Trametes versicolor

The world’s most thoroughly researched medicinal mushroom with the best documented evidence to support health promoting benefits

In many cultures, certain mushroom species have been long recognised to have profound health-promoting benefits. In China, Korea and Japan in particular, hot water extracts from these mushrooms have been used in traditional medicine for anti-cancer activities. Of all the commercially available mushrooms used for their medicinal properties, including Lentinus edodes (shitake mushroom), Trametes versicolor, Grifola frondosa (maitake), Pleurous ostreatus, Schizophyllum commune and Ganoderma lucidum (reishi), the one most thoroughly researched by scientists worldwide is Trametes versicolor (also known as Coriolus versicolor), commonly called “turkey tail mushroom” outside Asia.

Trametes versicolor mushroom has a long history of medicinal usage, dating back at least two millennia. In China, Trametes versicolor is known as ‘Yunzhi’ (cloud mushroom) and in Japan, it is known as “Kawaratake” (mushroom by the river). The mushrooms are gathered in the wild, growing as dense and overlapping clusters of fruiting bodies on dead or living trees.

The plush brownish mushroom caps have a velvety surface with a distinctive pattern of wavy bands of dark and light colour. Trametes versicolor is also found throughout the cool wooded temperate regions of Europe and North America. Historically, Chinese and Japanese herbalists harvest the fruiting bodies of the mushrooms, which are then dried, ground to a powder and made into tea. This simple hot water decoction or tea prepared according to the traditional Chinese pharmacopeias was used to ‘dispel dampness and reduce phlegm’ (meaning to deal with liquids and oils that are not adequately metabolised thus becoming toxic), to treat respiratory tract infection and support liver health. In Japan, many health practitioners use the mushroom to treat a variety of chronic conditions such as cancer and cardiovascular diseases.
Based on the reputation of the mushroom’s wide-ranging therapeutic benefits, scientists worldwide began to conduct controlled basic and clinical research (over 400 published studies) on hot water extracts from *Trametes versicolor*.

The researchers have found that the main therapeutic ingredients in the extracts of *Trametes versicolor* mushroom are complex polysaccharides with bound proteins that are intricately linked to the immune system enhancement by the mushroom.

These mixtures of proteoglycan compounds are non-toxic and are believed to be responsible for many of the mushroom’s therapeutic properties. The discovery that *Trametes versicolor* hot water extract was beneficial for stomach cancer led to scientists at the Japanese pharmaceutical company to isolate a major protein-polysaccharide component that belongs to a class of compounds known as beta-D-glucans in the *Trametes versicolor* hot water extract.²

The major protein-polysaccharide component after undergoing extensive research and development became known as PS-K or KRESTIN™. However, the *Trametes versicolor* bioactive proteoglycan, PSK, cannot be chemically synthesised and is difficult to extract in significant concentration from the fruiting stage of the mushroom. Hence, a high concentration of PSK is obtained from the pure mycelium (the vegetative stage) cultured in large submerged liquid fermenters under controlled conditions.

This new approach using modern biotechnology means that, unlike other processes in herbal medicine, PSK is produced as the active ingredient from *Trametes versicolor*. The freeze-dried mycelial culture mass is then produced in large repeatable amounts that have consistent potency with assured beneficial effects.

In the last 40 years there has been extensive work carried out on the biological and chemical properties of PSK. What the research has found is that PSK has wide-ranging effects on the human immune system.³ It can improve the effectiveness of the body’s natural defence and thereby has an effect on health and illness. PSK was shown to stimulate a significant immune response in healthy subjects with laboratory-confirmed depressed immunity. For example, when given PSK 3 gm/day daily for 8 weeks, workers from a Japanese chemical plant had a significant enhancement of natural killer cell activity and an improvement of other immunological parameters including increase in white blood cells and cellular immune functions,⁴ all of which are critical to the normal function of the human immune system. The researchers concluded that PSK ‘potentiates the immunity of non-tumour bearing individuals with depressed immunity.’ In another study,⁵ PSK also stimulated a significant immune response within 24 hrs when given to both healthy volunteers and to patients with gastric cancer.
**How does *Trametes versicolor PSK* work?**

The answer appears to lie in our immune system. The immune system defends against anything that goes wrong anywhere in the body. The immune system is comprised with many types of cells that circulate in the blood or populate the body tissues including the spleen, thymus, bone marrow, lung and gut. The function of these cells is to detect and eliminate any threats to the body, known collectively as ‘The Immune Response.’

