

A Review of Recent Medicinal/Culinary Mushroom Scientific Reports and
Moving Beyond Anecdotes: A Proposal for a Medicinal Mushroom Database
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ABSTRACT

This review covers the highlights of 180 peer-reviewed medicinal/culinary mushroom papers published primarily between 2018 and early 2024. The publications reflect a growing scientific interest in the still understudied potential of mushrooms to provide a source of new drugs. Simultaneously the under twelve minute 2011 TEDMED by Paul Stamets about four medicinal mushrooms has had over 233,000 views and inspired a strong public interest in both the use of culinary mushrooms as a part of a healthy diet, and experimentation with medicinal mushrooms by people suffering from illness. We need to collect this growing wealth of anecdotes in the hope that it can guide wise mushroom use in the future. Consequently, the NAMA Medicinal Mushrooms Committee has begun development of a central reporting system for gathering these anecdotal reports of medicinal/culinary mushroom use. A clinical trial of the health benefits of using medicinal/culinary mushrooms will never happen because trials are expensive (tens of millions to a billion dollars), and no drug company has anything to gain from funding a medicinal/culinary mushroom trial. The proposed Medicinal Mushroom Committee database, like the now over 50 year-old NAMA mushroom poisoning database, would be used by the Medicinal Mushroom Committee chair or a designated committee member to create and publish an annual review of Medicinal/Culinary mushroom use, and hopefully also publish ten-year summary reports. My hope is that the database will serve mushroom enthusiasts and scientists like the now invaluable toxicology database has.

INTRODUCTION

The NAMA Medicinal Mushrooms Committee has begun development of a central reporting system where individuals can obtain a form (either on-line or via a mail-in form) where they can record what culinary mushrooms they eat (both species and frequency) and if they have used medicinal mushrooms, what was the purpose and what was the results? It will be a form like the North American Mycological Association (NAMA) toxicology reporting form used for mushroom poisonings since 1974. The chair of the Toxicology Committee uses the NAMA toxicology database to publish summaries of poisoning cases in a manner protective of the individual's identity. The reports appear in the journal *McIlvainea* and form a source for other researchers publishing about mushroom toxicity. The proposed Medicinal Mushrooms Committee database would serve as the data source for Medicinal Mushroom Committee members authoring papers published in *McIlvainea* (and elsewhere) on the utilization of culinary and medicinal mushrooms in North America.

A clinical trial of the health benefits of using medicinal/culinary will never happen because a clinical trial can cost up to a billion dollars, and no drug company has anything to gain from funding a medicinal/culinary mushroom trial. I see the database as one major step that NAMA can make in informing the public about wise culinary and medicinal mushroom use. Anecdotes about medicinal mushroom use already exist and their collection and vetting by the Medicinal Mushroom Committee will

be an enormous public and scientific service. The publication of annual reports of the vetted material from the database will help guide future scientific research and wise use of fungi by the public.

In this article I review *in vitro* and *in vivo* animal trials that have shown the promise of medicinal/clinical mushrooms for a wide range of human ailments. Based on anecdotal reports I have personally gathered so far; I also propose a small “do no harm” change in medical practice. I propose that doctors should support starting medicinal/culinary mushrooms at the initial detection of diseases like cancer, diabetes, or neurological problems. If mushrooms are working, it will usually be evident within thirty to sixty days. Since it often takes thirty to sixty days to do the genetic analysis and stage a cancer, this initial trial of mushrooms would often not delay more invasive medical procedures. No other treatment may be necessary. If I am correct, we can save lives often without the risks of surgery and devastating effects of chemoradiation. The risk of harm from trying medicinal/culinary mushrooms is extremely low, the costs exceptionally low.

The time has come to seriously examine whether fungi have a key role to play not only in the diet of healthy people, but also in medicine. Using the search engine Ebscohost, a powerful intuitive online research platform that utilizes thirty platforms including Academic Search Complete, I searched for refereed reports covering medicinal mushrooms in general and then for reports covering the most well-known medicinal mushrooms out of the 270 fungal species now considered to be of medicinal interest. I set the parameters for peer reviewed papers published in the last five years. I searched for papers that included the following fungi in the title: *Agaricus*, *Armillaria mellea*, *Cordyceps*, *Fomitopsis officinalis*, *Ganoderma lucidum*, *Grifola frondosa*, *Hericium erinaceus*, *Inonotus obliquus*, *Lentinula edodes*, *Pachyma hoelen* (= Chinese *Poria cocos*), *Pleurotus*, *Trametes versicolor*, and *Tremella fuciformis*. I also searched for “medicinal fungi.” I separated the publications included in the References section first into the publications that are either reviews or cover multiple species, then I present each medicinal species in alphabetical order. Researchers should consider either Hobbs, Christopher. 2020. *Medicinal Mushrooms: The Essential Guide*. North Adams, MA: Storey Publishing or Rogers, Robert Dale 2020. *Medicinal Mushrooms: The Human Clinical Trials*. Troutdale, OR: WMC Publishing for papers published more than five years ago. I also have not included papers on psilocybin or psilocin since they are already widely recognized as having high medicinal value and I have spoken and written widely about their exceptional value in treating depression; curbing abusive behavior including alcohol abuse and spousal abuse; providing a non-addictive path to stopping smoking; a path out of our national opioid crisis; and a way to increase compassionate behavior.

