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Controlled Clinical Trial    *Int Immunopharmacol.* 2006 Mar;6(3):499-508.

doi: 10.1016/j.intimp.2005.08.026. Epub 2005 Sep 15.

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

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PMID: 16428086    DOI: [10.1016/j.intimp.2005.08.026](https://doi.org/10.1016/j.intimp.2005.08.026)

### Abstract

Many herbal medicines are widely used as immuno-modulators in Asian countries. *Ganoderma lucidum* (Lingzhi) is one of the most commonly used herbs in Asia and preclinical studies have established that the polysaccharide fractions of *G. lucidum* have potent immuno-modulating effects. However, clinical evidence for this is scanty. The present open-labeled study aimed to evaluate the effects of *G. lucidum* polysaccharides on selected immune functions in patients with advanced colorectal cancer. Forty-seven patients were enrolled and treated with oral *G. lucidum* at 5.4 g/day for 12 weeks. Selected immune parameters were monitored using various immunological methods throughout the study. In 41 assessable cancer patients, treatment with *G. lucidum* tended to increase mitogenic reactivity to phytohemagglutinin, counts of CD3, CD4, CD8 and CD56 lymphocytes, plasma concentrations of interleukin (IL)-2, IL-6 and interferon (IFN)-gamma, and NK activity, whereas plasma concentrations of IL-1 and tumor necrosis factor (TNF)-alpha were decreased. For all of these parameters, no statistical significance was observed when a comparison was conducted between baseline and those values after a 12-week treatment with *G. lucidum*. The changes of IL-1 were correlated with those for IL-6, IFN-gamma, CD3, CD4, CD8 and NK activity ( $p < 0.05$ ) and IL-2 changes were correlated with those for IL-6, CD8 and NK activity. The results indicate that *G. lucidum* may have potential immuno-modulating effect in patients with advanced colorectal cancer. Further studies are needed to explore the benefits and safety of *G. lucidum* in cancer patients.

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