

## Medicinal Mushrooms: Modern Clinical Uses Overview

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Many clinically useful modern drugs we take for granted such as digitoxin, aspirin, human estrogen, progesterone, cortisone, and morphine come directly or indirectly from higher plants. Less well known are the important and lifesaving drugs from fungi, which include many antibiotics such as penicillin and cyclosporin and the ergot alkaloids.

In the last 20 years or so, awareness of the importance of proper immune function for maintaining health has steadily increased. Diseases involving immune dysfunction including cancer, AIDS/HIV, chronic fatigue syndrome, hepatitis, and autoimmune conditions are coming to the forefront and are diagnosed frequently, receiving special interest among medical researchers and clinicians alike. As a consequence, researchers have taken a closer look at the kingdom Fungi because of the traditional clinical use for immune disorders that some of its members enjoy.

In China, a published *Fungi Pharmacopeia* drawn from ancient knowledge at least 2000 years old describes more than 100 species of mushrooms used by practitioners of traditional Chinese medicine, including *Ganoderma lucidum* (Curt.: Fr.) P. Karst., *Trametes versicolor* (L.: Fr.) Lloyd, *Wolfiporia cocos* (Schw.) Wolf., *Auricularia auricula-judae* (Bull.) Wettst., *Cordyceps* sp., and *Dendropolyporus umbellatus* (Pers.: Fr.) Jül.

While Western cultures are not as prolific in their praise or utilization of medicinal mushrooms over the millenia, still, some species have

been used by clinicians. One must first consider *Fomes officinalis* (Vill.: Fr.) Bond. et Sing., the quinine conk, which was commonly sold in pharmacies as an official drug in Europe for many centuries, along with *Inonotus obliquus* (Pers.: Fr.) Bond. et Sing. and *Auricularia auricula-judae*.

Currently, numerous mushroom products are utilized internationally by holistically oriented physicians, herbalists, naturopathic physicians, chiropractors, acupuncturists, and Chinese herbal practitioners in a clinical setting.

I briefly review the history of use of more than 30 species of medicinal mushrooms, and present a summary of the current state of modern evidence for the effectiveness and safety of the most common clinically used species such as *Lentinus edodes* (Berk.) Sing., *Ganoderma lucidum* (Leyuss.) P. Karst., *Trametes versicolor*, *Cordyceps sinensis* (Berk.) Sacc., *Grifola frondosa* (Dicks.) Gray, *Agaricus blazei* Murr., and their various derivatives and extracts.

Clinical efficacy of mushroom extracts depends on discovering their precise scope of activity verifiable through *in vitro* and *in vivo* tests and human clinical trials, dose range, extraction methods, source of the raw material (i.e., fruiting bodies or mycelium grown on varying substrates), duration and frequency of administration, and accuracy in matching the extract to each particular patient based on traditional or modern diagnostic methods.