

Macrophage genes regulated by *Ganoderma lucidum*

SUMMARY

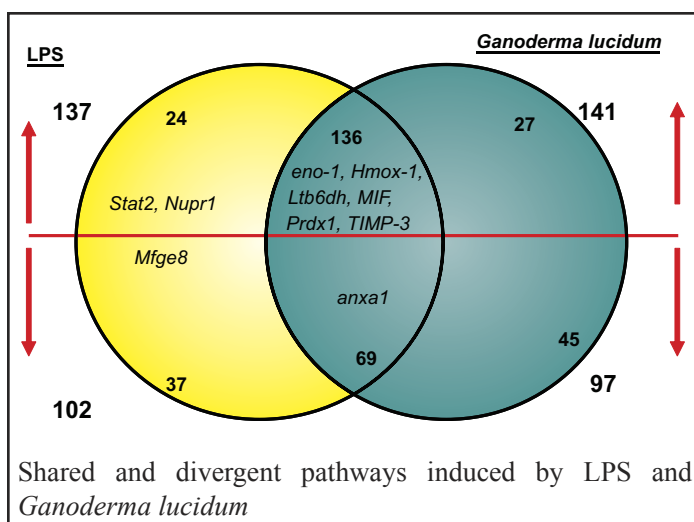
Ganoderma lucidum is an edible mushroom which is used to treat a range of conditions including cancer. Its mode of action is to act as an immune modulator, by activating macrophages. There are currently various preparations of *G. lucidum* available on the market with different levels of efficacy due to the characteristics of the extracts produced. In order to address this, the technology uses microarray methodology to identify genes regulated by different preparations of *G. lucidum*. Difference between preparations can be identified in order to determine those which are likely to be the most effective in cancer treatment.

APPLICATIONS

- Identifying the changes in gene expression and pathways initiated in macrophages when exposed to *G. lucidum*.
- Developing a method to compare different extracts and preparations of *G. lucidum*, leading to standardization of *G. lucidum* products.
- Identifying the extract that is most efficacious as an anti-cancer therapy.

CONCEPT

Cancer patients are typically immune compromised due to the immunosuppressive nature of most tumours or as a consequence



of chemo and radiation therapy. Therefore, these patients cannot benefit from the tumouricidal properties of innate immune effector cells. However, it has been shown that macrophages can be exploited for their anti-tumour properties when they are effectively activated. Medicinal mushroom are known to have various therapeutic benefits, including immunological and anti-cancer properties. *G. lucidum* has the longest historical usage for medicinal purposes and its extracts are available worldwide in tablet and liquid form. Medicinal mushrooms have been shown to reduce the immunosuppressive effects of radio and chemotherapy due to their immunostimulating effects. This technology uses a microarray-based approach to identify genes regulated by different preparations of *G. lucidum*. The technology can be used to validate and identify particular extracts of *G. lucidum* and to ensure there are adequate levels of standardization amongst products.

FEATURES AND BENEFITS

Validated and specific target

The anti-tumour effect of *G. lucidum* has been associated with its polysaccharides fraction. Experiments have shown that *G. lucidum* polysaccharides peptide (GLPP) stimulates host immune functions to inhibit tumour cell proliferation. A phase II clinical trial has shown that an herbal supplement which includes extracts of *G. lucidum*, significantly reduces prostate-specific androgen levels in prostate cancer patients. This technology will allow different extracts to be compared for their immunostimulating capabilities.

Growing market

The use of complementary and alternative medicines (CAMs) is growing, with herbal medicine growing faster than any other alternative therapy. It is believed that up to 35% of cancer patients worldwide may use CAMs as an adjunct to conventional therapies. The majority of cancer patients use CAMs to try and reduce the side effects of traditional therapies. As use of CAMs continues to increase, regulatory and policy making agencies will take a more effective role in characterizing compounds.

PROTECTION STATUS

Macrophage genes regulated by *Ganoderma lucidum* (NRC no. 11727).

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