

New research links proteins, stem cells and potential Alzheimer's treatment

A team of scientists led by professor Kiminobu Sugaya at the University of Central Florida may have found a new way to treat Alzheimer's disease.

The team, which also included researchers from the Karolinska Institute in Sweden and the National Institutes of Health, combined a technique for transplanting stem cells into rats and a newly discovered compound, phenserine. It reduces the amount of a plaque that is a hallmark of Alzheimer's disease. The combination triggered the regeneration of neurons that are destroyed by Alzheimer's and are necessary for healthy brain functions.

The research findings were published in the July 24 edition of *PNAS (Proceedings of the National Academy of Sciences)*.

There are 5 million Americans living with Alzheimer's, one of the most common forms of dementia, according to the National Alzheimer's Association. That's why finding treatments has become so important to many scientists.

"It's very exciting," Sugaya said. "If our success with mice can translate into the human brain, it could give hope to patients and their families."

Sugaya, who is the founder of the International Brain Conference at UCF, has spent his entire career studying the brain. Six years ago, he reported that brain stem cells transplanted into aged rats seemed to become functional neurons and improved age-associated memory loss, with no side effects.

When Sugaya transplanted stem cells into the brains of Alzheimer's-model mice, he found that the stem cells did not form any neurons.

Sugaya found that excess amounts of the amyloid-precursor protein (APP), which produces a component of the plaques, a hallmark of Alzheimer's, prevent stem cells from becoming neurons.

The research team treated Alzheimer's-model mice producing human APP with phenserine, which is known to reduce the amount of APP in the brain. The APP level in the brain of treated mice was reduced by up to 50 percent, which would provide optimal conditions for the brain stem cells to become neurons. Under this environment, the research team found that stem cells transplanted into the brain successfully produced neurons.

Many people believe that once scientists figure out how to create tissue from stem cells, most of the diseases that plague mankind will be eradicated almost overnight, Sugaya said. But he said his research shows that "it's not so simple."

Sugaya is now investigating whether a combination of phenserine and his compound (NBI-18), which increases brain stem cells by 600 percent, could become another way to treat Alzheimer's. Increasing neurons may be important in improving brain function, especially in people with neurodegenerative diseases.

Sugaya tempers his enthusiasm with the caveat that more research, including clinical trials, will be needed should the next set of research benchmarks be met.

"It's one thing to be able to manipulate stem cells for creating specific tissue types – the brain, the eyes, the

heart – but every disease is different,” he said. “Simply producing transplantable cells isn’t enough. You have to think of how the disease works and figure out ways to apply the cells. Sometimes that may mean coming up with other compounds that help deliver the therapy.”

Source: University of Central Florida

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