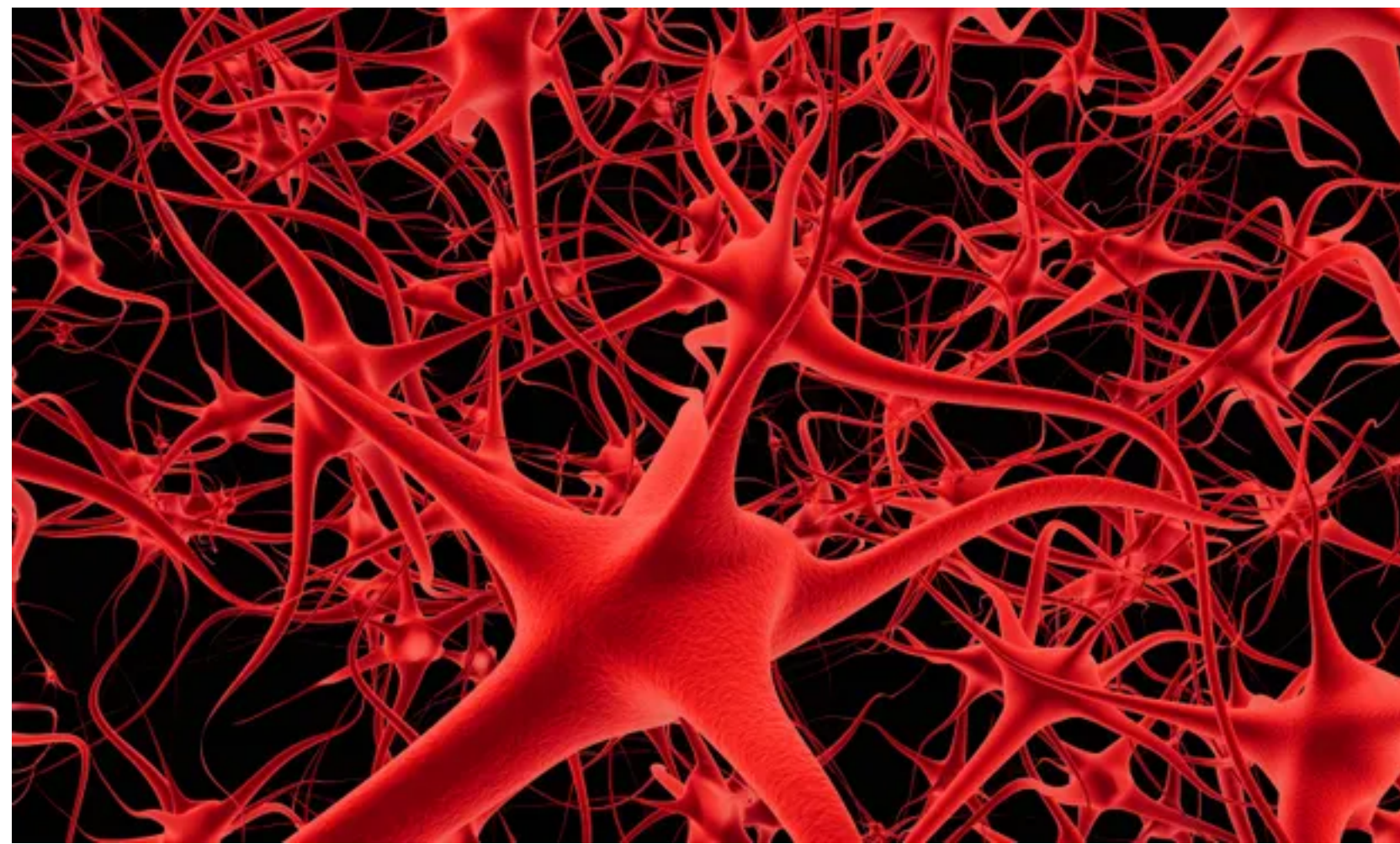


Neuroscience

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New drug raises hopes of reversing memory loss in old age

Toronto researchers believe the drug can also help those with depression, schizophrenia and Alzheimer's



▲ Neurons and nerves in a brain. The new drug, a derivative of benzodiazepine, targets specific receptors on neurons in key parts of the brain involved in cognition. Photograph: artpartner-images/Getty Images

An experimental drug that bolsters ailing brain cells has raised hopes of a treatment for memory loss, poor decision making and other mental impairments that often strike in old age.

