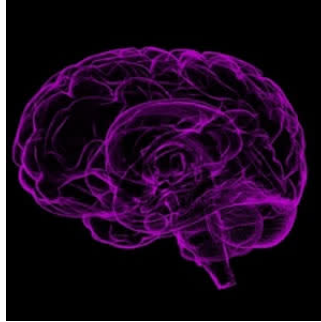


PET imaging tool measures synaptic loss in Alzheimer's disease



Research on Alzheimer's disease is slowed down by the fact that most studies on the disease's effects on the brain are done postmortem. Now, there is a new noninvasive method for measuring a patient's synaptic loss, a critical component of the disease, which has the potential to accelerate research for new Alzheimer's treatments, according to a Yale study published in JAMA Neurology.

This approach makes use of PET imaging technology to scan for a specific protein in the brain linked to synapses, the junctions between nerve cells. Yale researchers say a decrease in synapses correlates with cognitive impairment in Alzheimer's disease patients.

To quantify synaptic loss, the research team used a specific radioactive chemical, [11C]UCB-J, that binds with a protein, the SV2A, that is present in nearly all synapses. The Yale team recruited 21 older adults with either early Alzheimer's disease or normal cognitive ability. Each was injected with [11C]UCB-J and then scanned with high-resolution PET technology. The scans allowed the researchers to visualise synaptic "density" in different regions of the brain.

Analyses of the PET scans, as well as results from MRIs and cognitive evaluations for both groups, revealed this interesting finding: compared to individuals with normal cognition, the participants with Alzheimer's disease had a 41 percent reduction in the SV2A marker in an area of the brain associated with memory.

"We found that in early Alzheimer's disease, there is loss of synaptic density in the region of the hippocampus," said first author Ming-Kai Chen, MD, associate professor of radiology and biomedical imaging, and co-medical director of the Yale PET Center. "With this new biomarker, PET imaging for SV2A, we can measure synaptic density in the living human brain."

According to the Yale team, more study participants are currently being recruited in order to confirm their findings and potentially use the PET technique to assess drugs for treating Alzheimer's disease.

This PET imaging tool is also being used in clinical research studies at Yale for other diseases of the brain in which synapse loss is considered an important factor, said Richard Carson, co-author and director of Yale PET Center. These diseases include Parkinson's disease, epilepsy, drug abuse, depression, and schizophrenia.

"For those of us in the Alzheimer's field, in vivo assessment of synaptic density may transform our ability to track early Alzheimer's pathogenesis and response to treatment," explained Christopher Van Dyck, MD, director of the Yale Alzheimer's Disease Research Unit (ADRU).

Source: [Yale University](#)
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