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# Immunomodulating Effect of Ganoderma (Lingzhi) and Possible Mechanism

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## Abstract

Ganoderma (Lingzhi) has been used for a long time in China to prevent and treat various diseases. Accumulated studies have demonstrated that the Ganoderma modulates immune function both in vivo and in vitro. The immunomodulating effects of Ganoderma were extensive, including promoting the innate immune function, humoral immunity, and cellular immunity. In particular, *G. lucidum* polysaccharides may affect immune cells and immune-related cells including B and T lymphocytes, dendritic cells, macrophages, and natural killer cells, with the promotion of immune organ growth, cytokine release, and other immune regulatory functions. Furthermore, cellular and molecular immunomodulatory mechanisms, possible receptors involved, and triggered signaling pathways have also been summarized. However, whole animal experiments are still needed to further establish the mechanism of the immunomodulating effects by Ganoderma. Importantly, evidence-based clinical trials are also needed.

**Keywords:** Cytokines; Ganoderma; Immunomodulatory effects; Macrophages; Polysaccharides.

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