



EUROPEAN MEDICINES AGENCY
SCIENCE MEDICINES HEALTH

25 March 2013
EMA/HMPC/321234/2012
Committee on Herbal Medicinal Products (HMPC)

List of references supporting the assessment of *Panax ginseng* C.A. Meyer, radix

**This document was valid from 25 March 2014 until May 2024.
It is now superseded by a [new version](#) adopted by the HMPC on
29 May 2024 and published on the EMA website.**

The European Medicines Agency acknowledges that copies of the underlying works used to produce this monograph were provided for research only with exclusion of any commercial purpose.

Abe K, Cho SI, Kitagawa I, Nishiyama N, Saito H. Differential effects of ginsenoside Rb₁ and malonylginsenoside Rb₁ on long-term potentiation in the dentate gyrus of rats. *Brain Res* 1994, 649(1-2):7-11 (only abstract available)

Alanko J, Kurahashi Y, Yoshimoto T, Yamamoto S, Baba K. Panaxynol, a polyacetylene compound isolated from oriental medicines, inhibits mammalian lipoxygenases. *Biochem Pharmacol* 1994, 48(10):1979-1981 (only abstract available)

Allen JD, McLung J, Nelson AG, Welsch M. Ginseng supplementation does not enhance healthy young adults' peak aerobic exercise performance. *J Am Coll Nutr* 1998, 17(5):462-6

An X, Zhang AL, Yang AW, Lin L, Wu D, Guo X *et al.*. Oral ginseng formulae for stable chronic obstructive pulmonary disease: a systematic review. *Respir Med* 2011, 105(2):165-176

Anderson GD, Rosito G, Mohutsy MA, Elmer GW. Drug Interaction Potential of Soy Extract and Panax Ginseng. *J Clin Pharmacol* 2003, 43:643-648

Attele SA, Wu JA, Yuan CS. Ginseng Pharmacology: Multiple constituents and multiple actions. *Biochem Pharmacol* 1999, 58(11):1685-1693

Avakian EV Jr, Evonuk E. Effect of Panax ginseng extract on tissue glycogen and adrenal cholesterol depletion during prolonged exercise. *Planta Med* 1979, 36(1):43-48 (only abstract available)

Bahrke MS, Morgan WP. Evaluation of the ergogenic properties of ginseng. *Sports Med* 1994, 18(4):229-248 (only abstract available)

Becker BN, Greene J, Evanson J, Chidsey G, Stone WJ. Ginseng-induced diuretic resistance. *JAMA* 1996, 276(8):606-607 (only abstract available)



Bensky D, Clavey S, Stöger E, Gamble A editors. Chinese Herbal Medicine Materia Medica, 3rd ed., Eastland Press, Inc., Seattle 2004

Berté F, Toxicological investigation on G115. 1973 (unpublished report)

Berté F, Toxicological investigation of the standardized ginseng extract G115®, 1982 (unpublished report)

Blaschek W, Ebel S, Hackenthal E, Holzgrabe U, Keller K, Reichling J, Schulz V HagerROM 2008: Hagers Handbuch der Drogen und Arzneistoffe. Springer-Verlag, Heidelberg 2008

British Herbal Pharmacopoeia 1983. British Herbal Medicine Association, Bournemouth 1983

Buettner C, Yeh GY, Phillips RS, Mittleman MA, Kaptchuk TJ. Systematic review of the effects of ginseng on cardiovascular risk factors. *Ann Pharmacother* 2006, 40(1):83-95

Cai ZW, Quian TX, Wong RNS, Jiang ZH. Liquid chromatography-electrospray ionization mass spectrometry for metabolism and pharmacokinetic studies of ginsenoside Rg₃. *Anal Chim Acta* 2003, 492(1-2):283-293

Cardinal BJ, Engels HJ. Ginseng does not enhance psychological well-being in healthy, young adults: results of a double-blind, placebo-controlled, randomized clinical trial. *J Am Diet Assoc* 2001, 101(6):655-660

Caron MF, Hotsko AL, Robertson S, Mandybur L, Kluger J, White CM. Electrocardiographic and hemodynamic effects of Panax ginseng. *Ann Pharmacother* 2002, 36(5):758-763

Caso Marasco A, Vargas Ruiz R, Salas Villagomez A, Begona Infante C. Double-blind study of a multivitamin complex supplemented with ginseng extract. *Drugs Exp Clin Res* 1996, 22(6):323-329 (only abstract available)

Chai H, Dong Y, Wang X, Zhou W. Ginsenoside Rb₁ Attenuates Homocysteine-Augmented Guidewire Injury-Induced Intimal Hyperplasia in Mice. *J Surg Res* 2009, 157(2):193-198

Chan LY, Chiu PY, Lau TK. An in-vitro study of ginsenoside Rb₁-induced teratogenicity using a whole rat embryo culture model. *Human reproduction* 2003, 18(10):2166-2168

Chan LY, Chiu PY, Lau TK. Embryotoxicity study of ginsenoside Rc and Re in in vitro rat whole embryo culture. *Reproductive Toxicology*, 2004 19:131-134

Chan PC, Peckham JC, Malarkey DE, Kissling GE, Travlos GS. Two-Year Toxicity and Carcinogenicity Studies of Panax ginseng in Fischer 344 Rats and B6C3F1 Mice. *Am J Ch Med* 2011, 39(4):779-788

Chang Y, Lai PH, Wang CC, Chen SC, Chang WC, Sung HW. Mesothelium regeneration on acellular bovine pericardia loaded with an angiogenic agent (ginsenoside Rg₁) successfully reduces postsurgical pericardial adhesions. *J Thorac Cardiovasc Surg* 2006, 132(4):867-874

Chen KJ, The effect and abuse syndrome of Ginseng. *Journal of traditional Chinese medicine* 1981, 1(1):69-72

Chen XC, Chen Y, Zhu YG, Fang F, Chen LM. Protective effect of ginsenoside Rg₁ against MPTP-induced apoptosis in mouse substantia nigra neurons. *Acta Pharmacol Sin* 2002, 23(9):829-834

Chen CF, Chiou WF, Zhang JT. Comparison of the pharmacological effects of *Panax ginseng* and *Panax quinquefolium*. *Acta Pharmacol Sin* 2008, 29(9):1103-1108

- Cherdrungsi P, Rungroeng K. Effects of Standardized Extract and Exercise Training on Aerobic and Anaerobic Exercise Capacities in Humans. *Korean J Ginseng Sci* 1995, 19:93-100 (only abstract available)
- Chin RK. Ginseng and common pregnancy disorders. *Asia Oceania J Obstet Gynaecol* 1991, 17(4):379-80 (article or abstract not available)
- Cho SW, Cho EH, Choi SY. Ginsenosides activate DNA polymerase δ from bovine placenta. *Life sciences* 1995, 57(14) 1359-1365
- Cho WCS, Chung WS, Lee SKW, Leung AWN, Cheng CHK, Yue KKM. Ginsenoside Re of Panax ginseng possesses significant antioxidant and antihyperlipidemic efficacies in streptozotocin-induced diabetic rats. *Eur J Pharmacol* 2006, 550(1-3):173-179
- Choi HK, Seong DH, Rha KH. Clinical efficacy of Korean red ginseng for erectile dysfunction. *Int J Impot Res* 1995, 7(3):181-186 (only abstract available)
- Choi HK, Choi YD, Adaikan PG, Jiang Y. [Effectiveness of Korean red ginseng in erectile dysfunction: multi-national approach]. *J Ginseng Res.* 1999, 23:247-256 [Korean] (only abstract available)
- Choi HK, Choi YJ. [Evaluation of clinical efficacy of Korea red ginseng for erectile dysfunction by international index of erectile function]. *J Ginseng Res* 2001, 25:112-117 [Korean] (article or abstract not available)
- Choi HK, Choi YJ, Kim JH. [Penile blood change after oral medication of Korean red ginseng in erectile dysfunction patients]. *J Ginseng Res* 2003, 27:165-170 [Korean] (only abstract available)
- Choi KT. Botanical characteristics, pharmacological effects and medicinal components of Korean Panax ginseng C A Meyer. *Acta Pharmacol Sin* 2008, 29(9):1109-1118
- Christensen LP, Brandt K. Bioactive polyacetylenes in food plants of the Apiaceae family: Occurrence, bioactivity and analysis. *Journal of Pharmaceutical and Biomedical Analysis* 2006, 41:683-693
- Christensen LP. Aliphatic C₁₇-Polyacetylenes of the Falcarinol Type as Potential Health Promoting Compounds in Food Plants of the Apiaceae Family. *Recent Pat Food Nutr Agric* 2011, 3:64-77
- Churchill JD, Gerson JL, Hinton KA, Mifek JL, Walter MJ, Winslow CL *et al.* The Nootropic Properties of Ginseng Saponin Rb₁ are Linked to Effects on Anxiety. *Integr Physiol Behav Sci* 2002, 37(3):178-187
- Concha O, Hu S, Holmberg O. The proliferative responses of cow stripping milk and blood lymphocytes to pokeweed mitogen and ginseng in vitro. *Vet Res* 1996, 27:107-115
- Coon JT, Ernst E. Panax ginseng: a systematic review of adverse effects and drug interactions. *Drug Saf* 2002, 25(5):323-344
- Cui JF, Garle M, Björkhem I, Eneroth P. Determination of aglycones of ginsenosides in ginseng preparations sold in Sweden and in urine samples from Swedish athletes consuming ginseng. *Scand J Clin Lab Invest* 1996, 56(2):151-160
- Cui JF, Björkhem I, Eneroth P. Gas chromatographic-mass spectrometric determination of 20(S)-protopanaxadiol and 20(S)-protopanaxatriol for study on human urinary excretion of ginsenosides after ingestion of ginseng preparations. *J Chromatogr B* 1997, 689(2):349-355
- Cui J, Jiang L, Xiang H. Ginsenoside Rb₃ exerts antidepressant-like effects in several animal models. *J Psychopharmacol* 2012, 26(5):697-713

