Codonopsis

Codonopsis pilosula

Common names

Dang shen, bellflower, bonnet bellflower, bastard ginseng, poor man's ginseng, radix codonopsis

Family

Campanulaceae (bellflower)

Part used

Root

Background and traditional uses

Codonopsis is a perennial climbing plant, native to Asia where it grows prolifically in forests, meadows and scrubs. It has distinctive, creamy coloured, bell-shaped flowers, hence its common name. Codonopsis roots have been used in traditional Chinese medicine (TCM) for over 2,000 years and is thought to have similar properties to ginseng, hence its common names 'poor man's ginseng' and 'bastard ginseng'. Codonopsis is applied in TCM as a whole body adaptogenic tonic to boost strength, increase stamina and alertness, rejuvenate the body, strengthen immunity, aid in the recovery from chronic illness, increase resilience to stress and stimulate a healthy appetite.[1] More specifically, it is thought to invigorate the spleen, replenish qi, promote the healthy production of body fluids and nourish the blood.[2]

Actions

Primary:[1,3,4]

- Adaptogenic
- Tonic (specifically addressing adrenals, liver, blood, qi, spleen and lung)

Secondary:[3]

- Hypoglycaemic
- Antioxidant

Applications and indications

- The applications and indications for prescription of codonopsis are best understood from a TCM perspective. Like ginseng, codonopsis is principally applied to cases of qi deficiency which commonly manifests as shortness of breath, especially if associated with a chronic cough or asthma.[1,2,4,5]
- Used for fatigue and weakness, anorexia, excessive thirst, diabetes, dizziness, palpitations, chronic stress, chronic diarrhoea and sallow complexions.[1,2,4,5]
- Used to treat HIV infection and as a protective adjuvant to radiotherapy as part of cancer treatment.[1]

It is useful to consider codonopsis in prescribing for general debility, particularly in relation to the immune system, gastrointestinal system and mental functioning.

Active constituents and pharmacodynamics

Codonopsis contains a complex spectrum of active constituents including saponins, sesquiterpenes, polyphenolic glycosides, alkaloids, polyacetylenes, phytosteroids and essential oils. ***Codonopsis pilosula* polysaccharide** (CPPS) is perhaps the most significant medicinal component of the herb root and has been identified as having antioxidant, antitumour and immune system enhancing actions.[6,7] The roots are also rich in nutrients including seventeen amino acids, complex sugars and vitamins B1 and B2.[7-9]

Summary of clinical evidence

Human trials on codonopsis are lacking, however, there is substantial preclinical data that supports the use of the herb as a general tonic and adaptogen.

Neuroprotection

An *in vivo* study reported that a water and butanolic extract of codonopsis exerted antilipid peroxidative effects on brain slice homogenates; a method for assessing drug distribution in the central nervous system.[10]

Nephroprotection

A polysaccharide isolated from codonopsis (S-CPPA1) was shown to reduce ischaemia and reperfusion induced kidney damage in rats when ingested for 10 days prior to testing.[11] The polysaccharide significantly attenuated increases in creatinine, BUN, TNF-alpha, LDH and AST compared with untreated rats.[11]

Immunomodulation via spleen function

In a study on mice, isolated oligopeptides (SOP) from codonopsis were found to increase both cell-mediated and humoral immunity.[9] They enhanced ConA-stimulated proliferation of splenic lymphocytes and delayed-type hypersensitivity to SRBC and by increasing the IgM antibody response of the spleen to SRBC and serum haemolysin levels. The same study also demonstrated that codonopsis could improve adaptive immune responses through increasing macrophage phagocytosis and NK cell activity in mice treated with SOP compared to the control group.[9]

Thyroid activity

One study on rats reported that large doses of codonopsis (dose not specified in English version of the study) caused an increase of reverse T3 and thyrotropin-releasing hormone (TRH) levels alongside a reduction in serum triidothyronine (T3) levels and weight gain.[12]

Dosage summary

Liquid extract (1:2): 30-60mL weekly[13]
Dried herb equivalent: 9-30g daily[4]

Safety information

Few adverse effects have been reported on the use of codonopsis, however there are some areas of caution.

- Prescription of codonopsis is best avoided for pregnant and breastfeeding women due to a lack of human scientific evidence.[1]
- Avoid prescription for patients with a known allergy or sensitivity to plants in the *Campanulaceae* family.[1]
- Doses exceeding 60g of dried root equivalent may cause precordial discomfort and arrhythmia.[8]
- Codonopsis has exhibited antifertility activity in rats, so is best avoided for patients attempting to conceive.[1]
- Caution is advised in patients with bleeding disorders or those taking anticoagulant/antiplatelet drugs as codonopsis has been shown to inhibit platelet aggregation in humans.[1]

References

1. Codonopsis. Natural Medicines Comprehensive Database 2017. Viewed 26 Jul 2017, https://naturalmedicines.therapeuticresearch.com/databases/food,-herbs-supplements/professional.aspx?productid=630
2. Xinrong Y, Anmin C, Yingfu M, et al (Ed). Encyclopaedic reference of traditional Chinese medicine: a manual from A-Z. Symptoms, therapy and herbal remedies. Heidelberg: Springer-Verlag Berlin, 2003.
3. Hechtman L. Clinical naturopathic medicine. Marrickville: Churchill Livingstone Elsevier, 2015.
4. Mills S, Bone K. The essential guide to herbal safety. St Louis: Churchill Livingstone Elsevier, 2005.
5. Diamond JW. The clinical practice of complementary, alternative, and western medicine. Boca Raton: CRC Press, 2000.
6. Qin T, Ren Z, Lin D, et al. Effects of selenizing *Codonopsis pilosula* polysaccharide on macrophage modulating activities. J Microbiol Biotechnol 2016;26(8):1358-1366.
7. He JY, Ma N, Zhu S, et al. The genus Codonopsis (*Campanulaceae*): a review of phytochemistry, bioactivity and quality control. J Nat Med 2015;69:1-21.
8. Russo EB, Houe JP, Youyu J. The healing power of Chinese herbs and medicinal recipes. Binghamton: Taylor & Francis Inc, 2005.
9. He LX, Zhang ZF, Sun B, et al. Sea cucumber (*Codonopsis pilosula*) oligopeptides: immunomodulatory effects based on stimulating Th cells, cytokine secretion and antibody production. Food Funct 2016;7(2):1208-1216.
10. Ng TB, Liu F and Wang HX. The antioxidant effects of aqueous and organic extracts of *Panax quinquefolium, Panax notoginseng, Codonopsis pilosula, Pseudostellaria heterophylla* and *Glehnia littoralis*. J Ethnopharmacol 2004;93 (2-3):285-288.
11. Li Z, Zhu L, Zhang H, et al. Protective effect of a polysaccharide from stem of *Codonopsis pilosula* against renal ischemia/reperfusion injury in rats. Carbohydr Polym 2012;90(4): 1739-1743
12. Gardner Z, McGuffin M (Ed). American Herbal products association's botanical safety handbook, 2nd ed. Boca Rato: American Herbal Products Association, 2013.
13. Chinese Pharmacopeia Commission. Pharmacopoeia of the People's Republic of China. Beijing: Chinese Medical Science and Technology Press, 2010.

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