



# Compilation of studies on Lingzhi (Ganoderma lucidum)

The links below show the following scientific properties and benefits of Lingzhi (Ganoderma lucidum) and other mushrooms classified as medicinal mushrooms:

**anti-allergic • anti-cancer • anti-tumor • anti-bacterial (Staphylococci and Streptococci) • anti-candida • anti-viral • anti-inflammatory • antibacterial**

**improves sexual performance • improves cardiovascular circulation • enhances immunity • blood sugar modulator (hypoglycemia)**

**lowers blood pressure • bone marrow cell proliferation • natural killer cell enhancement • expectorant • immunomodulatory • anti-HIV • superb liver detoxifying • ionizing radiation protection • anti-ulcer • white blood cell and hemoglobin in peripheral blood increased.**

Medicinal mushrooms are currently being used in the following conditions:

- \* **Bronchitis** (except bacterial infections)
- \* **Asthma**
- \* **Arteriosclerosis** (hardening of arteries)
- \* **Lowers serum cholesterol**, triglyceride, B-lipoprotein, LDL and increases HDL
- \* **Neurasthenia** (anxiety, fatigue, depression, headache, insomnia, sleep disorders)
- \* **Insomnia**
- \* **Hepatitis**
- \* **Liver damage**
- \* **Diabetes** – delays cardiovascular issues
- \* **Cancer** – in conjunction with chemo / radiation therapy.
- \* **Tumor reduction** (and prevents their return)
- \* **Nausea/loss of appetite**
- \* **Spleen** deficiencies
- \* **Aging** – restores cellular immune function
- \* **GI Tract** issues
- \* **Cerebral hypoxia** regeneration
- \* **Altitude sickness**
- \* **Male menopause**
- \* **Prostate** hyperplasia
- \* **Nephrotic** syndrome (kidney disease and body swelling)
- \* **Multiple Sclerosis** ( via spore injection)
- \* **Scleroderma** (disease of connecting tissue)

Chinese pharmacopoeia only consider Red Lingzhi (Ganoderma lucidum) and Purple Lingzhi (Ganoderma sinensis) as medicinal; however, there are about 75 other variations of Lingzhi.

The fruiting body and spores contains sugars, polysaccharides, triterpenes, steroids, amino acids, protein, coumarin, glycosides, nucleosides, alkaloids, volatile oils, resins, lipids, minerals. The polysaccharides are proving to be one of the most important active medicinal components in the mushrooms.

The fruiting body (mushroom cap) and spores are the only parts useful for medicinal purposes, the stem and root are not. The spores contain the highest concentrations of medicinal elements, but only if the cellular walls have been broken. This can be done chemically, mechanically or with enzymes. When young, the caps have the texture of meat, then harden to an almost wood-like structure when mature. They grow only on the decaying wood of hardwood trees. It is extremely powerful at breaking down hardwoods with enzymes to extract required nutrition.

The highest concentration of the medicinal components is found in Lingzhi that has been processed with all 3 methods: alcohol, steam and enzymes. This can increase the efficacy from 9 to 25 times that of raw Lingzhi.



## Bladder

### [Lingzhi polysaccharides increase effects of anticancer drugs against bladder carcinoma cells.](#)

Huang CY *et al*

from: **Journal of Agricultural and Food Chemistry 2010**

The authors use extractions of Ganoderma spores to show that a polysaccharide fraction has cytotoxic effects on human bladder cancer cells. The polysaccharide caused cell division arrest.

### [The dual roles of Ganoderma antioxidants on urothelial cell DNA under carcinogenic attack.](#)

J.W.M Yuen *et al*

from: **Journal of Ethno-pharmacology 2008**

Study showing that the anti-oxidants in Ganoderma spores have protective effect on bladder cell DNA exposed to carcinogenic compounds.

