



*Cognitive Vitality Reports® are reports written by neuroscientists at the Alzheimer's Drug Discovery Foundation (ADDF). These scientific reports include analysis of drugs, drugs-in-development, drug targets, supplements, nutraceuticals, food/drink, non-pharmacologic interventions, and risk factors. Neuroscientists evaluate the potential benefit (or harm) for brain health, as well as for age-related health concerns that can affect brain health (e.g., cardiovascular diseases, cancers, diabetes/metabolic syndrome). In addition, these reports include evaluation of safety data, from clinical trials if available, and from preclinical models.*

## Lion's Mane Mushroom

### Evidence Summary

Preclinical evidence and one small pilot study suggest that lion's mane may provide benefit to individuals with Alzheimer's disease, but the 2009 pilot has yet to be replicated.

**Neuroprotective Benefit:** Promising results from one pilot trial and preclinical studies, but the results have not been replicated.

**Aging and related health concerns:** Preclinical studies have shown that lion's mane appears to protect against oxidative stress and inflammation and also positively affects blood glucose, triglycerides and cholesterol in animal models of diabetes.

**Safety:** Small clinical studies suggest that lion's mane is safe for consumption with the most common adverse effect being gastrointestinal problems.



**What is it?** Lion's mane mushroom (also known as Yamabushitake or *Hericium Erinaceus*) is a unique-looking edible mushroom, often found in East Asian cuisines and used in traditional Chinese medicine. It grows in North America, Europe and Asia. Like many mushrooms, Lion's Mane Mushroom is composed of two main components: a fruiting body, which is what we generally recognize as the mushroom, and mycelia, which are akin to the "root" of the mushroom. Lion's mane mushroom contains a large number of bioactive components and secondary metabolites that have been promoted for healthy benefits ranging from antibiotic, anti-inflammatory, anti-carcinogenic, and neuroprotective properties ([Friedman 2015](#)).

**Neuroprotective Benefit:** Promising results from one pilot trial and preclinical studies, but the results have not been replicated.

Types of evidence:

- 0 meta-analyses or systematic reviews
- 1 pilot randomized, controlled clinical trial in mild cognitive impairment
- Reports of 3 other clinical trials in Japan
- Several laboratory studies

Human research to suggest prevention of dementia, prevention of decline, or improved cognitive function?

One small, double-blind, placebo controlled clinical trial was conducted in Japan by a company that sells mushrooms with 29 adults aged 50-80 that had been diagnosed with mild cognitive impairment. The results over a 16-week period showed that the group that consumed 3 grams of lion's mane extract in pill form each day performed significantly better on the HDS-R cognitive test than the placebo group. Despite a positive trend, this effect was blunted by 4 weeks after discontinuing the supplement. ([Mori et al, 2009](#)).

Human research to suggest benefits to patients with dementia

One open-label study described in a review (Kawagishi 2008) followed 7 patients diagnosed with Alzheimer's disease or cerebrovascular dementia that were given 5 grams of lion's mane powdered mushroom in their soup, daily for 6 months. According to the review, 6 out of 7 patients had improvements in their perceptual capacity, while all 7 patients showed improvements in functional independence. 3 bedridden patients were able to get up for meals after treatment. The results of the original study, however, are not accessible or available. The study was also an open-label study.



*Mechanisms of action for neuroprotection identified from laboratory and clinical research*

Lion's mane is often purported to promote NGF synthesis. Such effects have been reported in cell culture and in a mouse model (e.g., [Tsai-Teng 2016](#)) but the mouse study used a very high dose (5% of the diet). Also, if NGF were the mechanism of action, the effects on cognition reported above in the MCI patients would likely be sustained. Several other mechanisms of action have been reported. Lion's mane prevented cognitive decline in mice that had been injected with Abeta (25-35). ([Mori et al, 2011](#)). In another mouse model of Alzheimer's disease, treatment with lion's mane decreased amyloid plaque burden, promoted expression of an enzyme that can degrade Abeta (insulin-degrading enzyme), increased the ratio of active NGF:precursor NGF, increased neurogenesis and lessened the decline on normal daily living activities of mice ([Tsai-Teng 2016](#)). Lion's mane or an extracted molecule (Erinacine A), has also been reported to increase NGF expression and secretion, lower inflammation, prevent amyloid beta toxicity, protect against ER stress, increase myelination, and protect against oxidative stress. ([Kuo 2016](#); [Chen 2016](#); [Mori et al, 2008](#); and [Kolotushkina 2010](#)) It does not seem to have been confirmed that the erinacine extracts can penetrate the brain.

*APOE4 interactions:*

None found.

**Aging and related health concerns:** Preclinical studies have shown that lion's mane appears to protect against oxidative stress and inflammation and positively affects blood glucose, triglycerides and cholesterol in animal models of diabetes.

*Types of evidence:*

- No clinical research
- Preclinical studies on rodent models of stroke, diabetes, and cancer. No studies on lifespan.

*Details:*

Use of lion's mane or Erinacine A, a compound extracted from the mushroom, protected neurons and reduced infarct volume after induced stroke in mice, and also reduced oxidative stress and inflammation ([Lee et al, 2014](#)). In rodent models of diabetes, treatment with lion's mane has also shown to be effective against inflammation in the brain, liver oxidative stress, the misfolded protein response and in lowering blood glucose, weight gain and triglyceride ([Trovato 2016](#), [Jang 2010](#), [Liang et al, 2013](#), [Wang 2004](#) and [Hiwatashi et al, 2010](#)). Preclinical studies also suggest that lion's mane may have anti-cancer properties ([Khan et al, 2013](#)).



**Safety:** Small clinical studies suggest that lion's mane is safe for consumption with the most common adverse effect being gastrointestinal problems.

Types of evidence:

- Two small clinical trials

*Details.*

Two small clinical trials demonstrated that taking up to 3 grams per day of lion's mane extract over 16 weeks did not appear to have any adverse health effects on patients, as measured by a complete blood profile and patient evaluation ([Mori et al, 2009](#)). A quarter of the patients in the study experienced mild stomach discomfort not requiring medical attention ([Mori et al, 2009](#)). Toxicology studies performed in rodents have demonstrated that at least 5 grams per day appears to be safe ([Li 2014](#) and [Park 2008](#)).

**Sources and dosing:**

Numerous sources sell supplements of lion's mane mushroom, yamabushitake or hericium erinaceus (fruiting body or mycelium or both) either alone or in combination with other mushrooms, ginseng (MUNOPHIL), or even lion's mane that has been cultured on oats or other grain. The supplements range from a few hundred mg/serving to up to 2 g/dose. Most recommend about 1 gram per day for dosage. This is lower than the dosage used in the 2 small clinical trials in humans.

**Research underway:**

There do not appear to be any clinical trials currently in progress.

**Search terms:**

Pubmed:

Google or other?

- Lion's Mane Mushroom
- Yamabushitake
- Hericium Erinaceus
- All of the above + Alzheimer's
- All of the above + MCI
- All of the above + cognition
- Erinacine + pharmacokinetic or bioavailability

Clinicaltrials.gov

- Yamabushitake



- Lion's Mane
- Hericium Erinaceus
- Mushroom

Japanese Clinical Trial Site

- Yamabushitake
- Lion's Mane
- Erinacine

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*If you have suggestions for drugs, drugs-in-development, supplements, nutraceuticals, or food/drink with neuroprotective properties that warrant in-depth reviews by ADDF's Aging and Alzheimer's Prevention Program, please contact [INFO@alzdiscovery.org](mailto:INFO@alzdiscovery.org). To view our official ratings, visit [Cognitive Vitality's Rating page](#).*