D'Angelo L, Grimaldi R, Caravaggi M, Marcoli M, Perucca E, Lecchini S *et al.*. A double-blind, placebo-controlled clinical study on the effect of a standardized ginseng extract on psychomotor performance in healthy volunteers. *J Ethnopharmacol* 1986, 16(1):15-22

De Andrade E, de Mesquita AA, Claro J de A, de Andrade PM, Ortiz V, Paranhos M *et al.*. Study of the efficacy of Korean Red Ginseng in the treatment of erectile dysfunction. *Asian J Androl* 2007, 9(2):241-244

Dega H, Laporte JL, Francès C, Herson S, Chosidow O. Ginseng as a cause for Stevens-Johnson syndrome. *Lancet* 1996 May 11, 347(9011):1344

Deng J, Lv XT, Qu Q, Huang XN. Ginsenoside Rg₁ inhibits rat left ventricular hypertrophy induced by abdominal aorta coarctation: Involvement of calcineurin and mitogen-activated protein kinase signaling. *Eur J Pharmacol* 2009, 608(1-3):42-47

Deng J, Wang YW, Chen WM, Wu Q, Huang XN. Role of Nitric Oxide in Ginsenoside Rg₁-Induced Protection against Left Ventricular Hypertrophy Produced by Abdominal Aorta Coarctation in Rats. *Biol Pharm Bull* 2010, 33(4):631-635

De Souza LR, Jenkins AL, Sievenpiper JL, Jovanovski E, Rahelić D, Vuksan V. Korean red ginseng (*Panax ginseng* C.A. Meyer) root fractions: Differential effects on postprandial glycemia in healthy individuals. *J Ethnopharmacol* 2011, 137:245-250

Ding DZ, Shen TK, Cui YZ. Effects of red ginseng on the congestive heart failure and its mechanism. *Zhongguo Zhong Xi Yi Jie He Za Zhi* 1995, 15(6):325-327 [Chinese] (English abstract available)

Döring E. Do ginsenosides influence the performance? Results of a double-blind study. *Notab Med* 1980, 10(5): 241-246

Dowling EA, Redondo DR, Branch JD, Jones S, McNabb G, Williams MH. Effect of *Eleutherococcus senticosus* on submaximal and maximal exercise performance. *Med Sci Sports Exerc* 1996, 28(4):482-489 (only abstract available)

Engels HJ, Said JM, Wirth JC. Failure of chronic ginseng supplementation to affect work performance and energy metabolism in healthy adult females. *Nutr Res* 1996, 16(8):1295-1305

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):1110-1115

Engels HJ, Kolokouri I, Cieslak TJ 2nd, Wirth JC. Effects of ginseng supplementation on supramaximal exercise performance and short-term recovery. *J Strength Cond Res* 2001, 15(3):290-295 (only abstract available)

Engels HJ, Fahlman MM, Wirth JC. Effects of ginseng on secretory IgA, performance, and recovery from interval exercise. *Med Sci Sports Exerc* 2003, 35(4):690-696

Etou H, Sakata T, Fujimoto K, Terada K, Yoshimatsu H, Ookuma K *et al.* Ginsenoside-Rb₁ as a suppressor in central modulation of feeding the rat. *Nihon Yakurigaku Zasshi* 1988, 91(1):9-15 [Japanese] (abstract available in English)

European Pharmacopoeia, 8th ed. Ginseng – Ginseng radix. Council of Europe. 1/2008:1523; 1261-1262

European Pharmacopoeia, 8th ed- Ginseng dry extract – Ginseng extractum siccum. Council of Europe. 1/2013:2356,;1262-1264

- Forgo I, Kayasseh L, Staub JJ. Effect of a standardized ginseng extract on general well-being, reaction capacity, pulmonary function and gonadal hormones. *Med Welt* 1981a, 32(19):751-756
- Forgo I, Kirchdorfer A.M. On the question of influencing the performance of top sportsmen by means of biologically active substances. Communication 1. *Aerztl Prax* 1981b, 33(44):1784-1786
- Forgo I, Kirchdorfer A.M. The effect of different ginsenoside concentrations on physical work capacity. Communication 3. *Notab Med* 1982, 12(9):721-727
- Forgo I. Effect of drugs on physical performance and hormone system of sportsmen. Communication 2. *Münch Med Wschr* 1983, 125(38):822-824
- Forgo I, Schimert G. The duration of effect of the standardized ginseng extract G115 ☐ in healthy competitive athletes. *Notab Med* 1985, 15(9):636-640
- Fujimoto K, Sakata T, Ishimaru T, Etou H, Ookuma K, Kurokawa M *et al.* Attenuation of anorexia induced by heat or surgery during sustained administration of ginsenoside Rg₁ into rat third ventricle. *Psychopharmacology* 1989, 99(2):257-260 (only abstract available)
- Fujimoto Y, Sakuma S, Komatsu S, Sato D, Nishida H, Xiao YQ *et al.* Inhibition of 15-Hydroxyprostaglandin Dehydrogenase Activity in Rabbit Gastric Antral Mucosa by Panaxynol Isolated from Oriental Medicines. *J Pharm Pharmacol* 1998, 50:1075-1078
- Garcia RR. Estudio comparativo de dos farmacos que actuan sobre el envejecimiento cerebral. *Prensa Med Argent* 1988, 75:134-139 (article or abstract not available)
- Geng J, Dong J, Ni H, Lee MS, Wu T, Jiang K *et al.* Ginseng for cognition. *Cochrane Database Syst Rev* 2010, (12):CD007769
- Gianoli AC, Riebenfeld D. A double-blind study to assess the tolerability and efficacy of the standardized ginseng extract G 115 with special regard to its effect on the resistance of the organism to external influences. *Cytobiol Rev* 1984; 8 (3):177-186
- Greenspan EM. Ginseng and vaginal bleeding. *JAMA* 1983, 249(15):2018
- González-Seijo JC, Ramos YM, Lastra I. Manic episode and ginseng: report of a possible case. *J Clin Psychopharmacol* 1995, 15(6):447-448 (article or abstract not available)
- Gross D, Krieger D, Efrat R, Dayan M. Ginseng extract G115[®] in the treatment of chronic respiratory diseases. *Schweiz Z Ganzheitsmed* 1995, 7(1): 29-33
- Gross D, Shenkman Z, Bleiberg B, Dayan M, Gittelsohn M, Efrat R. Ginseng improves pulmonary functions and exercise capacity in patients with COPD. *Monaldi Arch Chest Dis* 2002, 57(5-6):242-246
- Gu Y, Wang GJ, Sun JG, Jia YW, Wang W, Xu MJ *et al.* Pharmacokinetic characterization of ginsenoside Rh₂, an anticancer nutrient from ginseng, in rats and dogs. *Food Chem Toxicol* 2009, 47(9):2257-2268
- Gurley BJ, Gardner SF, Hubbard MA, Williams KD, Gentry BW, Cui Y *et al.* Clinical Assessment of Effects of Botanical Supplementaion on Cytochrome P450 Phenotypes in the Elderly: St John's Wort, Garlic Oil, Panax ginseng and Ginkgo biloba. *Drugs & Aging*. 2005 22(6): 525-539 (only abstract available)
- Ha SE, Shin DH, Kim HD, Shim SM, Kim HS, Kim BH *et al.* Effects of ginsenoside Rg₂ on the ultraviolet B-induced DNA damage responses in HaCaT cells. *Naunyn Schmiedeberg Arch Pharmacol* 2010, 382(1):89-101
- Haefeli WE, Carls A. Drug interactions with phytotherapeutics in oncology. *Expert Opin Drug Metab Toxicol* 2014, 10(3):359-377

- Hallstrom C, Fulder S, Carruthers M. Effects of ginseng on the performance of nurses on night duty. *Comp Med East West* 1982, 6:277-282 (only abstract available)
- Hammond TG, Whitworth JA. Adverse reactions to ginseng. *Med J Aust* 1981, 1(9):492 (article or abstract not available)
- Han KH, Choe SC, Kim HS, Sohn DW, Nam KY, Oh BH *et al.* Effect of red ginseng on blood pressure in patients with essential hypertension and white coat hypertension. *Am J Chin Med* 1998, 26(2):199-209 (only abstract available)
- Han B, Meng Q, Li Q, Zhang J, Bi Y, Jiang N. Effect of 20(S)-protopanaxatriol and its epimeric derivatives on myocardial injury induced by isoproterenol. *Arzneimittelforschung* 2011, 61(3):148-152 (only abstract available)
- Hänsel R, Sticher O. Pharmakognosie – Phytopharmazie. 9th ed. Springer, Heidelberg, 2010, 892-902
- Hao K, Gong P, Sun SQ, Hao HP, Wang GJ, Dai Y *et al.* Beneficial estrogen-like effects of ginsenoside Rb₁, an active component of Panax ginseng, on neural 5-HT disposition and behavioural tasks in ovariectomized mice. *Eur J Pharmacol* 2011, 659:15-25
- Hasegawa H, Sung JH, Matsumiya S, Uchiyama M. Main Ginseng Saponin Metabolites Formed by Intestinal Bacteria. *Planta Med* 1996, 62(5):453-457 (only abstract available)
- Heo JH, Lee ST, Chu K, Oh MJ, Park HJ, Shim JY *et al.* An open-label trial of Korean red ginseng as an adjuvant treatment for cognitive impairment in patients with Alzheimer's disease. *Eur J Neurol* 2008, 15(8):865-868
- Hess FG Jr., Parent RA, Cox GE, Stevens KR, Becci PJ. Reproduction study in rats of Ginseng Extract G115. *Food Chem Toxicol* 1982, 20(2):189-192
- Hess FG Jr., Parent RA, Cox GE, Stevens KR, Becci PJ. Effects of subchronic feeding of Ginseng Extract G115 in Beagle dogs. *Food Chem Toxicol.* 1983, 21(1):95-97
- Hofseth LJ, Wargovich MJ. Inflammation, Cancer, and Targets of Ginseng. *J Nutr* 2007, 137(1 Suppl):183S-185S
- Hong B, Ji YH, Hong JH, Nam KY, Ahn TY. A double-blind crossover study evaluating the efficacy of korean red ginseng in patients with erectile dysfunction: a preliminary report. *J Urol* 2002, 168(5):2070-2073 (only abstract available)
- Hopkins MP, Androff L, Benninghoff AS. Ginseng face cream and unexplained vaginal bleeding. *Am J Obstet Gynecol* 1988, 159 (5): 1121-1122 (only abstract available)
- Hsu CC, Ho MC, Lin LC, Su B, Hsu MC. American ginseng supplementation attenuates creatine kinase level induced by submaximal exercise in human beings. *World J Gastroenterol* 2005, 11(34):5327-5331
- Hu S, Concha C, Cooray R, Holmberg O. Ginseng-enhanced oxidative and phagocytic activities of polymorphonuclear leucocytes from bovine peripheral blood and stripping milk. *Vet Res* 1995, 26, 155-161
- Hu S, Concha C, Johannisson A, Meglia G, Waller KP. Effect of Subcutaneous Injection of Ginseng on Cows with Subclinical Staphylococcus aureus Mastitis. *J Vet Med B* 2001, 48:519-528
- Ikehara M, Shibata Y, Higashi T, Sanada S, Shoji J. Effect of Ginseng Saponins on Cholesterol Metabolism. III. Effect of Ginsenoside-Rb₁ on Cholesterol Synthesis in Rats fed on High-fat Diet. *Chem Pharm Bull* 1978, 26(9):2844-2849

