

# NeuroMag™

Chelated Magnesium L-Threonate



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This information is provided as a medical and scientific educational resource for the use of physicians and other licensed health-care practitioners ("Practitioners"). This information is intended for Practitioners to use as a basis for determining whether to recommend these products to their patients. All recommendations regarding protocols, dosing, prescribing, and/or usage instructions should be tailored to the individual needs of the patient considering their medical history and concomitant therapies. This information is not intended for use by consumers.

NeuroMag™ features the unique, patented, chelated mineral Magtein®, which contains magnesium that is chelated to threonic acid (magnesium L-threonate), a metabolite of ascorbic acid found naturally in foods and human physiology. This highly bioavailable form of magnesium is formulated to promote brain concentrations of magnesium.\* Magnesium L-threonate (MgT) is an ionophore that is able to transport magnesium ions across lipid membranes, including those of brain cells. Magtein® is superior to other forms of magnesium at entering through the blood brain barrier.\* This product is designed to support cognitive function, memory, and overall brain health.\*

## Formula Highlights

- Features Magtein®, a highly bioavailable magnesium L-threonate
- 145 mg of chelated magnesium from 2 g of magnesium L-threonate per serving
- Does not contain gluten, dairy, soy, or GMOs

Magnesium plays an important physiological role, particularly in the brain, skeletal muscles, and heart. Magnesium is an essential mineral that serves as an enzyme cofactor for more than 300 biochemical reactions in the body, including those that regulate glycolysis and cellular energy production, muscle and nerve function, nerve impulse conduction, and normal heart rhythm and blood pressure. Magnesium is critical for supporting normal muscle relaxation, neurological health, bone health, and psychological balance. Magnesium's role as an enzyme cofactor for processes that generate ATP underlies its importance for maintaining energy levels and metabolic efficiency in the brain.<sup>1</sup>

## Magnesium and Brain Health

According to epidemiological studies, magnesium intake in the U.S. has decreased significantly from 500 mg/day to a range of 175 to 225 mg/day, and individuals following a Western-style diet consume less than 30% to 50% of the RDA for magnesium.<sup>2</sup> Evolutionary intakes of magnesium have been estimated at approximately 643 mg per day; thus, the current RDA of magnesium (320 mg/day to 420 mg/day for adults) may not be adequate to support optimal health.<sup>3</sup> Magnesium insufficiency is common in the U.S. due to the wide use of demineralized water and soil and the increase of processed food consumption.<sup>2</sup> Magnesium is also depleted by stress, excessive alcohol and caffeine consumption, gastrointestinal diseases, aging, and certain medications.<sup>2,4</sup> Some research indicates that magnesium deficiency may be associated with a variety of neuropathologies, such as migraine, Alzheimer's disease (AD), Parkinson's disease (PD), epilepsy, stroke, chronic pain, attention-deficit hyperactivity disorder (ADHD), depression, and anxiety.<sup>2,5</sup>

Excitability of the central nervous system, abnormal mitochondrial functioning, neuroinflammation, and spontaneous neuronal depolarization are connected to many of these neuropathologies.<sup>2</sup> Magnesium ions regulate calcium ion flow in neuronal calcium channels, helping to regulate neuronal nitric oxide production. Magnesium also negatively modulates the glutamergic N-methyl-D-aspartate (NMDA) receptor and is a key metabolic factor in mitochondrial functioning, potentially reducing the possibility of spontaneous neuronal depression due to hyperexcitability.<sup>2</sup>

## Role of Magnesium L-Threonate in Neuropathologies

Studies indicate that synaptic connections in the brain hippocampus, a critical region for learning and memory, decline during the normal process of aging. AD is characterized by significant synapse loss and learning and memory impairments; the brains of patients suffering with AD (and PD) have been shown to have low levels of magnesium. Researchers from MIT concluded that elevating brain magnesium concentrations through supplementation with MgT may be a useful strategy to support cognitive abilities and decrease common age-related memory decline.<sup>6\*</sup> Magtein® may promote the functioning of the hippocampus by supporting synaptic plasticity and NMDA-receptor dependent signaling.\*

In a randomized, double-blind, placebo-controlled parallel group clinical trial, 1.5 to 2 g of Magtein® per day significantly increased body magnesium concentrations, improved memory and cognition at 12 weeks versus a placebo, and reduced brain age by 9 years in adults ages 50 to 70 years old who complained of memory problems, anxiety, and poor sleep.<sup>6</sup>

## Benefits\*

- Supports normal cognitive function and memory
- Promotes overall brain health
- Supports magnesium status
- May help support balanced mood

## Supplement Facts

Serving Size 3 capsules  
Servings Per Container 30

Amount Per Serving		% Daily Value
Magnesium	145 mg	34%
(from 2 g Magtein® Magnesium L-Threonate)		

Other Ingredients: Cellulose (capsule), dicalcium phosphate, vegetable stearate, microcrystalline cellulose.

