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FILE: ■ Gotu Kola (*Centella asiatica*)

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RE: Review of Gotu Kola

Monograph. *Centella asiatica*. *Altern Med Rev*. 2007; 12(1): 69-72.

Gotu kola (*Centella asiatica*) has a long history of use in Ayurvedic medicine. It is a perennial herbaceous creeper with kidney-shaped leaves that grows in shady, moist, or marshy areas in India, Sri Lanka, Madagascar, South Africa, Australia, China, and Japan. Several phytochemicals in gotu kola are active constituents responsible for its biological activity. They include the triterpenoid saponins asiaticoside, centelloside, madecassoside, and asiatic acid.

American consumers often perceive gotu kola as an herb to increase brain function, a poorly studied folkloric use from Ayurvedic traditions. However, most scientific studies have focused on topical use of the herb in the support of wound treatment. Several mechanisms of action have been attributed to gotu kola. In vivo studies show that it aids in wound healing by increasing cellular hyperplasia and collagen production after both oral and topical administration. Gotu kola also causes faster maturation and more cross-linking of collagen. Rats treated with gotu kola have "a higher degree of epithelialization and a faster rate of wound contraction." In addition, gotu kola aids in the treatment of varicose veins by reducing serum enzymes involved in mucopolysaccharide metabolism. In vivo studies also show that gotu kola helps to heal nerve damage more quickly "with increased axonal regeneration and more rapid functional recovery." Fresh gotu kola juice (200 and 600 mg/kg two times daily) is protective against aspirin- and ethanol-induced gastric ulcers. It induces gastric mucin secretion and mucosal cell glycoprotein production, which are makers of increased gastric mucosal defense factors. Pharmacokinetic studies reveal that gotu kola's active constituents are well absorbed in humans. Seven day repeated dosing resulted in longer half-lives, higher peak plasma concentrations, and greater area-under-the-curve values.

Several clinical studies have examined the effect of gotu kola in the treatment of venous disorders. One double-blind clinical trial has shown that gotu kola may have efficacy in the treatment of chronic venous insufficiency (average duration: 14 years) of the lower extremities. The study has demonstrated significant improvements in limb heaviness, edema, venous distension, and global evaluation of efficacy, compared with the placebo group. Two clinical trials have demonstrated gotu kola's effect on venous hypertensive angiopathy. The first has shown significant decreases in skin flux and ankle swelling rate and a rapid clinical improvement in patients treated with gotu kola, compared with those treated with a placebo. The second study also demonstrated a decrease in skin

flux, as well as a decrease in resting flux, an increase in venoarteriolar response, a reduction in leg volume, an increase in pO₂, and a reduction in pCO₂.

One randomized placebo-controlled trial has also shown that gotu kola may help to prevent airline flight microangiopathy. Subjects who took gotu kola before, during, and after a flight showed significant improvements in microcirculatory function, venoarteriolar response, rate of ankle swelling, and edema, compared with those who took a placebo. Two studies have shown that gotu kola can improve echolucent unstable carotid and femoral plaques. One study has shown a reduction in echolucency in carotid artery plaques after one year of treatment, and the other has shown significant decreases in echolucency of femoral artery plaques after one year of treatment, compared with the placebo groups. The reductions in echolucency indicate decreased risk of stroke and asymptomatic cerebral lesions. One randomized, placebo-controlled clinical trial examined the effect of gotu kola on diabetic microangiopathy. After six months of treatment, the patients treated with gotu kola experienced significant reductions in skin blood flow at rest, increased VAR scores (decrease of skin blood flow upon standing), increased pO₂, and decreased pCO₂, indicating an improvement.

Gotu kola's effect on skin keloids and scars has also been examined. One open clinical trial on orally administered gotu kola in the treatment of keloids and/or hypertrophic scars found that those treated with gotu kola alone or gotu kola in addition to surgery experienced improvements including relief of symptoms and disappearance of inflammation. However, the lack of a placebo makes it difficult to draw conclusions from this trial. An observational study found that topically applied gotu kola improves scar maturity (6 months without treatment vs. 3 months with treatment). Gotu kola is used in Ayurvedic medicine to treat anxiety; and one study has shown that treatment with gotu kola reduces the acoustic startle response in healthy subjects. In addition, gotu kola may have applications in the treatment of scleroderma, alcohol-induced liver cirrhosis, leg ulcers, and leprosy, as well as the prevention of aspirin- and ethanol-induced gastric ulcers.

In vivo studies indicate no toxicity in doses of up to 350 mg/kg. Reported gotu kola adverse effects include gastrointestinal upset and nausea when taken orally and rashes when used topically. Three cases of jaundice associated with gotu kola have been reported. The authors warn that gotu kola should be avoided during pregnancy because it is an emmenagogue. The recommended gotu kola dose for adults is 60-120 mg of the extract (standardized for asiatic acid, asiaticoside, and madecassic acid), 0.5-6 g of the crude herb, and 10-20 mL of a 1:5 gotu kola tincture.

—Marissa N. Oppel, MS

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