When functioning optimally, the immune system detects and destroys any invaders such as viruses or bacteria and also does important ‘housekeeping’ by disposing of any dead or dying or abnormal cells before they become a problem. Furthermore, the immune system protects the body when under stress and from injury caused by exposure to environmental agents such as chemicals and allergens. How the immune system goes about its task to defend the body everywhere is highly complex and co-ordinated. However, it is vulnerable to physical, chemical and emotional stresses that plague our daily life. A less than optimal immune function may reflect these insults.

For decades, *Trametes versicolor PSK* has been investigated for its mechanisms of action on key cell types known to be involved in optimum immune system functions necessary for maintaining good health. The research revealed that, as *Trametes PSK* is taken orally, it is absorbed in the gut to be processed by tissue ‘gatekeeper’ cells called dendritic cells. These cells then alert the immune system by passing on the processed polysaccharide material of PSK to killer cells, leukocytes and other immune cells in the vicinity. The effector cells in turn become ‘primed’ and ‘educated’ for immune vigilance to be ever better ready against the body’s enemies. This way an ongoing stimulation by *Trametes PSK* keeps the cell types of the immune system more vigilant and alert so that they respond more rapidly and intensely to any threat to the body’s health.

Of all the commercially available mushrooms that claimed to support immune health, *Trametes PSK* is the only one that has been most extensively researched and has the best documented evidence of benefit supported by a large body of peer-reviewed independent clinical studies including double blind human trials. The researchers found the beneficial effects of *Trametes PSK* were statistically significant and were probably due to an improved immune function.
The studies have also found that *Trametes* PSK was an effective radio- and chemo-protective dietary supplement supporting and protecting immune health in those people receiving treatments known to be harmful to the immune system. In these clinical settings, an impaired cellular immunity is the most common feature attributable to the treatments used.\(^3\)

*Trametes* PSK probably acts by boosting the body’s immunity by re-balancing the immune system. It is believed that the immune system comprises two immune responses, cellular and humoral (the body fluid surrounding the cells). The balance between the two responses determines how well our body deals with disease and infection (bacteria and virus). Keeping the balance between the body’s cellular and humoral responses is a vitally important process for immune health and is controlled by cells called T\(_{H1}\) and T\(_{H2}\). When imbalance occurs, the immune system shifts to a high T\(_{H2}\) state. Consequently, the body’s major natural defence against infection is compromised when fewer natural killer cells or NK cells are produced to combat the offending pathogen.

The ability to mobilise other immune mechanisms to combat the pathogen decisively is also defective when the body’s cellular and humoral processes are not in balance: where the body shifts to a T\(_{H2}\) state. A T\(_{H2}\) dominant state is normally associated with a chronic virus infection (e.g. hepatitis, HIV). Hence, higher levels of T\(_{H1}\) are needed in order to produce natural killer cells to eliminate the offending pathogen. Researchers have found that *Trametes* PSK promotes a T\(_{H1}\) response\(^3\), a state critically important for producing natural killer cells to support immune health.

**Who can benefit from taking *Trametes versicolor***?

The active ingredient responsible for the complete immune enhancing effect of *Trametes versicolor* is polysaccharide-K (PSK). *Trametes* PSK is formulated as a freeze-dried mycelial powder extract and encapsulated for effective delivery of the PSK immune nutrient.

Based on the available evidence from a huge body of research,\(^3\) the key reasons to take *Trametes* PSK would include typically those people who are: regular smokers, low in energy, exposed to radiation and toxic drugs, catch a common cold easily, recovering from injury/surgery, advancing in age, leading a highly stressful life, work in a health-challenging environment and those who have laboratory-confirmed impaired immunity.

In these settings, ability to boost the efficiency of the immune system without a downside suggests that *Trametes versicolor* proteoglycan extract is the most powerful immunoeutical available anywhere.
References


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