



Ganoderma lucidum

Ganoderma lucidum, an oriental fungus has a long history of use for promoting health and longevity in China, Japan, and other Asian countries. It is a large, dark mushroom with a glossy exterior and a woody texture. The Latin word *lucidus* means “shiny” or “brilliant” and refers to the varnished appearance of the surface of the mushroom. In China, *G. lucidum* is called lingzhi, whereas in Japan the name for the Ganodermataceae family is reishi or mannentake. In Chinese, the name lingzhi represents a combination of spiritual potency and essence of immortality, and is regarded as the “herb of spiritual potency,” symbolizing success, well-being, divine power, and longevity. Among cultivated mushrooms, *G. lucidum* is unique in that its pharmaceutical rather than nutritional value is paramount. A variety of commercial *G. lucidum* products are available in various forms, such as powders, dietary supplements, and tea. These are produced from different parts of the mushroom, including mycelia, spores, and fruit body. The specific applications and attributed health benefits of lingzhi include control of blood glucose levels, modulation of the immune system, hepatoprotection, bacteriostasis, and more. The various beliefs regarding the health benefits of *G. lucidum*



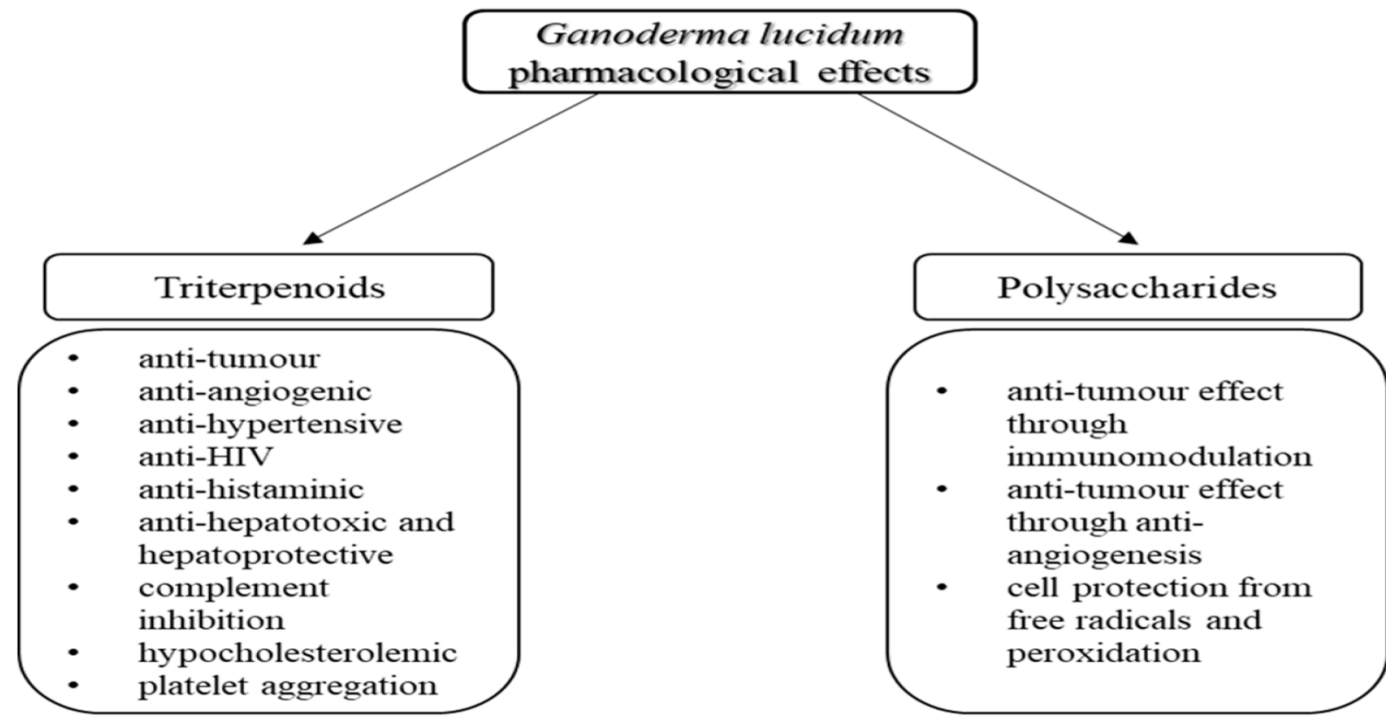
The mushroom has been recognized as a medicinal mushroom for over 2000 years, and its powerful effects have been documented in ancient scripts. Wild lingzhi is rare, and in the years before it was cultivated, only the nobility could afford it. It was believed that the sacred fungus grew in the home of the immortals on the “three aisles of the blest” off the coast of China. Nevertheless, the *Ganoderma* species continue to be a popular traditional medicine in Asia and their use is growing throughout the world . Owing to its irregular distribution in the wild and to an increasing demand for *G. lucidum* as a medicinal herb, attempts were made to cultivate the mushroom . Different members of the *Ganoderma* genus need different conditions for growth and cultivation .