Janetsky K, Morreale AP. Probable interaction between warfarin and ginseng. *Am J Health Syst Pharm* 1997, 54:692-693 (article or abstract not available)

Jang DJ, Lee MS, Shin BC, Lee YC, Ernst E. Red ginseng for treating erectile dysfunction: a systematic review. *Br J Clin Pharmacol* 2008, 66(4):444-450

Jenny E. On the toxicity of the standardized ginseng extract G115® and pure ginsenosides. 1982 (unpublished report)

Jeong DW, Moon SK, Hong JW, Shin WJ, Park YM, Jung JH et al. [Effects of Korean ginseng, Korean red ginseng and fermented Korean red ginseng on cerebral blood flow, cerebrovascular reactivity, systemic blood pressure and pulse rate in humans]. *J Korean Oriental Med* 2006, 27:48-60 [Korean] (only abstract available)

Jeong SJ, Han SH, Kim DY, Lee JC, Kim HS, Kim BH et al. Effects of mRG₂, a Mixture of Ginsenosides Containing 60% Rg₂, on the Ultraviolet B-Induced DNA Repair Synthesis and Apoptosis in NIH3T3 Cells. *International Journal of Toxicology* 2007, 26:151-158

Jiang X, Williams KM, Liauw WS, Ammit AJ, Roufogalis BD, Duke CC et al. Effect of St. John's wort and ginseng on the pharmacokinetics and pharmacodynamics of warfarin in healthy subjects. *Br J Clin Pharmacol* 2004, 57(5): 592-599

Jiang X, Blair EYL, McLachlan AJ. Investigation of the Effects of Herbal Medicines on Warfarin Response in Healthy Subjects: A Population Pharmacokinetic-Pharmacodynamic Modeling Approach. *J Clin Pharmacol* 2006, 46:1370

Jiang QS, Huang XN, Dai ZK, Yang GZ, Zhou QX, Shi JS et al. Inhibitory effect of ginsenoside Rb₁ on cardiac hypertrophy induced by monocrotaline in rat. *J Ethnopharmacol* 2007, 111(3):567-572

Jones BD, Runikis AM. Interaction of ginseng with phenelzine. *J Clin Psychopharmacol* 1987, 7:201-202

Jovanovski E, Jenkins A, Dias AG, Peeva V, Sievenpiper J, Arnason JT et al. Effects of Korean red ginseng (*Panax ginseng* C.A. Meyer) and its isolated ginsenosides and polysaccharides on arterial stiffness in healthy individuals. *Am J Hypertens* 2010, 23(5):469-472 (only abstract available)

Kaku T, Miyata T, Uruno T, Sako I, Kinoshita A. Chemico-pharmacological studies on saponins of *Panax ginseng* C. A. Meyer. II. Pharmacological part. *Arzneimittelforschung* 1975, 25(4):539-547 (only abstract available)

Kang M, Yoshimatsu H, Oohara A, Kurokawa M, Ogawa R, Sakata T. Ginsenoside Rg₁ Modulates Ingestive Behavior and Thermal Response Induced by Interleukin-1 β in rats. *Physiol Behav* 1995, 57(2):393-396

Kaneko H, Nakanishi K, Murakami A. Effect of red ginseng on hemodynamic changes by physical exercise. In: *Proceedings of the 4th International Ginseng Symposium*, Daejeon, Korea, Sept 18-20 1984, 256 (article or abstract not available)

Kennedy DO, Scholey AB, Wesnes KA. Dose dependent changes in cognitive performance and mood following acute administration of Ginseng to healthy young volunteers. *Nutr Neurosci* 2001, 4(4):295-310

Kennedy DO, Scholey AB, Wesnes KA. Modulation of cognition and mood following administration of single doses of Ginkgo biloba, ginseng, and a ginkgo/ginseng combination to healthy young adults. *Physiol Behav* 2002, 75(5):739-751

Kennedy DO, Scholey AB, Drewery L, Marsh VR, Moore B, Ashton H. Electroencephalograph effects of single doses of Ginkgo biloba and Panax ginseng in healthy young volunteers. *Pharmacol Biochem Behav* 2003, 75(3):701-709

Kennedy DO, Reay JL, Scholey AB. Effects of 8 weeks administration of Korean Panax ginseng extract on the mood and cognitive performance of healthy individuals. *J Ginseng Res* 2007, 31(1):34-43

Khalil WKB, Ahmed KA, Park MH, Kim YT, Park HH, Abdel-Wahhab MA. The inhibitory effects of garlic and *Panax ginseng* extract standardized with ginsenoside Rg₃ on the genotoxicity, biochemical, and histological changes induced by ethylenediaminetetraacetic acid in male rats. *Arch Toxicol* 2008, 82:183-195

Kim HS, Jang CG, Lee MK. Antinarcotic Effects of the Standardized Ginseng Extract G115 on Morphine. *Planta Med* 1990, 56(2):158-163

Kim YC, Kim SR, Markelonis GJ, Oh TH. Ginsenosides Rb₁ and Rg₃ protect cultured rat cortical cells from glutamate-induced neurodegeneration. *J Neurosci Res* 1998, 53(4):426-432

Kim SW, Paick JS. Clinical efficacy of Korean red ginseng on vasculogenic impotent patients. *Korean J Androl* 1999, 23:247-256 [Korean] (abstract available in English)

Kim HS, Lee BM. Protective effects of antioxidant supplementation on plasma lipid peroxidation in smokers. *J Toxicol Environ Health A* 2001, 63(8):583-598

Kim S, Ahn K, Oh TH, Nah SY, Rhim H. Inhibitory effect of ginsenosides on NMDA receptor-mediated signals in rat hippocampal neurons. *Biochem Biophys Res Commun* 2002, 296(2):247-254

Kim EH, Jang MH, Shin MC, Shin MS, Kim CJ. Protective effect of aqueous extract of Ginseng radix against 1-methyl-4-phenylpyridinium-induced apoptosis in PC12 cells. *Biol Pharm Bull* 2003, 26(12):1668-1673

Kim SH, Park KS. Effects of Panax ginseng extract on lipid metabolism in humans. *Pharmacol Res* 2003, 48(5):511-513

Kim S, Rhim H. Ginsenosides inhibit NMDA receptor-mediated epileptic discharges in cultured hippocampal neurons. *Arch Pharm Res* 2004, 27(5):524-530

Kim JH, Park CY, Lee SJ. Effects of Sun Ginseng on subjective quality of life in cancer patients: a double-blind, placebo-controlled pilot trial. *Journal of Clinical Pharmacy and Therapeutics* 2006, 31:331-334

Kim J, Chung SY, Park S, Park JH, Byun S, Hwang M *et al.* Enhancing effect of HT008-1 on cognitive function and quality of life in cognitively declined healthy adults: a randomized, double-blind, placebo-controlled, trial. *Pharmacol Biochem Behav* 2008, 90(4):517-524

Kim KM, Kwon HS, Jeon SG, Park CH, Sohn SW, Kim DI *et al.* Korean Ginseng Induced Occupational Asthma and Determination of IgE Binding Components. *J Korean Med Sci* 2008, 23:232-235

Kim TH, Jeon SH, Hahn EJ, Paek KY, Park JK, Youn NY *et al.* Effects of tissue-cultured mountain ginseng (*Panax ginseng* C.A Meyer) extract on male patients with erectile dysfunction. *Asian J Androl* 2009, 11(3):356-361

Kobaisy M, Abramowski Z, Lermer L, Saxena G, Hancock REW, Towers GHN. Antimycobacterial Polyynes of Devil's Club (*Oplopanax horridus*), a North American Native Medicinal Plant. *J Nat Prod* 1997, 60:1210-1213

Konno C, Sugiyama K, Kano M, Takahashi M, Hikino H. Isolation and hypoglycaemic activity of panaxans A, B, C, D and E, glycans of *Panax ginseng* roots. *Planta Med* 1984, 50(5):434-436

