ORIGINAL ARTICLE

Potential Health Benefits of Ginseng in Autoimmune Illnesses: A Review

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ABSTRACT Epidemiological data show that autoimmune illness has been steadily increasing in Westernized societies over the last few decades. There are numerous papers detailing past or current incidences/prevalence of specific autoimmune illnesses, but long-term studies on specific populations are sparse. Autoimmune diseases are a fascinating group of illnesses that are yet poorly understood. Ginseng is a 2000-year-old herb that has been used to treat a variety of ailments. It is known as the king of herbs and is utilised more as a restorative ingredient for the body than a curative strategy. Ginseng has potential in helping cure or manage autoimmune conditions.

Keywords: Autoimmune disorder, Ginseng, Crohn's diseases, Immunity

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INTRODUCTION

Autoimmune disorders are the fasting growing condition around the globe. Autoimmune illnesses are one of the top causes of death among the world's young and middle-aged adults. It can affect any individual, at any age and at any time. An autoimmune condition is destruction of body's own tissue by immune system and it is outcome of complex interaction of genetic and environmental factors. Autoimmune condition is triggered mostly by three situations. Environment, genetics and gut health. Environment triggers autoimmune condition in the form of metal poisoning, radiation exposure, chronic stress, etc. Genetics also play a very vital role in auto immune conditions. There's a saying in epigenetics that "Genes load the gun; environment pulls the trigger". Most common trigger of autoimmune disorder is gut health. Any food sensitivity such as gluten intolerance, lactose intolerance, peanut or any other nut allergies can weaken the gut lining. Body in order to protect itself has an autoimmune response that can cause inflammation. Recurrent inflammation can hence trigger autoimmune disorder.

Role of *Panax Ginseng* in Autoimmune Conditions

In milder climates, such as Northeast China, Korea, and Russia, Panax ginseng Meyer thrives. It can be classified as Chinese ginseng, White ginseng, Korean red ginseng, American ginseng, and so on, depending on the plant's origins and processing methods. Ginseng has been utilised in clinics for thousands of years as a valuable traditional Chinese medication. The Greek term "Panax," which means "all-cure," alluded to its significance in the medical sector(1).

Panax Ginseng has been known for its medicinal properties. *Panax ginseng* is known for its various health benefits. It can help prevent various illnesses and alleviate various symptoms. The human immune system is composed of various cells that have their own specialized functions. These cells can counteract or enhance the effects of microbial attacks. Extracts, fractions, and constituents of *P. ginseng* can differentially regulate each type of immune cells(2).

Saponins, polysaccharides, flavonoids, volatile oil, and gintonin have all been discovered to be active components in ginseng. Ginseng polysaccharides (GP) are the most prevalent active ingredient in ginseng, accounting for nearly a quarter of its dry weight and having immunoregulatory, anti-oxidant, anti-cancer, and anti-inflammatory properties. Recently, it was

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discovered that GP can also regulate intestinal metabolism and restore gut microbial equilibrium. This discovery may provide fresh insights into the mechanism of GP's effects on NSDs, given the existence of the "gut-brain axis" and the bidirectional link between the gastrointestinal and central neurological systems(3). *Panax ginseng's* active ingredient, ginsenosides, has various pharmacological effects. According to recent studies, these compounds can trigger an immunological response and inhibit the growth of immune cells in patients with Inflammatory bowel disease. They are also known to activate various protein signalling pathways and act on the balance of immune cells. The result suggested that effects of ginsenosides on immunoregulation and intestinal epithelial regeneration enhances the intestinal mucosal barrier function and thus ginsenosides might serve as a promising new drug for treating Inflammatory bowel disease(4).

