

# Gene linked to aging also linked to Alzheimer's

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MIT biologists report that they have discovered the first link between the amyloid plaques that form in the brains of Alzheimer's patients and a gene previously implicated in the aging process, SIRT1.

The researchers found that SIRT1 appears to control production of the devastating protein fragments, termed A-beta peptides, that make up [amyloid plaques](#). They also showed that in mice engineered to develop Alzheimer's plaques and symptoms, learning and memory deficits were improved when SIRT1 was overproduced in the brain, and exacerbated when SIRT1 was deleted.

The results, reported in the July 23 issue of the journal *Cell*, indicate that drugs that activate SIRT1 could be a promising strategy to combat Alzheimer's, says Leonard Guarente, the MIT biology professor who led the study.

Alzheimer's disease is a [neurodegenerative disorder](#) that affects up to one-third of people who reach the age of 80. Patients suffer from [memory loss](#) and other cognitive impairments believed to be the result of damage from amyloid plaques.

Amyloid plaques form when proteins called amyloid precursor proteins (APPs) are broken into smaller amyloid peptides. However, APPs can also be cleaved into harmless protein fragments.

In this study, the MIT researchers showed that SIRT1 activates the

production of an enzyme that cleaves APPs into harmless fragments instead of the Alzheimer's-associated amyloid [peptides](#). Mice engineered to produce excess SIRT1 had reduced peptide levels, while mice with SIRT1 knocked out showed increased peptide levels.

The SIRT1 gene, which produces proteins called sirtuins, has previously been shown to regulate many cell activities, especially those involved in stress response and calorie deprivation. Guarente first drew attention to sirtuins about 15 years ago when he discovered that the yeast version of the gene, SIR2, regulates longevity in yeast. Later work revealed similar effects in worms, mice and rats.

**More information:** "SIRT1 Suppresses beta-Amyloid Production by Activating the alpha-Secretase Gene ADAM10," Gizem Donmez, Diana Wang, Dena E. Cohen, and Leonard Guarente. Cell, July 23, 2010.

Provided by Massachusetts Institute of Technology

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