Konno C, Murakami M, Oshima Y, Hikino H. Isolation and hypoglycemic activity of panaxans Q, R, S, T and U, glycans of *Panax ginseng* roots. *J Ethnopharmacol* 1985, 14(1):69-74

Koren G, Randor S, Martin S, Danneman D. Maternal Ginseng Use Associated with Neonatal Androgenization. *JAMA* 1990, 264(22):2866 (only abstract available)

Krebs Seida J, Durec T, Kuhle S. North American (*Panax quinquefolius*) and Asian Ginseng (*Panax ginseng*) Preparations for Prevention of the Common Cold in Healthy Adults: A systematic review. *Evid Based Complement Alternat Med* 2011, doi:10.1093/ecam/nep068 Available at: <http://www.hindawi.com/journals/ecam/2011/282151/>

Kulaputana O, Thanakomsirichot S, Anomasiri W. Ginseng supplementation does not change lactate threshold and physical performances in physically active Thai men. *J Med Assoc Thai* 2007, 90(6):1172-1179

Lai DM, Tu YK, Liu IM, Chen PF, Cheng JT. Mediation of β -Endorphin by Ginsenoside Rh₂ to Lower Plasma Glucose in Streptozotocin-Induced Diabetic Rats. *Planta Med* 2006, 72:9-13

Lee FC, Ko JH, Park JK, Lee JS. Effects of *Panax ginseng* on blood alcohol clearance in man. *Clin Exp Pharmacol Physiol*. 1987, 14(6):543-546 (only abstract available)

Lee JK, Choi SS, Lee HK, Han KJ, Han EJ, Suh HW. Effects of Ginsenoside Rd and Decursinol on the Neurotoxic Responses Induced by Kainic Acid in Mice. *Planta Med* 2003, 69(3):230-234

Lee YJ, Jin YR, Lim WC, Park WK, Cho JY, Jang S *et al.* Ginsenoside Rb₁ acts as a weak phytoestrogen in MCF-7 human breast cancer cells. *Arch Pharm Res* 2003, 26 (1):58-63

Lee TK, Johnke RM, Allison RR, O'Brien KF, Dobbs LJ. Radioprotective potential of ginseng. *Mutagenesis* 2005, 20(4):237-243

Lee JY, Lee YD, Bahn JW, Park HS. A case of occupational asthma and rhinitis caused by Sanyak and Korean ginseng dusts *Allergy* 2006, 61:392-393

Lee WK, Kao ST, Liu IM, Cheng JT. Increase of Insulin Secretion by Ginsenoside Rh₂ to Lower Plasma Glucose in Wistar Rats. *Clin Exp Pharmacol Physiol* 2006, 33(1-2):27-32

Lee WK, Kao ST, Liu IM, Cheng JT. Ginsenoside Rh₂ is one of the active principles of *Panax ginseng* root to improve insulin sensitivity in fructose-rich chow-fed rats. *Horm Metab Res* 2007, 39(5):347-354 (only abstract available)

Lee SH, Ahn YM, Ahn SY, Doo HK, Lee BC. Interaction Between Warfarin and *Panax ginseng* in Ischemic Stroke Patients. *The Journal of Alternative and Complementary Medicine* 2008, 14(6):715-721

Lee SR, Kim MR, Yon JM, Baek IJ, Lee BJ, Ahn B *et al.* Effects of Ginsenosides on Organogenesis and Expression of Glutathione Peroxidase Genes in Cultured Rat Embryos. *J Reprod Dev* 2008, 54(3): 164-170

Lee ST, Chu K, Sim JY, Heo JH, Kim M. *Panax ginseng* enhances cognitive performance in Alzheimer disease. *Alzheimer Dis Assoc Disord* 2008, 22(3):222-226 (only abstract available)

Lee J, Lee E, Kim D, Lee J, Yoo J, Koh B. Studies on absorption, distribution and metabolism of ginseng in humans after oral administration. *J Ethnopharmacol* 2009, 122: 143-148

- Lee MS, Yang EJ, Kim JI, Ernst E. Ginseng for cognitive function in Alzheimer's disease: a systematic review. *J Alzheimers Dis* 2009, 18(2):339-344
- Lee YH, Lee BK, Choi YJ, Yoon IK, Chang BC, Gwak HS. Interaction between warfarin and Korean red ginseng in patients with cardiac valve replacement. *International Journal of Cardiology* 2010, 145(2):275-276
- Lee NH, Son CG. Systematic review of randomized controlled trials evaluating the efficacy and safety of ginseng. *J Acupunct Meridian Stud* 2011, 4(2):85-97
- Lee JY, Jin HJ, Park JW, Jung SK, Jang JY, Park HS. A Case of Korean Ginseng-Induced Anaphylaxis Confirmed by Open Oral Challenge and Basophil Activation Test. *Allergy Asthma Immunol Res* 2012, 42(2):110-111
- Li J, Xie ZZ, Tang YB, Zhou JG, Guan YY. Ginsenoside-Rd, a purified component from panax notoginseng saponins, prevents atherosclerosis in apoE knockout mice. *Eur J Pharmacol* 2011, 652(1-3):104-110
- Li Ling, Liu J, Yan X, Qin K, Shi M, Lin T *et al.* Protective effects of ginsenoside Rd against okadaic acid-induced neurotoxicity in vivo and in vitro. *J Ethnopharmacol* 2011, 138:135-141
- Li Liang, Chen X, Li D, Zhong D. Identification of 20(S)-Protopanaxadiol Metabolites in Human Liver Microsomes and Human Hepatocytes. *Drug Metab and Disp* 2011, 39:472-483
- Li Y, Tang J, Khatibi NH, Zhu M, Chen D, Tu L *et al.* Treatment with Ginsenoside Rb₁, A Component of Panax Ginseng Provides Neuroprotection in Rats Subjected to Subarachnoid Hemorrhage-Induced Brain Injury. *Acta Neurochir Suppl* 2011, 110(Pt2):75-79 (only abstract available)
- Liao B, Newmark H, Zhou R. Neuroprotective effects of ginseng total saponin and ginsenosides Rb₁ and Rg₁ on spinal cord neurons in vitro. *Exp Neurol* 2002, 173(2):224-234
- Lim JH, Wen TC, Matsuda S, Tanaka J, Maeda N, Peng H *et al.* Protection of ischemic hippocampal neurons by ginsenoside Rb₁, a main ingredient of ginseng root. *Neurosci Res* 1997, 28(3):191-200
- List PH, Hörhammer L. Hagers Handbuch der pharmazeutischen Praxis, Springer, Berlin-Heidelberg-New York 1977, 872-883
- Liu Z, Li Z, Liu X. Effect of Ginsenoside Re on Cardiomyocyte Apoptosis and Expression of Bcl-2/Bax Gene after Ischemia and Reperfusion in Rats. *J Huazhong Univ Sci Technolog Med Sci* 2002, 22(4):305-309
- Liu ZQ, Luo XY, Liu GZ, Chen YP, Wang ZC, Sun YX. In vitro study of the relationship between the structure of ginsenoside and its antioxidative or prooxidative activity in free radical induced hemolysis of human erythrocytes. *J Agric Food Chem* 2003, 51(9):2555-2558
- Liu P, Xu Y, Yin H, Wang J, Chen K, Li Y. Developmental Toxicity Research of Ginsenoside Rb₁ Using a Whole Mouse Embryo Culture Model. *Birth Defects Research (Part B)* 2005, 74:207-209
- Liu P, Yin H, Xu Y, Zhang Z, Chen K, Li Y. Effects of ginsenoside Rg₁ on postimplantation rat and mouse embryos cultured in vitro. *Toxicology in Vitro* 2006, 20:234-238
- Liu JH, Lee CS, Leung KM, Yan ZK, Shen BH, Zhao ZZ *et al.* Quantification of Two Polyacetylenes in Radix Ginseng and Roots of Related Panax Species Using a Gas Chromatography-Mass Spectrometric Method. *J Agric Food Chem* 2007, 55:8830-8835
- Liu H, Yang J, Du F, Gao X, Ma X, Huang Y *et al.* Absorption and Disposition of Ginsenosides after Oral Administration of *Panax notoginseng* Extract to Rats. *Drug Metab Disp* 2009, 37(12):2290-2298

