

# Unusual strobing light and sound treatment reverses Alzheimer's in mice

SCIENCE



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A new study suggests light and sound oscillating at 40 Hertz may help the brain clear toxic Alzheimer's causing proteins (Credit: [realcg/Depositphotos](#))  
Could an hour's exposure every day to a specifically calibrated flickering light and droning sound help clear your brain of the toxic proteins that cause Alzheimer's disease? An intriguing new MIT study raises this possibility after successful mouse

experiments showed marked neurological improvements through simple visual and auditory stimulation.

Back in 2016 Li-Huei Tsai and colleagues at MIT's Picower Institute for Learning and Memory were investigating the correlation between impaired gamma oscillations in the brain and Alzheimer's disease. These gamma oscillations can range anywhere from 25 to 100 Hertz, but there has long been a hypothesis that 40 Hz is the magic frequency for optimal brain functioning.

Using optogenetic technology the researchers specifically stimulated individual neurons in an animal's hippocampus, discovering dramatic reductions in both amyloid and tau proteins after just one hour of stimulation at 40 Hz. Fascinatingly, the researchers then discovered similar effects could be generated in the mouse brain through simple external exposure to a light flickering at 40 Hz.

In a newly published study the MIT team explored the effects of adding sound stimuli to the treatment. The results reveal similar effects, with an hour's exposure to 40 Hz tones per day significantly reducing amyloid build-up in both the auditory cortex and hippocampus of mouse brains.

"What we have demonstrated here is that we can use a totally different sensory modality to induce gamma oscillations in the brain," says Tsai. "And secondly, this auditory-stimulation-induced gamma can reduce amyloid and tau pathology in not just the sensory cortex but also in the hippocampus. When we combine visual and auditory stimulation for a week, we see the engagement of the prefrontal cortex and a very dramatic reduction of amyloid."

The dual visual and auditory treatment proved much more effective than each stimulation by itself. The broader neurological effects of this combined treatment demonstrated enhanced microglia activity in the prefrontal cortex. This suggests the body's innate immune response was heightened by the external stimulation.

The exciting results are not without significant limitations. A large amount of the beneficial effects from the stimulation treatment noticeably faded one week after the treatments had been stopped, meaning there may not be any long-term benefits from the stimulation. It is also unclear exactly why 40 Hz is the perfect frequency to generate these effects, so further study is needed to uncover the molecular mechanisms behind this particular phenomenon.

Underlying all these limitations is of course the fact that the research so far has only been established in mouse models. The entire field of Alzheimer's research is filled with studies that proved promising in animal models, yet could never be replicated in humans.

The research team has already conducted safety tests in humans for the combined visual and auditory treatment, with enrollments underway for a larger trial targeting early-stage Alzheimer's patients. It conceivably will take years to ascertain how effective this technique is in slowing, or reversing, Alzheimer's symptoms in humans, but it is undeniably a fascinating hypothetical treatment.

The new study was published in the journal *Cell*.