Study: High blood sugar makes Alzheimer's plaque more toxic to the brain

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High blood-sugar levels, such as those linked with Type 2 diabetes, make beta amyloid protein associated with Alzheimer"s disease dramatically more toxic to cells lining blood vessels in the brain, according to a new Tulane University study published in latest issue of the *Journal of Alzheimer"s Disease*.

The study supports growing evidence pointing to glucose levels and vascular damage as contributors to dementia.

“Previously, it was believed that Alzheimer"s disease was due to the accumulation of "tangles" in neurons in the brain from overproduction and reduced removal of beta amyloid protein,” said senior investigator Dr. David Busija, regents professor and chair of pharmacology at Tulane University School of Medicine. “While neuronal involvement is a major factor in Alzheimer"s development, recent evidence indicates damaged cerebral blood vessels compromised by high blood sugar play a role. Even though the links among Type 2 diabetes, brain blood vessels and Alzheimer"s progression are unclear, hyperglycemia appears to play a role.”

Drs. Cristina Carvalho and Paula Moreira from the University of Coimbra in Portugal were co-investigators in the study.

Researchers studied cell cultures taken from the lining of cerebral blood vessels, one from normal rats and another from mice with uncontrolled chronic diabetes. They exposed the cells to beta amyloid and different levels of glucose and later measured their viability. Cells exposed to high glucose or beta amyloid alone showed no changes in viability. However, when exposed to hyperglycemic conditions and beta amyloid, viability decreased by 40 percent. Researchers suspect the damage is due to oxidative stress from the mitochondria of the cell.

The cells from diabetic mice were more susceptible to damage and death to beta amyloid protein Ã¢Ë?â?? even at normal glucose levels. The increased toxicity of beta amyloid may damage the blood-brain barrier, disrupt normal blood flow to the brain and decrease clearance of beta amyloid protein.

The study"s findings underscore the need to aggressively control blood sugar levels in diabetic individuals, Busija said.