

Astragalus (*Astragalus membranaceus*)

Common Indications:

- Adaptogen – modulates the stress response to reduce fatigue and enhance performance
- Enhances immune function
- Antioxidant
- Cardiovascular: Reduces cholesterol, blood pressure and improves blood flow
- By reducing the stress response it may enhance glucose control
- Reduces cancer risk and is supportive during chemotherapy or radiation
- Enhanced oxygenation of tissue
- Neuroprotective

General Comments:

There are more than 3000 different species of Astragalus which have been favored by Chinese medicine for centuries. Its content of isoflavones, polysaccharides and saponins are what give it such broad properties to support the immune, cardiovascular, adrenal and bowel systems.

Benefits & Mechanism of Action:

Immune modulation

It enhances interferon production thus offering immune support against viral infection. The polysaccharide content enhances T-cell and natural killer cell function. Both in vitro and vivo studies in humans show the ability of astragalus to improve immune function and promote wound healing.^{1,2,3,4,5,6}

Anticarcinogenic effects

Astragalus may also be useful as adjunctive support in radiation and chemotherapy, especially in improving immune function.^{7,8} It has been shown to antiproliferative effects which inhibit the growth of tumor cells and promotes apoptosis.^{9,10}

Cardioprotection

Saponins found in astragalus have been reported to be cardioprotective. Astragalus may help with oxygenation of the heart and cerebrovascular tissue and improve stamina and endurance.¹¹ It has also been shown to reverse left ventricular remodeling which improves cardiac function.^{12,13}

Hypoglycemic effects

Has the ability to impact insulin resistance by effecting gene expression and gene splicing that

regulates insulin on the subcellular level and preserves pancreatic beta cell function.^{14,15} Has also been shown to improve insulin sensitivity in skeletal muscles and increase the expression of GLUT-4 transporters.^{16,17,18,19}

Hepatic-, Renal, and Neuro-protective effects

Increases liver glutathione levels and protects against paracetamol, carbon tetrachloride, and D-galactosamine poisoning.²⁰ Shown to decrease proteinuria which protects the microstructure of the kidney.^{21,22,23} Showed neuroprotective benefits and enhanced memory.²⁴ Has also been shown to have protective effect against cyclophosphamide-induced injury.²⁵

Dose:

- 250-500mg, 3-4 times daily of a standardized extract.
- Astragalus should be taken on a cycle of 3 weeks on, 2 weeks off and the full effects may take up to 4 weeks to materialize.

Standardization: Astragalus products should be standardized to contain a minimum of 0.4% 4'-hydroxy-3'-methoxyisoflavone 7-sug.

Cautions & Side Effects:

Astragalus has been reported to be safe in recommended doses.

- Astragalus should not be taken when acute inflammation (swelling, pain or redness) is present.
- Astragalus should not be taken in high doses during acute phases of infection, especially when accompanied by a high fever.
 - Caution should be use if taken if also using immunosuppressive medications.

References:

Immune modulation

1. Cho WC, Leung KN. In vitro and in vivo immunomodulating and immunorestorative effects of Astragalus membranaceus. J Ethnopharmacol. 2007 Aug 15;113(1):132-41. Epub 2007 May 31.
2. Hao Y, Qiu QY, Wu J. [Effect of Astragalus polysaccharides in promoting neutrophil-vascular endothelial cell adhesion and expression of related adhesive molecules]. Zhongguo Zhong Xi Yi Jie He Za Zhi 2004;24(5):427-430.
3. Hei ZQ, Zhang JJ, Lin SQ, et al. [Effects of Astragalus membranaceus injection on nitric oxide and endothelin concentration of intestinal mucosa after hemorrhage shock-reperfusion in rats]. Zhongguo Zhong Yao Za Zhi 2004;29(5):444-447.
4. Mao SP, Cheng KL, Zhou YF. [Modulatory effect of Astragalus membranaceus on Th1/Th2 cytokine in patients with herpes simplex keratitis]. Zhongguo Zhong Xi Yi Jie He Za Zhi 2004;24(2):121-123.

5. Shao BM, Xu W, Dai H, et al. A study on the immune receptors for polysaccharides from the roots of *Astragalus membranaceus*, a Chinese medicinal herb. *Biochem Biophys Res Commun* 2004;320(4):1103- 1111.
6. Shi FS, Yang ZG, Di GP. [Effect of *Astragalus* saponin on vascular endothelial cell and its function in burn patients]. *Zhongguo Zhong Xi Yi Jie He Za Zhi* 2001;21(10):750-751.

