Ginseng

Scientific Name(s): Panax ginseng C.A. Meyer., Panax quinquefolius L.
Common Name(s): American ginseng, Asian ginseng, Canadian ginseng, Chinese ginseng, Korean ginseng, Oriental ginseng, Radix ginseng

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Clinical Overview

Use

Ginseng root is widely used for its adaptogenic, immunomodulatory, antineoplastic, cardiovascular, CNS, endocrine, and ergogenic effects, but these uses have not been confirmed by clinical trials.

Dosing

According to the *Complete German Commission E Monographs*, crude preparations of dried root powder 1 to 2 g can be taken daily for up to 3 months. In numerous clinical trials, the dosage of crude root has ranged from 0.5 to 3 g/day and the dose of extracts has generally ranged from 100 to 800 mg.

Contraindications

Contraindications have not been established aside from known hypersensitivity.

Pregnancy/Lactation

Information regarding safety and efficacy in pregnancy and lactation is lacking.

Interactions

Limited evidence exists for any established interactions, with most data derived from laboratory studies and healthy volunteers.

Adverse Reactions

It is estimated that more than 6 million people regularly ingest ginseng in the United States. There have been few reports of severe reactions and a very low incidence of adverse events has been reported in clinical trials. Hypersensitivity and anaphylaxis have been reported. Inappropriate use of P. ginseng or ginseng abuse syndrome includes symptoms such as hypertension, diarrhea, sleeplessness, mastalgia, skin rash, confusion, and depression. Two cases of new onset

acute manic episodes subsequent to high doses have also been reported.

Toxicology

None known.

Scientific Family

- Araliaceae (ginseng)

Botany

Ginseng commonly refers to P. quinquefolius L. or P. ginseng C.A. Meyer, 2 members of the family Araliaceae. Several other species are less commonly used in Asia. The ginsengs were classified as members of the genus Aralia in older texts. In the eastern and central United States and Canada, P. quinquefolius is found in rich, cool woods; a large crop is grown commercially in Wisconsin. The Asian species P. ginseng is cultivated in Korea and China. The short plant grows 3 to 7 compound leaves that drop in the fall and bears a cluster of red or yellowish fruits from June to July. The shape of the root can vary depending on the species and has been used to distinguish types of ginseng. Medicinally, the root is considered the most valuable part of the plant in providing the pharmacologically active ginsenosides. Ginsenoside content varies with the age of the root, season of harvest, and method of preservation. While at least 4 ginsenosides are detectable in most young roots, this number more than doubles after 6 years of growth. High-quality ginseng is generally collected in the fall after 5 to 6 years of growth.1, 2

P. ginseng should not be confused with Siberian ginseng (Eleutherococcus senticosus), a related species with different chemistry.1

History

Ginseng is perhaps the most widely recognized plant used in traditional medicine and now plays a major role in the herbal health care market. It is classified into 3 types according to processing; fresh, white (dried after peeling), and red (steamed and dried). For more than 2,000 years, various forms have been used medicinally. The name Panax derives from the Greek word for "all healing," and its properties have been so touted. Ginseng root's man-shaped figure (shen-seng means "man-root") led proponents of the doctrine of signatures, an ancient European herbalists philosophy, to believe that the root could strengthen any part of the body. Through the ages, the root has been used in the treatment of asthenia, atherosclerosis, blood and bleeding disorders, erectile dysfunction, hypertension, liver dysfunction, and colitis, as well as to relieve the effects of aging, cancer, postmenopausal disorder, and senility.3, 4, 86

Evidence of the root's general strengthening effect has been examined for its ability to raise mental and physical capacity, as well as its protectant effect against diabetes, neurosis, radiation sickness, and some cancers. Today, its popularity is widely due to the adaptogenic or stress-protective effect of the saponins.3, 4