### [Telomerase events by Ganoderma lucidum on premalignant human urothelial cells](#)

Yuen JW *et al*

from: **Nutrition & Cancer 2008**

Study linking Ganoderma extracts to killing off bladder cancer cells. By inhibiting telomerase, which affects the critical parts of the chromosome ends, the spores trigger apoptosis in cell death in human bladder cancer cells.

### [Ganoderma lucidum extracts inhibit growth in bladder cancer cells in vitro](#)

Qing-Yi Lu

from: **Cancer Letters 2004**

Experiments reveal that Ganoderma spores can inhibit the growth of human bladder cells. By studying the effects on actin proteins, the scientists showed that Ganoderma causes a blockage in the cell division.



## Blood

### [Ganoderma lucidum polysaccharides accelerates wound healing in type 1 diabetes.](#)

Tie L, *et al*

from: **Cell Physiology and Biochemistry, 2011**

Lingzhi improved the speed of healing in wounds in diabetic mice.

### [Anti-hyperglycemic Effect of Ganoderma lucidum Polysaccharides on Diabetic Mice](#)

Fenglin Li *et al*

from: **International Journal of Molecular Science 2011**

Indications that Ganoderma lucidum polysaccharides have an positive effect on diabetes.

### [Hypoglycemic effects of Ganoderma lucidum water-extract in obese/diabetic mice](#)

Seto SW,*et al.*

from: **Phytomedicine. 2009**

This study demonstrate that G. lucidum consumption can provide beneficial effects in treating type 2 diabetes.



## Brain

### [Improved memory effect of preadministration with Ganoderma lucidum.](#)

*Chen LW, et al*

*from: **Experimental and Toxicologic Pathology 2012***

This study showed that Ganoderma lucidum markedly improved spatial learning and memory in rats. This may provide useful information in prevention of Alzheimer's disease.

### [Ganoderma lucidum extracts may be therapeutic strategy for Huntington's disease.](#)

*Chen LW, et al*

*from: **Neuropharmacology. 2012***

Ganoderma lucidum's active constituents have potent effects on markers of Huntington's disease. Among the identified ingredients, Ganoderic acid C<sub>2</sub> was most effective.

### [Ganoderma lucidum Protects Dopaminergic Neuron Degeneration.](#)

*Zhang R et al*

*from: **Evidence Based Complementary Alternative Medicine 2011***

Abundant evidence shows that neuroinflammation participates in Parkinson's disease. Ganoderma lucidum extract showed that they "significantly prevent" inflammation from occurring.

### [Effect of Ganoderma lucidum on the activities of mitochondrial dehydrogenases and complex I and II of electron transport chain in the brain of aged rats.](#)

*Ajith TA, Sudheesh NP,*

*from: **Experimental Gerontology 2009***

The results of the study concluded that the extract Ganoderma lucidum may improve the function of mitochondria, suggesting its possible therapeutic application against aging associated neurodegenerative diseases.



## Breast

### [Spore Powder of Ganoderma lucidum Improves Cancer-Related Fatigue in Breast Cancer Patients](#)

*Hong Zhao, et al.*

*from: **Evidence-Based Complementary and Alternative Medicine, 2012***

This clinical trial shows that Ganoderma spore powder relieved fatigue, anxiety and depression brought on by endocrine therapy. The spores had helpful effects on the immune system of the patients with no side-effects.

### [Ganoderic acid induces DNA damage in human breast cancer cells](#)

*Wu GS, et al.*

*from: **Fitoterapia, 2012 (a Journal dedicated to medicinal plants)***

Reveals that the active molecule in Ganoderma is a triterpenoid called ganoderic acid DM. It inhibits breast cancer cells. The compound blocked the cell division of the cancer cell, and caused them to undergo cell death.

### [Ganoderma inhibits cancer cell growth in inflammatory breast cancer](#)

*Martinez-Montemayer MM, et al.*

from: **Nutrition and Cancer, 2011**

This study shows that Ganoderma spore extract selectively kills metastatic inflammatory breast cancer cells, and with no effect on non-cancerous breast epithelial cells.

