

## Turmeric Component Inhibits Cancer Growth

**LOS ANGELES**--Researchers determined that curcumin triggers cell death in head and neck squamous cell carcinoma (HNSCC) in a dose-dependent fashion, according to a study published in the October issue of *Clinical Cancer Research* <http://clincancerres.aacrjournals.org/> (11, 19:6994-7002, 2005).

Researchers found HNSCC cell lines CCL 23, CAL 27 and UM-SCC1 treated with curcumin resulted in dose-dependent growth inhibition of all three cell lines. In vivo growth studies were conducted using nude mice xenograft tumors, in which curcumin was applied as a noninvasive topical paste to the tumors. Inhibition of tumor growth was observed in xenografts from the CAL27 cell line.

Researchers concluded curcumin treatment resulted in suppression of HNSCC growth both in vitro and in vivo. "Our data support further investigation into the potential use for curcumin as an adjuvant or chemopreventive agent in head and neck cancer," the study authors wrote.

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### Curcumin Inhibits Skin Cancer

**HOUSTON**--Curcumin inhibited proliferation and promoted apoptosis of skin cancer cells, according to a study published in *Cancer* (104, 4:879-900?).

Researchers from the University of Texas treated three melanoma cell lines with curcumin. The turmeric compound dose-dependently reduced viability and induced apoptosis in the melanoma cells and down-regulated activities of nuclear factor-kB (NF-kB), a gene transcription factor involved in the pathogenesis of melanoma, and IKK kinase (IKK), a complex capable of phosphorylating endogenous NF-kB inhibitors.

The researchers concluded curcumin has potent antiproliferative and pro-apoptotic effects in melanoma cells, and added these effects were associated with the suppression of NF-kB and IKK activities.

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## **Curry Lessens Alzheimer's Plaque Build-Up**

01/05/2005

**NORTH HILLS**, Calif.--Scientists found dietary curcumin--a component of the yellow curry spice turmeric--reduces deposits of beta-amyloid proteins in the brains of elderly lab mice. According to the University of California scientists, the findings may signify further dietary treatment and prevention for Alzheimer's disease (AD) patients.

AD involves amyloid (A $\beta$ ) accumulation, oxidative damage and inflammation, and risk is reduced with increased consumption of antioxidant and anti-inflammatory compounds. The phenolic curcumin has potent anti-inflammatory and antioxidant activities and can suppress oxidative damage, inflammation, cognitive deficits and amyloid accumulation, the researchers wrote.

The efficacy of the molecular structure of curcumin, and its suggested potential A $\beta$ -binding effects, was investigated in AD models (as elderly lab rats) to examine possible effects on A $\beta$  aggregation. Under aggregating conditions in vitro, curcumin inhibited aggregation as well as disaggregated fibrillar A $\beta$ 40, indicating favorable stoichiometry for inhibition. Curcumin was found to be a better A $\beta$ 40 aggregation inhibitor than ibuprofen and naproxen, and prevented A $\beta$ 42 oligomer formation and toxicity. Under electron microscopy, curcumin decreased dose-dependently A $\beta$  fibril formation.

Curcumin supplementation revealed preferential labeling of amyloid plaques in mice brain sections, and in vivo studies showed curcumin injected peripherally into aged mice crossed the blood brain barrier and bound plaques. Curcumin, when fed to aged mice with advanced amyloid accumulation, labeled plaques and reduced amyloid levels and plaque burden. Curcumin directly bound small beta-amyloid species to block aggregation and fibril formation both in vitro and in vivo.

The scientists concluded low dose curcumin effectively disaggregates A $\beta$  and prevents fibril and oligomer formation. They further wrote curcumin should be used in further clinical trials in the prevention or treatment of AD.

The study was published online, ahead of print, in the *Journal of Biological Chemistry* ([www.jbc.org](http://www.jbc.org)).

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## **Curcumin Complex Helps Clear Brain Plaque**

10/17/2006

**LOS ANGELES**--A curcumin complex extracted from turmeric helped the brain clear amyloid-beta plaque that could otherwise lead to development and progression of Alzheimer's disease and other neurological problems. Researchers from the University of California Los Angeles (UCLA) School of Medicine [published their findings](#) in the Oct. 9 issue of the *Journal of Alzheimer's Disease* (10,2, 2006).