Chemistry

Major compounds in ginseng include triterpene saponins, polyacetylenes, sequiterpenes, polysaccharides, peptidoglycans, nitrogen-containing compounds, and other compounds, including fatty acids, carbohydrates, and phenolic compounds.2, 5, 6 The triterpene saponins are considered the most active compounds, and some estimates report up to 150 different ginsenosides, grouped into either dammarane or oleanane groups.6 Ginsenosides Rb1, Rb, Rc, Rd, Re, Rf, and Rg1 are the most common components of commercial ginseng products.86 Many analytical methods

have been described and standards published. The *European Pharmacopoeia* requires a minimum of 0.4% combined Rg1 and Rb1 ginsenosides, while the *Chinese Pharmacopoeia* requires ginseng radix (dry root) to have not less than 0.3% Rg1 and Re combined ginsenosides and not less than 0.2% Rb1.5

Most traditional ginseng herbal preparations contain ginsenosides. However, a commercially available product, known as CVT-E002, a patented aqueous extract of approximately 80% to 90% poly-furanosyl-pyranosyl-saccharides from the roots of North American ginseng (P. quinquefolius), does not contain ginsenosides.7 Adulterants are commonly found in ginseng preparations due to the high cost of authentic ginseng roots, and the presence of natural methylxanthines may also contribute to some reported physiological effects.6, 7, 8

Variances in cultivation and processing methods, as well as the individual genetics of each plant source, result in varying chemical compositions among commercial products. This may contribute to the lack of consensus among studies on the pharmacology and efficacy of ginseng and should be considered when conducting and interpreting research.2, 9 A second factor that may have produced erratic results is the discovery that ginsenosides (specifically Rb1, Rb2, Rc, and Rd) are metabolized extensively by the human gut microflora and that some of the resulting metabolites are pharmacologically active, such as compound K. Colonic bacteria can remove the 3 sugars from ginsenoside Rb1 in stepwise fashion, and the deglycosylated compounds are then esterified in the liver with the fatty acids stearic, palmitic, and oleic acid. These esters persist in the liver for as long as 24 hours.10, 86 Thus, differences in an individual's gut flora may lead to differing pharmacological responses to ginseng preparations. Additionally, ginsenoside bioavailability as well as the content of ginsenoside metabolites (ie, compound K, Rh1, Rg3, protopanaxatriol, protopanaxadiol) of red ginseng were found to be increased with the fermented product.86

Uses and Pharmacology

Reviews of the effects of ginseng have been published. Most studies have used whole-root preparations, with considerable variations due to uncertain species identification, age of the roots, and curing process used. Variations in saponins between the species also may contribute to the lack of consensus among researchers on ginseng's pharmacology.(2, 6, 11)

Cancer

Animal data

Both ginsenosides and polyacetylenes have demonstrated anticarcinogenic effects in vitro, including direct cytotoxic and growth inhibitory effects, induction of differentiation, and inhibition of metastasis. High concentrations of M1, an active metabolite of Rb1, Rb2, and Rc, induced cell death of mouse melanoma cells by regulating proteins involved in apoptosis. Ginsenosides Rh2 and Rh3 induced differentiation of promyelocytic leukemia cells into granulocytes; Rg3 inhibited adhesion and invasion of melanoma cells and decreased pulmonary metastasis.(6, 12, 13)

Clinical data

Epidemiological data support a protective effect of ginseng on nonspecific organ cancers.(6, 14) A long-term study of ginseng 1 g taken weekly for 3 years among adults with long-term atrophic gastritis showed no effect on the overall relative risk of cancer. In the male subgroup analysis, there was a reduction in the risk of non–organ-specific cancers. (14)

Trials evaluating the effect of ginseng (both P. quinquefolius and P. ginseng) on cancer-related fatigue at doses of 800 mg to 2 g/day over 4 to 12 weeks have shown effects for some, but not all, aspects of mental and physical functioning. (15, 16, 75, 91) Ginseng may improve some of the adverse effects of chemotherapy-related transcatheter arterial chemoembolization.(17)

A systematic review of herbal medicines as adjuvants to the FOLFOX4 regimen used for treating colorectal cancer was conducted to identify evidence of safety and efficacy as well as management of chemotherapy side effects. A total of 13 Chinese randomized clinical trials involving 940 patients were included, which compared herbal medicines plus FOLFOX4 combination to the FOLFOX4 regimen alone in patients with advanced (stage IV) colorectal cancer. Although 58 different herbs and/or extracts were used, Panax ginseng was one of the 6 most common herbs found in treatment preparations (n = 5 in studies). Tumor response rate, overall survival at 1 year, time to progression, quality of life, body weight, nausea/vomiting, and neutropenia improved significantly (*P* values ranged from $P < 0.00001$ to $P = 0.01$) with herbal adjuvants. Ginseng was included in each of the studies contributing to these results.(82)