Anticarcinogenic effects

7. Duan P, Wang ZM. [Clinical study on effect of *Astragalus* in efficacy enhancing and toxicity reducing of chemotherapy in patients of malignant tumor]. *Zhongguo Zhong Xi Yi Jie He Za Zhi* 2002;22(7):515-517.
8. Kim SH, Lee SE, Oh H, et al. The radioprotective effects of bu-zhong-yi-qi-tang: a prescription of traditional Chinese medicine *astragalus*. *J Chin Med* 2002;30(1):127-137.
9. Huang L et al. *Astragalus membranaceus* lectin (AML) induces caspase-dependent apoptosis in human leukemia cells. *Cell Proliferation* 45.1 (2012):15-21
10. Wei H, Sun R, Xiao W, et al. Traditional Chinese medicine *Astragalus* reverses predominance of Th2 cytokines and their up-stream transcript factors in lung cancer patients. *Oncol Rep* 2003;10(5):1507-1512.

Cardioprotection

11. Chen KT, Su CH, Hsin LH, et al. Reducing fatigue of athletes following oral administration of *huangqi jianzhong tang*. *Acta Pharmacol Sin* 2002;23(8):757-761.
12. Zhang JG, Gao DS, Wei GH. [Clinical study on effect of *Astragalus* injection on left ventricular remodeling and left ventricular function in patients with acute myocardial infarction]. *Zhongguo Zhong Xi Yi Jie He Za Zhi* 2002;22(5):346-348.
13. Zhang JG, Yang N, He H, et al. [Effect of *Astragalus* injection on plasma levels of apoptosis-related factors in aged patients with chronic heart failure.]. *Chin J Integr Med* 2005;11(3):187-190.

Hypoglycemic effects

14. Mao XX, et al. Hypoglycemic effect of polysaccharide enriched extract of *Astragalus membranaceus* in diet induced insulin resistant C57BL/6J mice and its potential mechanism. *Phytomedicine* 2009: 16, 416-425.
15. Li C et al. Inhibitory effect of *Astragalus* polysaccharides on apoptosis of pancreatic beta-cells mediated by Fas in diabetes mellitus rats. *Zhong Yao Cai*. 2011; Oct;34(10):1579-82.
16. Liu M, et al. *Astragalus* polysaccharide improves insulin sensitivity in KKAY mice: Regulation of PKB/GLUT4 signaling in skeletal muscle. *Journal of Ethnopharmacology*. 127.8 (2010): 32-37.
17. Wang HY, Chen YP. [Clinical observation on treatment of diabetic nephropathy with compound *fructus arctii* mixture]. *Zhongguo Zhong Xi Yi Jie He Za Zhi* 2004;24(7):589-592.

18. Zou F et al 2009. Astragalus polysaccharides alleviates glucose toxicity and restores glucose homeostasis in diabetic states via activation of AMPK. *Acta Pharmacol Sin.* 2009 Dec;30(12):1607-15.
19. Wu Y, Ou-Yang JP, Wu K, et al. Hypoglycemic effect of Astragalus polysaccharide and its effect on PTP1B. *Acta Pharmacol Sin* 2005;26(3):345-352.

Hepatic-, Renal, and Neuro-protective effects

20. Zhang ZL, et al. Hepatoprotective effects of astragalus root. *J Ethnopharmacol* 30.2 (1990): 145-9.
21. Li S, Zhang Y. Characterization and renal protective effect of a polysaccharide from *Astragalus membranaceus*. *Carbo Polymers* 78.2 (2009): 343-348.
22. Son J et al. A combination of Chinese herbs, *Astragalus membranaceus* var. *mongholicus* and *Angelica sinensis*, improved renal microvascular insufficiency in 5/6 nephrectomized rats. *Vasc Pharm* 50.5 (2009): 185-193.
23. Wojcikowski K, et al. Beneficial effect of *Astragalus membranaceus* on estimated glomerular filtration rate in patients with progressive chronic kidney disease. *Phyto Research* 24.6 (2009): 875-884.
24. Jin R et al. Studies on pharmacological junctions of hairy root of *Astragalus membranaceus*. *Zhongguo Zhong Yao Za Zhi* 24.10 (1990): 619-621, 639.
25. Wei X, Zhang J, Li J, et al. Astragalus *mongholicus* and *Polygonum multiflorum*'s protective function against cyclophosphamide inhibitory effect on thymus. *Am J Chin Med* 2004;32(5):669-680.