### [Combined effect of green tea and Ganoderma lucidum on invasive behavior of breast cancer cells.](#)

*Thyagarajan A et al*

from: **International Journal of Oncology 2007**

Shows that Ganoderma extracts inhibited cancerous growth of breast cancer cells, and migration and adhesion. The effects were even greater when combined into a green tea extract.

### [Ganoderma lucidum inhibits proliferation of human breast cancer cells by down-regulation of estrogen receptor](#)

*Jiang J et al*

from: **International Journal of Oncology 2006**

Collectively, these abstracts are part of a program which begins to explain how Ganoderma works. The authors show that the spores block specific biochemical pathways in breast cancer cells, resulting in cancer cell arrest.

## **Cervical**

### [Cytotoxic and pro-apoptotic effects of ganoderic acid on human cervical cancer cells in vitro](#)

*Liu R M et al*

from: **Molecular and Cellular Pharmacology 2012**

The authors show that several derivatives of ganoderic acid—the main triterpenes in Lingzhi with anti-cancer properties—induce apoptosis (death of cells) in human cervical cancer cells.

### [Ganoderic acid Mf and S induce mitochondria mediated apoptosis in human cervical carcinoma HeLa cells](#)

*Liu RM et al*

from: **Phytomedicine 2011**

Two ganoderic acid isomers (structural variants of ganoderic acid) caused cell division arrest in human cancer cells growing in culture dishes. The two isomers also induced apoptosis in the cancer cells.

## **Colon**

### [Triterpenes from Ganoderma lucidum suppress growth of colon cancer cells.](#)

*Jedinak A et al*

from: **International Journal of Oncology 2011**

Shows that a triterpene molecule from Ganoderma spores, called Ganodermanontriol (GL) stops division of human colon cancer cells. It did this in cultures of cancer cells and in human adenocarcinoma cells growing in rats. The GL stopped cell division.

[Ganoderic acid could be important in inhibiting growth of human colon cancer cells.](#)

*Nian-Hong Chen et al*

from: **Phytomedicine 2011**

This study shows that a protein called P53, which is involved in DNA surveillance, could be one target of Ganoderic acid, and this could inhibit growth of human colon cancer cells.

[Ganoderic acid induces apoptosis through mitochondria dysfunctions in human colon carcinoma cells.](#)

*Li Zhou et al*

from: **Process Biochemistry 2011**

Another triterpene molecule of Ganoderma, called Ganoderic acid ME, causes apoptosis in human colon cancer cells. This is a second triterpene with anti-cancer activity.

[Effects of Ganoderic acid Me on inducing apoptosis in multi-drug resistant colon cancer cells.](#)

*Zijing Jian et al*

**Process Biochemistry 2011**

GA-Me effectively reverses multi-drug resistance in colon cancer cells.

[Triterpenes From Ganoderma Lucidum Induce Autophagy \(cell breakdown\) in Colon Cancer](#)

*Thyagarajan A et al*

from: **Nutrition & Cancer 2010**

The authors show that a triterpene extract from Ganoderma inhibits human colon cancer cell growth by blocking cell division. They conclude and suggest the use of Ganoderma as a treatment of colon cancer.

[A water-soluble extract from Ganoderma lucidum mycelia suppresses the development of colorectal tumors.](#)

*Okas et al*

from: **Hiroshima Journal of Medical Science 2010**

Clinical study showing that Ganoderma water extract reduced size and number of colorectal adenomas (tumors) over 12 months.

[Ganoderic acid "ME" induces arrest in human tumor cells.](#)

*Nian-Hong Chen, et al.*

from: **Process Biochemistry, 2009**

Ganoderma (Ganoderic acid) was found to possess remarkable cytotoxicity on highly metastatic lung cancer and colon cancer cells. The cytotoxicity results from blockage of cell division in the cancer cells.