The American Society of Clinical Oncology clinical practice guideline adaptation for the screening, assessment, and management of fatigue in adult survivors of cancer (2014) notes that results from small pilot studies on the effectiveness of supplements, such as ginseng, for managing cancer-related fatigue are equivocal.(81)

Cardiovascular effects

Ginseng saponins have been reported to act as selective calcium antagonists and enhance the release of nitric oxide from endothelial and neuronal cells. In vitro studies have shown that total ginseng saponins extracted from Panax notoginseng and P. quinquefolius inhibited calcium entry through receptor-operated calcium channels without affecting calcium entry through voltage channels or intracellular calcium release.(6, 18)

Animal data

In studies involving rabbits and dogs, ginsenosides Ro and Rb from P. ginseng offered a protective effect in myocardial ischemia and reperfusion injuries. This effect may be partly mediated by increased release of prostacyclin and by activation of nitric oxide synthase and subsequent release of nitric oxide. An inhibitory effect on platelet aggregation and on the conversion of fibrinogen to fibrin has been demonstrated, and the prevention of atheroma in rabbits fed a high-cholesterol diet has been observed.(6, 19)

Clinical data

Clinical trials evaluating the effect of ginseng on the cardiovascular system are limited. Hypotensive and hypertensive effects have been postulated. In a short-term study in healthy adults, ginseng 3 g had no effect on blood pressure but lowered the arterial augmentation index(20) while a 12-week study among hypertensive adults found no effect of ginseng on 24-hour blood pressure or on renal function.(21) Shenfu injection, a mixture of ginseng and monkshood, has been used to prevent reperfusion injury following mitral valve replacement.(22) Sanchi (P. notoginseng) is widely used in traditional Chinese medicine in acute ischemic stroke. The saponins in sanchi are similar to those found in P. ginseng and are classified as dammarane saponins (Rb1 and Rg1 primarily). A review of clinical trials found limited evidence of effect of sanchi on short-term effects of ischemic stroke, but noted that the trials were of limited methodological quality. (23)

In a double-blind controlled trial, 64 adults with well-controlled type 2 diabetes and hypertension received 3 g of American ginseng or placebo for 12 weeks. Ginseng significantly improved arterial stiffness by 5.3% ($P = 0.041$) and systolic blood pressure by 11.7% ($P < 0.001$); no effect was noted on diastolic blood pressure.(79)

CNS effects

Rb1 and Rg1 appear to play a major role in CNS stimulatory and inhibitory effects and may modulate neurotransmitters. Cholinergic activity, implicated in mediating learning and memory processes, is affected by certain ginsenosides. Antioxidant, anti-inflammatory, antiapoptotic, and immune stimulatory effects are suggested to contribute to a protective effect in neurodegenerative disorders.(24)

Animal data

Animal studies show that Rb1, Rg1, and Re prevent scopolamine-induced memory deficits, and that Rb1 and Rg1 appear to increase central choline uptake and facilitate the release of acetylcholine from hippocampal tissues. Results from a study in aged rats suggest that daily oral administration of P. ginseng extract 8 g/kg/day for 12 days improved learning performance. In animal tissues, ginseng extract inhibited gamma-aminobutyric acid (GABA), glutamine, dopamine, noradrenalin, and serotonin uptake in a concentration-dependent manner.(6, 24, 25, 26)

Clinical data

Limited high-quality clinical trials have been conducted, and systematic reviews include data from very few studies.(11, 27) An anxiolytic effect via GABA modulation was suggested to be responsible for an observed improvement in sleep disorders for fermented ginseng.(28) Among healthy adults, short-term effects of P. ginseng and P. quinquefolius include increased mental performance, increased calmness, and decreased mental fatigue.(29, 30, 31) A review of the effect of ginseng on cognitive function in Alzheimer disease found an effect in favor of ginseng for the mini-mental status examination and Alzheimer Disease Assessment Scale for the 2 included studies.(27, 32) A 2010 Cochrane systematic evidence review examining ginseng's effect on cognition found it difficult to pool the available data due to heterogeneity of studies. The reviewers stated that there was some evidence to suggest benefit of ginseng in healthy people for improvement in cognitive function, behavior, and quality of life. There was a lack of high-quality evidence to support ginseng's use in patients with dementia.(76)

