

Smell test challenge suggests clinical benefit for some before development of Alzheimer's

November 10 2017



PET scan of a human brain with Alzheimer's disease. Credit: public domain

Researchers at Columbia University Medical Center (CUMC) and the New York State Psychiatric Institute (NYSPI) may have discovered a way to use a patient's sense of smell to treat Alzheimer's disease before it

ever develops. Having an impaired sense of smell is recognized as one of the early signs of cognitive decline, before the clinical onset of Alzheimer's disease. The researchers at CUMC and NYSPI have found a way to use that effect to determine if patients with mild cognitive impairment may respond to cholinesterase inhibitor drugs to treat Alzheimer's disease.

The findings were published online this week in the *Journal of Alzheimer's Disease*.

Cholinesterase inhibitors, such as donepezil, enhance cholinergic function by increasing the transmission of the neurotransmitter acetylcholine in the brain. Cholinergic function is impaired in individuals with Alzheimer's [disease](#). Cholinesterase inhibitors, which block an enzyme that breaks down acetylcholine, have shown some effectiveness in improving the cognitive symptoms of Alzheimer's disease. However, they have not been proven effective as a treatment for individuals with mild cognitive impairment (MCI), a condition that markedly increases the risk of Alzheimer's disease.

"We know that cholinesterase inhibitors can make a difference for Alzheimer's patients, so we wanted to find out if we could identify patients at risk for Alzheimer's who might also benefit from this treatment," said D.P. Devanand, MBBS, MD, professor of psychiatry, scientist in the Gertrude H. Sergievsky Center at CUMC, and co-director of the Memory Disorders Clinic and the Late Life Depression Clinic at NYSPI. "Since odor identification tests have been shown to predict progression to Alzheimer's, we hypothesized that these tests would also allow us to discover which patients with MCI would be more likely to improve with donepezil treatment."

In this year-long study, 37 participants with MCI underwent odor identification testing with the University of Pennsylvania Smell

Identification Test (UPSIT). The test was administered before and after using an atropine nasal spray that blocks cholinergic transmission.

The patients were then treated with donepezil for 52 weeks, and were periodically reevaluated with the UPSIT and with memory and cognitive function tests. Those who had a greater decline in UPSIT scores, indicating greater cholinergic deficits in the brain, after using the anticholinergic nasal spray [test](#) saw greater cognitive improvement with donepezil.

In addition, short-term improvement in odor identification from baseline to eight weeks tended to predict longer-term cognitive improvement with donepezil treatment over one year.

"These results, particularly if replicated in larger populations, suggest that these simple inexpensive strategies have the potential to improve the selection of [patients](#) with [mild cognitive impairment](#) who are likely to benefit from treatment with cholinesterase inhibitors like donepezil," said Dr. Devanand.

More information: D.P. Devanand et al, Change in Odor Identification Impairment is Associated with Improvement with Cholinesterase Inhibitor Treatment in Mild Cognitive Impairment, *Journal of Alzheimer's Disease* (2017). [DOI: 10.3233/JAD-170497](https://doi.org/10.3233/JAD-170497)

Provided by Columbia University Medical Center

Citation: Smell test challenge suggests clinical benefit for some before development of Alzheimer's (2017, November 10) retrieved 25 April 2024 from <https://medicalxpress.com/news/2017-11-clinical-benefit-alzheimer.html>

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