[Monitoring of immune responses to a herbal immuno-modulator in patients with advanced colorectal cancer](#)

*Chen X et al*

from: **International Immunopharmacology 2006**

Clinical study with advanced colorectal cancer patients over a 12 week period given 5.4g of Ganoderma per day. 41 out of the 47 patients showed increases in immune cells (lymphocytes), suggesting Ganoderma may have potential immuno-modulating effect in patients with advanced colorectal cancer.

[Ganoderma extracts inhibit colorectal cancer cell growth via cell cycle arrest](#)

*Shis-Chung Hsu et al*

from: **Journal of Ethnopharmacology 2008**

This study shows that Ganoderma extracts block cell division in human colorectal cancer cells. Also that the extract caused tumor shrinkage in cancerous mice.

[Ganoderma lucidum extract inhibits proliferation of SW480 human colorectal cancer cells](#)

*J T Xie et al*

from: **Experimental Oncology 2006**

A team at the University of Chicago exposed human colorectal cancer cells to a polysaccharide and a triterpene extract of the mushroom called Ganoderma lucidum. They found this had a significant anti-proliferation effect on the cancer cells. This is a downloadable PDF.



[Ganoderma lucidum ameliorate mitochondrial damage in isoproterenol-induced myocardial infarction.](#)

*Sudheesh NP et al*

from: **International Journal of Cardiology 2013**

The study concluded that cardiac mitochondrial enzymes are markedly declined by the administration Ganoderma lucidum by preventing the decline of antioxidant status and by directly scavenging the free radicals.

[Ganoderma lucidum enhances activities of heart mitochondrial enzymes and respiratory complexes.](#)

*NP Sudheesh et al,*

from: **Biogerontology, 2009**

The results of the study revealed that G. lucidum is effective to ameliorate the age associated decline of cellular energy status.

[Antioxidant activity of Ganoderma lucidum in acute ethanol-induced heart toxicity](#)

from: **Kar-Lok Wong et al, 2005**

The hot water extract of the mushroom Ganoderma lucidum was shown to have anti-oxidative effect against heart toxicity. It concluded that Ganoderma lucidum may protect the heart from superoxide induced damage.

[A study of lingzhi extract in patients with coronary heart disease.](#)

*Gao, et al 2004*

from: **International Journal of Medical Mushrooms 2004**

The polysaccharides and triterpenes isolated from Ganoderma lucidum have shown to give "significantly improved" relief of symptoms in those with chest pains, palpitation, angina pectoris, and shortness of breath.



## Kidney

### [Ganoderma extract prevents albumin-induced oxidative damage in cultured human kidney epithelial cells.](#)

*Lai KN, Chan LY, Tang SC, Leung JC.*

*from: Nephrol Dial Transplant 2006*

Results suggest that Ganoderma significantly reduces oxidative damages and apoptosis (cell death) in human proximal tubular epithelial cells.



## Leukemia

### [Ganoderma lucidum induced apoptosis in NB4 human leukemia cells](#)

*Eva Calvino, et al.*

*from: Journal of Ethnopharmacology, 2010*

The authors investigate how Ganoderma extract leads to leukemia cell apoptosis (cell death). These show that the extract causes reduction in the levels of leukemia cells, thereby causing them to die.

### [Ganoderma lucidum Polysaccharides Induce Macrophage-Like Differentiation in Human Leukemia.](#)

*Jia-Wei Hsu et al*

*from: Evidence Based Complementary and Alternative Medicine 2009*

Results show that Ganoderma polysaccharides can cause human leukemia cells to differentiate into macrophages, thus ending uncontrolled cell division. They suggest that the Ganoderma polysaccharide F3 can bring cancer to an end whether by cell differentiation or cell death.