The drug could be taken as a daily pill by over-55s if clinical trials, which are expected to start within two years, show that the medicine is safe and effective at preventing memory lapses.

Tests in the lab showed that old animals had far better memory skills half an hour after receiving the drug. After two months on the treatment, brain cells which had shrunk in the animals had grown back, scientists found.

Etienne Sibille, at the Centre for Addiction and Mental Health in Toronto, said the treatment was aimed not only at the “normal” cognitive decline that leads to senior moments, but at memory loss and mental impairments that commonly afflict people with depression, schizophrenia and Alzheimer’s disease.

If the drug did well in human trials, Sibille said it was possible that “anybody over the age of 55-60 who may be at risk of cognitive problems later on could benefit from this treatment”.

“Our findings have direct implications for poor cognition in normal ageing,” he said, with the drug potentially improving learning, memory, decision making and essential life planning. “But we see this deficiency across disorders from depression to schizophrenia and Alzheimer’s.”

There are no medicines on the market that improve the sort of memory loss seen in old age and psychiatric disorders such as depression and schizophrenia. But the Toronto researchers believe their drug can reverse failing memories by targeting specific cells involved in learning and memory, and rejuvenating them. The changes the drug brings about in the brain suggest it could prevent memory loss at the beginning of Alzheimer’s and potentially delay its onset.

Research on memory loss has shown that it is partly linked to levels of a neurotransmitter known as GABA. Its normal job is to slow down the rate at which neurons fire, effectively dampening down electrical “noise” in the brain. Lower this background noise and important signals in the brain can be processed more easily, or so the theory goes.

The new drug is a derivative of benzodiazepine, a family of medicines that includes the anti-anxiety pills Valium and Xanax. While Valium and Xanax have broad effects in the brain, the new drug is designed to target specific GABA “receptors” found on neurons in key parts of the brain, such as the hippocampus, which are heavily involved in cognition.

Scientists tested the drug on mice in a maze and found that half an hour after receiving a single dose, old animals performed nearly as well as young mice. The drug also restored the performance of young mice whose memories had been temporarily impaired by the stress of being kept in a confined space.

“An old mouse will naturally perform at about 50-60% on this test. Its working memory is basically not working. But within 30 minutes of administration of the drug, their performance is back up to 80-90%, so almost at the level of a young mouse. We have a rapid reversal of age-related working memory deficit and that is exciting,” Sibille told the Guardian.

In the latest work, the Toronto team showed that brain cells which had shrunk in older mice grew back after two months of having the drug put in their drinking water. “We can actually grow the brain cells,” Sibille said.

“They tend to shrink with age and they shrink in neurodegenerative diseases. What we see is that the cells grow to a level that’s pretty close to that in young animals.”

The lab tests showed no benefit when the drug was given to healthy young animals, suggesting that it would not work like a cognitive enhancer and give healthy people superhuman memory skills. “It’s not a drug a student would take if they wanted to be smarter when they study for their exams,” Sibille said. The researchers submitted a patent on the drug on Wednesday before a talk at the American Association for the Advancement of Science annual meeting in Washington DC.

Scientists now hope to test the drug in humans, with the first trials expected to be in people with depression. When people are in remission from depression, those with poor memory and other mental impairments are often most likely to relapse, Sibille said.

“If we could somehow treat those deficits we could potentially have a major impact on the lifelong trajectory of the illness in those people. It would be a gamechanger in how we treat depression.”

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