

Controversial theory of Alzheimer's origin funded

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Dr. Shaohua Xu, Florida Tech associate professor of biological sciences, has an original theory of the origin of Alzheimer's Disease and has earned a \$150,000 grant from Space Florida to test it. The grant was matched with \$30,000 from NASA's Aerospace Medicine and Occupational Health Branch.

He is also the sole medical researcher at the State of Florida's Space Life Sciences Laboratory at Kennedy Space Center (KSC) and the research is being conducted both at the university and KSC.

Xu's theory, both controversial and praised, involves the start of the disease when molecules of a normal brain cell protein called "tau" do something very abnormal: they join together to form tangled fibers that the cell cannot remove. The fibers accumulate until essential substances cannot move through the cell and the cell dies, creating onset of the disease.

Using atomic force microscopy, Xu has studied for the first time the actual process by which the fibers form. Xu uses purified proteins to synthesize the fibers into their various forms.

"We find that it is a three-step process," he says. "First, molecules of the tau protein cluster together into spheres, each almost the same size. Next, the spheres join together in linear chains like beads on a string. In the third stage the beads merge together to form a uniform filament identical to those found in the brains of patients with the disease."

Advocates of Xu's theory are numerous. Daniel Woodard, KSC physician, was the first medical doctor to review the research. He says, "Shaohua's theory is revolutionary; his evidence is overwhelming. The medical implications are beyond anything in my experience."

NASA physician David Tipton, chief of the Aerospace Medicine and Environmental Health Branch at KSC, says, "This could be the most important biomedical discovery ever made at Kennedy Space Center."

Additionally, Pamela Tronetti, medical director of the Parrish Senior Consultative Center, predicts, "If this theory is correct, it may very well have as great an impact on neurodegenerative disease as the discovery of germs had on infection."

The more common theory of Alzheimer's origin is that the filaments form by the addition of individual tau molecules to the tip of the fiber.

"From our own observations, we believe this theory is incorrect," says Xu. "The process we have observed closely resembles that of colloid formation, mixtures like milk or ink in which tiny particles are suspended in a fluid. Our theory is based on colloid science."

Xu affirms that if his theory is correct, it may be possible to halt the disease with drugs that hinder the aggregation of the spherical colloidal particles into linear chains. Similar chemicals are already used to stabilize colloidal materials such as paints.

Xu began developing this theory in 1997, when he conducted Mad Cow Disease research at the University of Chicago. The research continues to have applications for Mad Cow Disease as well as Parkinson's Disease, both of which appear to have very similar mechanisms. Xu will be testing potential drugs that may be able to halt the formation of the filaments.

Source: Florida Institute of Technology

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