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FILE: ▪ Fig (*Ficus* spp.)
▪ Cancer
▪ Inflammation

HC 100483-369

Date: January 30, 2009

RE: The Ethnobotany of Figs as Anticancer and Anti-inflammatory Agents

Lansky EP, Paavilainen HM, Pawlins AD, Newman RA. *Ficus* spp. (fig): ethnobotany and potential as anticancer and anti-inflammatory agents. *J Ethnopharmacol*. 2008;119:195-213.

This is an overview of ancient, medieval, and modern ethnopharmacological uses of figs (*Ficus* spp.), especially in tumors and inflammation (a contributor to cancer development) and of figs' botanical and phytochemical characteristics, and biological activities. A mulberry (Moraceae) family member, the genus has over 800 species. The most important species commercially is the common fig (*F. carica*). Many species have auxiliary aerial roots and all have latex-like material within their vasculatures. Fruits, syconial collections of druplets forming fleshy sacs enclosed by a thin skin, each have 30-1600 seeds. The interior of figs is lined with tiny flowers. An opening at each fruit's apex gives entry to fig wasps. Each species lives in symbiosis with a specific wasp species. The wasps pollinate, and the flowers serve as a host for the wasp's eggs.

Among cultivated plants, figs may predate cereal grains. Fifty-six listed ancient and medieval medicinal uses from the Middle East and Europe, with one from Mexico, span the 1st-17th centuries C.E. The authors explain how particular fig species, even growth stages, have been identified, as well as phrases from several languages naming symptoms and conditions, and identify other ingredients in some fig-based medications. Most use either the common fig, or the sycamore fig (*F. sycomorus*). Parts used include fruit in different stages of ripeness, both fresh and dry; bark, leaves, twigs, and shoots; latex from bark, fruit, and young branches; and ashes from wood and stalks. Preparations range from directly applied split fruit as a poultice, to lye from fig ashes and wine from fruit. They often include other botanicals, e.g., blue flag (*Iris versicolor*), fenugreek (*Trigonella foenum-graecum*), barley (*Hordeum vulgare*), and pomegranate (*Punica granatum*); and/or additives like honey, vinegar, natron (hydrated sodium carbonate), "shoe blackener", and more. Most medications have been used topically, but every part of the fig used externally has also been taken orally in others. Ayurvedic medicine uses at least three *Ficus* species [cluster fig (*F. racemosa*), sacred fig (Bodhi tree;

F. religiosa), and banyan (*F. benghalensis*)]. Uses include external application for eczema, leprosy, rheumatism, sores, ulcers and pain; as a sore throat gargle; and internally for diarrhea, gonorrhea, and menorrhagia, and as an aphrodisiac. Figs are little used in traditional Chinese medicine (TCM). They grow only in far southern China and are used primarily as food. However, TCM also uses a cooked fig juice gargle for sore throats and treats hemorrhoids with concurrent external application and oral ingestion of figs. Fourteen contemporary ethnomedical uses suggestive of antineoplastic action (anticancer, antiwarts), from 12 nations, and 43 suggesting anti-inflammatory action, from over 20 countries, are shown.

Scientific investigation of fig's anticancer effects began in the 1940s when an extract of *F. carica* latex inhibited growth in an induced sarcoma, resulting in disappearance of small tumors in albino rats. Mixed sitosterol isoforms from latex showed anti-proliferative activity in several cell lines. A number of fig species and their constituents have been studied for activities relevant to cancer and inflammation.[1] Triterpenoids from aerial roots of Chinese banyan tree (*F. microcarpa*), with C-28 carboxylic acid functional groups, showed cytotoxity in three human cancer lines. Mixed phenanthroindolizidine alkaloids from *leng guo rong* (*F. septica*) leaves and *daduri*, or opposite-leaved fig, (*F. hispida*) twigs and stems were potently cytotoxic in others. An antofine derivative had potent activity in both drug-sensitive and multi-drug-resistant cancer lines and is being synthesized for further study. One xenograft study suggests tylophorine analogs may induce cancer cell differentiation. In vitro and in vivo results support anti-inflammatory effects of numerous fig components from several species. Coumarins, flavonoids (including anthocyanins), triacylglycerols, and phenolic compounds (e.g., terpenoids; small aliphatics), all present in fig species, have proven benefits. Seed lectins may be immune modulators, while sterols may boost immunity, inhibit inflammation, and promote apoptosis and differentiation. Salicylic acid and fig latex were equally effective in bovine teat papillomatosis, a common, sometimes pre-cancerous, condition in cows.

Only a few clinical trials have investigated uses of figs in humans. Dried figs eaten daily by healthy volunteers reduced oxidation of low density lipoprotein (LDL). An aqueous decoction of leaves relieved post-prandial hyperglycemia in Type 1 diabetes. Leaf latex was as effective as cryotherapy in removing warts. Figs have a very high safety profile, with rich opportunities in functional foods. Skin contact with latex may provoke allergic reactions. Orally, latex may cause hallucinations.

— Mariann Garner-Wizard

[1] Diagrams of 100 molecules are shown; with the name of each, its chemical class, and the fig species and plant part from which it was obtained. Only a small fraction of *Ficus* species and parts have been evaluated.

The American Botanical Council has chosen not to include the original article.