The American Psychiatric Association (APA) guideline watch for the treatment of patients with Alzheimer disease and other dementias (2014) did not find enough definitive new evidence to change the 2007 guideline recommendations for alternative agents, including ginseng.(90)

Diabetes

Animal data

Widespread usage of ginseng and the availability of limited clinical trial data make animal studies largely redundant.

Evidence appears to support the modulation of insulin sensitization and secretion based on cholinergic, dopaminergic, adrenergic, and nitric oxide actions found with ginsenosides. These have been noted to affect glucose metabolism in animal studies.(24, 33, 34)

Clinical data

Limited quality clinical trials have been conducted among adults with diabetes, with the majority of studies evaluating ginseng in healthy volunteers. Improvements in blood glucose measures and glycemic control have been reported in some(33, 34, 35, 36, 37) but not all(31, 38, 39) studies.

Ergogenic effects

Animal data

Widespread usage of ginseng and the availability of limited clinical trial data make animal studies largely redundant.

Clinical data

Evidence supporting the efficacy of ginseng in improving physical performance is conflicting. Physical performance in young, active volunteers did not improve in 4 studies; however, other studies reported a decrease in heart rate and an increase in maximal oxygen uptake.(11, 40) One comprehensive literature search evaluated P. ginseng preparations in data from human studies. Properly controlled studies using higher doses (standardized to 2 g/day of dried root)

administered for at least 8 weeks and in larger subject numbers more often exhibited improvement in physical or psychomotor performance. Benefit of ginseng may be greater in untrained subjects or in those older than 40 years.(41)

The Society for Integrative Oncology's updated guideline on the evidence-based use of integrative therapies during and after breast cancer treatment (2017) recommends ginseng be considered for improving fatigue during treatment (grade C).(88)

Fatigue, cancer-related

Clinical data

Patients diagnosed with cancer within the past 2 years who presented with cancer-related fatigue and who were undergoing or had undergone curative intent treatment were randomized to 2,000 mg/day of Wisconsin/American ginseng (P. quinquefolius) or placebo for 8 weeks. In this double-blind, multicenter trial of 364 patients, a significant improvement in fatigue scores was documented after 8 weeks in the ginseng group compared to controls (*P*=0.003). Significance was retained in the subgroup of patients currently undergoing cancer therapy (*P*=0.01) but was similar to placebo for those who had previously undergone cancer therapy. Ginseng was well tolerated with no significant differences in the incidence of side effects between groups.(104) Similar benefit was observed with 2,000 mg/day of Korean red ginseng (P. ginseng) in a multicenter, randomized, double-blind, phase 3 trial that enrolled 471 colorectal cancer patients with cancer-related fatigue who were undergoing adjuvant or palliative mFOLFOX-6 chemotherapy regimen. Of the 330 per-protocol patients who completed the 16-week study, those in the ginseng group experienced significant reductions in global fatigue scores compared with placebo (*P*=0.019) as well as "fatigue right now" (*P*=0.045), "mood" (*P*=0.006), "relations with others" (*P*=0.003), and "enjoyment of life" (*P*=0.036) subscores. Although perceived stress was improved in the ginseng group (*P*=0.024), fatigue-related quality-of-life scores remained similar between groups at week 16. Significant benefit for fatigue was retained for patients at least 60 years of age (*P*=0.000), at least 80% compliance (*P*=0.013), and in females (*P*=0.023). The incidence of adverse events was similar between groups with grade 1 or 2 neutropenia (6% vs 3%), headache (7% vs 2%), and URTI (6% vs 2%) occurring at least twice as often with ginseng than with placebo.(105)

