

# An Alzheimer's vaccine?

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Could a new vaccine be the key to stopping Alzheimer's disease? A new research study from the Oklahoma Medical Research Foundation (OMRF) shows that immunization could offer a way to blunt or even prevent the deadly, memory-robbing disease.

OMRF scientists immunized Alzheimer's mice with a protein believed to play a key role in the disease-causing process. The mice who received the vaccination showed a significant reduction in the build-up of protein plaques that, when present in the brain for long periods of time, are believed to cause the cell death, memory loss and neurological dysfunction characteristic of Alzheimer's.

The immunized mice also showed better cognitive performance than control mice that had not received the vaccine.

"These results are extremely exciting," said Jordan Tang, Ph.D., the OMRF researcher who led the study. "They certainly show that this vaccination approach warrants additional investigation as a therapy for Alzheimer's disease."

The new research appears in *The Journal of the Federation of American Societies for Experimental Biology*.

Tang and his colleagues at OMRF previously had identified the cutting enzyme (known as memapsin 2) that creates the protein fragments believed to be the culprit behind Alzheimer's. In the current study, researchers used mice that had been genetically engineered to develop

symptoms of Alzheimer's, then immunized the animals with memapsin 2.

“What we saw is that the mice immunized with memapsin 2 developed 35 percent fewer plaques than their non-vaccinated counterparts,” said Tang. “Those immunized mice also performed better than control mice in tests designed to assess their cognitive function.”

Tang's work with memapsin 2 also has led to the creation of an experimental drug to treat Alzheimer's disease. That drug, which works by inhibiting the cutting enzyme, began human clinical trials in the summer of 2007.

Tang emphasized that the vaccine approach should be viewed as a supplement to—rather than substitute for—the experimental inhibitor and other treatments currently in development for the illness.

“Alzheimer's is a complicated, multi-faceted disease,” said the OMRF researcher. “As with illnesses like cancer and heart disease, Alzheimer's demands that we develop many different approaches to combat it. We cannot rely on a 'one-size-fits-all' strategy, because what works in one patient will not necessarily work in another.”

A vaccination approach—getting the immune system to clean up the plaques—has been considered a promising way to tackle the disease, but its success has been limited. In 2002, for example, the pharmaceutical company Elan halted trials of a different vaccine after 15 patients suffered swelling of the central nervous system.

OMRF President Stephen Prescott, M.D., is hopeful that Tang's work will avoid the pitfalls that beset Elan's vaccine. “This vaccination stimulates the immune system more gently than previous Alzheimer's vaccines, so we are optimistic about its prospects going forward,” he

said. “Once again, Dr. Tang has found an innovative way to make inroads against a devastating and poorly understood disease.”

The next step, said Tang, will be to progress the work to the point that it can be tested in humans. “There currently is no effective treatment for Alzheimer’s disease, so we must explore every possible option to find a way to stop it,” he said.

The research was supported, in part, by a grant from the Alzheimer’s Association.

“The Alzheimer’s Association is pleased to provide funding for innovative work such as this to develop possible new therapies for Alzheimer’s,” said William Thies, Ph.D., vice president for Medical & Scientific Relations at the Alzheimer’s Association. “It is important to encourage imaginative researchers to test unconventional strategies, as Dr. Tang has done here. We face an overwhelming epidemic of Alzheimer’s and dementia if we don’t change the current unsatisfactory situation by greatly improving early detection, treatment and prevention.”

Source: Oklahoma Medical Research Foundation

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