A study done by collecting data from different platforms showed that Different properties of panax ginseng can be used for treating various disorders like Multiple Sclerosis, sleep disorders, and pain. It can improve the function of the brain and promote the anti-tumour effect of the immune system. It can also help treat Alzheimer's disease. Supplementing ginseng can inhibit secretion of inflammatory mediators and interleukin 1B. It contains acidic polysaccharides that stimulates the reduction of brain response during experimental autoimmune encephalomyelitis making it a good treatment option for multiple sclerosis(5). A study was conducted on a well-established mouse model of Type 1 diabetes to examine the preventive potential of Korean red ginseng (KRG) extract (Panax ginseng C.A. Meyer Radix Rubra). The preventive impact of KRG extract was tested in mice for two weeks before being given streptozotocin (STZ) to induce diabetes. KRG-treated diabetic mice's glucose levels and glucose challenge test results were compared to those of untreated diabetic mice and healthy control mice. Immune compartments in lymphoid organs were examined, as well as immunohistochemistry labelling of the pancreas for islet cell shape and insulin-producing beta cells. The result suggested that when used as a prophylactic, KRG extract dramatically reduced blood glucose levels to an average of 250 mg/dl from 350 mg/dl and enhanced glucose challenge testing. KRG extract protected pancreatic tissue from STZ-induced damage and restored insulin secretion, according to histological data. Surprisingly, this impact was coupled by lymphocyte reconstitution in secondary lymphoid organs, implying that KRG extract aided immunological homeostasis(6). A study suggested that immunostimulatory, anticancer, and anti-oxidative properties of ginseng are the most intriguing aspects of its relationship with the immune system. Few researchers have looked at the prospect of ginsenosides being used to treat anti-inflammatory disorders by looking into their inflammatory response inhibitory mechanisms in vivo and in vitro. Indeed, it has been suggested that it could be developed as a new anti-arthritis medicine due to its pharmacologic qualities. As a result, it is expected that freshly manufactured active saponin metabolites, or their modified structures, will be generated in the near future, with powerful and safe immunosuppressive and anti-inflammatory effects(7).

Systematic review was conducted to evaluate randomised controlled trials, with no publication date limitation, four English databases were searched. *P. ginseng* was studied in patients with a variety of diseases as well as healthy people. The Cochrane risk of bias method was used to assess the quality of the studies. Only 65 of the 475 potentially relevant studies met the criteria for inclusion.These studies examined effects of ginseng on psychomotor performance (17 studies), physical performance (ten), circulatory system (eight), glucose metabolism (six), the respiratory system (five), erectile dysfunction (four), immunomodulation (four), quality of life/mood (four), antioxidant function (two), cancer (two), menopausal symptoms (two) and dry mouth (one) (one). The risk of bias was unknown in most investigations. In 40 trials, the authors looked at adverse effects and found 135 mild ones but no significant ones. *P. ginseng* provides encouraging outcomes for regulating glucose metabolism and modulating the immunological response. This could have ramifications for a variety of ailments, including type 2 diabetes and chronic respiratory problems. Further research is needed to evaluate potential ginsengs as a successful treatment for these and other health issues(8). In a study conducted on people with Alopecia areata (AA), supplementation of Korean red ginseng was done. AA is an autoimmune illness that affects any region of the body that bears hair. Although it is recognised that AA is caused by an immune disease, the pathophysiology is yet unknown. Alopecia areata has been treated with a variety of treatment techniques, each with varying efficacy and safety profiles. Unfortunately, none of these agents are 100% curative or preventative on their own. Comparison was done on corticosteroid intra-lesional injection (ILI) alone patient group with ILI with KRG taking patient group utilising Folliscope 2.5 for 12 weeks to see how effective and safe Korean red ginseng (KRG) is for hair growth in AA. The result suggested efficacy of KRG in the treatment of AA and suggest KRG as a beneficial complementary meal for improving AA treatment efficacy(9).

Atopic dermatitis (AD) is a recurrent, chronic inflammatory condition that affects 1% to 20% of the world's population. The historic usage of Panax ginseng Meyer for its promise healing and restorative properties to treat a variety of ailments, including skin disorders, has led to the discovery of P.

ginseng's potential as a new drug development. Previous studies have found that *P. ginseng* has beneficial effects in Alzheimer's patients, including reduced eczema area and severity index, transepidermal water loss, immunoglobulin E levels, and improved sleep quality. P. ginseng and its derived ginsenosides have also shown positive results in in vivo animal models, such as decreased transepidermal water loss, immunoglobulin E levels in serum, allergy-related cytokines, and so on. ginseng and its derived ginsenosides are unquestionably a nontoxic effective option to treat AD(10).

