brain.

Dr. Roger Rosenberg, chairman of the Department of Neurology, is coordinating an interdisciplinary group effort in Alzheimer's research.

Dr. Louis Hersh, professor of Biochemistry, is developing tests for the enzyme involved in the production of acetylcholine -- choline acetyltransferase (CAT). With these tests researchers can localize CAT in the basal nucleus and the senile plaques.

White plans to work with Dr. Sue Griffin, associate professor of Cell Biology, and Dr. Marcelle Morrison, associate professor of Neurology and assistant professor of Biochemistry,

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in brain cell studies using DNA probes of individual cells. With this technique they can tell which cells are failing to make the necessary enzymes and why certain cells are dying.

With Dr. Dwight German, associate professor of Physiology and Psychiatry, White will help with a study to do computer "mapping" showing where there is acetylcholine activity in Alzheimer's disease brains.

"We plan to do six or seven projects using the same brain," says White. His role will be to prepare the brain for various kinds of studies, diagnose Alzheimer's disease and do other pathological research studies.

"So far the disease is untreatable," he says. "So it's not ethical to biopsy every patient's brain. Some researchers have tested for AChE (acetylcholine esterase, the enzyme involved in the breakdown of acetylcholine) in the cerebrospinal fluid, but not enough studies have been done. We need to look at other neurotransmitters and their breakdown. It's possible to develop a diagnostic test of the spinal fluid for positive diagnosis."

The researchers have set up a "brain bank" of Alzheimer's disease brains. "We are very willing to study the brain tissue of patients who die," says White. "It won't do that patient any good. But 10 or 15 years down the road, it may help somebody else."

For information about donations, call White at (214)688-2148 or German at (214)688-2541.

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