



Astragalus

Updated: April 10, 2019.

OVERVIEW

Introduction

Astragalus is a traditional Chinese herbal medicine used as a general tonic and treatment for many conditions including diarrhea, upper respiratory infections, heart disease, hepatitis and cancer. Astragalus has not been associated with serum enzyme elevations during therapy nor in causing clinically apparent liver injury.

Background

Astragalus is an ancient traditional Chinese herbal medicine that is derived from roots of various *Astragalus* species that are native to China, Korea and North America. Called “Huang Qi” in Chinese traditional medicine, it is purported to have immunomodulatory, antioxidant, antiviral and cardiotoxic activities and is used to treat stress, fatigue, pain, memory loss, viral infections, hypercholesterolemia, cancer, heart failure, and kidney and liver disease. It is also used as a general tonic to increase energy, reduce fatigue and counteract the effects of aging. Its efficacy in these conditions has not been shown in controlled prospective studies, but it has been used in traditional Chinese medicine for centuries and is currently becoming a popular herbal product in Western countries. Astragalus extracts have multiple chemical constituents and the specific active ingredient responsibility for its activity has not been identified. Constituents include triterpene glycosides, saponins (astragalosides), sterols, fatty acids, isoflavonoids and polysaccharides. Extracts of astragalus are often supplied as tablets or capsules which are taken once to three times daily. Astragalus is also supplied as liquids and teas. Side effects are uncommon and have not been clearly defined. Large doses can cause gastrointestinal upset, diarrhea, nausea and vomiting, probably because of direct irritation to the intestinal mucosa.

Hepatotoxicity

Astragalus is considered generally safe and without major adverse effects. In the few human studies that have been published there were no reports of serum enzyme elevations occurring during therapy and no mention of serious adverse events or hepatotoxicity. It has been shown to have hepatoprotective activities in animal models and has been used to treat liver diseases, although with uncertain efficacy. There have been no published reports of hepatotoxicity from astragalus, but it is present in many multiingredient products and the purity and potency of commercial preparations are not rigorously regulated. Thus, clinically apparent liver injury attributable to astragalus must be rare if it occurs at all.

Likelihood score: E (unlikely cause of clinically apparent liver injury).

Mechanism of Injury

The mechanism by which astragalus might cause hepatotoxicity is unclear. The possibility of mislabeling or adulteration with hepatotoxic herbal products is always an issue in commercial multiingredient dietary supplements. In vitro and in vivo studies have reported that astragalus is metabolized by the hepatic microsomal enzyme system and that it has some degree of inhibitory activity against several CYP enzyme isoforms. However, clinically apparent astragalus-drug interactions have not been reported.

Outcome and Management

Astragalus has not been reported to cause clinically apparent liver injury. Because of its possible effects on CYP activity, its potential for herb-drug interactions should be considered before it is used.

Other Names: Huang Qi, Milk vetch, Radix astragalus

Drug Class: [Herbal and Dietary Supplements](#)

PRODUCT INFORMATION

REPRESENTATIVE TRADE NAMES

Astragalus – Generic

DRUG CLASS

Herbal and Dietary Supplements

SUMMARY INFORMATION

[Fact Sheet at National Center for Complementary and Integrative Health, NIH](#)

CHEMICAL FORMULA AND STRUCTURE

DRUG	CAS REGISTRY NUMBER	MOLECULAR FORMULA	STRUCTURE
Astragalus	94166-93-5	Herbal Extract	Not applicable

ANNOTATED BIBLIOGRAPHY

References updated: 10 April 2019

Abbreviations used: HDS, herbal and dietary supplements

Zimmerman HJ. Unconventional drugs. Miscellaneous drugs and diagnostic chemicals. In, Zimmerman, HJ. Hepatotoxicity: the adverse effects of drugs and other chemicals on the liver. 2nd ed. Philadelphia: Lippincott, 1999: pp. 731-4.

(Expert review of hepatotoxicity published in 1999; several herbals are discussed, including comfrey, Jin Bu huan, germander, chaparral leaf, skullcap and valerian, but not astragalus).

Seeff L, Stickel F, Navarro VJ. Hepatotoxicity of herbs and dietary supplements. In, Kaplowitz N, DeLeve LD, eds. Drug-induced liver disease. 3rd ed. Amsterdam: Elsevier, 2013, pp. 631-58.

(Review of hepatotoxicity of HDS; astragalus is not discussed).

No authors listed. Astragalus. In, Natural medicines: comprehensive database. Available at: <http://naturaldatabase.therapeuticresearch.com>

(Fact sheet on herbal medications and natural products including astragalus).

Astragalus. In, PDR for Herbal Medicines. 4th ed. Montvale, New Jersey: Thomson Healthcare Inc. 2007: pp. 56-61.

(Compilation of short monographs on herbal medications and dietary supplements).

Schiano TD. Hepatotoxicity and complementary and alternative medicines. Clin Liver Dis 2003; 7: 453-73. PubMed PMID: 12879994.

