Natural Healing Track

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Ginseng

Continuing Education Module

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Goal:
The goal of this module is to examine the role of ginseng in health and disease, and to identify its therapeutic usefulness.

Objectives:
Following the successful completion of this module, the participant will be able to:

- Explain ginseng's historical use, nomenclature and current status in the United States and abroad.
- Identify the constituents found in ginseng plants and explain their pharmacological activity.
- Compare clinical research data with ginseng preparations and identify limitations.
- List potential adverse effects of ginseng and possible drug interactions.
- Relate advice to patients on the use of ginseng.

Introduction

Humans have used plants and other natural products to treat illnesses, improve body functions and prevent diseases since ancient times. For many decades, the development of synthetically manufactured drugs had substantially reduced the use of herbs and plant products, especially in the United States. The recent renewed interest in alternative medicine has generated a boom in the production of herbs and plant products, and these products are now sold in natural product stores, retail pharmacies, and other retail outlets. However, this has led to some confusion among health care professionals as to product choice and appropriate patient advice.

One of the plants now generating strong public interest is ginseng. Ginseng ranks among the top herb sellers in the US ($ 86 million in 1997), and is one of the 10 most frequently purchased herbs in health food stores.[1,2]

Ginseng has been used for thousands of years. In Asia, where it is considered almost a universal therapeutic agent, it is believed to improve vitality into old age and extend the human life span.[3] As stated in a *JAMA* article over one hundred years ago, the Chinese traditional medicine system has utilized ginseng in situations "wherever a tonic or heating medicine is needed." One of its most popular uses has been as an aphrodisiac. However, this article also mentioned that the Chinese use the plant empirically, and that its efficacy depends upon patient imagination.[4]

> "In Western Europe, ginseng is widely accepted among health care professionals, and is sold as an over-the-counter drug."

Historically, some Native American tribes in the US have used ginseng for pain relief during childbirth, to increase fertility and to treat shortness of breath, nosebleed or upset stomach.[5] The Cherokee knew the herb as *atale-kule* and utilized it primarily as a remedy for female problems (i.e. headaches, premenstrual syndrome).[6] Interestingly, until 1882 ginseng was considered a useful stimulant and stomachic drug and was monographed in the *United States Pharmacopoeia*.[7]

Numerous and sometimes controversial reports about ginseng's traditional use and claimed effectiveness can be found in the scientific literature of countries with high ginseng use such as China, Korea, Japan and Russia. Between 1687 and 1975, over one thousand papers and books have been cited and abstracted by the Korean Ginseng Research Institute, and many more have been published since.[8]

In Western Europe, ginseng is widely accepted among health care professionals, and is sold as an over-the-counter drug. Its safety and efficacy has been evaluated and quality standards have been developed. The German Commission E of the Federal Health Agency officially recognizes indications, contraindications, side effects, interactions, dosages, modes of administration, duration of use and effects of ginseng.[1] Ginseng is also included in monographs in several pharmacopoeias (e.g. Australia, China, France, Japan, Russia, and Switzerland).[9,10]

In the US ginseng is presently officially regulated as a dietary supplement with no proven therapeutic properties.[7] Quality standards for ginseng products have not been established, and this leads to uncertainty about identity, value and efficacy of these ginseng products.

Scientific Nomenclature

The ginseng plant is associated with various names and these many varieties are commercially available. This can cause considerable confusion and misinterpretation. See Table 1 for a breakdown of scientific names of ginseng and their common name counterparts.

The two major species are *Panax ginseng* C.A. Meyer, also referred to as Asian ginseng, which is distributed primarily in Asia and East-Siberia; and *Panax quinquefolium L.*, commonly called American ginseng. This species grows wild in rich, cool wooden areas in the US such as Minnesota. Because of recent intense harvesting in the US, the plant

Table 1 [3,5,6,7,10]

