

## COMMENTARY

# Astragalus

**Publish date:** June 14, 2011

**Dermatology News™**

*Astragalus membranaceus* has a millennia-long tradition of medicinal use in China, but has only recently been considered and investigated by Western medicine. Preliminary indications suggest that this herb offers significant potential, with few side effects, as an alternative or adjuvant therapy for several conditions, including dermatologic.

Native to Mongolia, and northern and eastern China, *A. membranaceus*, a member of the pea family, is a perennial herb that has been used in Traditional Chinese Medicine (TCM) as a tonic for thousands of years ([Zhonghua Shi Yan He Lin Chuang Bing Du Xue Za Zhi 1998;12:269-71 <http://www.ncbi.nlm.nih.gov/pubmed?](http://www.ncbi.nlm.nih.gov/pubmed?term=Zhonghua+Shi+Yan+He+Lin+Chuang+Bing+Du+Xue+Za+Zhi.%5BJour%5D+AND+12%5Bvolume%5D+AND+269%5Bpage%5D+AND+1998%5Bpdat%5D&cmd=detailssearch)

[term=Zhonghua+Shi+Yan+He+Lin+Chuang+Bing+Du+Xue+Za+Zhi.%5BJour%5D+AND+12%5Bvolume%5D+AND+269%5Bpage%5D+AND+1998%5Bpdat%5D&cmd=detailssearch](http://www.ncbi.nlm.nih.gov/pubmed?term=Zhonghua+Shi+Yan+He+Lin+Chuang+Bing+Du+Xue+Za+Zhi.%5BJour%5D+AND+12%5Bvolume%5D+AND+269%5Bpage%5D+AND+1998%5Bpdat%5D&cmd=detailssearch) ).

The dried root of the plant has been traditionally used to treat various digestive ailments, stomach ulcers, colds and influenza, fever, allergies, anemia, uterine bleeding and prolapsed uterus, as well as wounds, and, in combination with other herbs, to treat dry or peeling skin, bruises and other minor skin conditions.

Recently, the herb has come to be recognized for its medical potential as an antioxidant and for its immunomodulatory activity ([Yao Xue Xue Bao 1992;27:5-9 <http://www.ncbi.nlm.nih.gov/pubmed?](http://www.ncbi.nlm.nih.gov/pubmed?term=Yao+Xue+Xue+Bao%5BJour%5D+AND+27%5Bvolume%5D+AND+5%5Bpage%5D+AND+1992%5Bpdat%5D&cmd=detailssearch)

[term=Yao+Xue+Xue+Bao%5BJour%5D+AND+27%5Bvolume%5D+AND+5%5Bpage%5D+AND+1992%5Bpdat%5D&cmd=detailssearch](http://www.ncbi.nlm.nih.gov/pubmed?term=Yao+Xue+Xue+Bao%5BJour%5D+AND+27%5Bvolume%5D+AND+5%5Bpage%5D+AND+1992%5Bpdat%5D&cmd=detailssearch) ).

In fact, the effectiveness of Astragalus to boost the immune system has been well established over the last several years ([Integr. Cancer Ther. 2003;2:247-67 <http://www.ncbi.nlm.nih.gov/pubmed?](http://www.ncbi.nlm.nih.gov/pubmed?term=Integr+Cancer+Ther.%5BJour%5D+AND+247%5Bpage%5D+AND+2003%5Bpdat%5D&cmd=detailssearch)

[term=Integr+Cancer+Ther.%5BJour%5D+AND+247%5Bpage%5D+AND+2003%5Bpdat%5D&cmd=detailssearch](http://www.ncbi.nlm.nih.gov/pubmed?term=Integr+Cancer+Ther.%5BJour%5D+AND+247%5Bpage%5D+AND+2003%5Bpdat%5D&cmd=detailssearch) ; [J. Clin. Lab. Immunol. 1988;25:119-23 <http://www.ncbi.nlm.nih.gov/pubmed?](http://www.ncbi.nlm.nih.gov/pubmed?term=j.+clin+lab+immunol.%5BJour%5D+AND+25%5Bvolume%5D+AND+119%5Bpage%5D+AND+1988%5Bpdat%5D&cmd=detailssearch)

[term=j.+clin+lab+immunol.%5BJour%5D+AND+25%5Bvolume%5D+AND+119%5Bpage%5D+AND+1988%5Bpdat%5D&cmd=detailssearch](http://www.ncbi.nlm.nih.gov/pubmed?term=j.+clin+lab+immunol.%5BJour%5D+AND+25%5Bvolume%5D+AND+119%5Bpage%5D+AND+1988%5Bpdat%5D&cmd=detailssearch) ; [J. Clin. Lab. Immunol. 1988;25:125-9 <http://www.ncbi.nlm.nih.gov/pubmed/3260961](http://www.ncbi.nlm.nih.gov/pubmed/3260961) ).