- Liu X, Xia J, Wang L, Song Y, Yang J, Yan Y *et al.*. Efficacy and safety of ginsenoside-Rd for acute ischaemic stroke: a randomized, double-blind, placebo-controlled, phase II multicenter trial. *European Journal of Neurology* 2009, 16:569-575
- Liu Z, Wang LJ, Li X, Hu JN, Chen Y, Ruan CC *et al.* Hypoglycemic Effects of Malonyl-ginsenosides Extracted from the Roots of *Panax ginseng* on Streptozotocin-induced Diabetic Mice. *Phytother Res* 2009, 23:1426-1430
- Liu L, Hoang-Gia T, Wu H, Lee MR, Gu L, Wang C *et al.* Ginsenoside Rb₁ improves spatial learning and memory by regulation of cell genesis in the hippocampal subregions of rats. *Brain Res* 2011, 1382:147-154
- Lou BY, Li CF, Li PY, Ruan JP. [Eye symptoms due to ginseng poisoning]. *Yan Ke Xue Bao* 1989, 5(3-4):96-97 [Chinese] (only abstract available)
- Lu P, Su W, Miao ZH, Niu HR, Liu J, Hua QL. Effect and Mechanism of Ginsenoside Rg₃ on Postoperative Life Span of Patients with Non-Small Cell Lung Cancer. *Chin J Integr Med* 2008, 14(1):33-36
- Ma TC, Yu QH. Effect of 20(S)-ginsenoside-Rg₂ and cyproheptadine on two-way active avoidance learning and memory in rats. *Arzneimittelforschung* 1993, 43(10):1049-1052 (only abstract available)
- Ma SW, Benzie IF, Chu TT, Fok BS, Tomlinson B, Critchley LA. Effect of *Panax ginseng* supplementation on biomarkers of glucose tolerance, antioxidant status and oxidative stress in type 2 diabetic subjects: results of a placebo-controlled human intervention trail. *Diabetes Obes Metab* 2008, 10(11):1125-1127
- Madaus R. Lehrbuch der biologischen Heilmittel. Thieme, Leipzig 1938
- Matsuda H, Namba K, Fukuda S, Tani T, Kubo M. Pharmacological Study on *Panax ginseng* C.A. Meyer. IV. Effects of Red Ginseng on Experimental Disseminated Intravascular Coagulation. (3). Effect of Ginsenoside-Ro on the Blood Coagulative and Fibrinolytic System. *Chem Pharm Bull* 1986, 34(5):2100-2104
- Matsunaga H, Katano M, Yamamoto H, Fujito H, Mori M, Takata K. Cytotoxic Activity of Polyacetylene Compounds in *Panax ginseng* C.A. Meyer. *Chem Pharm Bull* 1990, 38(12):3480-3482
- McElhaney JE, Gravenstein S, Cole SK, Davidson E, O'Neill D, Petitjean S *et al.* A placebo-controlled trial of a proprietary extract of North American ginseng (CVT-E002) to prevent acute respiratory illness in institutionalized older adults. *J Am Geriatr Soc* 2004, 52(1):13-19
- McElhaney JE, Goel V, Toane B, Hooten J, Shan JJ. Efficacy of COLD-fX in the prevention of respiratory symptoms in community-dwelling adults: a randomized, double-blinded, placebo controlled trial. *J Altern Complement Med* 2006, 12(2):153-157
- Morris AC, Jacobs I, McLellan TM, Klugerman A, Wang LC, Zamecnik J. No ergogenic effect of ginseng ingestion. *Int J Sport Nutr* 1996, 6(3):263-271
- Mulz D, Scardigli G, Jans G, Degenring FH. Long-term treatment of psychasthenia in the second half of life. *Pharm Rundsch* 1990, 12:86-86
- Nah SY, Kim DH, Rhim H. Ginsenosides: are any of them candidates for drugs acting on the central nervous system? *CNS Drug Rev* 2007, 13(4):381-404
- National Toxicology Program. Toxicology and carcinogenesis studies of ginseng (CAS No. 50647-08-0) in F344/N rats and B6C3F1 mice (gavage studies). *Natl Toxicol Program Tech Rep Ser* 2011, 567:1-149.

- Nemmani KVS, Ramarao P. Ginsenoside Rf potentiates U-50, 488H-induced analgesia and inhibits tolerance to its analgesia in mice. *Life Sci* 2003, 72(7):759-768
- Neri M, Andermarcher E, Pradelli JM, Salvioli G. Influence of a double blind pharmacological trial on two domains of well-being in subjects with age associated memory impairment. *Arch Gerontol Geriatr* 1995, 21(3):241-252
- Ng TB, Yeung HW. Hypoglycemic constituents of Panax ginseng. *Gen Pharmacol* 1985, 16(6):549-552 (only abstract available)
- Ni W, Zhang X, Wang B, Chen Y, Han H, Fan Y *et al.* Antidepressant-like effects of the active acidic polysaccharide portion of ginseng in mice. *J Med Food* 2010, 13(2):270-277
- Nie BM, Yang LM, Fu SL, Jiang XY, Lu PH, Lu Y. Protective effect of panaxydol and panaxynol on sodium nitroprusside-induced apoptosis in cortical neurons. *Chemico-Biological Interactions* 2006, 160:225-231
- Nie BM, Jiang XY, Xai JX, Fu SL, Yang LM, Lin L *et al.* Panaxydol and panaxynol protect cultured cortical neurons against A β 25-35-induced toxicity. *Neuropharmacology* 2008, 54:845-853
- Nielsen AS. Hypertension af ginsengtabletter? *Ugeskr Laeger* 1988, 150:377 [Danish] (no abstract available)
- Oh KJ, Chae MJ, Lee HS, Hong HD, Park K. Effects of Korean red ginseng on sexual arousal in menopausal women: placebo-controlled, double-blind crossover clinical study. *J Sex Med* 2010, 7(4 Pt1):1469-1477 (only abstract available)
- Oka K, Saito F, Yasuhara T, Sugimoto A. The allergens of *Dendropanax trifidus* Makino and *Fatsia japonica* Decne. et Planch. and evaluation of cross-reactions with other plants of the Araliaceae family. *Contact Dermatitis* 1999, 40:209-213
- Okamura N, Kobayashi K, Akaika A, Yagi A. Protective Effect of Ginseng Saponins against impaired brain growth in neonatal rats exposed to Ethanol. *Biol Pharm Bull* 1994, 17(2): 270-274
- Okuda H, Yoshida R. Studies on the effects of ginseng components on diabetes mellitus. In: *Proceedings of the 3rd International Ginseng Symposium*. Seoul, Korea: Korea Ginseng Research Institute, Sept 8-10, 1980, 53-57 (article or abstract not available)
- Oshima Y, Konno C, Hikino H. Isolation and hypoglycemic activity of panaxans I, J, K and L, glycans of Panax ginseng roots. *J Ethnopharmacol* 1985, 14(2-3):255-259 (only abstract available)
- Paek IB, Moon Y, Kim J, Ji HY, Kim SA, Sohn DH *et al.* Pharmacokinetics of a Ginseng Saponin Metabolite Compound K in Rats. *Biopharm Drug Dispos* 2006, 27:39-45
- Palmer BV, Montgomery ACV, Monteiro JCMP. Gin Seng and mastalgia *BMJ*. 1978, 1:1284
- Palop V, Catalán C, Rubio E, Martínez-Mir I. Ginecomastia en un varon y ginseng [Ginseng and gynecomastia in a young male]. *Med Clin (Barc)* 1999, 112(19):758 [Spanish] (only abstract available)
- Palop-Larrea V, González-Perales JL, Catalán-Oliver C, Belenguer-Varea A, Martínez-Mir I. Metrorrhagia and ginseng. *Ann Pharmacother* 2000, 34(11):1347-1348
- Pannacci M, Lucini V, Colleoni F, Martucci C, Grosso S, Sacerdote P *et al.* Panax ginseng C.A. Mayer G115 modulates pro-inflammatory cytokine production in mice throughout the increase of macrophage toll-like receptor 4 expression during physical stress. *Brain Behav Immun* 2006, 20(6):546-551

Panwar M, Kumar M, Samarth R, Kumar A. Evaluation of Chemopreventive Action and Antimutagenic Effect of the Standardized Panax Ginseng Extract, EFLA400, in Swiss Albino Mice. *Phytother Res* 2005, 19:65-71

Park HJ, Rhee MH, Park KM, Nam KY, Park KH. Effect of non-saponin fraction from Panax ginseng on cGMP and thromboxane A₂ in human platelet aggregation. *J Ethnopharmacol* 1995, 49:157-162

Park KH, Shin HJ, Song YB, Hyun HC, Cho HJ, Ham HS *et al.* Possible Role of Ginsenoside Rb₁ on Regulation of Rat Liver Triglycerides. *Biol Pharm Bull* 2002, 25(4):457-460

Park EK, Choo MK, Oh JK, Ryu JH, Kim DH. Ginsenoside Rh₂ Reduces Ischemic Brain Injury in Rats. *Biol Pharm Bull* 2004, 27(3):433-436

Park EK, Shin YW, Lee HU, Kim SS, Lee YC, Lee BY, *et al.* Inhibitory effect of ginsenoside Rb₁ and compound K on NO and prostaglandin E₂ biosyntheses of RAW264.7 Cells induced by lipopolysaccharide. *Biol Pharm Bull* 2005, 28(4):652-656

Paulsen E, Christensen LP, Andersen KE. Dermatitis from common ivy (*Hedera helix* L. subsp. *Helix*) in Europe: past, present, and future. *Contact Dermatits* 2010, 62:201-209

Ping FW, Keong CC, Bandyopadhyay A. Effects of acute supplementation of Panax ginseng on endurance running in a hot & humid environment. *Indian J Med Res* 2011, 133:96-102

Poon PY, Kwok HH, Yue PY, Yang MS, Mak NK, Wong CK *et al.* Cytoprotective effect of 20S-Rg₃ on benzo[a]pyrene-induced DNA damage. *Drug Metab Dispos* 2012, 40(1):120-129 (only abstract available)

Predy GN, Goel V, Lovlin R, Donner A, Stitt L, Basu TK. Efficacy of an extract of North American ginseng containing poly-furanosyl-saccharides for preventing upper respiratory tract infections: a randomized controlled trial. *CMAJ* 2005, 173(9):1043-1048

Punnonen R, Lukola A. Oestrogen-like effect of ginseng. *Br Med J* 1980, 281(6248):1110

Punnonen R, Lukola A. The effect of ginseng on serum total cholesterol, HDL-cholesterol and triglyceride levels in postmenopausal women. *Asia Oceania J Obstet Gynaecol* 1984, 10(3):399-401 (article or abstract not available)

Qi D, Zhu J, Wen L, Liu Q, Qiao H. Ginsenoside Rg₁ restores the impairment of learning induced by chronic morphine administration in rats. *J Psychopharmacol* 2009, 23(1):74-83

Qi LW, Wang CZ, Du GJ, Zhang ZY, Calway T, Yuan CS. Metabolism of Ginseng and its Interactions with Drugs. *Curr Drug Metab* 2011, 12(9):818-822

Quian ZM, Lu J, Gao QP, Li SP. Rapid method for simultaneous determination of flavonoid, saponins and polyacetylenes in Folium Ginseng and Radix Ginseng by pressurized liquid extraction and high-performance liquid chromatography coupled with diode array detection and mass spectrometry. *Journal of Chromatography A* 2009, 1216:3825-3830

