

Scientists create natural Alzheimer's-fighting compound in lab

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Scientists at Yale University have developed the first practical method to create a compound called huperzine A in the lab. The compound, which occurs naturally in a species of moss found in China, is an enzyme inhibitor that has been used to treat Alzheimer's disease in China since the late 1990s and is sold in the U.S. as a dietary supplement to help maintain memory. Scientists believe it could also potentially combat the effects of chemical warfare agents.

Until now, researchers have only been able to derive small amounts of the compound directly from the *Huperzia serrata* plant, or had to resort to lengthy and cumbersome methods to synthesize it in the lab.

Now researchers at Yale have developed a practical and cost-effective method to synthesize huperzine A in the lab. The process requires just eight steps and produces a yield of 40 percent. Previously, the best synthetic techniques had required twice as many steps and achieved yields of only two percent.

"Being able to synthesize large amounts of huperzine A in the lab is crucial because the plant itself, which has been used in Chinese [folk medicine](#) for centuries, takes decades to grow and is nearing extinction due to overharvesting," said Seth Herzon, the Yale [chemist](#) who led the research, which is described in the Aug. 25 issue of the journal [Chemical Science](#).

In some places, huperzine A can cost up to \$1,000 per milligram. Herzon

and his team produced several grams of the compound in their lab and are capable of creating much more. They believe they will be able to drive the cost down to just 50 cents per milligram (a projected typical dose is about one milligram per day), and have partnered with an industrial firm to help produce it on larger scales.

The firm plans to comprehensively evaluate the therapeutic potential of huperzine A by conducting [clinical trials](#) for several different neurological disorders in the U.S. In addition, the Herzon lab and the firm are working with the U.S. Army, which is interested in huperzine A's potential in blocking the effects of chemical warfare agents, he said. The compound has been shown to protect primates against chemical warfare agents, without side effects.

Other Alzheimer's treatments based on enzyme inhibitors are currently prescribed in the U.S., but huperzine A binds better, is more easily absorbed by the body and last longer in the body than other treatments, Herzon said.

"We believe huperzine A has the potential to treat a range of neurologic disorders more effectively than the current options available," Herzon said. "And we now have a route to huperzine A that rivals nature's pathway."

Provided by Yale University

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