

# Research identifies link between Alzheimer's disease and diabetes

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(Medical Xpress) -- Researchers from the University of Medicine and Dentistry of New Jersey (UMDNJ), collaborating with scientists from Northwestern University in Illinois, have provided direct experimental evidence that diabetes is linked to the onset of Alzheimer's disease. The study, published online this week in the *Journal of Alzheimer's Disease*, used an experimental model that shows potential as an important new tool for investigations of Alzheimer's disease and of drugs being developed to treat Alzheimer's.

UMDNJ researchers Peter Frederikse, PhD, and Chinnaswamy Kasinathan, PhD, collaborated with William Klein, PhD, at Northwestern University, to build on prior studies from the Klein lab and others that indicated close links between Alzheimer's disease and [diabetes](#). Working with Claudine Bitel and Rajesh Kaswala, students at UMDNJ, the researchers tested whether untreated diabetes would provide a physiological model of Alzheimer neuropathology.

"The results were striking," Frederikse said. "Because we used diabetes as an instigator of the disease, our study shows – for the first time directly – the link between Alzheimer's and diabetes."

The researchers found substantial increases in amyloid beta peptide pathology – a hallmark of Alzheimer's disease – in the brain cortex and hippocampus concurrent with diabetes. They also found significant amyloid beta pathology in the retina and by contrast, when diabetes is not present, no observable pathology was detected in either the brain or

the retina.

“Second, our study examined the retina, which is considered an extension of the brain, and is more accessible for diagnostic exams,” Frederikse added. “Our findings indicate that scientists may be able to follow the onset and progression of Alzheimer’s disease through retinal examination, which could provide a long sought after early-warning sign of the disease.”

This [experimental model](#) replicated spontaneous formation of amyloid beta “oligomer” assemblies in brain and retina which may help to explain one of the most widely recognized symptoms of Alzheimer’s. “This is exciting,” Klein said. “Oligomers are the neurotoxins now regarded as causing Alzheimer’s disease memory loss. What could cause them to appear and buildup in late-onset Alzheimer’s disease has been a mystery, so these new findings with diabetes represent an important step.”

Previous research indicated that insulin plays an important role in the formation of memories. Once attached to neurons, oligomers cause insulin receptors to be eliminated from the surface membranes, contributing to insulin resistance in the brain. This launches a vicious cycle in which diabetes induces oligomer accumulation which makes neurons even more insulin resistant.

“In light of the near epidemic increases in Alzheimer’s disease and diabetes today, developing a physiological model of Alzheimer neuropathology has been an important goal,” Kasinathan added. “It allows us to identify a potential biomarker for Alzheimer’s disease and may also make important contributions to Alzheimer drug testing and development.”

The current research was supported by a grant from the National Eye Institute of the National Institutes of Health, the National Institute of

Aging, and the Neuroscience Research and Education Foundation. Drs. Kasinathan and Frederikse have applied for patent protection regarding this novel experimental model of Alzheimer neuropathology.

Provided by University of Medicine and Dentistry of New Jersey

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