Nomenclature of Ginseng	
Scientific Name	**Common Name**
*P. ginseng C.A. Meyer	Korean ginseng ,Chinese ginseng, Panax, ginseng root, oriental ginseng, *ren shen*, Panax schinseng Nees
*P. quinquefolium L.	American ginseng, Western ginseng, *rhen shen*
P. trifolius L.	Dwarf ginseng (USA)
P. notoginseng (Burk.) F. H. Chen	*San qi* ginseng, tienchi ginseng, sanchi ginseng
P. pseudoginseng var.	Himalayan ginseng, Zhuzishen, Chikusetsu
*Eleutherococcus senticosus Maxim Acanthopanax senticosus., Hedera senticosa	Siberian ginseng, Devil's shrub, eleuthera, taiga-root, eleutherococ, shigoka, touch-me-not, wild pepper

* most commonly used

has been labeled an endangered species with regulations on collection and sale.[11] Ginseng is also commercially grown in large quantities and shipped abroad, primarily to Asia. The greek word Panax refers to a goddess believed to "heal all." Several other Ginseng types with varying medicinal value are sub-specified under *Panax pseudoginseng* and mostly available in Asia.[3,12]

A non-Panax species of the ginseng family is *Eleutherococcus senticosus* Maxim. or *Acanthopanax senticosus.*, which is also known as Siberian ginseng. This species is found abundantly in Russia, and in the 1970s was marketed to the United States by Soviet scientists as an inexpensive substitute for ginseng.[13,14] Caution is indicated when considering the terms wild red American ginseng and wild desert ginseng. These names refer to Canaigre, the root of *Rumex hymenosepalus Torr.*, a plant totally unrelated to ginseng, both botanically and in its active ingredients, but promoted as the original.[15]

Botany

All ginsengs and the eleutherococcus species belong to the family *Araliaceae*. Ginseng is a short, 30-80 cm high perennial plant with three to seven compound leaves, while eleutherococcus is a shrub two to three meters tall with a gray bark and numerous thin thorns.[8,9,18]

The roots of both plants are used in herbal medicine, and different shapes distinguish ginseng types; i.e. the American ginseng root is more fibrous and resembles a 'beard' while the Korean type has a more compact form.[4] The Chinese name ginseng (*shen-seng*) means 'man-root' and refers to the human-shaped figure of the root; this suggests the claim that ginseng can strengthen any part of the human body.[3,8]

The roots of ginseng are used in two different forms: white ginseng is the peeled and sun-dried root, while red ginseng is the unpeeled, steamed and dried root of *Panax* ginseng.[8] Steaming is considered an effective method of stabilizing the product, but some scientists think that doing so may also alter the active ingredients.[19] The dried ginseng roots are usually chopped or powdered, and used in teas, tablets and extracts or are combined with foods.

Ginseng is difficult to grow, and needs between six and seven years of growth before the roots reach the certain weight associated with a higher level of active ingredients. It is then that the root is harvested. As the plant's age increases so does its value and price. Because of this, and because ginseng crops generate high profits, various problems arise. Chemicals used to protect the cultivated plants from diseases may substantially influence the active ingredients; older roots may be mixed with younger roots; inactive or unrelated substances may be added.[3,14] A study analyzing fifty-four ginseng products found that 60 percent of them were worthless and 25 percent contained no ginseng at all.[20]

Chemical Components

The ginseng *panax* species contains various active substances, among which the prime ingredients are terpenoid saponin glycosides. These are complex mixtures of compounds called ginsenosides or panaxosides.[8] More than two dozen ginsenosides have been isolated, and different conventions have been used to name them. They may be described by a capital R followed by a subscript letter or letter and numeral, e.g. Ra or R b-1. Other pharmacologically active substances include a volatile oil, polyacetylenes, sterols, flavonoids, polysaccharides, peptides, vitamins, fats, minerals, beta-amylase and choline.[8,11]

Eleutherococcus contains compounds called Eleutherosides (subgrouped A-M) as major active substances, which are mainly sterols, phenylpropanoids, lignans, monosaccharides and coumarins. Carbohydrates, terpenoids and volatile oils are also present.[8,12]

The constitution and composition of the active ingredients of ginseng may vary depending on the species of the plant, the age of the root, growing location, harvesting season and processing methods. This needs to be considered when evaluating reports and study results of ginseng's efficacy, and can make comparisons difficult. However, few differences appear in the overall effects of the three major ginsengs.[11,21]