[J. Clin. Lab. Immunol. 1988;25:125-9 <http://www.ncbi.nlm.nih.gov/pubmed/3260961](http://www.ncbi.nlm.nih.gov/pubmed/3260961) ).

[term=j.+clin+lab+immunol.%5BJour%5D+AND+25%5Bvolume%5D+AND+119%5Bpage%5D+AND+1988%5Bpdat%5D&cmd=detailssearch](http://www.ncbi.nlm.nih.gov/pubmed/3260961) ; [J. Clin. Lab. Immunol. 1988;25:125-9 <http://www.ncbi.nlm.nih.gov/pubmed/3260961](http://www.ncbi.nlm.nih.gov/pubmed/3260961) ).

[J. Clin. Lab. Immunol. 1988;25:125-9 <http://www.ncbi.nlm.nih.gov/pubmed/3260961](http://www.ncbi.nlm.nih.gov/pubmed/3260961) ).

## Antioxidant Properties of *A. membranaceus*

A study conducted of 21 species of herbs used for medicinal purposes to evaluate relative antioxidant as well as nicotine degradation activity revealed that *A. membranaceus* exhibited significant antioxidant activity and nicotine degradation activity. The herb was subsequently included in a medicinal tea (with 10 other species) and studied, displaying success as a smoking cessation treatment in 100 human males (*Am. J.Chin. Med.* 2005;33:127-38 <<http://www.ncbi.nlm.nih.gov/pubmed?term=Am+J+Chin+Med.+%5BJour%5D+AND+127%5Bpage%5D+AND+2005%5Bpd%5D&cmd=detailssearch>> ). Antioxidant effects have also been associated with the polysaccharides of the *A. membranaceus* variant *A. mongholicus*. The effects of Astragalus polysaccharide, an active component, on *Escherichia coli* endotoxin–induced liver damage in mice were found to increase longevity, as the most significant of several benefits. The protective effects of Astragalus polysaccharide were ascribed to its antioxidant activity (*Yao Xue Xue Bao* 1992;27:5-9 <<http://www.ncbi.nlm.nih.gov/pubmed?term=Yao+Xue+Xue+Bao.+%5BJour%5D+AND+5%5Bpage%5D+AND+1992%5Bpd%5D&cmd=detailssearch>> ). *A. mongholicus*, also used for centuries in TCM, has been shown in animal models and clinical trials to exhibit immunomodulating activity (*Mem. Inst Oswaldo Cruz* 1991;86 Suppl 2:159-64 <<http://www.ncbi.nlm.nih.gov/pubmed/1841992>> ). In addition, a novel lectin, isolated from the roots of *A. mongholicus*, was recently found to exert antifungal activity against *Botrytis cinerea*, *Fusarium oxysporum*, *Colletorichum sp.*, and *Drechslera turcia* (*Arch. Biochem. Biophys.* 2005;442:72-81) <<http://www.ncbi.nlm.nih.gov/pubmed?term=Drechslera%20turcia%20>>

Astragalus is an adaptogen and is usually used in conjunction with other herbs such as ginseng and echinacea.

## Anti-aging Properties and Cutaneous Applications

In a recent study, investigators evaluated the anti-aging effects of astragalosides (AST), major active components of Astragalus species, by ascertaining the influence of AST on motor and memory manifestations of D-galactose (D-gal)–induced senescent and middle-aged mice.



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*A. membranaceus* has been used in traditional Chinese medicine to treat a wide variety of ailments including skin disorders.

