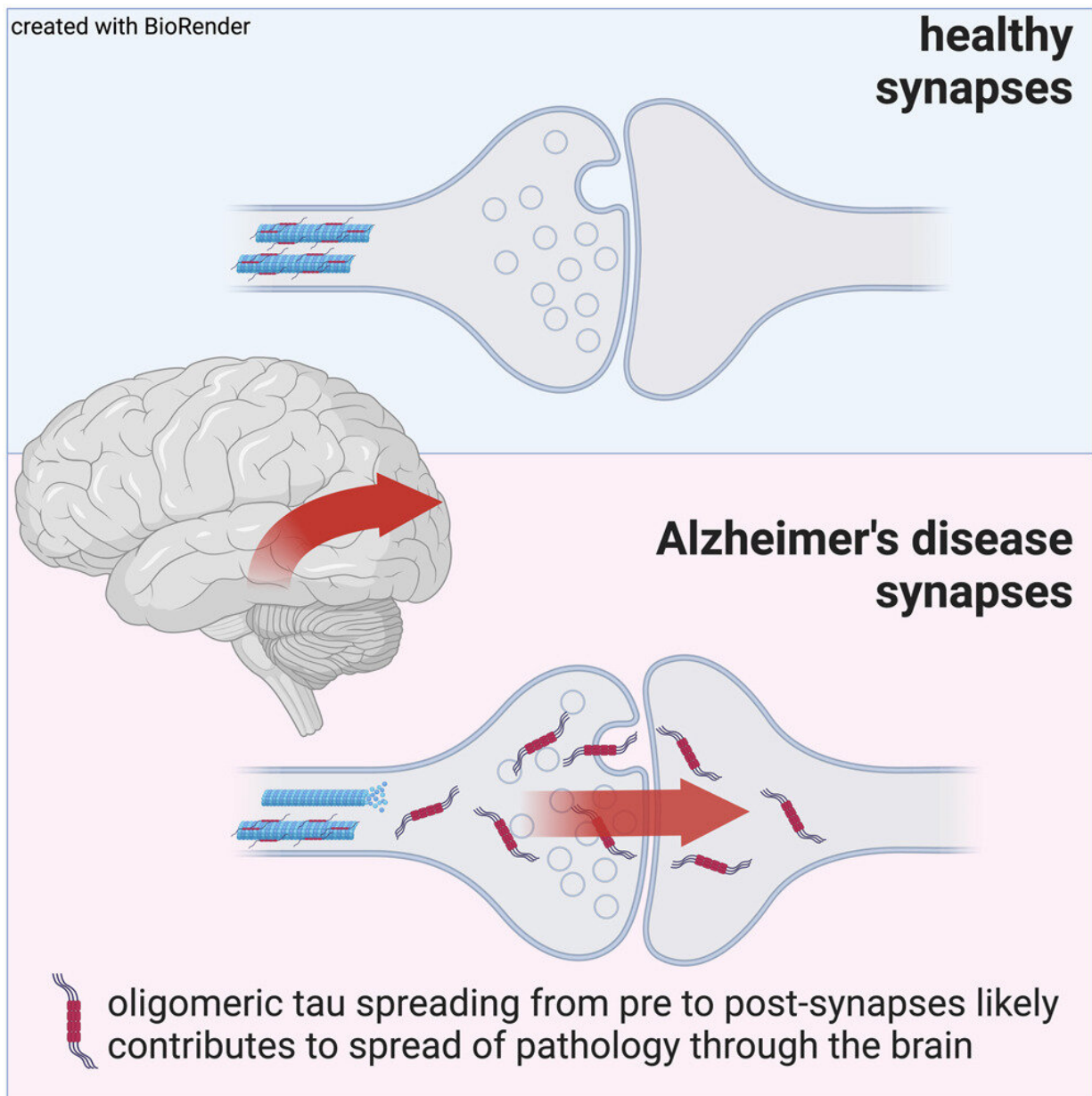


Dementia study reveals how toxic proteins spread through brain

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Graphical Abstract. Credit: *Neuron* (2023). DOI: 10.1016/j.neuron.2023.04.020

Fresh insights into the spread of damaging proteins that build up in the brains of people with Alzheimer's disease could hold the key to stopping the condition from progressing, a study says.

Researchers have discovered that [synapses](#), which send essential signals through the brain, are also transporting toxic proteins known as tau around the brain.

Large clumps of the protein tau—called [tangles](#)—form in [brain cells](#) and are one of the defining features of Alzheimer's disease. As these tangles spread through the brain during the disease, there is a decline in brain function.

Led by the University of Edinburgh, the study published in *Neuron* focused on synapses, connections that allow the flow of chemical and electrical messages between brain cells and are vital to healthy [brain function](#). Alzheimer's disease attacks synapses and their loss strongly predicts reduced memory and thinking abilities.

In the study, scientists used powerful microscopy techniques to examine more than one million synapses and visualize proteins within individual synapses of 42 people. The team discovered that small clumps of the protein tau—known as tau oligomers—are found within the synapses of people who died of Alzheimer's disease.

Tangles of tau oligomers were seen inside both ends of the synapse—from the brain cell sending signals and the brain cell receiving signals. In a mouse model of the disease, the oligomers jumped from one side of the synapse to the other, spreading the toxic tau through the

brain.

Lowering oligomeric tau at synapses may be a promising strategy to stop [disease progression](#) in future, experts say.

Alzheimer's disease is the most common form of dementia, with currently around 900,000 people with the condition in the UK. This figure is projected to rise to nearly 1.6 million in 2040. It can cause severe memory loss and there is currently no cure.

More information: Tara Leigh Spire-Jones, Synaptic oligomeric tau in Alzheimer's disease—a potential culprit in the spread of tau pathology through the brain, *Neuron* (2023). [DOI: 10.1016/j.neuron.2023.04.020](https://doi.org/10.1016/j.neuron.2023.04.020). [www.cell.com/neuron/fulltext/S0896-6273\(23\)00305-7](https://www.cell.com/neuron/fulltext/S0896-6273(23)00305-7)

Provided by University of Edinburgh

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