Researchers drew blood taken from six Alzheimer's disease patients and three healthy controls, and isolated the antigen-fighting macrophages. The isolated immune cells were exposed to the turmeric extract (as Curcumin C3 Complex®, from Sabinsa Corp.) in a cell culture for 24 hours, after which time they introduced amyloid-beta to the culture. The treated macrophages showed improved ingestion of amyloid-beta compared to those not treated with curcuminoids. Macrophages from the healthy controls, which were shown to be effectively clearing amyloid-beta, showed no changes with curcuminoids treatment.

"These initial findings may lead to a new approach in treating Alzheimer's disease by enhancing the natural function of the immune system using curcumin, thus increasing the body's ability to remove plaques that may cause Alzheimer's disease and other forms of dementia," stated UCLA researcher Milan Fiala, M.D. He explained the method researchers used to test the immune cell response of macrophages may provide a novel way of evaluating the effectiveness of drugs in clearing amyloid beta from the brain and may help to individualize Alzheimer's disease treatment.

"The amount of research being conducted on curcuminoids in different and diversified fields of medicine is staggering, and it is becoming evident from results of basic, preclinical and clinical research that they are some of the most promising food derived compounds for managing inflammatory and degenerative conditions," noted Vladimir Badmaev, M.D., Ph.D., vice president of scientific and medical affairs at Sabinsa. "Often in studies, the material being tested is not commercially available. However, our Curcumin C3 Complex is available to manufacturers, as well as to consumers through a variety of finished products."

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## **Turmeric May Improve Cystic Fibrosis**

**NEW HAVEN, Conn.** Curcumin, a major constituent of the spice turmeric, may help correct cystic fibrosis (CF) defects, according to researchers at Yale University School of Medicine. The study is published in the April 23 issue of *Science* (304, 5670:600- 2, 2004).

In most common forms of CF, a responsible protein (CFTR) is trapped inside the cells of the airways and gastrointestinal tract, inhibiting normal secretion of ions and fluid that eventually can lead to a buildup of mucous clogs in the lungs and the pancreas. However, in the study, researchers found 45 mg/kg body weight/d of curcumin administered to mice with CF helped release the protein from the cells. The treatment was either given once per day, or as a divided dose administered three times per day.

After having received curcumin treatment, mice with the genetic defect that causes CF survived at a rate almost equal to normal mice, said Gergely Lukacs, M.D., Ph.D., one of the study's authors. The CFTR protein also functioned normally in the cells lining the nose and rectum, which are areas of the body affected by CF.

Plans for a human clinical trial using curcumin are underway, which will be carried out under the auspices of Cystic Fibrosis Foundation Therapeutics Inc., according to Michael

Caplan, M.D., Ph.D., the study's senior author and professor at Yale University School of Medicine. In the next phase of research, we will work to determine precisely how curcumin is achieving these effects and to optimize its potential as a possible drug, he said.

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### **Herbal Combo Highlight of Upcoming Prostate Cancer Research**

**BRATTLEBORO, Vt.** Zyflamend, an herbal extract combination from New Chapter Inc., is going to be featured in a three-year clinical trial conducted by Aaron Katz, M.D., and colleagues from New York's Columbia-Presbyterian Medical Center, as noted in a recent edition of *Holistic Primary Care* (Vol. 4, No.3, 2003). Zyflamend is a combination of 10 herbal extracts, including turmeric, ginger, green tea, rosemary and oregano. Research the New York team presented at the 2002 meeting of the Society for Urologic Oncology indicated Zyflamend is a COX-2 inhibitor, which may be a mechanism of action for preventing the growth and viability of prostate cancer cells. Regarding the potential protective effect in humans, Katz and his colleagues announced their new study should answer that question and will follow 100 men to assess Zyflamend's efficacy in prostate cancer.