A small 8-week human clinical trial showed that 1.8 g/day of Magtein® supplementation improved overall cognitive functioning in older adults ages 63 to 87 years old with mild-to-moderate dementia.<sup>7</sup> Magnesium L-threonate supplementation (500 mg in the morning and evening) for 12 weeks in adults ages 18 to 55 years old who were diagnosed with moderate ADHD led to significant improvements in both clinician and self-reported ADHD symptoms, increased full scale IQ scores by 5% to 12%, and executive functioning and visual scanning measure improvements.<sup>8</sup>

Similar beneficial results were found in several animal studies. Magtein® significantly increased magnesium concentrations in the brain, improving learning capacity, short- and long-term memory, working memory, and synaptic connections.<sup>9-14</sup> In transgenic mice models of AD, Magtein® supplementation significantly reduced amyloid plaques in the hippocampus and frontal cortex,<sup>15</sup> inhibited neuroinflammation by reducing the expression of interleukin-1B and tumor necrosis factor (TNF)-alpha,<sup>16,17</sup> and rescued learning and memory function.<sup>18</sup> In a mouse model of PD, MgT administration for 4 weeks elevated cerebrospinal fluid magnesium levels and attenuated motor deficits and dopamine neuron loss compared to those treated with magnesium sulfate.<sup>19</sup> In an animal study of alcohol-mediated diseases, chronic plus binge alcohol-fed mice who were treated with MgT showed significant improvements in memory and relieved gut-brain axis dysfunction by reshaping the gut microbiota, improving inflammation in the gut, and enhancing glutamate and amino acid metabolism.<sup>20</sup>

Several animal studies indicate MgT as the superior form of magnesium in supporting a balanced mood and memory. In a dose-dependent comparative study, healthy rats who were orally treated with MgT showed more significant improvements in memory and decreased depression-like symptoms compared with magnesium chloride and magnesium sulfate, highlighting that 100 mg/kg (6.2 mg/kg human equivalent) was the most appropriate dose for strengthening the cholinergic system by attenuating oxidative burden.<sup>21</sup> In rats who were injected with medication that induced short-term memory deficits and anxiety- and depression-like behaviors, chronic oral administration of MgT prevented oxaliplatin-induced memory and emotional deficits by normalizing TNF-α and nuclear factor-kappa B (NF-κB) signaling.<sup>22</sup> Likewise, in a female rat model of medication-induced cystitis, bladder-pain syndrome and magnesium deficiency, 604 mg/kg of MgT per day (the human equivalent of 97 mg/kg) in drinking water attenuated depressive-like behaviors, memory deficits, and pain by inhibiting TNF-α and NF-κB signaling.<sup>23</sup> Furthermore, chronic oral MgT significantly prevented or reversed chronic pain, memory and emotional deficits in ovariectomized female rats by normalizing neuroinflammation, synaptic potentiation, and magnesium deficiency.<sup>24</sup>

**Recommended Use:** Take 3 capsules per day or as directed by your health-care practitioner. (Divided dosing recommended.)

For a list of references cited in this document, please visit:

<https://www.designsforhealth.com/api/library-assets/literature-reference---neuromag-tech-sheet-references>

Dosing recommendations are given for typical use based on an average 150 pound healthy adult. Healthcare practitioners are encouraged to use clinical judgement with case-specific dosing based on intended goals, subject body weight, medical history, and concomitant medication and supplement usage.

**Magtein® is a registered trademark of Magceutics®, Inc. and is patented under U.S. Patents 8,178,118; 8,142,803; 8,163,301; and other pending patents. Magtein® is distributed exclusively by AIDP, Inc.**

**\*These statements have not been evaluated by the Food and Drug Administration. This product is not intended to diagnose, treat, cure, or prevent any disease.**

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