

The Discovery of Lithium in the Human Brain Brings New Hope for Alzheimer's Disease Patients

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Alzheimer's disease is a progressive neurodegenerative disorder that affects memory and thinking. Alzheimer's is a leading cause of dementia, accounting for 60-80% of dementia cases (Alzheimer's Association, n.d.). 10% of those over the age of 65 have Alzheimer's disease, 50% for those over 85; the number of patients doubles every 5 years after the age of 65 (Piedmont, n.d.). Despite its prevalence, its cure is yet to be found. However, in August 2025, a new approach to treating Alzheimer's was discovered: lithium.

A study led by Dr. Bruce Yanker at Harvard Medical School revealed that human brain tissue contains naturally occurring lithium. Lithium protects the brain from neurodegeneration, while its deficiency causes an increase in brain pathology and memory decline (Bush, 2025). Given its importance, Yanker and his team found a link between the amount of lithium and Alzheimer's, supported by the fact that lithium deficiency is one of the earliest changes leading to the disease (Dutchen, 2025). When investigating mice brains, Yanker's team found that the mice with lithium-deficient brains developed more amyloid plaques than those with normal lithium levels. Plaques, often referring to amyloid plaques, are extracellular deposits of amyloid beta protein, which are the hallmark of Alzheimer's disease. The plaques bind with lithium in the brain, depriving the other brain cells from functioning normally (Dutchen, 2025). Lithium depletion was also shown to reduce the formation of another hallmark of Alzheimer's, tau tangles—abnormal clumps of tau protein in the brain (Johnson, 2025).

In the past two years, two treatments, donanemab and lecanemab, were approved by the FDA as they have marked a significant innovation in Alzheimer's treatment (Young, 2024). Both

of these treatments focus on removing the abnormal beta-amyloid to reduce the numbers of plaques in the brain. Instead of merely alleviating the symptoms like older medicine did, they slow the rate of cognitive decline, directly tackling the progression of the disease itself (Young, 2024). However, the anti-amyloid antibodies in these treatments can still cause significant side effects such as brain swelling and bleeding, which are common signs of amyloid-related imaging abnormalities, also known as ARIA (Young, 2024). ARIA can range from asymptomatic to fatal. Eli Lilly, a pharmaceutical company, reported that in their donanemab trial, around 37% of patients who got the antibody developed ARIA (Couzin-Frankel, 2023). 25% had brain swelling, and a quarter of such patients had symptoms of headaches and confusion (Couzin-Frankel, 2023). Similarly, about 21% of those who took lecanemab developed ARIA, and 12.6% had brain swelling (Couzin-Frankel, 2023). Therefore, treatments now still come with several side effects and are not enough to sufficiently treat Alzheimer's.

In considering lithium as an alternative solution, the current forms of its intake are commonly found in medication for treating bipolar disease or major depressive disorder. However, the lithium in these medications are present in high concentrations, which is especially risky for the elderly due to their reduced renal clearance as lithium is notorious for its effects on the kidneys (Wissa, 2024). Considering lithium's use in treating the disease, scientists have identified a salt of lithium and orotic acid, called lithium orotate. The substance does not get captured by Alzheimer's plaques, and it was even found to undo the neurological changes and restore memory in mice's brains (Peeples, 2025).

Nevertheless, lithium's use for treating Alzheimer's is yet to be investigated further in its real-life application. Lithium orotate is not approved by the FDA and cannot receive medical supervision; its consequences are not yet fully understood (Talcherkar, 2025). Building off of

that, Dr. Michelle Longo, a Tulane clinical neurologist at the UMC Healthy Brain Aging Institute, suggests that supplementing diets with lithium should not be considered yet (WWLTV, 2025). Still, scientists remain hopeful to find a new and more effective treatment for Alzheimer's disease.

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