

## Mushrooms – From Cuisine to Clinic

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While sautéed Portobello mushrooms are popular as side-dishes and are a key ingredient in many main-course recipes, the possibility that mushrooms could be used to treat human diseases is viewed with suspicion by many Westerners, including Portobello-loving Italians. Yet, mushrooms have been used for centuries by Asian people to improve health and enhance longevity.

Recent studies indicate that mushrooms such as *Ophiocordyceps sinensis*, *Ganoderma lucidum*, *Agaricus blazei* Murrill, and *Antrodia cinnamomea* produce a broad range of beneficial effects on cultured cells, laboratory animals, and humans. They protect against infection, cancer, diabetes, and liver damage; they enhance energy and lower cholesterol levels.<sup>[1-3]</sup> In addition, the more common white button mushroom (*Agaricus bisporus*), available in major supermarkets throughout the world, can enhance natural killer cell activity<sup>[4]</sup> and reduce breast cancer risk.<sup>[5]</sup>

From the perspective of Western medicine, it is worth noting that various bioactive compounds have been isolated from fungi, including the antibiotic penicillin, the immunosuppressant compound cyclosporin, and the cholesterol-lowering drug lovastatin. In addition, more than 30 mushroom extracts and fungal compounds are currently being investigated in clinical trials by the National Institutes of Health in the US.<sup>[6]</sup> Given that only about 10% of fungi have been studied so far, and few of them have been characterized with regards to health benefits, it is likely that new active fungal compounds will be discovered in the future.

In this issue of *Biomedical Journal*, Paterson and Lima<sup>[7]</sup> suggest that Asian countries have a head start in the study of medicinal mushrooms, compared to the rest of the world. For instance, the Chinese pharmacopeia lists more than 100 mushroom species for medicinal use, and fungal polysaccharide extracts have been used for over three decades as an adjuvant in



cancer chemotherapy in Japan, China, and South Korea. Paterson and Lima describe in detail the beneficial properties of mushrooms on human health, focusing mainly on immunomodulatory and anticancer activities.

In the second featured article,<sup>[8]</sup> Wasser describes the wide variety of medicinal mushrooms and emphasizes their extensive range of biological effects, summarizing information about 700 species of mushrooms and their bioactive compounds. The author notes that around 400 clinical trials have been performed to evaluate the effects of fungal extracts and compounds on various diseases, and more than 50,000 scientific studies and 15,000 patents on medicinal mushrooms have been produced so far. Wasser summarizes the results of these studies and goes on to describe the unsolved challenges in the field, such as issues related to the classification and standardization of fungal extracts.

With interest in medicinal mushrooms being on the rise in recent years in both East and West, we expect that this topic will attract the attention of researchers and clinicians of a broad range of backgrounds. With this information in mind, it might also be tempting to add more shiitake and chanterelle to the dishes on our plates.

## REFERENCES

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