Herbal Treatment of Inflammation, Part 3

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Herbs exert anti-inflammatory effects through a variety of pathways. As COX and LOX inhibitors, their effects can be superior to pharmaceuticals because they preserve baseline COX / LOX activity. Beneficial herbal actions have been found for nitric oxide induction, NFkB modulation, downregulation of arachadonic acid and proinflammatory cytokines, and upregulation of anti-inflammatory molecules. Let’s continue our discussion of herbs that have beneficial influences upon the induction and inhibition of chronic inflammatory responses, including an investigation of neuroprotective neurotransmitter regulation via herbals.

Ginkgo Biloba (Leaf Extract)

The ginkgo tree, utilized in the Chinese humoral system for 5,000-plus years, is thought to be more than 150 million years old. Conservatively, we can assume that ginkgo has interacted with the human genome for millenia. The leaf extract is used medicinally; the fruit and seeds are best avoided due to high butyric acid / urushiol content. Superior herbal formulations are extracted from the yellowed leaves of autumn, when the chlorophyll-rich pigments have faded and the carotenoid-rich pigments are enhanced.

Ginkgo leaf extract is prized for its anti-inflammatory, antioxidant and blood flow-enhancing properties. While its efficacy for enhancing circulation is well-known, current research supports its use in pulmonary and hepatic fibrotic syndromes, cystic fibrosis, and to prevent pulmonary fibrosis consequent to chemotherapy (Pharmacology Research, 2006). Both in vivo and in vitro effects have been demonstrated, attributed to ginkgo’s free radical-scavenging action. Oxidation is known to produce proliferation of fibrotic connective tissue, which can compromise organ function.

Research has suggested ginkgo’s effectiveness in preventing ischemia-induced reperfusion injury after MI by both decreased proinflammatory cytokine induction and upregulation of anti inflammatory mediators. Ginkgo leaf extract seems preventive of retinopathy in type 2 diabetes, and its benefits for ulcerative colitis, asthma and dementias are noteworthy.
Ginkgo contains flavonoids, terpenoids (ginkgolides ABCM and J) and bilobalides, apparently neuroprotective and regenerative to motor neurons. Standardization is usually to 25 percent flavonoid glycosides and 6 percent terpenoids. Ginkolides inhibit the action of platelet activating factor (PAF) and reduce inflammation by increasing vascular permeability. This may be the mechanism of ginkgo’s "blood thinning" action. PAF reduction reduces bronchial smooth-muscle contraction, relaxing airway constriction. Ginkgo leaf extract also has contributed to a reduction in plasma D-dimer concentration (a marker of intravascular coagulation) in dialysis patients.

The anti-inflammatory effects upon neural tissues are augmented by ginkgo’s behavior as a natural MAO inhibitor, inhibiting degradation of neurotransmitters including dopamine, noradrenaline, serotonin and phenylethylamine (PEA). Its free radical-scavenging activity is neuroprotective, showing benefits for ADD, depression, anxiety, headaches, dizziness, macular degeneration and cataracts. Aging baby boomers are well-advised to consider ginkgo leaf extract as a mental health boon.

Studies on the extract’s use in colitis are particularly convincing. A human study has demonstrated a 33 percent remission rate, with significant protection against histological changes both macroscopically and microscopically. Effects of elevated SOD and reduced MDA [both inflammatory mediators], and downregulated expression of TNF-alpha, NFkB, and IL-6 in a dose-dependent fashion, were seen.

Extracts of ginkgo leaf also have demonstrated the ability to lower COX-2 induction, iNOS, and the inflammatory stress markers p53 and p53-phosphoserine 15. Ginkgo has suppressed colonic macrophage activation, demonstrating both in vivo and in vitro CD4+ effector T-cell apoptosis, effectively reducing inflammatory colitis and colon cancer risk. Ginkgo is beneficial for erectile dysfunction, especially ED related to antidepressant use, and increases the efficacy of NSAIDs. It has reduced arthritic pain comparably or better than common NSAIDs.

Potent activity in treating Alzheimer’s disease has recently been proposed as well. Beta-amyloid protein is produced by the cleavage of amyloid precursor protein (APP) by beta-secretase. However, the enzyme alpha-secretase also cleaves APP, creating neuroprotective alphaAPP. Ginkgo leaf extract has been found to induce APP metabolism via alpha-secretase, thereby raising alphaAPP levels.