Fatigue, chronic

Clinical data

A double-blind, placebo-controlled, randomized clinical trial investigated antifatgue effects of P. ginseng (20% ethanol extract) in 90 adults with idiopathic chronic fatigue. Fatigue severity measured by numerical self-rating scores was significantly improved by 1 and 2 g daily doses; additionally, the 2 g/day doses significantly reduced visual analogue scores. Serum levels of antioxidants and biomarkers associated with oxidative stress (ie, reactive oxygen species, malondialdehyde) were also decreased significantly by both ginseng doses compared with placebo.(73)

Fatigue, multiple sclerosis-associated

Clinical data

Fatigue is a common and frequently bothersome problem in patients with multiple sclerosis (MS), and a randomized, double-blind, placebo-controlled crossover pilot study (n = 47) was conducted. Patients received 6-week courses of ginseng or placebo, with a 2-week washout between crossover therapies. Patients were instructed to titrate therapy upward beginning with 1 capsule/day for 1 week, 2 capsules/day in week 2, and 4 capusles/day for the next 4 weeks. Capsules contained 100 mg of ginseng extract or placebo. No significant difference in benefit for MS-related fatigue reduction was seen for ginseng versus. placebo.(78)

Fibromyalgia

Clinical data

P. ginseng (100 mg/day root extract, 27% ginsenosides) was compared with amitriptyline 25 mg/day and placebo in a double-blind randomized clinical trial for the treatment of fibromyalgia in adult women. Over the 12-week study period, statistically significant reductions from baseline were documented for pain, fatigue, and sleep in all 3 treatment groups (n = 38); however, no differences between groups occurred.(74)

Immunomodulatory and adaptogenic effects

Animal data

Animal studies have shown that ginseng extracts can prolong swimming time, prevent stress-induced ulcers, stimulate the proliferation of hepatic ribosomes, increase natural killer-cell activity, and possibly enhance the production of interferons.(42) Increased spleen B lymphocyte proliferation and serum immunoglobulin production have been documented in animal models. Increased peritoneal exudate macrophage production of the cytokines IL-1, tumor necrosis factor–alpha, and IL-6, and the production of nitric oxide has also been reported.(43, 44)

Clinical data

Studies in healthy volunteers measuring T-lymphocyte immunomodulation yield equivocal results.(11, 26) Studies in healthy sedentary men and healthy physically active men have found no effect of ginseng on immune markers.(40, 45) Modulation of CD8+ T cells and interleukin production was reported in sedentary men beginning to exercise.(45) A possible effect of ginseng on the CD4+ T cell count in HIV-positive men was reported.(46)

Clinical trials supported by the manufacturers of a patented P. quinquefolius preparation suggest a lowered incidence of influenza with the use of ginseng as a prophylactic, especially among elderly patients.(47, 48, 49, 50, 51, 77) Dosage studies have taken place to evaluate the effect of ginseng in children with upper respiratory tract infections.(52) Experimental and placebo groups experienced significant improvements from baseline in symptoms of allergic rhinitis over a 4-week double-blind, randomized, controlled trial. Symptom duration for nasal congestion was significantly shorter for fermented red ginseng (1.5 g/day as 750 mg twice daily) starting from week 1 compared to symptom duration for placebo in week 4. (Jung 2011)

Compared to baseline and placebo, administration of 6 g/day of the acidic polysaccharide Y-75 (Ginsan) from *P. ginseng* for 14 weeks resulted in significantly enhanced natural killer cell cytotoxic activity in 72 healthy volunteers. Red blood cell phagocytic activity was also significantly increased at 14 weeks compared with placebo.(83)

Other uses

Hepatoprotective effects

Limited data in animals suggest some hepatoprotective effects of ginseng show better results than seen with vitamin E against cyclophosphamide-induced liver injury.(100)

Sexual dysfunction

Studies in postmenopausal women suggest ginseng 1 g daily (as Korean red ginseng) may increase sexual arousal possibly via a relaxing effect on the clitoral cavernosal muscle and vaginal smooth muscle.(53)

In men, an improvement in erectile function has been shown in a meta-analysis of clinical studies.(54, 55) The American Urological Association guidelines on the management of erectile dysfunction (2005) states that herbal therapies are not

recommended for the treatment of erectile dysfunction based on insufficient data. They note that evidence from a small randomized controlled trial has suggested that Korean red ginseng may be an effective treatment, but this needs to be validated by larger trials.(72)