On the immunological function of individuals with bile duct or pancreatic cancer, Korean Red Ginseng was given with adjuvant chemotherapy. Twenty-six consecutive patients who underwent curative resection for bile duct or pancreatic cancer followed by 5-fluorouracil/leucovorin or gemcitabine chemotherapy were enrolled in a prospective, randomised controlled trial. They were split into two groups: ginseng and control. During and after treatment, immune and inflammatory markers were measured in peripheral blood samples. There were no significant variations in immune-related markers between the groups before and throughout treatment. The percentage of CD4+T cells in the ginseng group was substantially greater than in the control group after chemotherapy. The ginseng group also had a higher CD4+/CD8+ T lymphocyte ratio. The prevalence of neutropenia and hepatic dysfunction did not differ between the groups. After chemotherapy, the ginseng group, which received Korean Red ginseng daily throughout adjuvant chemotherapy, had greater levels of CD4+ T lymphocytes and a lower CD4+/CD8+ T lymphocyte ratio(11). Crohn's Disease (CD) is a chronic inflammatory disease of the bowel that is mostly mediated by T cells. The public's impression of CD is now limited, and public health inspections are carried out because it promotes eminent ability. It is more prevalent in wealthy countries. CD is a disease that is recurring, dynamic, and fatal. Due to the overlapping symptoms, CD is difficult to diagnose(11). The anti-inflammatory and anti-oxidant effects of anthocyanin-enhanced Ginseng extract in combination, repress the extraction of inflammatory action work by improving anti-oxidant action, inhibiting DNA oxidative injury and free-radicle foraging, as well as fatty acid peroxidation(12).

Chronic inflammation is linked to an increased risk of cancer. Ginseng has been shown to have powerful anti-inflammatory effects on key actors in the inflammatory cascade. Chemically generated abnormal crypt foci in mice can be inhibited by *P. ginseng*. Active inflammation is linked to a cytokine storm. It's thus intriguing to see that ginseng reduces cultured macrophages' production of tumour necrosis factor and other proinflammatory cytokines in response to lipopolysaccharide. Other mediators of the inflammation-to-cancer pathway can be inhibited by ginseng. Ginseng has been demonstrated to have an influence on critical tumour suppressor proteins in investigations. The effects of different types of ginsengs on molecules have the end result of promoting apoptosis and suppressing cell cycle progression. Overall, it's an excellent example of a natural herb with a wide range of qualities that aid in the prevention of inflammatory-mediated carcinogenesis(13). Rheumatoid arthritis (RA) is a chronic joint inflammation caused by a systemic inflammatory illness. Red ginseng is a steamed and dried Panax ginseng C.A. Meyer that has been used for thousands of years as an alternative medicine. The effects of red ginseng extracts (RGE) on autoimmune arthritis in mice and humans, as well as the underlying mechanism, were investigated in this study. Mice with arthritis were given RGE three times a week orally. In mice with CIA, oral treatment of RGE significantly reduced clinical arthritis score and histologically evaluated joint inflammation. RGE therapy resulted in a significant reduction in STAT3 phosphorylation and a drop in the number of Th17 cells. With RGE therapy, RANKL-induced osteoclast genesis was also significantly reduced. The inhibitory impact of RGE on Th17 differentiation and osteoclast genesis reported in mice was verified in human peripheral blood mononuclear cells in subsequent tests. The findings in this study are the first to show that RGE can decrease the phosphorylation of STAT3 and so regulate Th17 and increase Treg cells in a reciprocal manner. As a result, by addressing pathogenic Th17 and osteoclast development, RGE can alleviate arthritis in CIA mice, suggesting a potential therapeutic for the treatment of RA(14).

Because of their ability to catalyse the breakdown of neurotransmitters like acetylcholine and some esters, ginsenosides have been found to inhibit the activity of AChE (acetylcholinesterase), BChE (butyrylcholinesterase), and BACE1, which are the enzymes responsible for the onset of Alzheimer's disease. It was discovered that ginseng given alone had no significant influence on the course of Alzheimer's disease. When used in conjunction with other Alzheimer's medications, it has the potential to improve cognitive performance in Alzheimer's patients. When delivered systemically, ginsengin, a relatively novel component of ginseng, was found to boost memory formation in mice(15). This review evaluated current knowledge on ginseng's effects on important vas risk factors such as cardiovascular disease, internal organ illness, hyperlipidaemia, aerophiles stress, and particle management. Ginseng is an ancient seasoning treatment with a long history dating back to ancient times. Ginseng's active constituents, ginsenosides, play a key part in its medicinal properties. Ginsenosides have a wide range of effects on CVD, including suppression of ROS formation, promotion of NO production, improved blood circulation,

improved dilation tone, and supermolecule profile control. Ginsenosides' exact mechanisms of action(16).

CONCLUSION

The therapeutic benefits and promises of ginseng are met with scepticism in the Western world. The widespread use of ginseng as a seasoning treatment necessitates thorough research to determine both its efficacy and safety. however, every ginsenoside should be researched in the future for its distinct mechanism of action on different illnesses. Hence, ginseng has shown such promising result, it should be studied further in more detail.

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