

Study explores nicotine patch to treat memory loss

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Vanderbilt University Medical Center has received a \$9.4 million grant from the National Institute on Aging (NIA) to test the effectiveness of a transdermal nicotine patch in improving memory loss in older adults with mild cognitive impairment (MCI), a precursor to Alzheimer's disease.

About 300 older individuals with MCI will be enrolled at about 20 different sites around the country, including Vanderbilt, in the two-year MIND (Memory Improvement through Nicotine Dosing) study—the largest study of a nicotine patch in non-smokers.

Paul Newhouse, M.D., professor of Psychiatry and director of the Center for Cognitive Medicine at VUMC, is the co-principal investigator of the study that is being launched in conjunction with the Alzheimer's Treatment Research Institute at the University of Southern California, Indiana University and the University of Vermont.

MCI affects millions of people around the world and is the stage between normal aging and dementia when others begin to notice that an individual is developing mild memory or thinking problems. Most people with MCI (about 75 percent) go on to develop Alzheimer's disease. The research is a continuation of Newhouse's work into nicotine as a treatment for MCI. A 2012 study published in *Neurology* looked at 74 nonsmokers for six months at three sites.

Like the smaller study, half of the patients will wear a nicotine patch of

up to 21 mg. a day and half will receive a placebo. The current study is designed so neither the investigators nor the participants know which group receives the active nicotine patch.

Those in the 2012 study who received the nicotine patch experienced only minor side effects like nausea and dizziness, similar to what a person would experience when smoking a cigarette for the first time, Newhouse said.

Those on the nicotine patch also experienced mild weight loss, not surprising since nicotine is an appetite suppressant. There were also no withdrawal symptoms reported when the study participants stopped using the nicotine patch.

"We'll have a rigorously defined patient population and should have some very important results by the end of this study," Newhouse said. "If this study shows that the nicotine patch is a safe and effective treatment, we will have a medication that is inexpensive and is easily obtained."

Those enrolled in the study will wear the patch for 16 hours a day, taking it off only to sleep, and will participate in computer memory and cognition testing every three to six months, conducted in collaboration with the company Cogstate from Melbourne, Australia. Those enrolled will also be given the opportunity to volunteer for an additional part of the study, looking at brain function and brain structure through magnetic resonance imaging (MRI) in the volunteers, to see if the nicotine patch produces changes in the brain structure and function or has a positive effect on the progression of Alzheimer's disease through spinal fluid sampling.

Nicotine, a natural plant alkaloid, is a "fascinating drug with interesting properties," Newhouse said. "People think of it as a potentially noxious substance, but it's a plant-derived medication just like a lot of other

medications."

Nicotine binds to very specific receptors in the brain that are important for thinking and memory and may have neuroprotective effects. People with Alzheimer's disease are known to lose some of those receptors. Pharmaceutical companies are also working to develop nicotine-like drugs to treat people with Alzheimer's disease, but Newhouse believes that nicotine by itself is a worthwhile product to continue to explore. "Sometimes the original compound might be the best," he said.

Newhouse said the study shouldn't be viewed as an endorsement of smoking or of nicotine for normal individuals. "What we and others have shown is that nicotine doesn't do much for memory and attention in the normal population," he said. "But we believe it does do something for those whose cognitive function is already impaired."

People with [memory loss](#) should not start smoking or using [nicotine patches](#) by themselves because there are harmful effects associated with smoking and a medication such as nicotine should only be used with a doctor's supervision, he said. "We're excited about this study, and to see whether it can change the course of illness in these patients." "We're hoping to finally answer the question that we've been asking for 30 years. 'Does this really work?' It's the essence of repurposing an old drug for a new use."

Provided by Vanderbilt University Medical Center

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