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New study indicates amino acid may be useful in treating ALS

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A naturally occurring amino acid is gaining increased attention from scientists as a possible treatment for ALS following a new study published today in the *Journal of Neuropathology & Experimental Neurology*. The study showed that the amino acid, L-serine, successfully reduced ALS-like changes in an animal model of ALS.

The scientists conducted the vervet study at the Behavioural Science Foundation, a specialized research facility on the Caribbean island of St. Kitts. After being exposed to a cyanobacterial neurotoxin called BMAA, the vervets developed aggregations of misfolded proteins similar to those seen in human ALS patients, and activated microglia, a type of immune cells, in their spinal cord and brain, similar to those that occur in the early stages of ALS. In contrast, vervets that also received the amino acid L-serine had significantly reduced ALS pathology.

Dr. David Davis at the Department of Neurology, University of Miami Miller School of Medicine who served as first author on the paper, said that the differences were profound. "Without L-serine co-administration, the BMAA-exposed vervets developed motor neuron degeneration, pro-inflammatory microglia and dense inclusions of TDP-43 and other misfolded proteins known to be associated with ALS," Dr. Davis explained. "In animals dosed with L-serine, the progression of these ALS-like changes was considerably reduced."

ALS is a devastating disease that hits people in the prime of life, causing increasing paralysis and often results in death within two to three years

after diagnosis. At present, only two drugs are available that slow the disease modestly. This study offers the possibility that L-serine may slow the progression of the disease even more.

Potential Implications for L-Serine as a Treatment

Neurobiologist Dr. Deborah Mash of Nova Southeastern University, who was also an author on the study, said that the results "holds promise for identifying a cause of sporadic ALS, which accounts for 90 percent of all ALS cases."

Dr. Elijah Stommel, a Professor of Neurology at Dartmouth Medical School, who was not associated with the study, said that these experimental results are encouraging. Stommel is conducting a Phase II trial of L-serine in 50 ALS patients. "We are attempting to replicate a previous positive trial of L-serine for ALS patients, but won't know the results until the trial is finished," he said.

L-serine is one of the twenty amino acids that make up human proteins. L-serine molecules in proteins are often the site where proteins are phosphorylated, or charged, so they can be properly folded. "Think of a charging port for an electric car," explained Dr. Paul Alan Cox, Executive Director of the Brain Chemistry Labs in Jackson Hole, "If the cable can't be connected there, the car can't be charged." Scientists at the Brain Chemistry Labs have also discovered that L-serine modulates the unfolded protein response which helps protect neurons from the damage produced by misfolded proteins.

"While these data provide valuable insights, we do not yet know if L-serine will improve outcomes for human patients with ALS," cautioned internationally renowned ALS expert, Dr. Walter Bradley, who was also an author on the study. "We need to carefully continue FDA-approved clinical trials before we can recommend that L-serine be added to the

neurologists' toolbox for the treatment of ALS. However, this vervet BMAA model will be an important new tool in the quest for new drugs to treat ALS."

Dr. Larry Brand, a prominent oceanographer unassociated with the study, said that there are even broader implications of the study for human health. "These vervets were exposed to the same cyanobacterial toxin that was found in the brains of beached dolphins with Alzheimer's neuropathology," he said. "This is one more indication that we need to carefully monitor the health effects of exposure to cyanobacterial blooms."

Provided by Brain Chemistry Labs

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