### [Ganoderma polysaccharides can induce human leukemia cells into cells with immuno-stimulatory function](#)

*Chan WK, et al.*

*from: Journal of Hematology & Oncology 2008*

Authors showed that preparations of Ganoderma polysaccharides could cause human leukemia cells to differentiate into other cells with immunotherapeutic activities. Somehow, compounds in the Ganoderma re-directed the leukemia cells to become cells able to enhance the function of the immune system.

### [Ganoderma lucidum causes apoptosis in leukemia, lymphoma and multiple myeloma cells](#)

*Claudia I. Muller, et al.*

*from: Leukemia Research, 2006*

Using 26 human cancer cell lines, the authors show that Ganoderma extracts cause many of them to stop dividing. Leukemia, lymphoma and myeloma cell lines were most sensitive to the Ganoderma extracts.

### [Ganoderma lucidum polysaccharides in human leukemia cells: from gene expression to network construction](#)

*Cheng KC, et al.*

*from: BioMed Central Genomics, 2007*

Results show that a polysaccharide extracted from Ganoderma spores, called F3 is responsible for anti-tumor activity. F3 binds to the surface of human leukemia cells and triggers apoptosis (cell death) in them.



### [Inhibitory Effects of \*Ganoderma lucidum\* on Human Hepatoma Cells in Cells](#)

*Chia-Jui Weng et al*

*from: Journal of Agricultural & Food Chemistry* 2009

This study shows that Ganoderma extracts block specific signaling pathways inside human liver cancer cells. Also that the extract reduced the occurrence of cancer in mice given human cancer cells.

### [Effects of \*Ganoderma lucidum\* spores on HepG2 cells proliferation and growth cycle](#)

*Li L et al*

*from: Zhong Yao Cai* 2008

Ganoderma spores inhibit human hepatoma tumor cell proliferation in G2 phase of cell cycle, and in high doses stops metastasis.

### [Antihepatoma activity of the acid and neutral components from \*Ganoderma lucidum\*.](#)

*Lu H, et al*

*from: Phytotherapy Research* 2012

### [The polysaccharides from \*Ganoderma lucidum\*: Are they always inhibitors on human hepatocarcinoma cells?](#)

*Liu YJ et al*

*from: Carbohydrate Polymer.* 2012

### [Free radical scavenging and mitochondrial antioxidant activities of Reishi- \*Ganoderma lucidum\*](#)

*E. Cherian, et al*

*from: Journal of Basic Clinical Physiology and Pharmacology* 2011

### [Post-treatment of \*Ganoderma lucidum\* reduced liver fibrosis induced by thioacetamide in mice.](#)

*Wu YW et al*

*from: Phytotherapy Research* 2010

Ganoderma lucidum protects liver mitochondrial oxidative stress and improves the activity of electron transport chain in carbon tetrachloride intoxicated rats.

### [Hepatoprotective effects of \*Ganoderma lucidum\* peptides against D-galactosamine-induced liver injury.](#)

*Shi Y et al*

*from: Journal of Ethnopharmacology* 2008

Results of this study revealed that ganoderma extracts could afford significant protection in the alleviation of liver damage or injury.



## Longevity

### [Ganoderma new anti-aging ergosterols from spores of the medicinal mushroom.](#)

Weng Y, *et al*

from: **Bioscience, Biotechnology, and Biochemistry. 2011**

Two new anti-aging compounds, ganodermasides C and D, were isolated from Ganoderma lucidum extract. Both of them significantly extended the replicative lifespan of a yeast strain.

### [The lifespan-promoting effect of acetic acid and Reishi \(aka Lingzhi\) polysaccharides.](#)

Chuang MH *et al*,

from: **Bio-organic Medical Chemistry 2010**

Various health-food supplements were screened to evaluate their effects on longevity. Among the substances tested were Reishi polysaccharides. 15 differentially expressed proteins involved in the lifespan-promoting activity were identified.