Pharmacological Effects

Several pharmacologic effects have been attributed to ginseng, and they generally can be classified as up- or down-regulating properties. Therefore, ginseng is considered an adaptogen, a Russian term used primarily in the herbal literature; its main use a general tonic to increase vital-

ity, mental alertness and physical well-being.[13] An adaptogen is a substance that helps the body during periods of physical, biological and chemical stress to regulate itself in order to regain equilibrium.[21] This may be accomplished in different ways, one of which is the reduction of mental and physical fatigue. It can also involve counteracting stress-related metabolic imbalances and hormonal abnormalities of excess or deficiency.[5]

The effects may be explained by the observation that different ginsenoides can produce opposite effects. One ginsenoide (Rb1) has been found to have central nervous system (CNS) depressant, anticonvulsant, analgesic and antipsychotic effects. It also lowers blood pressure, protects against stress ulcers and accelerates glycolysis and nuclear RNA synthesis. Another, (Rg1), acts as CNS stimulant, raises blood pressure, may aggravate stress ulcers and reduces fatigue.[16] In one instance low blood sugar can be elevated

"The greek word Panax refers to a goddess believed to 'heal all'."

to normal levels, while in another high blood sugar may be decreased to normal levels.[5]

Furthermore, due to its so-called "heating" properties, Asian ginseng, especially the red form, is advocated for the elderly, who chill easily and who can be weak and fatigued.[5] White ginseng seems to be effective for those susceptible to weakness, illness and poor endurance, while American ginseng is said to be milder and have a cooling effect.[19] This ginseng is considered beneficial for those who feel warm or overheated, who have type A personalities as well as those with headaches or hypertension.[5]

Due to its adaptogenic properties ginseng has been used in many different situations, and its medical applications include almost all body systems. It has shown behavior modifying effects (e.g. increased performance in learning, speed, and accuracy), stress and fatigue reducing effects, positive influences on the cardiovascular, nervous, and reproductive system, endocrine and metabolic activity, as well as cancer reducing and immunostimulating effects.[9,16,17,21]

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However, one must realize that many of these claims result from anecdotal data, or from *in-vitro* and animal studies with various species. Very few controlled human studies have been conducted to date, although the recent interest in ginseng may stimulate more research. Furthermore, the observed effects may vary depending on dose and duration of treatment, and lack of quality standards may hinder reproducible results.

Effects on Stress, Fatigue and Cognitive Function

The structural similarity of the ginsenoides to steroids such as testosterone, corticosteroids, adrenocorticotrophic hormone, and estrogen has been cited to explain its corticosteroid-like actions. Endocrinological animal studies have suggested that ginsenoides may indirectly act on the pituitary gland and increase ACTH secretion, thereby contributing to adrenal steroidogenesis, and ultimately causing higher production of stress hormones. This may translate into a substantial increase in working capacity as was observed in rats when ginseng was administered.[10,11]

In addition to traditional reports, the improvement in psychological, physical and mental performance with ginseng therapy has been experienced by more than 2000 patients in several clinical, controlled and uncontrolled studies.[13] Tyler quotes four recent company sponsored clinical trials. These trials supplemented a standardized extract of Chinese ginseng (G115), in combination with multivitamins, minerals, and diethylaminoethanol bitartrate (DEAE). The results included a beneficial effect on fatigue and increased feelings of well-being with an improvement in quality of life.[13]

One of the trials, a double-blind study, involved 501 outpatients who were all exposed to physical or mental stress and/or had fatigue symptoms. Quality of life parameters such as well-being, pain, personal satisfaction, depression, energy level, sleep and sexual satisfaction were compared between two groups using a standardized, 11-item questionnaire. 163 patients received a multivitamin/mineral complex with G115, and 338 patients received the same complex without ginseng (placebo) for a 12-week period. The patients with the additional ginseng extract had significantly higher quality-of-life scores than those with the multivitamin/mineral combination alone.[22]

Two double-blind, placebo-controlled studies investigated ginseng's effect on psychomotor and cognitive function and concluded a tendency for better mathematical reasoning, faster reaction time and better abstract thinking related to ginseng supplementation. A third study examined a combination of ginseng with gingko and found minimal changes in cognitive function. In evaluating the studies various flaws were cited, and the results considered unreliable.[16]

