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Could Lion's Mane Be Helping Your Memory?

Health fads have become a mainstay of popular culture in modern times. Now adays, it is common to see celebrities, influencers, nutritionists, holistic healers, doctors, and the like promoting “health hacks” such as diets, superfoods, and health supplements on their platforms. One fad that has entered this sphere of popular influence is mushroom supplements. Specifically, those containing *Hericium erinaceus* – lion’s mane. Numerous influencers across major platforms have endorsed taking lion’s mane for an array of health benefits including immune and gut health, improved memory and focus, and sexual health. But as is often the case, what online personalities or public figures may present as simple, surefire ways to improve your health may have nothing to do with what the scientific consensus is at all.

Mushroom supplements draw their origins back to traditional eastern medicine, where mushrooms such as lion’s mane were often used to treat an array of ailments including insomnia, anxiety, indigestion, cancer, and memory loss to name a few. But the question of whether modern science backs these practices is still to be seen. This essay calls into question the supposed health benefits humans can experience from consistently taking lion’s mane as a health supplement or ingesting these mushrooms as food. Through the evaluation of peer-reviewed research and public discourse, I aim to parse fact from fiction and to reveal what scientific evidence there is supporting (or weakening) the argument for using lion’s mane as a health supplement.

Lion’s mane has emerged in popular culture through several avenues. Scientist celebrity and fungi expert Paul Stamets has touted the theorized benefits of lion’s mane on multiple platforms, none more notable than *The Joe Rogan Experience* a podcast that reaches hundreds of millions of listeners every episode. In this episode, Stamets and Rogan cover *a lot* of ground discussing different types of fungi and mushrooms, and a good portion of that was focused on lion’s mane and its potential benefits for humans. Lion’s mane is also a popular ingredient in trendy, often exorbitantly expensive superfood drinks and supplements such as *Thesis* supplements, *Ryze Superfood*, and *Mudwater*, all of which are frequent advertisers on social media. The promises behind these products are always the same: healthy skin, mental clarity, energy, immune boosts, focus and more. Superfood supplements are incredibly popular on social media today; and the influence that these brands have over the public’s perception of supplements such as lion’s mane is immense as there are seldom other ways in which the public interacts with lion’s mane.

Of all the supposed health benefits of taking lion’s mane that circulate our airspace, it seems that the most researched effect of these mushrooms is related to our memory and cognitive function. There is reason to believe through both historical and scientific evidence that lion’s mane can stimulate ~~growth~~ growth, regrowth, and protection of our nerves and brain cells. This has many implications, but none more significant than the potential for these effects to defend against age-based memory disorders such as dementia and Alzheimer’s. Our best understanding of how these mushrooms improve our cognitive health and resilience comes down to two bioactive compounds found in lion’s mane: hericerins and erinacines. These compounds - when ingested - regenerate myelin on the axons of nerves which insulates the nerve connections and increases the rate at which electrical impulses pass along between neurons (Stamets).

Numerous studies have been conducted on this topic, and the data is interesting. A study conducted in 2002 by scientists in Japan exposed a rat’s adrenal cells to the extracts of lion’s mane mushroom. The cells reacted to the lion’s mane by growing faster and larger normal (Park

et al.). Cells that no longer a part of a living organism's body were introduced to lion's mane as well, and these grew even more rapidly than cells that were still within a healthy, living body. This study was published relatively early in the history of lion's mane research, and several more recent studies have used these findings in their own research to dive further into this topic. One such study, published in 2017 by the National Library of Medicine, found that providing mice with dietary supplementation of lion's mane increased hippocampal neurotransmission and recognition memory. In this study, mice were fed mushrooms for two months and then observed while they performed memory tests (Brandalise et al.). The study showed that the mice who were fed the lion's mane were drawn more towards new items in the tests, suggesting that they were recalling the old items better than the mice who were not fed lion's mane, and perhaps that the compounds introduced in the lion's mane provided this cognitive boost (SciShow). If the results of these pre-clinical, rodent focused studies were yielded from clinical trials in which humans were the test subjects, it would be relatively clear that lion's mane may indeed improve cognitive health and function in humans. However, clinical studies are required to find out if that is the case or not.

This brings us to another study conducted by a team of researchers headed by Kimio Kukushima in 2019 in which the researchers designed a double-blind, parallel-group, placebo-controlled trial for 30 middle-to-old age Japanese men and women diagnosed with mild cognitive impairment. Test subjects were split into two groups at random. The members of one group were fed one 650 mg capsule of lion's mane per day over the first 12 weeks of the trial, and the others were given a placebo over that duration. The study examined the efficacy of lion's mane health supplements by measuring the cognitive function of the test subjects using a cognitive function scale over the final four weeks of a 16-week trial. The results of this study found that the subjects who were fed lion's mane improved their scores on the cognitive function scale significantly more than the subjects who were fed the placebo (Kikushima et al.). However, it is possible that the data is biased. Because both the placebo and the active groups displayed an increase in their cognitive scores, there is a potentiality for the data to be skewed by the learning effect – a bias in which the test subject's improved scores are more a product of them learning and remembering the test rather than improving their scores because of the lion's mane (Stanfield). Still, the margin between the active group's scores and the placebo group's scores was statistically significant which is compelling. All in all, this study does provide gripping evidence in support of lion's mane's efficacy, but it still leaves room for doubt in the debate of whether lion's mane poses real benefits to human cognition.

One last study I want to discuss is a similar double-blind, placebo-controlled test measuring the neurocognitive effects of lion's mane specifically pertaining to cognitive function and memory. However, a key difference between this study and Kikushima's is that the timescale of this study is 49 weeks rather than 16. Lengthening the period of the trial is a promising idea as it gives more time for the potential effects of the lion's mane to appear in the data. The study results found that there was only a significant improvement in the Mini-Mental State examination (the cognitive exam used to scale their results) score in the lion's mane group. However, looking closer again at the data, the differences are negligible in practice, and not clinically relevant (Steinfeld). Furthermore, in this trial they conducted numerous other tests in which the data was not statistically significant which in all likelihood diminishes the significance of the one set of positive data. All in all, it is unclear based off these two clinical trials whether lion's mane supplements improve cognitive health in humans. The data shows interesting

signals, but nothing definitive, and it lacks robust human data showing that lion's mane improves brain function.

The overall outcome of all these studies is nuanced. There is relatively strong data for both the efficacy and inefficacy of taking lion's mane supplements for cognitive health. However, the short timescale of these studies examines the use of lion's mane more as a remedy rather than a preventive measure. With this in mind, it is true that the advertised effects of lion's mane supplements are misrepresentative of the scientific data behind these mushrooms. We would stand to learn much if future studies were conducted over even longer timescales, and with more diverse demographics to explore other possible avenues for these mushrooms to benefit our neurocognitive health. In my research for this paper, I noticed a discourse forming amongst the researchers publishing in this field. From around 2014 till 2021, there seemed to be a new study published each year that builds off the previous year's findings. Yet, there is a lack of meta-analysis on this topic that corroborates evidence and identifies patterns across these studies. This type of synthesis might also lead to new points of inquiry regarding lion's mane supplements. Despite the relatively muddled scientific data on whether lion's mane supplements provide cognitive health benefits, there are still myriad other ways in which lion's mane has been used. A long-standing tradition of using lion's mane in eastern medicine and current public opinion further suggest the need for more research on this mushroom. But until those studies are conducted, the science will remain unclear whether these products benefit our health in any way.

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