## Lung

### [Lingzhi arrests growth of lung cancer cells proliferation via the ribosomal protein pathway](#)

Wu CT *et al*

from: **Carcinogenesis 2011**

The authors show that a protein termed LZ-8 in Ganoderma, rather than a polysaccharide or a triterpene, blocks growth of human lung cancer cells. They suggest that this protein pushes cancer cells into apoptosis.

### [Effect of Ganoderma on drug-sensitive and multidrug-resistant small-cell lung carcinoma cells.](#)

David Sadava *et al*

from: **Cancer Letters 2009**

Multi drug resistance is a major problem in lung cancer. The results from this study shows that Ganoderma is cytotoxic to both drug-sensitive and drug-resistance small cell lung cancer cells.

### [Enhancement of NK cells activity involved in the anti-tumor effect of ganoderic acid.](#)

Wang G *et al*

from: **International Immunopharmacology 2007**

Ganoderic acid Me is a triterpenoid purified from Ganoderma lucidum, the most widely used herb for cancer treatment and prevention in east Asia. Study shows that Ganoderma is the chief inhibitory molecules in a human lung cancer cell assay.

### [Ganoderic acid induces mitochondria mediated apoptosis in lung cancer cells](#)

Wen Tang *et al*

from: **Life Sciences 2006**

The findings show that Ganoderma markedly induced apoptosis of metastatic lung tumor cells. It did this through intrinsic pathway related to mitochondrial dysfunction.

[A Randomized, Placebo-Controlled, Multicenter Study of Ganoderma lucidum](#)

*Yihuai Guo et al*

*from: International Journal of Medicinal Mushrooms 2003*

68 patients with advanced lung cancer were given Ganoderma. Compared to the control group, after 12 weeks these patients showed a significant increase in lymphocyte mitogenic reactivity (increase in natural killer cells).



## Lymphoma

[Lymphoma-killing action of Ganoderma lucidum on interleukin 3 dependent lymphoma DA-1 cells.](#)

*Calvino E et al*

*from: Phytotherapy Research 2011*

Results showed a clear indication of induction of apoptosis (cancer cell death) in human lymphoma cells by compounds present in Ganoderma lucidum

[Ganoderma lucidum causes apoptosis in leukemia, lymphoma and multiple myeloma cells](#)

*Claudia I. Muller, et al.*

*from: Leukemia Research, 2006*

Using 26 human cancer cell lines, the authors show that Ganoderma extracts cause many of them to stop dividing. The Leukemia, lymphoma and myeloma cell lines were very sensitive to the Ganoderma extracts.



## Melanoma

[Ganoderma polysaccharides antagonize the suppression on lymphocytes.](#)

*Sun LX et al*

*from: Journal of Pharmacy and Pharmacology 2011*

Human tumor cells release growth factor proteins that suppress the immune system and the apoptosis that would otherwise detect them. The authors show that Ganoderma polysaccharides block this suppression in human melanoma cells, allowing the immune cells to help to detect the melanoma.

[Promoting Effects of Ganoderma lucidum Polysaccharides on B16F10 Cells to Activate Lymphocytes](#)

*Li-Xin Sun et al*

*from: Basic & Clinical Pharmacology & Toxicology 2010*

The immune system in patients with cancer often fails to control tumor growth because of deficient immunogenicity. Ganoderma polysaccharides are shown to activate lymphocyte proliferation in melanoma.



## Multiple Myeloma

[Molecule called Ergosterol peroxide \(EP\) found in Ganoderma inhibits signaling process in multiple myeloma.](#)

*Yun-Hee Rhee*

from: **BMC Cancer 2012**

A molecule called Ergosterol peroxide (EP) found in Ganoderma, inhibits a cellular signaling process known to be linked with multiple myeloma cells. Lingzhi may be a potent cancer preventive for treatment of multiple myeloma.

[Ganoderma lucidum causes apoptosis in leukemia, lymphoma and multiple myeloma cells](#)

*Claudia I. Muller, et al.*

from: **Leukemia Research, 2006**

The authors show that Ganoderma extracts cause leukemia cells to stop dividing. Leukemia, lymphoma and myeloma cell lines were most sensitive to the Ganoderma extracts.