Based on available clinical data the Commission E has permitted ginseng's use as "tonic for invigoration and fortification in times of fatigue and debility or declining capacity for work and concentration, also during convalescence."[1]

Ergogenic Effects

Athletes have used ginseng as an ergogenic remedy in the belief that it enhances physical performance and restores body function after intensive activity.[23] Siberian ginseng has been given to Russian athletes and cosmonauts to provide energy, stimulate activity, and normalize elevated blood pressure and blood sugar in response to sport and performance related stress.[19]

However, a recent double-blind study with 31 healthy men who received either panax ginseng capsules or placebo for 8 weeks showed that ginseng did not improve submaximal or maximal aerobic exercise by various measurements, e.g. oxygen consumption, respiratory exchange ratio, blood lactic acid level, heart rate, or perceived exertion.[24]

Additional studies, as well as a literature review evaluating the ergogenic properties of ginseng, have concluded that there is a lack of controlled research to support ginseng's claim to reliably improve or enhance athletic performance.[23,25]

Table 2 [41,42]

Potential Adverse Reactions to Ginseng

System	Symptoms
Cardiovascular	Hypertension, Palpitations, Chest pain, Edema
Central Nervous	Insomnia, Nervousness, Headaches
Dermatological	Skin eruptions (ginseng abuse), Pruritis, Stevens-Johnson syndrome (1)
Gastrointestinal	Diarrhea, Nausea, Vomiting
Genitourinary	Vaginal bleeding
Others	Epistaxis, Impotence, Mastalgia

Effects on Male Fertility

Ginseng has produced mixed results in regard to its effects on reproductive capacity in animals;[23] however, some human studies have shown positive outcomes. In an unblinded trial 50 patients with oligostenospermia were matched with 20 volunteers and received 4g/day of panax ginseng for three months. Increases in the number of spermatozoa/ml as well testosterone plasma levels, DHT, FSH and LH were observed.[26] An improvement in penile function, libido and patient satisfaction was found in another study with 90 men.[27]

Cardiovascular and Hepatic Effects

Ginseng appears to exert different beneficial effects on the cardiovascular system, which may be the result of a combination of various mechanisms. Presumably, by stimulating cholesterol transport or increasing its metabolism, cholesterol levels may decrease.[21] An inhibitory effect on LDL oxidation and an increase in HDL was observed in animals.[12,28]

Opposing actions of the ginsenoides are reported on cardiac performance, and some have antiarrhythmic effects *in vitro* similar to verapamil or amiodarone.[10] Ginseng seems to inhibit calcium-channels and calcium uptake into vascular smooth muscle cells and that may explain its observed antihypertensive effects. However, vasoconstriction was found with higher ginseng doses. Antiplatelet activities of ginsenosides have also been described.[10] A synergistic benefit with digoxin was observed in 45 patients in the treatment of heart failure.[21,23]

Ginseng's cardioprotective effects have been linked to stimulated release of nitric oxide by endothelial cells resulting in vasorelaxation.[29,30] Enhanced nitric oxide synthesis was also believed to be responsible for ginseng's aphrodisiac effects, and for hepatoprotective activity which was observed at low ginseng doses in some animal studies[10,29] but not in a placebo controlled study involving 24 elderly patients with chronic liver disease due to alcohol and drugs.[31]

Hypoglycemic Effects

Both the saponin and polysaccharide constituents in ginseng are thought to be responsible for its observed hypoglycemic effects. Preliminary *in vitro* and animal studies have indicated that ginseng may promote insulin release, increase insulin receptors and enhance insulin sensitivity.[10]

Sotaniemi et al. studied the impact of ginseng in 36 newly diagnosed non-insulin dependent diabetics in a double-blind, placebo-controlled trial. 100 or 200 mg of a ginseng preparation administered for eight weeks reduced fasting blood glucose and body weight and improved patient performance.[32]

Anticancer Effects

In a recent article by Yun, ginseng's effect on the prevention of cancer was summarized.[33] Animal studies in mice indicated that the anticarcinogenicity of ginseng varied according to ginseng type and increased with the age of the root (at least four years needed for red, five years for white and six years for fresh ginseng). Epidemiologic data is available from several case-control and one prospective cohort study involving several thousand adults. The author concluded that ginseng consumption may decrease the risk of many cancer types (except uterine, cervical, urinary bladder, female breast and thyroid gland), and that there is a significant dose-response relationship (increased effect with higher ginseng use). However, other factors promoting health or risk factors were not evaluated.