Quiroga HA, Imbriano AE. The effect of Panax ginseng extract on cerebrovascular deficits. *Orientacion Med* 1979, 28(1208):86-87

Quiroga HA. A comparative double-blind study on the effect of Ginsana G115[®] and Hydergin on cerebrovascular deficits. *Orientacion Med* 1982, 31(1281):201-202

Radad K, Gille G, Moldzio R, Saito H, Rausch WD. Ginsenosides Rb₁ and Rg₁ effects on mesencephalic dopaminergic cells stressed with glutamate. *Brain Res* 2004, 1021(1):41-53

Rausch WD, Liu S, Gille G, Radad K. Neuroprotective effects of ginsenosides. *Acta Neurobiol Exp* 2006, 66:369-375

Reay JL, Kennedy DO, Scholey AB. Single doses of Panax ginseng (G115) reduce blood glucose levels and improve cognitive performance during sustained mental activity. *J Psychopharmacol* 2005, 19(4):357-365

Reay JL, Kennedy DO, Scholey AB. Effects of Panax ginseng, consumed with and without glucose, on blood glucose levels and cognitive performance during sustained 'mentally demanding' tasks. *J Psychopharmacol* 2006a, 20(6):771-781

Reay JL, Kennedy DO, Scholey AB. The glycaemic effects of single doses of Panax ginseng in young healthy volunteers. *Br J Nutr* 2006b 96(4):639-642

Reay JL, Kennedy DO, Scholey AB. The behavioural and mood effects of Panax ginseng (G115): A 20 week chronic trial. *Appetite* 2008, 50(2-3), 564

Reay JL, Scholey AB, Milne A, Fenwick J, Kennedy DO. *Panax ginseng* has no effect on indices of glucose regulation following acute or chronic ingestion in healthy volunteers. *Br J Nutr* 2009, 101(11):1673-1678

Reay JL, Scholey AB, Kennedy DO. Panax ginseng (G115) improves aspects of working memory performance and subjective ratings of calmness in healthy young adults. *Hum Psychopharmacol* 2010, 25(6):462-471

Reeds DN, Patterson BW, Okunade A, Holloszy JO, Polonsky KS, Klein S. Ginseng and Ginsenoside Re do not improve β -Cell Function of Insulin Sensitivity in Overweight and Obese Subjects With Impaired Glucose Tolerance or Diabetes. *Diabetes Care* 2011, 34:1071-1076

Rhee MY, Kim YS, Bae JH, Na DY, Kim YK, Lee MM *et al.* Effect of Korean Red Ginseng on Arterial Stiffness in Subjects with Hypertension. *The Journal of alternative and complementary medicine* 2011, 17(1):45-49

Ries CA, Mervyn A, Sahud MD. Agranulocytosis caused by Chinese Herbal Medicines – Dangers of Medications containing aminopyrine and phenylbutazone. *JAMA* 1975, 231(4):352-355 (only abstract available)

Rosenfeld M.S. Evaluation of the efficacy of a standardized ginseng extract in patients with psychophysical asthenia and neurological disorders. *Sem Med* 1989, 173(9):148-154

Ryu SJ, Chien YY. Ginseng-associated cerebral arteritis. *Neurology* 1995, 45(4):829-830 (only abstract available)

Salvati G, Genovesi G, Marcellini L, Paolini P, De Nuccio I, Pepe M *et al.* Effects of Panax Ginseng C.A. Meyer saponins on male fertility. *Panminerva Med* 1996, 38(4):249-254 (only abstract available)

Samira MM, Attia MA, Allam M, Elwan O. Effect of the Standardized Ginseng Extract G115 on the Metabolism and Electrical Activity of the Rabbit's Brain. *J Int Med Res* 1985, 13(6):342-348

Savel J. Toxicological investigation of the standardized Ginseng extract G115®. 1971 (unpublished report)

Scaglione F, Ferrara F, Dugnani S, Falchi M, Santoro G, Fraschini F. Immunomodulatory effects of two extracts of Panax ginseng C.A. Meyer. *Drugs Exp Clin Res* 1990, 16(10):537-542

- Scaglione F, Cogo R, Cocuzza C, Arcidiacono M, Beretta A. Immunomodulatory effects of Panax ginseng C.A. Meyer (G115) on alveolar macrophages from patients suffering with chronic bronchitis. *Int J Immunotherapy* 1994, 10(1):21-24
- Scaglione F, Cattaneo G, Alessandria M, Cogo R. Efficacy and safety of the standardised Ginseng extract G115 for potentiating vaccination against the influenza syndrome and protection against the common cold [corrected]. *Drugs Exp Clin Res* 1996, 22(2):65-72
- Scaglione F, Weiser K, Alessandria M. Effects of the standardised ginseng extract G115® in patients with chronic bronchitis. A nonblinded, randomised, comparative pilot study. *Clin Drug Invest* 2001, 21(1), 41-45
- Scaglione F, Pannacci M, Petrini O. The standardised G115® Panax ginseng C.A. Meyer extract. A review of its properties and usage. *Evid Based Integrative Med* 2005, 2(4), 195-206
- Schinkovitz A, Stavri M, Gibbons S, Bucar F. Antimycobacterial Polyacetylenes from *Levisticum officinale*. *Phytother Res* 2008, 22:681-684
- Scholey AB, Kennedy DO. Acute, dose-dependent cognitive effects of Ginkgo biloba, Panax ginseng and their combination in healthy young volunteers: differential interactions with cognitive demand. *Hum Psychopharmacol* 2002, 17(1):35-44
- See DM, Broumand N, Sahl L, Tilles JG. In vitro effects of echinacea and ginseng on natural killer and antibody-dependent cell cytotoxicity in healthy subjects and chronic fatigue syndrome or acquired immunodeficiency syndrome patients. *Immunopharmacology* 1997, 35(3):229-235
- Seely D, Dugoua JJ, Perri D, Mills E, Koren G. Safety and Efficacy of Panax ginseng during Pregnancy and Lactation. *Can J Clin Pharmacol* 2008, 15 (1):e87-e94
- Shader RI, Greenblatt DJ. Phenelzine and the dream machine: ramblings and reflections. *J Clin Psychopharmacol* 1985, 5:65
- Shader RI, Greenblatt DJ. Bees, ginseng and MAOIs revisited. *J Clin Psychopharmacol* 1988, 8:235
- Shi Y, Han B, Yu X, Qu S, Sui D. Ginsenoside Rb₃ ameliorates myocardial ischemia-reperfusion injury in rats. *Pharm Biol* 2011, 49(9):900-906
- Siegel RK. Ginseng abuse syndrome. Problems with the panacea. *JAMA* 1979, 241(15):1614-1615
- Siegel RK. Ginseng and High Blood Pressure. *JAMA* 1980, 243 (1):32
- Sievenpiper JL, Arnason JT, Leiter LA, Vuksan V. Null and opposing effects of Asian ginseng (Panax ginseng C.A. Meyer) on acute glycemia: results of two acute dose escalation studies. *J Am Coll Nutr* 2003a, 22(6):524-532
- Sievenpiper JL, Arnason JT, Leiter LA, Vuksan V. Variable effects of American ginseng: a batch of American ginseng (Panax quinquefolius L.) with a depressed ginsenoside profile does not affect postprandial glycemia. *Eur J Clin Nutr* 2003b, 57(2):243-248
- Sievenpiper JL, Arnason JT, Leiter LA, Vuksan V. Decreasing, null and increasing effects of eight popular types of ginseng on acute postprandial glycemic indices in healthy humans: the role of ginsenosides. *J Am Coll Nutr* 2004, 23(3):248-258
- Sievenpiper JL, Sung MK, Di Buono M, Seung-Lee K, Nam KY, Arnason JT et al . Korean red ginseng rootlets decrease acute postprandial glycemia: results from sequential preparation- and dose-finding studies. *J Am Coll Nutr* 2006, 25(2):100-107