(Comprehensive review of herbal associated hepatotoxicity; astragalus is not listed as causing hepatotoxicity).

Russo MW, Galanko JA, Shrestha R, Fried MW, Watkins P. Liver transplantation for acute liver failure from drug-induced liver injury in the United States. Liver Transpl 2004; 10: 1018-23. PubMed PMID: 15390328.

(Among ~50,000 liver transplants reported to UNOS between 1990 and 2002, 270 [0.5%] were done for drug induced acute liver failure, including 7 [5%] for herbal medications, none were attributed to astragalus).

McCulloch M, See C, Shu XJ, Broffman M, Kramer A, Fan WY, Gao J, et al. Astragalus-based Chinese herbs and platinum-based chemotherapy for advanced non-small-cell lung cancer: meta-analysis of randomized trials. J Clin Oncol 2006; 24: 419-30. PubMed PMID: 16421421.

(Systematic review of 34 published controlled trials of astragalus combined with platinum-based chemotherapy for NSCLC found evidence reduced risk of death and improved tumor responses with astragalus, no discussion of adverse events).

Taixiang W, Munro AJ, Guanjian L. Chinese medical herbs for chemotherapy side effects in colorectal cancer patients. Cochrane Database Syst Rev 2005; (1): CD004540. PubMed PMID: 15674951.

(Systematic review of published studies on efficacy of Chinese herbal medicines in decreasing side effects of colorectal cancer chemotherapy, identified 4 rather low-quality studies which reported lower rates of nausea and vomiting with Huang Qi; no adverse effects were reported).

Matkovic Z, Zivkovic V, Korica M, Plavec D, Pecanic S, Tudoric N. Efficacy and safety of Astragalus membranaceus in the treatment of patients with seasonal allergic rhinitis. Phytother Res 2010; 24: 175-81. PubMed PMID: 19504468.

(Among 48 adults with allergic rhinitis treated with an herbal, vitamin and mineral combination product containing astragalus vs placebo for 6 weeks, allergic symptoms improved more with herbal supplement and "adverse events were not connected with the study drug").

Pao LH, Hu OY, Fan HY, Lin CC, Liu LC, Huang PW. Herb-drug interaction of 50 Chinese herbal medicines on CYP3A4 activity in vitro and in vivo. Am J Chin Med 2012; 40: 57-73. PubMed PMID: 22298448.

(In vitro testing using human microsomes and in vivo testing in rats suggest that Huang Qi was a potent inhibitor of CYP 3A4 activity).

Teschke R, Wolff A, Frenzel C, Schulze J, Eickhoff A. Herbal hepatotoxicity: a tabular compilation of reported cases. Liver Int 2012 32: 1543-56. PubMed PMID: 22928722.

(A systematic compilation of all publications on the hepatotoxicity of specific herbals identified 185 publications on 60 different herbs and supplements, but astragalus was not present in the list).

Bunchorntavakul C, Reddy KR. Review article: herbal and dietary supplement hepatotoxicity. Aliment Pharmacol Ther 2013; 37: 3-17. PubMed PMID: 23121117.

(Systematic review of literature on HDS associated liver injury does not mention astragalus).

Navarro VJ, Barnhart H, Bonkovsky HL, Davern T, Fontana RJ, Grant L, Reddy KR, et al. Liver injury from herbals and dietary supplements in the U.S. Drug-Induced Liver Injury Network. *Hepatology* 2014; 60: 1399-408. PubMed PMID: 25043597.

(Among 85 cases of HDS associated liver injury [not due to anabolic steroids] enrolled in a US prospective study between 2004 and 2013, none were attributed to an astragalus-containing product).

Jiang D, Wang X, Su Q, Jiang S, Yuan F, Zhang C, Gong F, et al. Milkvetch root improves immune function in patients with acute exacerbation of COPD. *Biomed Mater Eng* 2015; 26 Suppl 1: S2113-21. PubMed PMID: 26405990.

(Among 82 adults with an acute exacerbation of chronic obstructive lung disease treated with astragalus vs placebo for 2 weeks, improvement in pulmonary function and decrease in inflammatory markers was slightly greater with astragalus treatment and the only adverse reaction recorded was mild diarrhea in 2 subjects).

García-Cortés M, Robles-Díaz M, Ortega-Alonso A, Medina-Caliz I, Andrade RJ. Hepatotoxicity by dietary supplements: a tabular listing and clinical characteristics. *Int J Mol Sci* 2016; 17. pii: E537. PubMed PMID: 27070596.

(Listing of published cases of liver injury from HDS products does not mention or discuss astragalus).

Brown AC. Liver toxicity related to herbs and dietary supplements: online table of case reports. Part 2 of 5 series. *Food Chem Toxicol* 2017; 107 (Pt A): 472-501. PubMed PMID: 27402097.

(Description of an online compendium of cases of liver toxicity attributed to HDS products does not mention or discuss astragalus).