Immunologic Effects

Several reports have addressed the immunologic activity of ginseng, and it has been found to induce interferon production, and increase natural killer cell and cytotoxic activity in human lymphocytes.[10,23,24] While a human double-blind study with 36 healthy volunteers showed a substantial increase in T-lymphocytes with eleutheroccus[35], there were no significant effects in leukocyte or lymphocyte counts found after administration of standardized ginseng extract (300 mg qd for 8 weeks) to 20 young Thai men.[36]

A significant immune response to flu vaccine including a significant rise in antibody levels and the number of natural killer cells was recently reported in 227 volunteers.[34] In this multicenter, randomized, double-blind and placebo-controlled study 200 mg G115 qd or placebo was given for 12 weeks and an influenza vaccine at week four. The ginseng treated subjects experienced significantly fewer bouts of the common cold and cases of influenza than those on placebo.

G 115 (220 mg qd for eight weeks) was also found to restore and increase the activity of alveolar macrophages in a controlled, single-blind study involving 40 smokers suffering with chronic bronchitis.[37]

Adverse Effects

Ginseng is generally well tolerated, and the monographs in the German Commission E and the Herbal PDR list no adverse effects when following therapeutic dosages and correct administration. High blood pressure is, however, mentioned as a contraindication to Eleutherococcus root.[1,18] This may be due to reports of a "ginseng abuse syndrome" observed by Siegel.[38,39] In a two-year ginseng study, 26 out of 133 psychiatric patients had developed hypertension with nervousness, sleeplessness, skin eruptions and morning diarrhea.The study was later criticized because of various problems; e.g. the patients had used between three and 15 grams ginseng per day and additional other drugs such as caffeine.

Table 3

Potential Drug Interactions

Drug	Monitoring Parameter	Actions
Caffeine	Increased stimulation	Cave hypertensive, hyperactive patients
Digoxin	Increased digoxin levels, ? Signs of overdose	Avoid concomitant use
Estrogens, Corticosteroids	Possible additive effects	Avoid combination
Insulin, Oral hypoglycemics	Variable effects	Monitor blood sugar
MAOIs	Increased agitation Worsening of depression	Avoid combination
Warfarin, Heparin Aspirin, NSAIDS	Loss of anticoagulative effect (INR, PT, PTT) ? Antiplatelet effect	Monitor carefully Avoid combination with warfarin
Vitamins B1, B2, C	Increased excretion	Increase vitamin dose

Other adverse reactions have been reported in few cases but they appear to be rare and more common with higher doses or prolonged use. (Table 2) They may be extensions of the pharmacological or ginseng effects, or may be due to adulteration with unrelated products (e.g. Rauwolfia, Cola species, Sulfites) and mislabeling.

A recent case report described a 63-year old man with membranous glomerulonephritis who on two occasions had experienced weight gain, acute edema and hypertension refractory to furosemide after taking unspecified supplements including 10-12 ginseng tablets. Germanium, an ingredient in many ginseng products and associated with renal toxicity, was considered responsible for the diuretic resistance.[40]

Eleutherococcus is commonly adulterated with the bark of silk vine (*Periploca sepium*) which contains cardiac glycosides. In one report, it was associated with a case of hirsutism in an infant.[41]

Drug Interactions

Very few drug interactions with ginseng have been reported, and both the Commission E monographs and the PDR for herbal medicines list no interactions.

