

# Lithium Extends Lifespan and Slows Brain Aging

Lithium may slow degenerative processes by inhibiting an age-accelerating enzyme in the brain and other organs.

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During the past two centuries, people made pilgrimages to springs that were naturally high in the mineral **lithium**.

One site, **Lithia Springs** in Georgia, was visited by Mark Twain, at least *four* U.S. presidents, and other prominent figures, all because of the famous **lithium water**.

The more that scientists study **lithium**, the more persuasive the evidence has become for its unique effects.

Scientists have found that lithium may prevent [cognitive decline](#).<sup>1,2</sup> Preclinical studies have shown it activates pathways that may slow the [aging process](#).<sup>3,4</sup>

In one animal study, high doses of **lithium** increased median **lifespan** by **46%**.<sup>5</sup>

Two studies have found that individuals living in areas with even modest levels of lithium in drinking water tend to **live longer**.<sup>6,7</sup>

As little as **300 to 1,000 mcg** of **lithium** daily may provide these benefits.

## What is Lithium?

**Lithium** is a naturally occurring mineral found in rocks and subsoil in some geographical areas. Some natural water sources contain small amounts of this element.

By the 19<sup>th</sup> century, many people had come to believe that there were health and **longevity** benefits to drinking water that contained lithium. It also became linked to improved **mood**.

Modern science has confirmed these beliefs.

For instance, two studies found that people living in areas with even **low levels** of lithium in the drinking water tend to **live longer**.<sup>6,7</sup>

## Lithium and the ‘Age-Accelerating Enzyme’

One key to lithium’s benefits appears to be its ability to *inhibit* a cellular *enzyme* called **glycogen synthase kinase-3 (GSK-3)**.<sup>3,4,8</sup>

**GSK-3** controls several important functions within cells. But **overactivity** of GSK-3 can be harmful.

Increased GSK-3 activity correlates with **rapid aging** of many tissues and the entire body.<sup>9,10</sup> Its impact is so dramatic that GSK-3 can be thought of as an **age-accelerating enzyme**.

Overactivity of GSK-3 is linked to **chronic diseases**, including Alzheimer's, type II diabetes, some cancers, and mood disorders.<sup>4,11-14</sup>

Even in low doses, lithium **reduces** GSK-3 overactivity.<sup>3,4,8</sup>

Studies suggest that this **GSK-3 inhibition** is largely responsible for lithium's ability to protect brain function and promote healthy longevity.<sup>3,8</sup>

## Boosting Longevity

Scientists have noted that people taking **high-dose lithium** for medical reasons generally have **lower mortality rates**, including lower rates of death due to **cardiovascular disease**.<sup>15,16</sup>

Controlled experiments have been conducted to rigorously explore possible life-extending effects of lithium.

These studies showed that **low-dose lithium** led to a modest **increase in lifespan** in roundworms, known as *C. elegans*.<sup>7</sup>

*Higher* doses of lithium led to longer lifespans in both roundworms and fruit flies.<sup>3,5,7</sup> In one of these studies, median survival was boosted by **46%**.<sup>9</sup>

Evidence from these and other studies suggested that, in addition to inhibiting GSK-3, lithium exerted **pro-longevity** effects in three ways:<sup>5,17,18</sup>

- Lithium may help maintain longer **telomeres**, protective structures related to cellular health,
- Lithium regulates **genes** related to healthy **DNA structure**, and
- Lithium may protect against **cell senescence**. Senescent cells are contributors to age-related disease and accelerated aging.

Together, these mechanisms may help slow the aging process and protect against chronic disease.

## Protecting the Brain

Very *high* doses of lithium have long been used to treat the psychiatric condition **bipolar disorder**.

Now, clinical studies suggest that much *lower* doses of lithium provide **neuroprotective** benefits.

Scientists are finding that lithium may help prevent or improve mood disorders, dementia, and Alzheimer's disease.

One study found that long-term lithium exposure from drinking water may be associated with a *lower* risk of being diagnosed with **dementia**.<sup>19</sup>

Similar benefits have been demonstrated with [Alzheimer's disease](#).

One epidemiological study in Texas revealed that rates of death from Alzheimer's were *higher* in areas with *low* levels of lithium in the water.<sup>20</sup>

In one clinical study, a micro-dose of just **300 mcg** of lithium daily was found to **significantly** decrease **cognitive decline** in Alzheimer's patients, compared to a placebo.<sup>21</sup>

## Mechanisms of Neuroprotection

Lithium appears to protect the **brain** in a number of different ways.

In preclinical research, scientists found that it not only reduces the elevated **GSK-3 activity** associated with **Alzheimer's**, but *also* reduces the buildup of **beta-amyloid**. This is the abnormal protein that accumulates and forms plaques in the brains of Alzheimer's patients.<sup>22</sup>

Scientists have also documented that lithium:<sup>8</sup>

- Increases the activity of multiple beneficial **neurotransmitters** in the brain,
- Increases **brain-derived neurotrophic factor**, an important signaling molecule that protects brain cells and augments their function, and
- Helps balance **circadian rhythm** and may help with **adrenal hormone** function.

## WHAT YOU NEED TO KNOW

### Lithium's Brain and Body Benefits

- Studies have found that people living in areas with the mineral **lithium** in the drinking water tend to live longer.

- Patients taking lithium for medical reasons also have **lower mortality rates**, and lithium treatment extends **lifespan** in animal studies.
- Lithium in drinking water may also be associated with a *lower* risk of being diagnosed with **dementia**.
- In a clinical study, **300 mcg** of lithium daily **significantly decreased cognitive decline** in patients with Alzheimer’s disease.
- Lithium appears to work largely by *inhibiting* overactivity of the “age-accelerating enzyme” **GSK-3**, which has been tied to rapid aging, cognitive decline, and risk for chronic diseases.
- **Low-dose lithium** may reduce risk for age-related disorders, protect brain function, and extend healthy lifespan.

In clinical studies, lithium treatment has been linked to additional signs of **neuroprotection**, including:<sup>23</sup>

- Thickening of the **cerebral cortex**, the brain’s outer layer,
- Increased density of **gray matter**, which contains most of the brain’s nerve cell bodies, and
- Enlargement of the **hippocampus**, the brain’s memory center.

All of these activities together may slow brain aging and protect against cognitive decline.

## Summary

The mineral **lithium** is demonstrating broad-spectrum health benefits.

Lithium works, in part, by inhibiting the overactivity of the “age-accelerating enzyme” **GSK-3** and protecting DNA.

Lithium intake is associated with **longer lifespan** in humans and a median **46%** increase in longevity in roundworms.

In a clinical study, it decreased cognitive decline in patients with **Alzheimer’s disease**.

Research shows that low lithium doses—only **300 mcg** to about **1,000 mcg** daily—may benefit mental and physical health and increase longevity.

If you have any questions on the scientific content of this article, please call a **Life Extension®** Wellness Specialist at 1-866-864-3027.

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