Menopausal symptoms

The Society of Obstetricians and Gynaecologists of Canada revised clinical practice guidelines on managing menopausal vasomotor symptoms (2021) do not recommend ginseng based on a lack of evidence to support clinical benefit.(106) Likewise, the Endocrine Society clinical practice guidelines for the treatment of symptoms of the menopause (2015) recommend counseling patients on the lack of consistent evidence for benefit of complementary medicine therapies, including ginseng, as an alternative nonhormonal therapy for vasomotor symptoms (weak recommendation; low quality evidence).(89) The North American Menopause Society position statement for nonhormonal management of menopause-associated vasomotor symptoms (2015) states that ginseng does not appear to be effective for vasomotor symptoms (Level I).(98)

Dosing

Ginseng root is standardized according to ginsenosides content, and can be chewed or taken as a powder, liquid extract, decoction, or infusion.

According to the *Complete German Commission E Monographs*, crude preparations of dried root powder 1 to 2 g can be taken daily for up to 3 months.8 In numerous clinical trials, the dosage of crude root has ranged from 0.5 to 3 g/day and the dose of extracts has generally ranged from 100 to 400 mg.2, 11, 13 Other trials have used higher dosages.38, 91

Pregnancy / Lactation

Avoid use during pregnancy and lactation due to insufficient safety evidence.2, 56 Concerns regarding estrogenic effects of ginseng have not been established, while in vitro teratogenicity in rats has been reported at artificially high doses of ginsenosides. 2, 56

An association of ginseng with androgenization in a case report is considered doubtful and more likely due to an adulterant in the preparation.56, 57 Ginseng is widely used in Asian countries among pregnant women and evidence from a cohort study and a review of clinical trials conducted in Singapore found no association between adverse events and the consumption of ginseng products in pregnant women.56

Interactions

Agents with antiplatelet properties: Herbs (anticoagulant/antiplatelet properties) may enhance the adverse/toxic effect of agents with antiplatelet properties. Bleeding may occur. Consider therapy modification.(58, 59, 60, 61)

Anticoagulants: Herbs (anticoagulant/antiplatelet properties) may enhance the adverse/toxic effect of anticoagulants. Bleeding may occur. Consider therapy modification.(58, 59, 60, 61)

Antihypertensive agents: Herbs (hypertensive properties) may diminish the antihypertensive effect of antihypertensive agents. Monitor therapy.(92)

Atorvastatin: Drug-induced liver injury was reported within 1 week of starting a ginseng/silymarin supplement in a patient with hepatitis on stable atorvastatin doses for the previous 5 years. The drug-induced atorvastatin interaction was scored as "probable" and precipitated by ginseng.(99)

Digoxin: Ginseng (Siberian) may increase the serum concentration of digoxin. No action needed.(94)

Fexofenadine: Ginseng (Panax) may increase the serum concentration of fexofenadine. No action needed.(96, 101, 102)

Herbs (anticoagulant/antiplatelet properties): May enhance the adverse/toxic effect of other herbs (anticoagulant/antiplatelet properties). Bleeding may occur. Consider therapy modification.(58)

Hypoglycemia agents: Herbs (hypoglycemic properties) may enhance the hypoglycemic effect of hypoglycemia-associated agents. Monitor therapy.(93)

Imatinib: Ginseng (Panax) may enhance the hepatotoxic effect of imatinib.No action needed.(62, 63, 64, 65, 66, 67, 68)

Nonsteroidal anti-Inflammatory agents: Herbs (anticoagulant/antiplatelet properties) may enhance the adverse/toxic effect of nonsteroidal anti-inflammatory agents. Bleeding may occur. Consider therapy modification.(58)

Phenelzine: Ginseng products may enhance the adverse/toxic effect of phenelzine. No action needed.(103)

Salicylates: Herbs (anticoagulant/antiplatelet properties) may enhance the adverse/toxic effect of salicylates. Bleeding may occur. Consider therapy modification.(58, 59, 60, 61)

Thrombolytic agents: Herbs (anticoagulant/antiplatelet properties) may enhance the adverse/toxic effect of thrombolytic agents. Bleeding may occur. Consider therapy modification.(58, 59, 60, 61)