One case report mentions a potential interaction with warfarin in a 47-year-old man whose previously stabilized INR values decreased significantly after taking ginseng. When ginseng was discontinued, the INR returned to baseline.[43]

Another less clear case involves digoxin.[44] A 74-year old man stabilized for years on digoxin had a significantly increased serum level without symptoms when taking Siberian ginseng concurrently. The level dropped upon discontinuation of ginseng and increased again when ginseng was reinstituted. The ginseng product was never clarified, and a potential effect of *Periploca sepium* was mentioned.[11]

Due to ginseng's reported metabolic, cardiovascular, endocrine and antiplatelet effects caution may be indicated with certain drugs. (Table 3)

Table 4 [1,18,41]

Dosage Recommendations

Panax ginseng

- From 1-2 g of root daily to 0.6-3.0 g of root daily

Eleutherococcus senticosus

- 2-3 gram or root daily

Dosage and Administration

See Table 4 for ginseng dosage recommendations. Infusions can be prepared by pouring boiling water over the finely chopped ginseng root and straining the mixture after five to ten minutes.[18] Ginseng is also available in capsules, which can contain 100, 250 and 500 mg. Tea bags containing 500 mg ginseng root extracts as well as ginseng extract (2 oz. root extract) can also be used, and root powder is available.[16] Suggested duration of use is variable and ranges from a few weeks to several months based on patient age and condition.[23]

Conclusion

Ginseng preparations have been safely used for thousands of years for a variety of reasons. Although well-designed clinical studies are sparse, anecdotal and experimental data support several beneficial effects. Its main activity is as an adaptogen in helping people to better respond to stress related conditions, to improve immunity, and to balance or restore mental, physical and metabolic effects. Patients need to be informed about the problems associated with lacking quality standards, possible adverse effects, and cautioned about potentially dangerous interactions with other drugs.

References

1. Blumenthal M. The complete German Commission E Monographs: Therapeutic Guide to Herbal Medicines. 1st ed. , Austin; American Botanical Council;1998:11-12

2. Eliason BC, Kruger J, et al. Dietary supplement users: demographics, product use, and medical system interaction. J Am Board Fam Pract 1997 Jul-Aug;10(4):265-71

3. Weiss RF. Herbal Medicine. Translated from the Sixth German Edition of Lehrbuch der Phytotherapie. AB Arcanum, Gotheburg, Sweden, Beaconsfield Publishers LTD, Beaconsfield, England. 176-177

4. JAMA 100 Years Ago (Dec 17, 1989). Ginseng in Korea (anonymous). JAMA , 1998; 280:1552

5. Collura JO. Ginseng: Prince of Tonics. Vegetarian Times, March 1997: 94, 96-7

6. Mooney J. The sacred formulas of the cherokees, Asheville, NC: Bright Mountain Books, 1992 (Ellison G, ed. James Mooney's History Myths and Sacred Formulas of the Cherokees, 1891-1921)

7. The Herbal Regulatory Dilemma. In Tyler's Herbs of Choice.The Therapeutic Use of Phytomedicinals. Robbers JE, Tyler VE, eds., The Haworth Herbal Press, Inc. New York, 1999: 23-32

8. Abstracts of Korean Ginseng Studies (1687-1975). The Research Institute, Office of Monopoly, Seoul, Republic of Korea, 1975

9. Ginseng, Panax. In Herbal Medicines. A Guide for Health-care Professionals. Newall CA, Anderson, LA, Phillipson JD, eds. The Pharmaceutical Press, London, 1996: 145-150

10. Wichtl M. Herbal Drugs and Phytopharmaceuticals. (Translated by Bisset NM). 2nd ed., Medpharm, Stuttgart 1994, CRC Press Ann Arbor: 236-238

11. Ginseng and Related Herbs. In Tyler's Honest Herbal. A sensible Guide to the Use of herbs and Related Remedies. 4th ed, Foster S, Tyler VE, eds., The Haworth Herbal Press, Inc., New York, 1999: 187-194

12. Ginseng. In Facts and Comparisons.The Review of Natural Products. DerMarderosian A, ed., Facts and Comparisons Publishing Group 1999

13. Performance and Immune Deficiencies. Tyler's Herbs of Choice.The Therapeutic Use of Phytomedicinals. Robbers JE, Tyler VE, eds., The Haworth Herbal Press, Inc. New York, 1999: 235-241