- Smith K, Engels HJ, Marint JJ, Wirth JC. (Efficacy of a standardized ginseng extract to alter psychological function characteristics at rest and during exercise stress. *Med Sci Sport Exerc* 1995, 27:S147 (article or abstract not available)
- Sørensen H, Sonne J. A double-masked study of the effects of ginseng on cognitive functions. *Current Therapeutic Research* 1996, 57(12):959-968
- Sotaniemi EA, Haapakoski E, Rautio A. Ginseng therapy in non-insulin-dependent diabetic patients. *Diabetes Care* 1995, 18(10):1373-1375
- Srisurapanon S, Rungroeng K, Apibal S, Cherdugsri P, Siripol R, Vanich-Angkul V *et al.* The effect of standardized ginseng extract on peripheral blood leukocytes and lymphocyte subsets: a preliminary study in young health adults. *J Med Assoc Thai* 1997, 80 Suppl 1:S81-85 (only abstract available)
- Stavro PM, Woo M, Heim TF, Leiter LA, Vuksan V. North American ginseng exerts a neutral effect on blood pressure in individuals with hypertension. *Hypertension* 2005, 46(2):406-411
- Stavro PM, Woo M, Leiter LA, Heim TF, Sievenpiper JL, Vuksan V. Long-term intake of North American ginseng has no effect on 24-hour blood pressure and renal function. *Hypertension* 2006, 47(4):791-796
- Stevens KR, Cox GE. Effects of feeding Ginseng Extract G115 to purebred Beagle dogs for 90 days. 1978 (unpublished report)
- Suh SO, Kroh M, Kim NR, Joh YG, Cho MY. Effects of red ginseng upon postoperative immunity and survival in patients with stage III gastric cancer. *Am J Chin Med* 2002, 30(4):483-494 (only abstract available)
- Sun D, Wang B, Shi M, Zhang YX, Zhou LF, Liu ZR, *et al.* Pharmacokinetic, tissue distribution and excretion of ginsenoside-Rd in rodents. *Phytomedicine* 2012, 19(3-4):369-73 doi: 10.1016/j.phymed.2011.08.061
- Sung J, Han KH, Zo JH, Park HJ, Kim CH, Oh BH. Effects of red ginseng upon vascular endothelial function in patients with essential hypertension. *Am J Chin Med* 2000, 28(2):205-216 (only abstract available)
- Sung H, Kang SM, Lee MS, Kim TG, Cho YK. Koren Red Ginseng Slows Depletion of CD4 T Cells in Human Immunodeficiency Virus Type 1-Infected Patients. *Clin Diagn Lab Immunol* 2005, 12(4):497-501
- Sünram-Lea SI, Birchall RJ., Wesnes KA., Petrini O. Acute administration of ginseng improves speed of attention in healthy young volunteers. *J Psychopharmacol* 2003, 17(3 Suppl), A62
- Sünram-Lea SI, Birchall RJ, Wesnes KA, Petrini P. The effect of acute administration of 400 mg of Panax ginseng on cognitive performance and mood in healthy young volunteers. *Curr Top Nutraceut Res* 2005, 3(1), 65-74
- Tawab MA, Bahr U, Karas M, Wurglics M, Schubert-Zsilavecz M. Degradation of ginsenosides in humans after oral administration. *Drug Metabolism and Disposition* 2003, 31(8):1065-1071
- Teng CM, Kuo SC, Ko FN, Lee JC, Lee LG, Chen SC *et al.* Antiplatelet actions of panaxynol and ginsenosides isolated from ginseng. *Biochim Biophys Acta* 1989, 990(3):315-320 (only abstract available)
- Timm A. Salmonella typhimurium reverse mutation assay with Stand. Ginseng Extract G115. Report, CCR Project 149905, 1989

- Tode T, Kikuchi Y, Hirata J, Kita T, Nakata H, Nagata I. Effect of Korean red ginseng on psychological functions in patients with severe climacteric syndromes. *Int J Gynaecol Obstet* 1999, 67:169-174
- Trabucchi E. Teratological investigation of the standardized Ginseng Extract G115. Investigational Report, 1971
- Van Kampen J, Robertson H, Hagg T, Drobitch R. Neuroprotective actions of the ginseng extract G115 in two rodent models of Parkinson's disease. *Exp Neurol* 2003, 184(1):521-529
- Van Schepdael P. The effects of ginseng G115® on physical performance of endurance athletes. *Acta Ther* 1993, 19(4):337-347
- Voces J, Alvarez AI, Vila L, Ferrando A, de Oliveira CC, Prieto JG. Effects of administration of the standardized Panax ginseng extract G115 on hepatic antioxidant function after exhaustive exercise. *Comp Biochem Physiol C Pharmacol Toxicol Endocrinol* 1999, 123(2):175-184
- Vogler BK, Pittler MH, Ernst E. The efficacy of ginseng. A systematic review of randomised clinical trials. *Eur J Clin Pharmacol* 1999, 55(8):567-575
- Vohra S, Johnston BC, Laycock KL, Midodzi WK, Dhunoo I, Harris E *et al.* Safety and tolerability of North American ginseng extract in the treatment of pediatric upper respiratory tract infection: a phase II randomized, controlled trial of 2 dosing schedules. *Pediatrics*. 2008, 122(2):e402-410
- Von Ardenne M, Klemm W. Measurements of the increase in the difference between the arterial and venous Hb-O₂ saturation obtained with daily administration of 200 mg standardized ginseng extract G115 for four weeks. Long-term increase of the O₂ transport into the organs and tissues of the organism through biologically active substances. *Panminerva Med* 1987, 29(2):143-150
- Vuksan V, Stavro MP, Sievenpiper JL, Koo VY, Wong E, Beljan Zdravkovic U *et al.* American ginseng improves glycemia in individuals with normal glucose tolerance: effect of dose and time escalation. *J Am Coll Nutr* 2000a, 19(6):738-744
- Vuksan V, Stavro MP, Sievenpiper JL, Beljan-Zdravkovic U, Leiter LA, Josse RG. Similar Postprandial Glycemic Reductions With Escalation of Dose and Administration Time of American Ginseng in Type 2 Diabetes. *Diabetes Care* 2000b, 23(9):1221-1226
- Vuksan V, Sievenpiper JL, Koo VY, Francis T, Beljan-Zdravkovic U, Xu Z *et al.* American ginseng (*Panax quinquefolius* L) reduces postprandial glycemia in nondiabetic subjects and subjects with type 2 diabetes mellitus. *Arch Intern Med* 2000c, 160(7):1009-1013
- Vuksan V, Sievenpiper JL, Wong J, Xu Z, Beljan-Zdravkovic U, Arnason JT *et al.* American ginseng (*Panax quinquefolius* L.) attenuates postprandial glycemia in a time-dependent but not dose-dependent manner in healthy individuals. *Am J Clin Nutr* 2001, 73:753-758
- Vuksan V, Sung MK, Sievenpiper JL, Stavro PM, Jenkins AL, Di Buono M *et al.* Korean red ginseng (*Panax ginseng*) improves glucose and insulin regulation in well-controlled, type 2 diabetes: results of a randomized, double-blind, placebo-controlled study of efficacy and safety. *Nutr Metab Cardiovasc Dis* 2008, 18(1):46-56
- Wang LCH, Lee TF. Effect of Ginseng Saponins on Cold Tolerance in Young and Elderly Rats. *Planta Med* 2000, 66:144-147
- Wang XY, Zhang JT. Effect of Ginsenoside Rb₁ on long-term potentiation in the dentate gyrus of anesthetized rats. *J Asian Nat Prod Res* 2003, 5(1):1-4
- Wang Z, Zheng Q, Liu K, Li G, Zheng R. Ginsenoside Rh₂ Enhances Antitumour Activity and Decreases Genotoxic Effect of Cyclophosphamide. *Basic Clin Pharmacol Toxicol*. 2006, 98:411-415

Wang Z, Li M, Wu WK, Tan HM, Geng DF. Ginsenoside Rb₁ Preconditioning Protects Against Myocardial Infarction After Regional Ischemia and Reperfusion by Activation Phosphatidylinositol-3-kinase Signal Transduction. *Cardiovasc Drugs Ther* 2008, 22(6):443-452

Wang J, Li S, Fan Y, Chen Y, Liu D, Cheng H *et al.* Anti-fatigue activity of the water-soluble polysaccharides isolated from *Panax ginseng* C.A. Meyer. *J Ethnopharmacol* 2010a, 130(2):421-423

Wang J, Flaisher-Grinberg S, Li S, Liu H, Sun L, Zhou Y *et al.* Antidepressant-like effects of the active acidic polysaccharide portion of ginseng in mice. *J Ethnopharmacol* 2010b, 132(1):65-69

Washida D, Kitanaka S. Determination of Polyacetylenes and Ginsenosides in *Panax* Species Using High Performance Liquid Chromatography. *Chem Pharm Bull* 2003, 51(11):1314-1317

Wichtl M. Teedrogen und Phytopharmaka. 5th ed. Wiss. VerlagsgesmbH, Stuttgart, 2009

Wiklund IK, Mattsson LA, Lindgren R, Limoni C. Effects of a standardized ginseng extract on quality of life and physiological parameters in symptomatic postmenopausal women: a double-blind, placebo-controlled trial. *Int J Clin Pharmacol Res* 1999, 19(3):89-99

Wilkie A, Cordess C. Ginseng – a root just like a carrot? *Journal of the Royal Society of Medicine* 1994, 87(10):594-595 (only abstract available)

Williams M. Immuno-protection against herpes simplex type II infection by eleutherococcus root extract. *Int J Alternative Complementary Med.* 1995, 13:9-12 (original article or abstract not available)

Winther K, Ranlov C, Rein E, Mehlsen J. Russian root (Siberian Ginseng) improves cognitive functions in middle-aged people, whereas Ginkgo biloba seems effective only in the elderly. *J Neurol Sci* 1997, 150:S90

Wong HB. Effects of herbs and drugs during pregnancy and lactation. *J Singapore Paediatr Soc* 1979, 21(3-4):169-178 (only abstract available)

Wu CH, Tsai BR, Hsieh WT, Chang GY, Mao SJT, Chang WC. The preventive effects of G115 on balloon injury-induced neointima formation in rats. *Life Sciences* 2001, 70(6):669-679

Wu Y, Xia ZY, Dou J, Zhang L, Xu JJ, Zhao B *et al.* Protective effect of ginsenoside Rb₁ against myocardial ischemia/reperfusion injury in streptozotocin-induced diabetic rats. *Mol Biol Rep* 2011, 38(7):4327-4335

Xia C, Wang G, Sun J, Hao H, Xiong Y, Gu S *et al.* Simultaneous determination of ginsenoside Rg1, Re, Rd, Rb1 and ophiogonin D in rat plasma by liquid chromatography/electrospray ionization mass spectrometric method and its application to pharmacokinetic study of “Shenmai” injection. *J Chromatogr B* 2008, 862:72-78

Xu C, Teng J, Chen W, Ge Q, Yang Z, Yu C *et al.* 20(S)-protopanaxadiol, an active ginseng metabolite, exhibits strong antidepressant-like effects in animal tests. *Prog Neuropsychopharmacol Biol Psychiatry* 2010, 34(8):1402-1411

Xu Z, Lan T, Wu W, Wu Y. The effects of ginsenoside Rb₁ on endothelial damage and ghrelin expression induced by hyperhomocysteine. *J Vasc Surg* 2011, 53(1):156-164 (only abstract available)