Ginkgo’s broad spectrum of pharmacological effects suggests that it may be a valuable tool in promoting a long and healthful life. Generally well-tolerated, adverse reactions including nausea, dizziness and allergic skin reactions are known. Ginkgo should not be used in diabetes without clinical supervision and is not
recommended for epileptics, during pregnancy or while breast-feeding. Patients taking anticoagulants, ibuprofen, aspirin, anticonvulsants, alprazolam, antipsychotics, MAO inhibitors or SSRI antidepressants should avoid ginkgo. History of mango or cashew allergy precludes ginkgo use. Discontinue two weeks before surgery.

Holy Basil / Tulsi / Ocimum Sanctum (Leaves, Seeds, Stems)

This adaptogenic herb has a history of use in the ayurvedic medical tradition for 3,000 years. Purple tulsi leaves are also used in Thai cooking. The seeds of holy basil / tulsi, a plant of the mint family, contain a yellow fixed oil whose fatty acids have been shown to have anti-inflammatory, adaptogenic, antioxidant and anticancer properties.

The primary chemical constituents include eugenol, ursolic acid, the powerful antioxidant rosmarinic acid, oleanolic acid, and the bioflavonols lutein and apigenin, among others. The fixed oil of tulsi has effective actions against PGE2, inflammatory leukotrienes and arachadonic acid in animal studies.

Research suggests that the oil of Ocimum sanctum inhibits both COX and LOX independent of the HPA axis. Effective for ulcers and mastitis, and an antibiotic for Staphylococcus aureus, holy basil may possess antitumor, antidiabetic, antimicrobial, cardioprotective and hepatoprotective qualities. It balances cortisol and neurotransmitters associated with chronic stress, normalizing serotonin, dopamine, succinate dehydrogenase enzymes, MAO, norepinephrine and epinephrine levels. Tulsi’s ability to raise dopamine levels is believed to allow for resynthesis of norepinephrine and epinephrine, thereby assisting stress adaptation. In traditional ayurvedic use, tulsi was used for mood enhancement and to prepare the mind for enlightenment.

Studies at the Karmanos Cancer Institute have shown that the herb appears to possess cancer-inhibiting and anti-inflammatory properties, providing significant protection against cancer induction and progression, especially of the breast and oral cavity. Anti-tumor action has also been documented for hepatic, colon, prostate and skin cancers.

Ursolic acid, a component of tulsi, may also have a role in suppressing polycystic ovarian syndrome via its hypothesized actions of lowering follicle stimulating hormone (FSH) and luteinizing hormone (LH), as well as sperm counts in males. Studies reported in Phytomedicine (2004 Feb;11(2-3):139-51) also describe augmented phase and phase II detoxification, decreased hepatic lipid peroxidation and membrane
stabilization (100-200 mg/kg body-weight), increased hepatic glutathione reductase, catalase and SOD activity, and hepatoprotective synergism with silymarin. Helpful neurological and adaptogenic effects are reported at 500 mg BID [twice daily].

Holy basil protects against cadmium bioaccumulation and toxicity from industry and cigarette smoking, probably via its flavanols. In a human trial, after four weeks’ consumption of a 300 mg ethanolic extract of tulsi leaves, subjects showed increased levels of interferon-y, interleukin-4, natural killer and helper T cells, and immunomodulatory actions thought secondary to flavonoid activity.

Holy basil should be avoided during pregnancy or the preconception period, as high levels of stem and leaf extracts exert an antifertility effect. Substitutions with sweet basil should be avoided.

Resources


- Cystic Fibrosis. Information provided by the University of Maryland Medical Center.


- Milligan TD. "UpToDate; Bleomycin-Induced Lung Injury." May 2011.


- Zhou YH, Yu JP, Liu YF, et al. Effects of Ginkgo biloba extract on inflammatory mediators (SOD,


- Prakash P, Gupta N; Op cit.


Part 4 of this series will continue to develop an alphabet of clinically important anti inflammatory herbs effectively utilized as singletons in practice. The popular herb cinnamon, widely recommended for diabetics, will also be reviewed in terms of its undesirable heating qualities and traditional use only in combination with modifying herbs.

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