

Ganoderma lucidum. Pequeno Guia Clínico

Ganoderma lucidum

(from Medicinal Mushrooms - A Clinical Guide by Martin Powell)



Japanese name - Reishi or Mannetake (10,000 year mushroom / mushroom of immortality)
Chinese name - Ling Zhi (spirit mushroom - mushroom of spritual potency)

The most famous of all the medicinal mushrooms, with annual sales of over US\$2billion, *G. lucidum*'s wide ranging health benefits are due to its combination of high polysaccharide content (Stamets reports the fruiting body to contain 41% beta glucan) and wide range of triterpenoid compounds¹⁻⁴. Over 130 of these have been identified, belonging to two families: ganoderic and lucidenic acids with functions including:

- Inhibiting Histamine Release
- Hepatoprotective
- Anti-hypertensive (ACE inhibiting)
- Inhibiting cholesterol synthesis
- Anti-inflammatory
- Inducing apoptosis
- Inhibiting viral induction
- Antioxidant
- Anti-tumour
- CNS sedation
- Anti-microbial
- Immune modulation

There has recently been interest in the lipid rich spores as an anti-cancer agent with tumour inhibition shown in different *in vitro* studies⁵⁻⁷. However, a recent comparative study of the immunomodulatory and antitumour activity of the sporoderm-broken spores and whole fruiting body extract showed them to be comparable with no superiority of efficacy for the sporoderm-broken spores⁸.

G. lucidum shows exceptionally high tyrosinase inhibition with the highest activity in the aqueous extract. This has led to its inclusion in many commercial skin whitening products and also has medical implications, especially in relation to Parkinson's Disease (see discussion under Parkinson's Disease)⁹⁻¹¹.

Cancer - *G. lucidum* has a long history of traditional use in the treatment of cancer and is credited with many cases of spontaneous remission^{12,13}.

As well as the immune modulating effect of its high polysaccharide content, its triterpenes show significant cytotoxic activity against different cancer cell lines, as well as inhibitory effects against Epstein-Barr virus, known to be associated with some cancers¹⁴⁻²¹. In addition triterpenes from *G. lucidum* show inhibition of the nuclear transcription factor, NF-kappaB (NF-κB), which is overexpressed in various cancer cell lines, and also the AP-1 signalling pathway²².

Inhibition of NF-κB is of particular importance in the activity of *G. lucidum* against breast and prostate cancers as it is considered to play an essential role in the hormone independent growth and spread of these cancers^{23,24}.

Studies with *G. lucidum* polysaccharide extract confirms its ability to enhance immune status in cancer patients with increases in NK cell activity and Th1 cytokine levels and decrease in Th2 cytokine levels in advanced lung cancer patients^{25,26}.

Allergies - As well as immuno-modulatory activity, *G. lucidum* demonstrates strong anti-inflammatory activity with suppression of tumor necrosis factor-alpha (TNF-alpha), interleukin-6 (IL-6), the inflammatory mediator nitric oxide (NO) and prostaglandin E(2), mediated through inhibition of the NF-κB and AP-1 signaling pathways. This combination of immuno-modulatory and anti-inflammatory action activity makes it ideally suited to the treatment of allergies and other inflammatory conditions²⁷⁻³⁰.

G. lucidum is also a component of FAHF-2, a Chinese herbal formula that completely blocked anaphylactic reactions in a mouse model of peanut allergy³¹.

Liver Disease - The fruiting body of *G. lucidum* has long been a popular traditional treatment for liver diseases and demonstrates wide

hepatoprotective properties³²⁻³⁶. It appears that at least part of its action in this regard may be through the ability of *G. lucidum* triterpenes to block platelet-derived growth factor beta receptor (PDGFBetaR), thus inhibiting the activation and proliferation of hepatic stellate cells, a key event in hepatic fibrosis³⁷.

G. lucidum is also traditionally used in the treatment of hepatitis and in a clinical study of 355 cases of hepatitis B treated with Wulingdan Pill, of which *G. lucidum* is the major component, 92.4% of patients were reported to have positive results³⁸. Again, it appears that the triterpenes are the key components^{39,40}.

Hypertension - *Ganoderma lucidum* has a broad range of action on cardiovascular health. Polysaccharides and triterpenes isolated from *Ganoderma lucidum* have shown hypolipidemic, hypotensive, and antithrombotic effects while a polysaccharide preparation (Ganopoly) led to improved ECG and lowered chest pain, palpitation and shortness of breath in a double-blind, randomized, multicentered study⁴¹. Mild ACE-inhibitory activity has also been demonstrated for some of Reishi's triterpenoid compounds⁴².

Insomnia/anxiety - The traditional name 'spirit mushroom' points to the sedative action of its triterpenoid components on the CNS and many herbalists value its benefits in cases of insomnia⁴³⁻⁴⁵. Christopher Hobbs recommends *G. lucidum* for deficiency insomnia while Mizuno also recommends it for 'mental stabilisation'.

Rheumatoid Arthritis - *G. lucidum*'s combination of immuno-modulatory and anti-inflammatory action suggests potential application in the treatment of autoimmune conditions such as rheumatoid arthritis. A proteoglycan fraction from *G. lucidum* has been shown to inhibit production of rheumatoid arthritis synovial fibroblasts *in-vitro*, in part through inhibition of NF- κ B transcription pathway⁴⁶.

Anti-aging - Traditionally considered to promote longevity, *G. lucidum* extract has been shown to inhibit beta-amyloid synaptic toxicity with potential benefits in Alzheimers Disease⁴⁷. In addition, *G. lucidum*'s broad spectrum cardiovascular, neurological and immune benefits, in addition to beneficial effects on blood sugar and cholesterol control⁴⁸⁻⁵¹, make it an excellent general health supplement.

CLINICAL SUMMARY

Main Therapeutic Applications - Allergies, Liver Support, Cancer (especially breast and prostate), High Blood Pressure, Anxiety/Insomnia. Together with *Cordyceps sinensis*, *G. lucidum* has the most extensive range of indications and combines well with it in treatment of lung and liver conditions, as well as to provide all-round adaptogenic support.

Key Components - Triterpenes and polysaccharides

Dose - Chang reports the daily dose in folk use for cancer as 25-300g/day fruiting body as decoction (aqueous extract)⁵², and cases of spontaneous remission have been reported using similar doses. Concentration ratios of extracts vary with most in the range of 12-18:1. Taking an average concentration ratio of 15:1, this equates to 2-20g/day of extract, with most practitioners using the lower end of the range, in the region of 3-6g/day. For other conditions lower doses in the range of 1-3g /day are usual.

Levels of both polysaccharides and triterpenes are highest in the fruiting body and are traditionally extracted by hot water extraction (i.e. boiling to make a tea). However, while aqueous extraction is ideal for the polysaccharides, which are highly water soluble, the triterpenes are poorly water-soluble but highly alcohol-soluble. As the polysaccharides are precipitated out of solution by alcohol some manufacturers have taken the step of supplementing polysaccharide-rich aqueous extracts with triterpenes obtained through alcohol extraction in order to combine the benefits of *G. lucidum*'s polysaccharides and triterpenes.

Caution - Patients on anti-hypertensive and sedative medication. *G. lucidum*'s anti-coagulant properties mean that caution is also required when using it alongside anticoagulant drugs⁵³.

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