

**Status of Ganoderma Lucidum in United States:  
Ganoderma Lucidum as an Anti-inflammatory Agent**

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The status of herbs has recently changed in the United States with the passage of the Dietary Supplement Health and Education Act of 1994 (DSHEA). This law created a new category called Dietary Supplements which includes herbs. The act declares these substances are not food additives nor are they drugs. It allows manufactures to publish more complete directions for use than previously allowed including warnings, contraindications, and side effects. The act also allows manufacturers to publish limited information regarding the benefits in the form of Statements of Nutritional Support as well as Structure and Function Claims.

Alzheimer's Disease is primarily an old age disorder in which competent individuals become agitated, uncomprehending, with profound loss of cognitive function finally requiring continued and complete care. In the United States it is the fourth leading cause of death. At present, the choice of therapeutic or preventive drugs for use in Alzheimers disease is limited and the best only slow the progress of the disease for about 40 weeks. Recent research has discovered evidence of inflammation in the brain of Alzheimers patients and unless inflammation is present there is little evidence of neurodegeneration, even in patients with profuse amyloid B-peptide deposition and neurofibrillary tangles. Prospective and retrospectively collected data on men and women suggest that use of non steroidal antiinflammatory drugs is associated with reduced risk of Alzheimers disease. This research heightens the importance of the ancient reports where Ganoderma lucidum was praised for its effect of increasing memory and preventing forgetfulness in old age reported in Shen Nong Ben Cao Jing vol. 1 as early as 456-536 AD. Research on mice using orally or topically administered Ganoderma lucidum provides evidence that Ganoderma lucidum has anti-inflammatory activity. This pharmacological activity may provide the basis for its activity on memory in old age, although we do not know as yet that Ganoderma lucidum can enter the brain and exert antiinflammatory activity. In cardiovascular research, it has been found that aspirin ingestion can reduce the incidence of cardiovascular disease. The possibility that it is antiinflammatory activity of aspirin that can provide benefit in reducing the risk of cardiovascular disease is suggested by the finding that higher levels of C-reactive protein in the plasma which is an acute phase marker for systemic inflammation is a predictor for increased risk of cardiovascular disease. These studies on inflammation provide important evidence that warrants further study of Ganoderma lucidum and its possible role in mitigating these two devastating diseases.

Another important event more specific for Ganoderma was the incorporation of the Ganoderma International Research Institute in New York in 1993 for the purpose of fostering international scientific and medical research on Ganoderma, setting standards of quality for related products and to promote popular awareness and appropriate use of Ganoderma.

Research on Ganoderma in the United States is not extensive. The major reason is the lack of research funds available. The interest of the public in herbal medicine is growing, the sales of herbal products is increasing yearly, with little effect on research funding.

Ecological studies along the Savannah river in South Carolina by Chen et al., (1993) identified Ganoderma as the first long-spore species in the genus to associate with oak. More recently Chen and Hu (1994) reported three successful strategies for obtaining monokaryons in Ganoderma species. To my knowledge the major producer of fruiting body Ganoderma lucidum in the United States at present is Organotech of San Antonio.

In clinical studies Chang (1994) at Sloan-Kettering Cancer Center reported that applications of Ganoderma should be studied and considered for (1) chemoprophylaxis of cancer in individuals at high risk for developing cancer (2) adjuvant use in the prevention of metastasis or recurrence of cancer (3) palliation of cancer related cachexia and pain and (4) adjunctive use with concurrent chemotherapy to reduce side-effects, maintain leukocyte counts and allow a more optimal dosing of chemo or radio therapeutics. In a very interesting report Chang (1993) addressed the question of proper dose of Ganoderma for therapy. Since studies of human dosage were traditional and empiric a dose range was calculated using this data and pharmacokinetic principals. The calculations suggested that a (1) Ganoderma dried fruit body dose of 0.5 to 1 g per day for health maintenance (2) 2 to 5 g per day if there is chronic fatigue, stress, auto immune, or other chronic health problems (3) 5 to 10 g per day for serious illness.

Of great interest has been the recent reports from the United States indicating a possible central role for inflammation in the development of such diverse diseases as Alzheimers Disease and Cardiovascular disease. This research has the possibility of linking some of the historical uses of Ganoderma in promoting longevity with contemporary Western scientific theory. The provocative connections are: (1) Ganoderma was used to prevent memory loss in old age (2) Ganoderma is anti-inflammatory, (3) inflammation is involved in the development of Alzheimers disease (4) Alzheimers disease appears to be ameliorated by chronic antiinflammatory use.

(1) Ganoderma and old age: The ancient Chinese text Shen Nong Ben Jing volume 1 from about the year 500 states that Ganoderma lucidum is useful for enhancing vital energy, increasing thinking faculty and preventing forgetfulness. It can refresh the body and mind, delay aging and enable one to live long. It stabilizes ones mental condition (Mizuno 1996). The importance of retaining memory into old age probably lies in the Taoist belief that sickness was caused by past transgressions and that the patient had to remember the transgressions, record them and destroy the record. This belief placed a strong emphasis on memory in the maintenance of health and longevity.

(2) Antiinflammatory: In research in mice Stavinovah et al. (1991, 1996) found Ganoderma lucidum to be potent antiinflammatory agent. The water extract of the fruiting body was active orally against both carrageenan induced inflammation and croton oil induced inflammation. The ethyl acetate extract was active as an antiinflammatory agent both orally and topically. The active compound was isolated and identified. This compound is equivalent in antiinflammatory activity to hydrocortisone. It does not show the typical side effects of steroids such as thymic involution nor appear to cause gastropathy which is the major side effect of the non-steroidal antiinflammatory drugs such as aspirin.

(3) Inflammation and Alzheimers disease: A number of indicators of active inflammation have been found in the Alzheimers diseased brain. Unless inflammation is present there is no notable neurodegeneration or Alzheimers signs and symptoms even in the presence of extensive neurofibrillary tangles and Amyloid B-peptide plaque deposition (Rogers 1995).

(4) Nonsteroidal antiinflammatory drugs in Alzheimers disease: Researchers in the United States and Canada have found that ingestion of non steroidal antiinflammatory drugs can slow the progress of the disease (McGeer and Rogers 1992). In a report by Corrida et al. (1996) reported on findings on 1417 man and 648 women from Baltimore Longitudinal Study of aging which is 37 year multidisciplinary study of normal aging. The preliminary results suggest that use of nonsteroidal antiinflammatory drugs is associated with decreased incidence of Alzheimers disease.

In studying incidence of cardiovascular disease, Ricker et al. (1997) measures C-reactive protein, an acute phase reactant used as a marker for systemic inflammation, in plasma. They found that baseline plasma concentration of C-reactive protein predicts the risk of future myocardial infarction and stroke. The reduction of risk associated with aspirin appears to be directly related to the level of C-reactive protein, suggesting that antiinflammatory agents may have benefits in preventing cardiovascular disease. The increase risk was independent of lipid related and non-lipid related cardiovascular factors. Masari (1997) felt that the time has come to reexamine that pathogenetic components of these disease to identify patients who would benefit from particular therapies.

Considering these recent findings, research on Ganoderma as a potential useful antiinflammatory fro a long term use as a prevention of disease appears warranted.

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