### **Chinese Herbal Combo May Stymie Cancer Growth**

**NEW YORK**--A blend of Chinese herbs has been shown to inhibit proliferation in a line of prostate cancer cells, as well as induce apoptosis, according to in vitro research conducted at the Department of Urology at Columbia University. Researchers noted the herbal combination also possessed COX-2 inhibiting properties, and the anti-cancer properties were more pronounced than when using one botanical--curcumin--alone. Results of this study were presented at the Dec. 13 meeting of the Society of Urologic Oncology at the National Institutes of Health in Bethesda, Md.

The blend used in this study was Zyflamend from New Chapter Inc. in Brattleboro, Vt., and contains ten extracts: turmeric, ginger, holy basil, green tea, hu zhang, Chinese goldthread, barberry, oregano, rosemary and *Scutellaria baicalensis* (skullcap).

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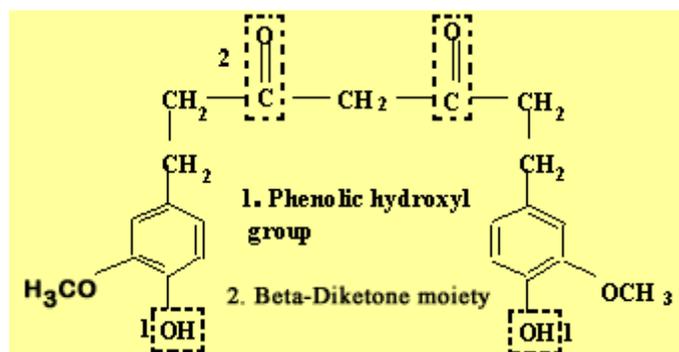
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A set of studies performed by Sabinsa Corporation revealed that Tetrahydrocurcuminoids is a potent antioxidant than the commonly used synthetic antioxidant, Butylated Hydroxytoluene (BHT)

In the DPPH radical scavenging method, the ability of an antioxidant to bind the 1:1 diphenyl-2-picrylhydrazyl-radical (a very stable free radical species) is measured using various concentrations of the selected antioxidants.

The role of curcuminoids as topical antioxidants has been validated in laboratory experiments. Curcuminoids are reported to protect normal human keratinocytes from hypoxanthine/xanthine oxidase injury in *in vitro* experiments. It was surmised in this study that since curcuminoids synergistically inhibit nitroblue tetrazolium reduction, a decrease in superoxide radical formation leading to lower levels of hydrogen peroxide could be their probable mode of action. The authors of this study propose that lower levels of hydrogen peroxide, leading to decreased cytotoxic effects, may be responsible for the protective effects of curcuminoids<sup>11</sup>. This study suggests that curcuminoids and THC offer protection to the skin and could be included in antioxidant topical preparations.

A recent study further validated the well-known superior antioxidant properties of THC and explained the mechanism of antioxidant action<sup>5</sup>. The inhibitory effects of curcumin and tetrahydrocurcumin on lipid peroxidation of the erythrocyte membrane induced by tertbutylhydroperoxide were studied. The results demonstrated that THC showed a greater inhibitory effect than curcumin. The authors concluded that THC must scavenge free radicals such as the tert-butoxyl radical and peroxy radical efficiently. They attempted to explain the mechanism of antioxidant action of THC on the basis of the molecular structure (Figure 9). They concluded that the beta-diketone moiety of THC must exhibit antioxidant activity by cleavage of the C-C bond at the active methylene carbon between two carbonyls in the beta-diketone moiety. Since THC is one of the major metabolites of curcumin, the authors propose that this compound may exhibit the observed physiological and pharmacological properties *in vivo* by means of the beta-diketone moiety as well as phenolic hydroxyl groups (see figure)



Structure of Tetrahydrocurcumin //© Sabinsa Corporation 2000

<http://www.tetrahydrocurcuminoids.com>

<http://www.bioperine.com/BioWithCur.htm>

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Tetrahydrocurcuminoids are derived from curcuminoids (extracted from the roots of *Curcuma longa*, commonly called turmeric root).

This compound is colorless, unlike the yellow curcuminoids. It could therefore be used in color free food and cosmetic products that currently employ conventional synthetic antioxidants.

A set of studies performed by Sabinsa Corporation revealed that the Curcuminoids and Tetrahydrocurcuminoids (THC) are more potent antioxidants than the commonly used synthetic antioxidant, Butylated Hydroxytoluene (BHT).

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