Xue CC, Shergis JL, Zhang AL, Worsnop C, Fong H, Story D *et al.* *Panax ginseng* C.A Meyer root extract for moderate Chronic Obstructive Pulmonary Disease (COPD): study protocol for a randomised controlled trial. *Trials* 2011, 12:164

Yamada N, Araki H, Yoshimura H. Identification of antidepressant-like ingredients in ginseng root (*Panax ginseng* C.A. Meyer) using a menopausal depressive-like state in female mice: participation of 5-HT_{2A} receptors. *Psychopharmacology* 2011, 216:589-599

Yamamoto M, Kumagai A. Anti-Atherogenic Action of *Panax ginseng* in Rats and in Patients with Hyperlipidemia. *Planta Med* 1982, 45(7):149 (original article or abstract not available)

Yamamoto M, Uemura T, Nakama S, Uemiya M, Kumagai A. Serum HDL-cholesterol-increasing and fatty liver-improving actions of *Panax ginseng* in high cholesterol diet-fed rats with clinical effect on hyperlipidemia in man. *Am J Chin Med* 1983, 11(1-4):96-101(only abstract available)

Yamamoto M, Kumagai A. Long term ginseng effects on hyperlipidemia in man with further study of its actions on atherogenesis and fatty liver in rats. In: *Proceedings of the 4th International Ginseng Symposium*, Daejeon, Korea, Sept 18-20, 1984, 13:9 (original article or abstract not available)

Yan Z, Yang R, Jiang Y, Yang Z, Yang J, Zhao Q *et al.* Induction of Apoptosis in Human Promyelocytic Leukemia HL60 Cells by Panaxynol and Panaxydol. *Molecules* 2011, 16:5561-5573

Yang MC, Seo DS, Choi SU, Park YH, Lee KR. Polyacetylenes from the Roots of Cultivated-Wild Ginseng and Their Cytotoxicity *In Vitro*. *Arch Pharm Res* 2008, 31(2):154-159

Yang L, Xu SJ, Wu ZF, Liu YM, Zeng X. Determination of Ginsenoside-Rg₁ in Human Plasma and its Application to Pharmacokinetic Studies Following Intravenous Administration of "Shenmai" Injection. *Phytother Res* 2009, 23: 65-71

Yang YH, Han SJ, Ryu JH, Jang IS, Kim DH. Ginsenoside Rh₂ Ameliorates Scopolamine-Induced Learning Deficit in Mice. *Biol Pharm Bull* 2009, 32(10):1710-1715

Ye R, Kong X, Yang Q, Zhang Y, Han J, Zhao G. Ginsenoside Rd attenuates redox imbalance and improves stroke outcome after focal cerebral ischemia in aged mice. *Neuropharmacology* 2011a, 61(4):815-824

Ye R, Kong X, Yang Q, Zhang Y, Han J, Li P. Ginsenoside Rd in Experimental Stroke: Superior Neuroprotective Efficacy with a Wide Therapeutic Window. *Neurotherapeutics* 2011b, 8(3):515-525

Ye R, Zhang X, Kong X, Han J, Yang Q, Zhang Y *et al.* Ginsenoside Rd attenuates mitochondrial dysfunction and sequential apoptosis after transient focal ischemia. *Neuroscience* 2011c, 178:169-180

Ye R, Yang Q, Kong X, Han J, Zhang X, Zang Y *et al.* Ginsenoside Rd attenuates early oxidative damage and sequential inflammatory response after transient focal ischemia in rats. *Neurochem Int* 2011d, 58(3):391-398

Yi SW, Sull JW, Hong JS, Linton JA, Ohr H. Association between ginseng intake and mortality: Kangwha cohort study. *J Altern Complement Med* 2009, 15(8):921-928

Yokozawa T, Kobayashi T, Oura H, Kawashima Y. Stimulation of Lipid and Sugar Metabolism in Ginsenoside-Rb₂ Treated Rats. *Chem Pharm Bull* 1984, 32(7):2766-2772

Yokozawa T, Kobayashi T, Kawai A, Oura H, Kawashima Y. Hyperlipemia-Improving Effects of Ginsenoside Rb₂ in Cholesterol-Fed Rats. *Chem Pharm Bull* 1985a, 33(2):722-729

Yokozawa T, Kobayashi T, Oura H, Kawashima Y. Studies on the Mechanism of the Hypoglycemic Activity of Ginsenoside-Rb₂ in Streptozotocin-Diabetic Rats. *Chem Pharm Bull* 1985b, 33(2):869-872

Yokozawa T, Satoh A, Cho EJ. Ginsenoside-Rd attenuates oxidative damage related to aging in senescence-accelerated mice. *J Pharm Pharmacol* 2004, 56(1):107-113 (only abstract available)

- Yoon SH, Han EJ, Sung JH, Chung SH. Anti-diabetic Effects of Compound K versus Metformin versus Compound K-Metformin Combination Therapy in Diabetic db/db Mice. *Biol Pharm Bull* 2007, 30(11):2196-2200
- Yoon SJ, Kom KH, Kim CJ, Park HC, Kang KH, Kim MJ *et al.* Effects of red ginseng supplementation on aerobic, anaerobic performance, central and peripheral fatigue. *J Ginseng Res* 2008, 32(3):210-219 [Korean] (only abstract available)
- Yu K, Ma Y, Shao Q, Qu H, Cheng Y. Simultaneously determination of five ginsenosides in rabbit plasma using solid-phase extraction and HPLC/MS technique after intravenous administration of "Shenmai" injection. *J Pharm Biomed Anal* 2007, 44:532-539
- Yuan J, Guo W, Yang B, Liu P, Wang Q, Yuan H. 116 cases of coronary angina pectoris treated with powder composed of radix ginseng, radix notoginseng and succinum. *J Trad Chin Med* 1997, 17(1):14-17 (only abstract available)
- Yuan CS, Wei G, Dey L, Karrison T, Nahlik L, Maleckar S *et al.* Brief communication: American Ginseng reduces warfarin's effect in healthy patients. *Ann Intern Med* 2004, 141: 23-27
- Zeng X, Deng Y, Feng Y, Liu Y, Yang L, Huang Y *et al.* Pharmacokinetics and Safety of Ginsenoside R_d Following a Single or Multiple Intravenous Dose in Healthy Chinese Volunteers. *J Clin Pharmacol* 2010, 50:285-292
- Zhan Y, Xu XH, Jiang YP. Protective effects of ginsenoside on myocardial ischemic and reperfusion injuries. *Zhonghua Yi Xue Za Zhi* 1994, 74(10):626-628, 648 [Chinese] (only abstract available)
- Zhang WY, Teng H, Zheng Y. Ginseng saponin treatment for intrauterine growth retardation. *Zhonghua Yi Xue Za Zhi* 1994, 74(10):608-610, 646 [Chinese] (only abstract available)
- Zhang B, Matsuda S, Tanaka J, Tateishi N, Maeda N, Wen TC *et al.* Ginsenoside Rb₁ Prevents Image Navigation Disability Cortical Infarction, and Thalamic Degeneration in Rats With Focal Cerebral Ischemia. *J Stroke Cerebrovasc Dis* 1998, 7(1):1-9
- Zhang G, Liu A, Zhou Y, San X, Jin T, Jin Y. Panax ginseng ginsenoside-Rg₂ protects memory impairment via anti-apoptosis in rat model with vascular dementia. *J Ethnopharmacol* 2008, 115(3):441-448
- Zhang QH, Wu CF, Duan L, Yang JY. Protective effects of total saponins from stem and leaf of *Panax ginseng* against cyclophosphamide-induced genotoxicity and apoptosis in mouse bone marrow cells and peripheral lymphocyte cells. *Food Chem Toxicol* 2008, 46:293-302
- Zhang QH, Wu CF, Yang JY, Mu YH, Chen XX, Zhao YQ. Reduction of cyclophosphamide-induced DNA damage and apoptosis effects of ginsenoside Rb₁ on mouse bone marrow cells and peripheral blood leukocytes. *Environ Toxicol Pharmacol* 2009, 27:384-389
- Zhao XZ. [Antisensitizing effect of ginseng-rhizome saponin]. *Zhong Xi Yi Jie He Za Zhi*. 1990 (10):586-9, 579 [Chinese] (only English abstract available)
- Zhao J, Su C, Yang C, Liu M, Tang L, Su W *et al.* Determination of ginsenosides Rb₁, Rb₂, and Rb₃ in rat plasma by a rapid and sensitive liquid chromatography tandem mass spectrometry method: Application in a pharmacokinetic study. *J Pharm Biomed Anal* 2012, 64-65:94-7, doi: 10.1016/j.jpba.2012.02.017
- Zhou D, Tong L, Wan M, Wang G, Ye Z, Wang Z *et al.* An LC-MS method for simultaneous determination of nine ginsenosides in rat plasma and its application in pharmacokinetic study. *Biomed Chromatogr* 2011, 25:720-726

Zhu M, Chan KW, Ng LS, Chang Q, Chang S, Li RC. Possible influences of ginseng on the pharmacokinetics and pharmacodynamics of warfarin in rats. *J Pharm Pharmacol* 1999, 51(2):175-80 (only abstract available)

Zidorn C, Jöhrer K, Ganzera M, Schubert B, Sigmund EM, Mader J *et al.* Polyacetylenes from the Apiaceae Vegetables Carrot, Celery, Fennel, and Parsnip and Their Cytotoxic Activities. *J Agric Food Chem* 2005, 53:2518-2523

Ziemba AW, Chmura J, Kaciuba-Uscilko H, Nazar K, Wisnik P, Gawronski W. Ginseng treatment improves psychomotor performance at rest and during graded exercise in young athletes. *Int J Sport Nutr* 1999, 9(4):371-377

References read but not included to the Assessment Report

Bahrke MS, Morgan WP, Stegner A. Is ginseng an ergogenic aid? *Int J Sport Nutr Exerc Metab* 2009, 19(3):298-322