Ginseng drug interactions (more detail)

Adverse Reactions

It is estimated that more than 6 million people regularly ingest ginseng in the United States. There have been few reports of severe reactions, and a very low incidence of adverse events has been reported in clinical trials.56 Hypersensitivity and anaphylaxis have been reported69 and the QTc interval may be increased.70

Inappropriate use of P. ginseng has been described causing symptoms such as hypertension, diarrhea, sleeplessness, mastalgia, vaginal bleeding, skin rash, confusion, and depression. A "ginseng abuse syndrome" was described based on an uncontrolled study in which participants used up to 15 g ginseng daily. When the dosage was reduced to 1.7 g/day, adverse reactions resolved.2, 56

Estrogenic effects have been reported in both pre- and postmenopausal women. However, studies with standardized extracts have shown no effect on estrogenic receptors (rats) or progesterone receptors (humans).2, 56 A case of orobuccolingual dyskinesia was reported in a 46-year-old menopausal woman after using a product containing black cohosh and ginseng for over a year.80 Two cases of new onset acute manic psychosis associated with high-dose, long-term ginseng use were reported in a 23 year-old Caucasian man and 79 year-old African American man after consuming an estimated 7 and 10 times, respectively, the daily recommended traditional Chinese medicinal dose. Neither patient had a psychiatric history. Approximately 15 g/day for 1 month and 20 g/day for 2 months, respectively, were consumed prior to emergency evaluation of bizarre or inappropriate behavior and psychomotor activity, restlessness, irritability, and anxiousness. All symptoms remitted in both patients with administration of supportive care and a short course of antipsychotic medication.84

In the 2016 Scientific Statement by the American Heart Association regarding drugs that may cause or exacerbate heart failure, ginseng has been recognized as a product with possibly harmful cardiovascular effects, such as hypo- or hypertension or decreased diuretic responsiveness, and may be harmful in patients with heart failure. The guidance noted that naturoceuticals are not recommended for the management of heart failure symptoms or for the secondary

prevention of cardiovascular events, and that nutritional supplements are not recommended for the treatment of heart failure [Low-quality; Limited].85

Data collected between 2004 and 2013 from 8 US centers in the Drug-induced Liver Injury Network revealed that 15.5% (130) of hepatotoxicity cases were caused by herbals and dietary supplements, whereas 85% (709) of cases were related to prescription medications. Of the 130 cases of liver injury related to supplements, 65% were from non-bodybuilding supplements and occurred most often in Hispanics/Latinos compared with non-Hispanic whites and non-Hispanic blacks. Liver transplant was also more frequent with toxicity from non-bodybuilding supplements (13%) than with conventional medications (3%) (P<0.001). Overall, the proportion of severe liver injury cases was significantly higher for supplements than for conventional medications (P=0.02). Of the 217 supplement products implicated in liver injury, 175 had identifiable ingredients, of which ginseng was among the 32 (18%) single-ingredient products.87

Ginseng side effects (more detail)

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Toxicology

Embryotoxicity due to ginsenosides Rb1, Rc, Re, and Rg1 has been demonstrated in rat embryos.56 In vitro studies found no carcinogenicity, mutagenicity, or teratogenicity for Radix ginseng.2

A doping-control urinalysis was conducted under International Olympic Committee (IOC) doping control guidelines for CVT-E002 200 and found no IOC-banned substances that might induce a positive doping-control urinalysis result.71

References

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This information relates to an herbal, vitamin, mineral or other dietary supplement. This product has not been reviewed by the FDA to determine whether it is safe or effective and is not subject to the quality standards and safety information collection standards that are applicable to most prescription drugs. This information should not be used to decide whether or not to take this product. This information does not endorse this product as safe, effective, or approved for treating any patient or health condition. This is only a brief summary of general information about this product. It does NOT include all information about the possible uses, directions, warnings, precautions, interactions, adverse effects, or risks that may apply to this product. This information is not specific medical advice and does not replace information you receive from your health care provider. You should talk with your health care provider for complete information about the risks and benefits of using this product.

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Frequently asked questions

- Does Ginseng interact with any drugs?
- What are the benefits of ginseng?

More about ginseng

- Check interactions
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- Side effects
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