## Ovarian Cancer

[Ganoderma lucidum exerts anti-tumor effects on ovarian cancer cells.](#)

*Zhao S, et al.*

from: **International Journal of Oncology, 2011**

Ganoderma arrests cell division in epithelial ovarian cancer cells, at G2/M phase of cell cycle. Overall, the findings suggest that Ganoderma lucidum exerts multiple anti-tumor effects on ovarian cancer cells and can enhance the sensitivity of the cancers cells to cisplatin (chemotherapy drug)

[Modulatory effect of Ganoderma lucidum polysaccharides on ovarian cancer in rats](#)

*YouGuo, et al.*

from: **Carbohydrate Polymers, 2009**

When Ganoderma polysaccharides were fed to rats with ovarian cancer, the levels of antioxidants in the blood increased, significantly reducing MDA production and increasing antioxidant enzyme activity. The authors speculate that the antioxidants are part of the anti-tumor effects of the spores.



## Pancreas

[In vitro effect of Ganoderma lucidum polysaccharides on pancreatic islets damage](#)

*Hui-Na Zhang et al*

from: **Life Sciences 2003**

Results show that Ganoderma polysaccharides protects against free radical damage in pancreas cells. One of the mechanisms is through its scavenging ability to protect the pancreatic islets from free radical damage.



## Prostate Cancer

### [Ganoderic Acid: An Alternative Agent for the Treatment of Advanced Prostate Cancer](#)

*Benjamin M. Johnson et al*

*from: The Open Prostate Cancer Journal 2010*

This is a review of the effect of ganoderic acid (from Ganoderma) on human prostate cancer cells. The summary is that GA is toxic to the cancer cells, whether they need male hormones to grow or not. The GA also reduced the spread of the prostate cancer cells to the bone.

### [Ganoderic acid DM: Anti-androgenic osteoclastogenesis inhibitor](#)

*Jie Liu et al*

*from: The Open Bioactive Compounds Journal 2009*

Ganoderic acid, a triterpene from Ganoderma spores, inhibits prostate cancer cells. The authors show that GA block the receptors on the cancer cells for male hormones, so that the cells cannot divide. Prostate cancer has a high incidence of bone metastasis. Ganoderic acid DM can block osteoclastogenesis.

### [Ganoderma lucidum activities in LNCaP prostate cancer cells](#)

*Ben-Zion Zaidman et al*

*from: International Journal of Oncology 2007*

Ganoderma spore extracts trigger apoptosis in human prostate cancer cells. The extracts activate caspases in the cancer cells. These are proteases that bring about cell disassembly in cancer cells (apoptosis).

### [Ganoderma lucidum suppresses prostate cancer cells](#)

*Gwenaelle Stanley et al*

*from: Biochemical & Biophysical Research Communication 2005*

The authors show that Ganoderma extracts block the development of blood vessels needed to supply prostate cancer cells with oxygen and nutrients, causing the prostate cancer to die. They also reveal that the extracts do this by inhibiting a key signaling molecule in the prostate cancer cells themselves.



## STOMACH /GASTRIC CANCER

### [Effects of Ganoderma lucidum polysaccharides on the immune functions in advanced-stage cancer patients](#)

*Gao Y. et al, Massey University, New Zealand, 2003*

*from: Immunology Investigations*

34 patients with advanced stage cancer were given Ganoderma for 12 weeks. Results showed significantly enhanced immune responses which ordinarily are reduced or damaged in patients undergoing chemotherapy/ radiotherapy. This confirms the in vivo studies that Ganoderma polysaccharides are able to activate macrophages, T lymphocytes and NK cells.

### [Ganoderma lucidum induces endoplasmic reticulum stress-mediated autophagic cell death in gastric cancer cells.](#)

*Lian et al*

*from: Oncology Report 2012*

A protein in Ganoderma (LZ-8) induces cell death in human gastric cancer cell lines.