14. Eleutherococcus. In Facts and Comparisons.The Review of Natural Products. DerMarderosian A, ed., Facts and Comparisons Publishing Group 1999

15. Canaigre. In Tyler's Honest Herbal. A sensible Guide to the Use of Herbs and Related Remedies. 4th ed, Foster S, Tyler VE, eds., The Haworth Herbal Press, Inc., New York, 1999: 87-88

16. Ginseng. In Complementary & Alternative Medicines. Fetrow CW, Avila JR, eds. Springhouse Corporation, Springhouse, Philadelphia 1999: 284-287

17. Ginseng, Siberian. . In Complementary & Alternative Medicines. Fetrow CW, Avila JR, eds. Springhouse Corporation, Springhouse, Philadelphia 1999: 287-290

18. Panax Ginseng. PDR for Herbal Medicines. Medical Economics Company, Inc., Montvale, NJ, 1998:1009

19. Yaychuk-Arabei I. Ancient Herb for Modern Lifestyles: Ginseng. Health Naturally, Dec/Jan 1998: 7-8

20. Liberti LE, Der Marderosian A. Evaluation of Commercial Ginseng Products. J Pharm Sci 1978; 67: 1487-89

21. Li, T S.C., Harries D. Medicinal Values of Ginseng. The Herb, Spice, and Medicinal Plant Digest, Fall 1996; 17 (3): 1-5

22. Caso Marasco A, Vargas-Ruiz R et al. Double-blind study of a multivitamin complex supplemented with ginseng extract. Drugs Exp Clin Res 1996; 22(6): 323-9

23. Hamilton W, Kirchain W. Ginseng. Fact Versus Myth. Pharmacist July 1999: 50-67

24. Engels HJ, Wirth JC. No ergogenic effects of ginseng (Panax ginseng C.A. Meyer) during graded maximal aerobic exercise. J Am Diet Assoc 1997;97 (10):1110-15

25. Bahrke MS, Morgan WP. Evaluation of the ergogenic properties of ginseng. Sports Medicine 1994: 18(4): 229-48

26. Panminervia Medica 1996: 38:249-54

27. Choi HK, Seong DH, Rha KH. Clinical efficay of Korean ginseng for erectile dysfunction. Int J Impot Res 1995; 7(3):181-6

28. Li J, Huang M, et al. Panax quinquefolium saponins protect low density lipoproteins from oxidation. Life Sci 1999; 64 (1): 53-62

29. Gillis NC. Panax ginseng Pharmacology: A Nitric Oxide Link? Biochem Pharmacol 1997; 54:1-8

30. Chen X. Cardiovascular protection by ginsenosides and their nitric oxide releasing action. Clin Exp Pharmacol Physiol 1996; 23(8): 728-32

31. Zuin M, Battezzati PM et al. Effects of a preparation containing standardized ginseng extract combined with trace elements and multivitamins against hepatotoxin-induced chronic liver disease in the elderly. J Int Med Res 1987; 15(5): 276-81

32. Sotaniemi E, et al. Ginseng therapy in Non-Insulin-Dependent Diabetic Patients. Diabetes Care 1995; 18: 1373-75

33. Yun TK. Experimental and Epidemiological Evidence of the Cancer-Preventive Effects of Panax ginseng C.A. Meyer. Nutrition Reviews 1996; 54(11): S72-S81

34. Scaglione F et al. Efficay and Safety of the Standardized Ginseng Extract G115 for Potentiating Vaccination against Common Cold and/or Influenza Syndrome. Drugs Ex Clin Res 1997; 22(2): 65-72

35. Bohn B, Nebe CT, Birr C. Flow-cytometric Studies with Eleutherococcus senticosus Extract as an Immunomodulatory Agent. Arzneimittelforschung 1987; 37(10): 1193-6

36. Srisurapanon S, Rungroeng K, et al. The Effect of Standardized Ginseng Extract on Peripheral Blood Leukocytes and Lymphocytes Subsets: a Preliminary Study in Young Healthy Adults. J Med Assoc Thai 1997; 80 Suppl 1:S81-5