DISCUSSION

My focus has been on exploring mushroom use in the treatment of cancer and neurological diseases. Gariboldi (2023) provides an excellent review on the “Anti-cancer Potential of Edible/Medicinal Mushrooms in Breast Cancer.” The authors review *in vitro* studies, *in vivo* studies, and clinical studies. They predict that due to increasingly western lifestyles including “delayed pregnancies, reduced breastfeeding, low age at menarche, lack of physical activity, and poor diet” new global breast cancer cases will increase from 2.3 million cases per year to 2.7 million by 2030. Their review covers all the most extensively researched medicinal/culinary mushrooms and extracts of those fungi. They provide insight into the mechanisms through which those fungi exert antitumor effects as well as the effect of dietary consumption on breast cancer risk. The glass is no longer simply half full or half empty (Smith 2020). Panda (2022) in their abstract note that “Approximately 270 species of mushrooms have been reported as potentially useful for human health. However, few mushrooms have been studied for bioactive compounds that can be helpful in treating various diseases.” Stunningly, they observe (only slightly incorrectly) that “over 60% of anticancer drugs can be traced to natural products, but none so far originate

from a mushroom.” The Rokos (2023) review focuses on HPV infection and associated cancer but is also of broad interest due to its focus on the role of infectious events, notably virus infections as a cause of cancer. We are increasingly learning to appreciate the broad applications of fungi in fighting viral infections including Covid. Hetland (2020) provides an excellent exploration of anti-tumor, anti-inflammatory, and antiallergenic effects of *Agaricus subrufescens* (as *A. blazei*), *Hericium erinaceus*, and *Grifola frondosa*. They discuss the varied antitumor mechanisms including direct tumor attack through apoptosis and metastatic suppression; indirect tumor neovascularization and T helper cell (Th)1 immune response and the anti-inflammatory mechanisms that include a reduction in proinflammatory cytokines, oxidative stress and (importantly) changed gut microbiota; plus, an antiallergic mechanism via an amelioration of a skewed Th1/Th2 balance. It is this very package that has convinced me that we should not be searching for one magic bullet to extract from a fungus and use as medicine and should instead be using the entire arsenal provided by the whole fungus. I know from my 50 years of work on the NAMA toxicology committee that edible mushrooms are incredibly safe, especially at the low one to eight grams (about one-eighth to one teaspoon) doses used in trying to cure cancer and neurological diseases. For the past fourteen years I have been following individuals using mushrooms to combat prostate, breast, colon, lung, and skin cancer (including myself). Yes, what I have been gathering are just anecdotes, but I must sharply disagree with the position of Bakitis (2022) that anecdotes have no value. Do not discard anecdotes out of hand. To achieve a broad audience for my collection of anecdotes, I have submitted a separate paper to Fungi magazine. That paper highlights just ten of the references and presents the anecdotes that together have convinced me that whole mushrooms are able to arrest cancer as well as or better than the best current medical practices.

I have been an advocate since May of 2022 for a 77 year-old Caucasian woman diagnosed with inoperable, incurable stage IIIB lung cancer detected not because of any symptoms but from a swollen supraclavicular lymph node. Forty-five days after starting eight grams per day of turkey tail mycelium on myceliated rice (Host Defense Turkey Tail capsules), and ten days before starting therapy recommended by her oncologist, her swollen supraclavicular lymph node had decreased in size by 20%. Her oncologist discontinued all but mushroom therapy after nine days due to an adverse reaction to the drug. A second drug also produced a severe adverse reaction. In March of 2024, after twenty-one months using medicinal mushrooms, she remains asymptomatic (for lung cancer). In the only side effect of the mushrooms, she is not in pain after twenty years of chronic pain that had destroyed her quality of life. I am in utter disbelief. I plan to submit a case report for publication in a reviewed medical journal. I changed from a doubter of the promise of medicinal mushrooms to an advocate for continued experimentation, but with better record keeping.

If you are using medicinal mushrooms, and even culinary mushrooms do everything in moderation. One man over-indulged in chaga tea and built up sufficient levels of oxalic acid over years to destroy his kidneys leading to his early death (Lee, 2020). Chaga (and other long-lived polypores) can accumulate radioactive potassium forty as well as heavy metals. Cordyceps, already a source for two important drugs, can have powerful effects on the heart that can be beneficial at the right dose, but potentially deadly if not used with care (Valdez-Solana 2022). Shiitake is the source of Lentinan, an anti-cancer drug used in Japan (Aldwinckle 2020). In ten percent of the population, lentinan produces a rash that in severe cases is known as shiitake flagellate dermatitis because the appearance of the extremely painful long-lasting rash is like that of someone after a severe whipping.

CONCLUSION

Interest in both culinary and medicinal mushrooms has soared in the past decade spawning both growing scientific interest and public interest. I have gathered the most interesting recent culinary/medicinal mushroom publications, that I hope will guide further research. Now NAMA is preparing to gather and vet anecdotes on the potential health effects of mushrooms.

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Agaricus

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