

Indications of Alzheimer's disease may be evident decades before first signs of cognitive impairment

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Researchers at Mount Sinai School of Medicine have found that patients with Alzheimer's disease have lower glucose utilization in the brain than those with normal cognitive function, and that those decreased levels may be detectable approximately 20 years prior to the first symptoms of Alzheimer's disease. This new finding could lead to the development of novel therapies to prevent the eventual onset of Alzheimer's. The study is published online in the journal *Translational Neuroscience*.

Using [mice](#) modified to develop Alzheimer's disease, the research team found that when β -amyloid, an abnormal protein linked to Alzheimer's disease, starts to become detectable in the [brain](#) in its soluble toxic form, the mitochondria, or "power plants" of the cell where glucose is converted into energy, became impaired. Within the equivalent of about 20 human years, mice with decreased energy metabolism developed signs of Alzheimer's disease such as cognitive defects and impairment of the synaptic terminal, the area of brain cells important in memory formation.

"This evidence in mice validates that the diagnosis of probable Alzheimer's disease may be the end result of impairment in brain cell energy production," said the study's lead author, Giulio M. Pasinetti, MD, PhD, The Saunder Family Professor in Neurology, and Professor of Psychiatry, Geriatrics, and Adult Development at Mount Sinai School of Medicine. "Identifying that mitochondrial impairment is evident years

earlier than cognitive defects is a major breakthrough."

"This new evidence could revolutionize the way we design interventions," said Merina T. Varghese, MD, co-author of the study and Postdoctoral Fellow in Neurology at Mount Sinai School of Medicine.

"This study sets the stage for the development of potential novel preventions or therapies to apply in humans, even when they have normal cognitive function, to prevent the eventual onset of Alzheimer's disease."

Provided by The Mount Sinai Hospital

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