Ten-week treatment with AST was found to improve age-related changes in memory and motor response, as well as ameliorate the diminished cellular immunity in the murine test subjects. Investigators concluded from the enhanced brain activity and immunomodulatory results that AST confers an anti-aging effect on D-gal–induced senescent and middle-aged mice ([Acta Pharmacol. Sin. 2003;24:230-4](http://www.ncbi.nlm.nih.gov/pubmed?term=Acta+Pharmacol+Sin.%5BJour%5D+AND+24%5Bvolume%5D+AND+230%5Bpage%5D+AND+2003%5Bpdat%5D&cmd=detailssearch)  [<http://www.ncbi.nlm.nih.gov/pubmed?term=Acta+Pharmacol+Sin.%5BJour%5D+AND+24%5Bvolume%5D+AND+230%5Bpage%5D+AND+2003%5Bpdat%5D&cmd=detailssearch>](http://www.ncbi.nlm.nih.gov/pubmed?term=Acta+Pharmacol+Sin.%5BJour%5D+AND+24%5Bvolume%5D+AND+230%5Bpage%5D+AND+2003%5Bpdat%5D&cmd=detailssearch) ). An earlier investigation of the hairy root of *A. membranaceus* (HRA), in which the extract was administered over 50 days to senescent mice treated with D-galactose, revealed several benefits. The hairy root was found to enhance memory, elevate superoxide dismutase antioxidant activity in brain and liver, and foster natural killer (NK) cell activity in immunocompromised mice as well as reduce malondialdehyde content in rat ischemia-reperfusion kidney and lower the creatinine level in rat blood. Investigators concluded that HRA is similar to natural *A. membranaceus* in its antioxidant capacity as well as its immunomodulatory and senility-preventing activity ([Zhongguo Zhong Yao Za Zhi 1999;24:619-21, 639](http://www.ncbi.nlm.nih.gov/pubmed?term=Zhongguo+Zhong+Yao+Za+Zhi.%5BJour%5D+AND+24%5Bvolume%5D+AND+619%5Bpage%5D+AND+1999%5Bpdat%5D&cmd=detailssearch)  [<http://www.ncbi.nlm.nih.gov/pubmed?term=Zhongguo+Zhong+Yao+Za+Zhi.%5BJour%5D+AND+24%5Bvolume%5D+AND+619%5Bpage%5D+AND+1999%5Bpdat%5D&cmd=detailssearch>](http://www.ncbi.nlm.nih.gov/pubmed?term=Zhongguo+Zhong+Yao+Za+Zhi.%5BJour%5D+AND+24%5Bvolume%5D+AND+619%5Bpage%5D+AND+1999%5Bpdat%5D&cmd=detailssearch) ).

In a study evaluating 15 extracts of herbs used in TCM, investigators found that *A. membranaceus* was one of three botanicals to inhibit 5-lipoxygenase, one of the enzymes, along with elastase, considered important therapeutic targets in the treatment of psoriasis and other cutaneous conditions ([J Pharm Pharmacol. 2003;55:1275-82](http://www.ncbi.nlm.nih.gov/pubmed?term=J+Pharm+Pharmacol.%5BJour%5D+AND+55%5Bvolume%5D+AND+1275%5Bpage%5D+AND+2003%5Bpdat%5D&cmd=detailssearch)  [<http://www.ncbi.nlm.nih.gov/pubmed?term=J+Pharm+Pharmacol.%5BJour%5D+AND+55%5Bvolume%5D+AND+1275%5Bpage%5D+AND+2003%5Bpdat%5D&cmd=detailssearch>](http://www.ncbi.nlm.nih.gov/pubmed?term=J+Pharm+Pharmacol.%5BJour%5D+AND+55%5Bvolume%5D+AND+1275%5Bpage%5D+AND+2003%5Bpdat%5D&cmd=detailssearch) ).

### **Antiviral Properties of *A. membranaceus***

Astragalus extract has also been shown to impart an anticarcinogenic effect in mice by spurring cytotoxic activity and cytokine production ([Cancer Invest. 1999;17:30-5](http://www.ncbi.nlm.nih.gov/pubmed?term=Cancer+Invest.+%5BJour%5D+AND+17%5Bvolume%5D+AND+30%5Bpage%5D+AND+1999%5Bpdat%5D&cmd=detailssearch)  [<http://www.ncbi.nlm.nih.gov/pubmed?term=Cancer+Invest.+%5BJour%5D+AND+17%5Bvolume%5D+AND+30%5Bpage%5D+AND+1999%5Bpdat%5D&cmd=detailssearch>](http://www.ncbi.nlm.nih.gov/pubmed?term=Cancer+Invest.+%5BJour%5D+AND+17%5Bvolume%5D+AND+30%5Bpage%5D+AND+1999%5Bpdat%5D&cmd=detailssearch) ).