Anti-tumor effects of *Ganoderma lucidum* (reishi) in inflammatory breast cancer in in vivo and in vitro models

The medicinal mushroom *Ganoderma lucidum* (Reishi) was tested as a potential therapeutic for Inflammatory Breast Cancer (IBC) using in vivo and in vitro IBC models. IBC is a lethal and aggressive form of breast cancer that manifests itself without a typical tumor mass. Studies show that IBC tissue biopsies overexpress E-cadherin and the eukaryotic initiation factor 4G1 (eIF4G1), two proteins that are partially responsible for the unique pathological properties of this disease. IBC is treated with a multimodal approach that includes non-targeted systemic chemotherapy, surgery, and radiation. Because of its non-toxic and selective anti-cancer activity, medicinal mushroom extracts have received attention for their use in cancer therapy. Previous studies demonstrate these selective anti-cancer effects of Reishi, where IBC cell viability and invasion, as well as the expression of key IBC molecules, including eIF4G is compromised. Thus, herein we define the mechanistic effects of Reishi focusing on the phosphoinositide-3-kinase (PI3K)/AKT/mammalian target of rapamycin (mTOR) pathway, a regulator of cell survival and growth. The present study demonstrates that Reishi treated IBC SUM-149 cells have reduced expression of mTOR downstream effectors at early treatment time. The medicinal mushroom *Ganoderma lucidum* (Reishi) was tested as a potential therapeutic for Inflammatory Breast Cancer (IBC) using in vivo and in vitro IBC models, as we observe reduced eIF4G levels coupled with increased levels of eIF4E bound to 4E-BP, with consequential protein synthesis reduction. Severe combined immunodeficient mice injected with IBC cells treated with Reishi for 13 weeks show reduced tumor growth and weight by ~50%, and Reishi treated tumors showed reduced expression of E-cadherin, mTOR, eIF4G, and p70S6K, and activity of extracellular regulated kinase (ERK1/2).

SOURCE: www.ncbi.nlm.nih.gov/pubmed/23468988



Effect of *Ganoderma lucidum* Powder on Oxidative Stability, Microbial and Sensory Properties of Emulsion Type Sausage

A study was done to investigate the oxidative stability, microbial and sensory properties of sausage at three different treatments; (i) 1% w/w *Ganoderma lucidum* powder (GLP) without nitrite as a food preservative (P), (ii) 0.5% w/w GLP with 80 ppm nitrite (N + P), and (iii) sausage with 120 ppm nitrate (N). Lipid oxidation was evaluated using peroxide value (PV) and thiobarbituric acid reactive species. Antimicrobial properties were assessed by total plate count (TPC), yeasts and molds, coliforms, *Clostridium perfringens*, and *Staphylococcus aureus*. Sensory assessment was evaluated by nine-point hedonic procedure. Samples in N + P treatment showed lower PV than other treatments at the storage period with no significant difference in 2-thiobarbituric acid (TBA) between N and N + P. The P group showed the highest TBA value ($P < 0.01$). TPC remained below maximal permissible limit recommended by ISIRI during 30 days of storage in all sausage formulations (6.9798 log CFU). There was not found any coliforms bacteria, *Clostridium perfringens*, and *S. aureus*. The sensory evaluation indicated that there is no significant difference between samples in texture, taste, and smell. The color and overall acceptability of N group were higher and N + P group was closer to N group.. The results suggest that *G. lucidum* powder might be considered as a potential natural preservative for meat products

.SOURCE: www.ncbi.nlm.nih.gov/pmc/articles/PMC5840970



Neuroprotective Effects of *Ganoderma lucidum* on Spinal Cord Injury

Traumatic injury to the spinal cord results in the delayed dysfunction and neuronal death. Impaired mitochondrial function, generation of reactive oxygen species (ROS), and lipid peroxidation occur soon after traumatic spinal cord injury (SCI), while the activation of compensatory molecules that neutralize ROS occurs at later time points. A study was done to investigate the putative neuroprotective effect of *Ganoderma lucidum* in a rat model of SCI. In order to induce SCI, a standard weight-drop method that induced a moderately severe injury (100 g/cm force) at T10, was used. Injured animals were given either 20 mL/kg *Ganoderma lucidum* or saline 30 min post injury per day by gastric gavage. At seven days postinjury, rats were decapitated. Spinal cord samples were taken for histological examination or determination of malondialdehyde (MDA) and glutathione (GSH) levels, myeloperoxidase (MPO) activity. SCI caused a significant decrease in spinal cord GSH content, which was accompanied with significant increases in MDA levels, MPO activity. On the other hand, *Ganoderma lucidum* treatment reversed all these biochemical parameters as well as SCI-induced histopathological alterations. Furthermore, impairment of the neurological functions due to SCI was improved by meloxicam treatment. The present study suggests that *Ganoderma Lucidum*, reduces SCI-induced oxidative stress and exerts neuroprotection by inhibiting lipid peroxidation, GSH depletion.

SOURCE: scielo.conicyt.cl



Ganoderma Lucidum Subchronic Toxicity on The Liver As Anti-oxidant and Anti-inflammatory Agent for Cardiovascular Disease

Previous studies have successfully proven Ganoderma lucidum polysaccharides peptide ability as an antioxidant and anti-inflammatory agent whereby reducing levels of MDA, hs-CRP, H₂O₂, total cholesterol, foam cells as well as increasing the levels of HDL in experimental testing using Wistar rat (*Rattus norvegicus* strain wistar) fed with a high-fat diet. In order to develop Ganoderma lucidum polysaccharides peptide as an integral and comprehensive form of treatment against cardiovascular disease, further research regarding the subchronic toxicity on the liver was performed. 90 days after the administration of pure, freeze dried Ganoderma lucidum solution with dosages ranging from 300 mg–1200 mg/per kg body weight, there were no observable toxic symptoms in male and female rats. There was no adverse effect on liver function with the administration of the maximum dosage (1200 mg/ per kg body weight). Gross pathology examinations of the rat's liver after the maximal dosage of Ganoderma lucidum extract proved to be unremarkable. These findings are supported by the results of clinical pathology and histopathology of liver cells which do not indicate a change in morphology and histopathology of the liver. The result of this study shows that oral administration of Ganoderma lucidum polysaccharides peptide until the maximum dose of 1200 mg/per kg body weight/day does not cause toxic effects in the liver.

SOURCE: journals.lww.com/jhypertension