37. Scaglione F, et al. Immunomodulatory Effects of Panax ginsneg C.A. Meyer (G115) on Alveolar Macrophages from Patients Suffering with Cronic Bronchitis. Int J Immunotherapy 1994;X(1):21-4

38. Siegel RK. Ginseng abuse syndrome. Problems with the panacea. JAMA 1979; 241(15):1614-5

39. Siegel RK. Ginseng and high blood pressure. JAMA 1980; 243(1): 32 (letter)

40. Becker BN, et al. Ginseng-induced Diuretic Resistance. JAMA 1996; 276(8): 606-7

41. Botanical Safety Handbook. American Herbal Products Association. McGuffin M, et al, eds, CRC Press, Boca Raton, 1997:81-2, 45

42. Panax Ginseng. AltMedDex.Micromedex ® Healthcare Series, Vol 102, 1974-1999

43. Janetzky K, Morreale AP. Probable Interaction between Warfarin and Ginseng. Am J Health Sys Pharm 1997;54(6): 692-3

44. McRae S. Elevated Serum Digoxin Levels in a Patient taking Digoxin and Siberian Ginseng. CMAJ. 1996; 155(3): 293-5

ONLY PHARMACISTS NEED COMPLETE THIS SECTION

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	Agree				Disagree
1. The program objectives were met.	1	2	3	4	5
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Ginseng
Continuing Education Test Questions

Natural Healing Track — January 2000

Directions: Select your answer and check *one* box for each of the test questions. When you have answered all of the questions, please print or type all requested information and mail your completed test, along with processing fee, to the appropriate address listed below.

1. Ginseng has been associated with many different names. The correct scientific term for Siberian ginseng is:
   ☐ a. *Panax quinquefolium.*
   ☐ b. *Panax ginseng.*
   ☐ c. *Eleutherococcus senticosus.*
   ☐ d. *Panax pseudoginseng.*

2. People have used ginseng for thousands of years. Its major therapeutic claim has been as a:
   ☐ a. tranquilizer.
   ☐ b. tonic.
   ☐ c. remedy for female diseases.
   ☐ d. remedy for male infertility.

3. An adaptogen is a substance believed to increase body resistance to external influences and stimuli and to balance body functions.
   ☐ a. True ☐ b. False

4. The major constituents in ginseng are called ginsenoides. All of the following comments regarding ginsenoides are true, except that they are:
   ☐ a. also called panaxosides.
   ☐ b. terpenoid saponines.
   ☐ c. specified by Rx (where x is a letter followed by a number.)
   ☐ d. identical to eleutherosides.

5. Which of the following is true of the ginseng root?
   ☐ a. It resembles a human face.
   ☐ b. It contains consistent concentrations of active substances.
   ☐ c. It should not be harvested before the plant is at least six years old.
   ☐ d. It should not be peeled or steamed.

6. Well-controlled clinical studies have documented all of the following beneficial effects from ginseng except:
   ☐ a. improvement in quality of life.
   ☐ b. enhanced immune effects together with influenza vaccine.
   ☐ c. anticancer effects for uterine, cervical and urinary bladder cancer.
   ☐ d. All of the above effects have been documented.

7. Which of the following statements regarding ginseng are correct?
   ☐ a. It should never be administered for more than one month.
   ☐ b. The usual dose is between 0.6 and 3.0 g dry ginseng root per day.
   ☐ c. Sleeplessness and nervousness are common with low dosages.
   ☐ d. Ginseng abuse syndrome is frequently observed.

8. Due to presumed side effects, ginseng has been contraindicated by the Commission E for which of the following conditions?
   ☐ a. renal failure
   ☐ b. congestive heart failure
   ☐ c. diabetes
   ☐ d. hypertension

9. Ginseng should be avoided with all of the following drugs except:
   ☐ a. MAOIs.
   ☐ b. Oral hypoglycemics.
   ☐ c. Warfarin.
   ☐ d. Steroids.

10. Several issues need to be addressed when evaluating ginseng's therapeutic role in the US today. The biggest obstacle seems to be:
    ☐ a. lack of quality standards.
    ☐ b. ginseng's significant side effect profile.
    ☐ c. the confusing nomenclature of ginseng products.
    ☐ d. ginseng's high price.

For retailers:

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