[Extracts of Ganoderma lucidum deactivates cancer cell activities in Human Gastric Carcinoma Cells.](#)

*Jang KJ et al*

from: **Journal of Acupuncture & Meridian Studies 2011**

Ganoderma extracts suppress invasiveness of human stomach adenocarcinoma cells.

[Induction of apoptosis by ethanol extracts of Ganoderma lucidum in human gastric carcinoma cells](#)

*Jang KJ et al*

from: **Journal of Acupuncutre & Meridian Studies 2010**

Ganoderma extracts trigger apoptosis in human stomach cancer cells in culture.

[Regression of gastric large B-Cell lymphoma accompanied by immunomodulatory effect of Lingzhi](#)

*Wah W Cheuk et al 2007*

Report of a complete regression of a high-grade lymphoma likely due to Ganoderma stimulating t-cell production.

**Acute Myeloblastic Leukaemia** (2004, Teow Sun-Soo) – patients took high doses of Ganoderma while undergoing chemotherapy. All the patients experienced changes in their WBC, haemoglobin and platelet counts which were either significant or very significant after 3 months of treatment.

**Nasopharyngeal Carcinoma** (2004 Teow Sun-Soo) – patients with stage 3 cancer experienced complete remission of their cancer (significant tumor shrinkage after 40 days of combined chemotherapy and Ganoderma and complete regression after 90 days) Reduced side-effects were observed regarding nausea/vomiting and pain and increased energy, sleep and appetite were also observed.

**Advanced Lung Cancer** (Gao Y et al, Massey University, NZ 2004ol) – 68 patients with advanced lung cancer were given Ganoderma for 12 weeks.. Compared to the control group, after 12 weeks these patients showed a significant increase in lymphocyte mitogenic reactivity (increase in natural killer cells).

## **From the TCM (Traditional Chinese Medicine) perspective:**

**Spleen (spleen • stomach and pancreas):** The polysaccharides in Lingzhi mushroom benefits the spleen by increasing DNA synthesis in its cells. It has been found that the are able to significantly reduce blood plasma sugar levels in hyperglycemic mice which helps take some burden off the pancreas. One study found it effective in treating duodenal ulcers (stomach).

**Lung (lung and large intestine):** Lingzhi mushroom benefits the lungs as an expectorant by helping clear them of mucus. In the 1970's over 2000 patients with chronic bronchitis and bronchial asthma were part of clinical studies in China. They found that 60-90% of patients had a marked improvement, many even having an increase in appetite.

**Kidney (kidneys • bladder • genes • adrenals and endocrine system):** In vivo and in vitro studies have shown that Ganoderma lucidum extracts improves adrenocortical function. The various sterols found in Lingzhi mushroom benefit the endocrine system by acting as hormone precursors. One study showed that taking Lingzhi supplements before and after exposure to ionizing radiation helped prevent and minimize the negative effects of the radiation. This naturally helps protect the DNA from becoming damaged and causing accelerated aging.

**Liver (liver and gallbladder):** The benefits of Lingzhi mushroom on the liver are demonstrated with the favorable results attained with its use in cases of hepatitis. One study of 355 patients with hepatitis B who were treated with Lingzhi supplements showed that 92.4% of the patients had positive results. The compounds in Lingzhi that cause these benefits for the liver are likely ganodosterone (a plant steroid) and Triterpenes R and S.

**Heart (heart and small intestine):** It has been shown that Lingzhi mushroom benefits patients with coronary heart disease and hyperlipidemia, resulting in varying degrees of improvement in symptoms. One controlled study showed a Ganoderma extract being capable of reducing blood and plasma viscosity in hypertensive patients with hyperlipidemia. Another study showed the Ganoderma Lucidum extract was capable of lowering blood pressure and reducing cholesterol.