ScienceDaily®
Your source for the latest research news

Online brain training reverses 10 years of aging in memory and learning

Brain training just proved it can make aging brains 10 years younger, no pills required.

Date: October 29, 2025

Source: McGill University

Summary: A new McGill-led study reveals that digital brain exercises can rejuvenate aging brain systems responsible for learning and memory. Older adults using BrainHQ for 10 weeks showed restored cholinergic function — effectively turning back the brain's clock by a decade. Scans confirmed measurable biochemical changes, offering a hopeful new approach for dementia prevention.

FULL STORY

Playing BrainHQ for 10 weeks helped older adults regain youthful brain function, according to groundbreaking McGill research. The study found measurable biochemical rejuvenation, marking a major step toward non-drug dementia prevention. Credit: Shutterstock

A clinical trial led by McGill University has become the first in humans to demonstrate that online brain training can strengthen the brain networks responsible for learning and memory.

After 10 weeks of using the game-like app BrainHQ, older adults showed significant improvements in cholinergic function, a key brain chemical system that tends to decline with age and affects attention, memory, and decision-making.

"The training restored cholinergic health to levels typically seen in someone 10 years younger," said senior author Dr. Etienne de Villers-Sidani, an Associate Professor in McGill's Department of Neurology and Neurosurgery and neurologist at The Neuro (Montreal Neurological Institute-Hospital).

"This is the first time any intervention, drug or non-drug, has been shown to do that in humans," he said.

Because Alzheimer's disease is linked to sharp declines in cholinergic health, the results help explain previous findings that such exercises can lower dementia risk and enhance cognitive performance. The researchers suggest this type of brain training could serve as a safer alternative to medication or work effectively alongside it.

Evidence-based brain game

BrainHQ features speed-based cognitive games that adapt to become more demanding as users improve, an approach supported by hundreds of scientific studies.

"A lot of people assume crossword puzzles or reading are enough to keep the brain sharp. But not all activities truly promote neuroplasticity," said de Villers-Sidani.

Since BrainHQ is already commercially available, clinicians can discuss it with patients who want to take an active role in maintaining or improving brain health, he added.

Cutting-edge brain imaging at The Neuro

To observe brain changes, researchers used a specialized PET scan and tracer that makes cholinergic reserves visible, allowing them to measure activity before and after the training period.

"We used a rare technology," said de Villers-Sidani. "The Neuro is one of the few centres worldwide that can produce the tracer and run the scan."

The study included 92 healthy adults aged 65 and older. Participants were randomly assigned to either the BrainHQ program or an active control group that played recreational computer games. Both groups trained on tablets for 30 minutes a day over 10 weeks, but only the BrainHQ users showed measurable increases in cholinergic activity.

Researchers are now preparing a follow-up study to evaluate the program's effects in individuals with early-stage dementia.

About the Study

"Effects of Computerized Cognitive Training on Vesicular Acetylcholine Transporter Levels using Fluoroethoxybenzovesamicol Positron Emission Tomography in Healthy Older Adults: Results from the INHANCE Randomized Clinical Trial" by Mouna Attarha and Etienne de Villers-Sidaniet al. is published in *JMIR Serious Games.*

The study was conducted independently by McGill researchers in collaboration with Posit Science, which provided access to BrainHQ. All data collection and analyses were led by McGill.

This research was supported by the National Institute on Aging of the National Institutes of Health. This content is solely the responsibility of the authors and does not necessarily represent the official views of the National Institutes of Health.

Story Source:

Materials provided by **McGill University**. *Note: Content may be edited for style and length.*

Journal Reference:

1. Mouna Attarha, Ana de Figueiredo Pelegrino, Lydia Ouellet, Paule-Joanne Toussaint, Sarah-Jane Grant, Thomas Van Vleet, Etienne de Villers-Sidani. **Effects of Computerized Cognitive Training on Vesicular Acetylcholine Transporter Levels using [18F]Fluoroethoxybenzovesamicol Positron Emission Tomography in Healthy Older Adults**. *JMIR Serious Games*, 2025; 13: e75161 DOI: 10.2196/75161

Cite This Page: MLA APA Chicago

McGill University. "Online brain training reverses 10 years of aging in memory and learning." ScienceDaily. ScienceDaily, 29 October 2025. <www.sciencedaily.com/releases/2025/10/251029002858.htm>.

Explore More

from ScienceDaily

RELATED STORIES

Scientists May Have Found How to Reverse Memory Loss in Aging Brains

Nov. 5, 2025 — Virginia Tech researchers have shown that memory loss in aging may be reversible. Using CRISPR tools, they corrected molecular disruptions in the hippocampus and amygdala, restoring memory in older ...

A Molecule Is Shown to Produce Cognitive Improvement in Rodents With Early Alzheimer's Disease

Jan. 15, 2025 — Scientists have come up with a drug that is a potential candidate for tackling

memory deficits in the early stages of the disease in rodents. Research shows that the drug activates the cannabinoid ...

Diagnosing Different Forms of Dementia Now Possible Using Artificial Intelligence

July 8, 2024 — Ten million new cases of dementia are diagnosed each year but the presence of different dementia forms and overlapping symptoms can complicate diagnosis and delivery of effective treatments. Now ...

Scientists Show How Gene Expression Controls Synaptic Plasticity in the Aging Human Brain

Mar. 8, 2023 — Cognitive decline associated with aging is caused by the loss of cholinergic nerve supply to the hippocampus of our brain. Since the hippocampus is the center of learning and memory, a reduction in ...

Memory Helps Us Evaluate Situations on the Fly, Not Just Recall the Past

June 18, 2021 — Scientists have long known the brain's hippocampus is crucial for long-term memory. Now a new study has found the hippocampus also plays a role in short-term memory and helps guide ...

'Rejuvenating' the Alzheimer's Brain

May 25, 2021 — Alzheimer's disease is the main cause of dementia and current therapeutic strategies cannot prevent, slow down or cure the pathology. The disease is characterized by memory loss, caused by the ...

TRENDING AT SCITECHDAILY.com

The First Hooved Reptile: Dinosaur “Mummies” Reveal a Shocking Evolutionary Twist

A Massive Geomagnetic Superstorm Crushed Earth’s Plasma Shield

New Microwave Technique Could Turn CO2 Into Fuel Far More Efficiently

Doctors “Astounded”: Long-Held Belief About Coffee and Heart Rhythm Was Wrong