

Compounding the Issue

Alzheimer's and Atherosclerosis have apolipoprotein-E in common

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Biological scientist Nilay Patel, biochemist Jonathan Stoddard and their research students are looking for a way to control a key factor in the onset of both Alzheimer's disease and heart disease. If they succeed, their therapy stands a good chance of stopping Alzheimer's in its tracks.



Nilay Patel

As with many things in the body, balance is everything. Too much apolipoprotein-E (apoE) in the brain can lead to Alzheimer's; too little in the body risks atherosclerosis, a potentially fatal heart disease. Patel's research is based largely on the premise that if apoE can be reduced appropriately in the brain, it can delay or stop Alzheimer's disease; increased appropriately in the body, it could inhibit formation of atherosclerotic plaques, the deposits that can block arteries.

Because many factors can influence the outcome, "what we need are compounds that can affect the apoE levels as needed and where needed," said Patel, assistant professor of biological science. "So, my students and I

are collaborating with Jonathan Stoddard, assistant professor of chemistry and biochemistry, and his students. Jon and I design the compounds, which are synthesized by his students and tested by mine."

Lipoproteins are responsible for carrying cholesterol and other fats through the bloodstream and are essential for the normal breakdown of fat molecules. ApoE is a major component of specific low-density lipoproteins (LDL) that remove excess cholesterol from the blood and carry it to the liver where it is broken down for excretion. Maintaining normal cholesterol levels is essential for the prevention of Alzheimer's and cardiovascular diseases, including heart attacks and stroke.

With one in five people genetically predisposed

to contract Alzheimer's at a rate more than seven times that of the general population, Patel said, "genotype-specific, custom-designed therapies like ours may be the way of the future."

Advances in various branches of medicine during the 20th century have extended the average lifespan, dramatically increasing the incidence of neurodegenerative diseases, Patel said. "Previous generations didn't live long enough to face these illnesses," he added.

The most common neurodegenerative disease is Alzheimer's, he said, "Estimates suggest that 4 million U.S. citizens are currently afflicted by Alzheimer's, with a total domestic population of 14 million expected by the year 2050."

In his quest to understand Alzheimer's disease pathogenesis, Patel is investigating the possibility of starting a new line in his research using embryonic stem cells from mice. "The stem cells could be used to develop neuron and glial cells (cells in the nervous system) which then could be used for testing," he explained.

"This project combines the expertise and energies of two of our newer faculty members and their students, providing valuable experience in carrying out scientific research," said Stephen Murray, dean of the College of Natural Sciences and Mathematics. *Inside*



Help for Caregivers Coping with Alzheimer's

BY VALERIE ORLEANS vorleans@fullerton.edu

For Joseph Weber, associate professor of sociology and coordinator of Cal State Fullerton's gerontology program, it began when his mother forgot how to make oatmeal.

His mother, who fixed oatmeal every morning for breakfast, discovered one day that she couldn't remember what to do after she boiled the water.

"With Alzheimer's disease, the initial decline is often quite gradual," Weber explained. "In my studies of those caring for individuals with Alzheimer's, I often find there is a specific event that demonstrates that this isn't just ordinary forgetfulness."

With an estimated 4 million Americans suffering from Alzheimer's, more attention is being paid not only to those with the disease but to their caregivers, who often are family members.

"I found that Alzheimer's in the abstract is very different from Alzheimer's on a personal level," Weber said. "Frequently, there is denial that there is a problem. Then, there's an 'event.' With my mother, it was the oatmeal incident that caught my attention."

According to Weber, Alzheimer's tends to fall into three stages. In the first stage, forgetfulness becomes more frequent.

Caregivers can help by keeping the person with Alzheimer's as active as possible, doing things they used to enjoy, Weber said. For instance, if individuals liked to cook, have them help by doing dishes or assisting with food preparation.



Joseph Weber

"At this point, caregivers perhaps haven't started to come to terms with what is happening," he said. "There is a tendency to mask, hide or excuse forgetful behavior."

At the second stage, caregivers will notice a tendency for the person to get lost in familiar areas, repeat themselves within short periods of time, use the wrong name for things (such as identifying a spoon as a fork), or get confused about time and place.

"This can be a very frustrating stage for caregivers," Weber said.

By the third stage, the individual has no sense of reality and often is moved to a nursing home.

"Caring for someone with Alzheimer's becomes a 24-hour-a-day job," Weber said.

In 2001, Weber published a study on caregivers in the *American Journal of Alzheimer's Disease* where he surveyed caregivers' strategies for successful coping. Here are some tips from what he learned:

- Get help as soon as possible.
- Seek adult daycare services and support groups for caregivers.
- Take care of yourself.
- Recognize that caring for someone with Alzheimer's exacts a toll.
- Do your best to avoid conflict.
- Keep a journal. Weber said caregivers often expressed that a journal was a good place to describe their feelings and to record memories.

"As we live longer, the number of those with Alzheimer's will continue to grow," Weber said. "It's important to work on cures for Alzheimer's, but it's also important to develop ways to care for the caregivers." ■