Investigators conducted a study on the anti-herpes simplex virus activity of *A. membranaceus* (in suppository or ointment form) combined with recombinant human interferon (IFN) alpha 2b in human diploid cell culture. Results showed that combination treatment was significantly more effective than placebo or IFN alone. The authors concluded that this combination treatment including *A. membranaceus* was suitable in suppository form for the treatment of cervicitis and, in ointment form, for the treatment of herpetic lesions on the skin ([Zhonghua Shi Yan He Lin Chuang Bing Du Xue Za Zhi 1998;12:269-71](http://www.ncbi.nlm.nih.gov/pubmed?term=Zhonghua+Shi+Yan+He+Lin+Chuang+Bing+Du+Xue+Za+Zhi.+%5BJour%5D+AND+12%5Bvolume%5D+AND+269%5Bpage%5D+AND+1998%5Bpdat%5D&cmd=detailssearch)  [<http://www.ncbi.nlm.nih.gov/pubmed?term=Zhonghua+Shi+Yan+He+Lin+Chuang+Bing+Du+Xue+Za+Zhi.+%5BJour%5D+AND+12%5Bvolume%5D+AND+269%5Bpage%5D+AND+1998%5Bpdat%5D&cmd=detailssearch>](http://www.ncbi.nlm.nih.gov/pubmed?term=Zhonghua+Shi+Yan+He+Lin+Chuang+Bing+Du+Xue+Za+Zhi.+%5BJour%5D+AND+12%5Bvolume%5D+AND+269%5Bpage%5D+AND+1998%5Bpdat%5D&cmd=detailssearch) ).

More recent studies have also demonstrated clear HSV-1 inhibiting activity and low cytotoxicity exhibited by *A. membranaceus* ([Di Yi Jun Yi Da Xue Xue Bao 2004;24:57-8](http://www.ncbi.nlm.nih.gov/pubmed?term=Di+Yi+Jun+Yi+Da+Xue+Xue+Bao.+%5BJour%5D+AND+24%5Bvolume%5D+AND+57%5Bpage%5D+AND+2004%5Bpdat%5D&cmd=detailssearch)  [<http://www.ncbi.nlm.nih.gov/pubmed?term=Di+Yi+Jun+Yi+Da+Xue+Xue+Bao.+%5BJour%5D+AND+24%5Bvolume%5D+AND+57%5Bpage%5D+AND+2004%5Bpdat%5D&cmd=detailssearch>](http://www.ncbi.nlm.nih.gov/pubmed?term=Di+Yi+Jun+Yi+Da+Xue+Xue+Bao.+%5BJour%5D+AND+24%5Bvolume%5D+AND+57%5Bpage%5D+AND+2004%5Bpdat%5D&cmd=detailssearch) ).

In a study with 106 patients with herpes simplex keratitis, evidence showed that *A. membranaceus* significantly improved imbalances in serum cytokines and enhanced immune function ([Zhongguo Zhong Xi Yi Jie He Za Zhi 2004;24:121-3](http://www.ncbi.nlm.nih.gov/pubmed?term=%22Zhongguo+Zhong+xi+yi+jie+he+za+zhi+Zhongguo+Zhongxiyi+jiehe+zazhi+%3D+Chinese+journal+of+integrated+traditional+and+Western+medicine+/%5BZhongguo+Zhong+xi+yi+jie+he+xue+hui%2C+Zhongguo+Zhong+yi+yan+jiu+yuan+zhu+ban%25%5D)  [<http://www.ncbi.nlm.nih.gov/pubmed?term=%22Zhongguo+Zhong+xi+yi+jie+he+za+zhi+Zhongguo+Zhongxiyi+jiehe+zazhi+%3D+Chinese+journal+of+integrated+traditional+and+Western+medicine+/%5BZhongguo+Zhong+xi+yi+jie+he+xue+hui%2C+Zhongguo+Zhong+yi+yan+jiu+yuan+zhu+ban%25%5D](http://www.ncbi.nlm.nih.gov/pubmed?term=%22Zhongguo+Zhong+xi+yi+jie+he+za+zhi+Zhongguo+Zhongxiyi+jiehe+zazhi+%3D+Chinese+journal+of+integrated+traditional+and+Western+medicine+/%5BZhongguo+Zhong+xi+yi+jie+he+xue+hui%2C+Zhongguo+Zhong+yi+yan+jiu+yuan+zhu+ban%25%5D) ).

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