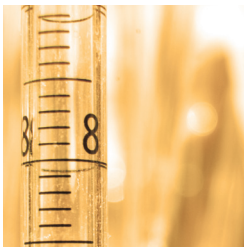

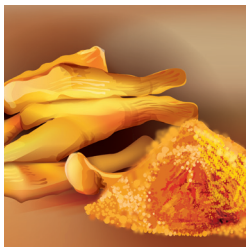

CURCUMINRICH™ TURMERIC ROOT THERACURMIN™

Antioxidant and anti-inflammatory protection

ROOTED IN TRADITION, ENHANCED BY SCIENCE

The root of the turmeric plant *(Curcuma longa)*, a member of the ginger family, has been used in India for thousands of years as the principal spice in curry and as an Ayurvedic medicine for treating inflammatory conditions. A century ago, two chemists, Lampe and Milobedzka, isolated turmeric's primary active compound, curcumin. This natural phenol gives turmeric its vibrant yellow colour and its medicinal qualities. An explosion of scientific research with curcumin has deepened and expanded our understanding of curcumin's unique pharmacological activities as an antioxidant, antimicrobial, and anti-inflammatory, and of its effects on cancer and neurological health.

While the preclinical work with curcumin is nothing short of miraculous, its clinical evaluation has been hindered by its low bioavailability. Clinical studies show that curcumin is poorly absorbed and once absorbed is rapidly metabolized and excreted. Dosages as high as 12 grams of curcumin powder have failed to significantly raise blood levels. A number of processing techniques have been developed to enhance the bioavailability of curcumin. Natural Factors CurcuminRich Turmeric Root Extract contains Theracurmin™, a natural turmeric extract preparation based on proprietary dispersion technology, which improves absorption and bioavailability of curcumin and its derivatives, curcuminoids, by means of fine granulation and suspension. Theracurmin has an absorption rate 27 times greater than regular curcumin, and superior absorption compared to all other commercial forms tested, including other enhanced forms, such as phosphatidylcholine-bound curcumin.

HOW CURCUMIN WORKS

The curcumin molecule is highly pleiotropic, meaning it has several different actions. This seems to be the key to curcumin's potent effects in chronic degenerative disorders, which often have multiple pathways of dysfunction that converge to cause disease. For example, research shows curcumin can regulate numerous pathways that have been linked to inflammatory diseases, including transcription factors, cytokines, protein kinases, adhesion molecules, redox status, and enzymes. Curcumin's effectiveness in neurodegenerative diseases may also be due to its pleiotropic activities, including its antioxidant, anti-inflammatory, and anti-amyloid properties.

ACHIEVING THE HIGHEST BIOAVAILABILITY

The average curcumin particle size in Theracurmin is 0.19 µm, over 100 times smaller than curcumin powder, which has an average particle size of 22.75 µm. These microscopic particles are obtained by mixing curcumin powder with all-natural emulsifiers, including gum from the Indian ghatti tree. This mixture is then ground by a wet grinding mill. To make the curcumin water soluble, it is dispersed evenly through the emulsifiers by homogenization, creating a colloidal suspension that is easily absorbed by the digestive tract. The result is a dramatic increase in the level of curcumin measured in the blood stream.

When an oral dose of Theracurmin was tested in rats, the blood concentration was measured over time to produce a graph. The area under the curve (AUC), which reflects the total bioavailability, was found to be more than 40 times higher than that of curcumin powder. Then, healthy human volunteers were given an oral dose of either 30 mg curcumin powder or 30 mg Theracurmin. The bioavailability of Theracurmin was 27 times higher than that of curcumin powder, as measured by AUC (Sasaki). When compared to equal doses of other enhanced curcumin preparations, Theracurmin produced the highest AUC blood levels: 25 times greater than BCM-95® curcumin, and four times greater than phosphatidylcholine-bound curcumin. Note that these measurements include all the curcuminoids in the blood, including the free curcumin plus its metabolites, which have already been metabolized in the liver and are far less active than free curcumin. The only curcumin supplement that actually increased the amount of free curcumin was Theracurmin.

THE MANY BENEFITS OF CURCUMIN

- Potent antioxidant and anti-inflammatory
- Reduces oxidation of LDL cholesterol, a risk factor for atherosclerosis
- Relieves the symptoms of rheumatoid arthritis and postoperative inflammation
- Reduces the risk of neurodegenerative diseases including Alzheimer's
- Protects DNA against damage caused by toxins in the environment
- Promotes the liver's detoxification of cancer-causing compounds
- Enhances the body's production of cancer-fighting compounds
- Inhibits tumour growth and promotes the death of cancer cells

PROTECTS AGAINST ALZHEIMER'S AND AGE-RELATED BRAIN DAMAGE

It is known that increased consumption of antioxidant and anti-inflammatory compounds reduces the risk of neurodegenerative diseases, and a growing body of evidence shows that curcumin protects against such diseases, including Parkinson's and Alzheimer's. Researchers began investigating curcumin after observing that elderly residents (aged 70–79) of rural India who eat large amounts of turmeric have the lowest incidence of Alzheimer's in the world: 4.4 times lower than that of Americans. Early studies using mice confirmed that curcumin can prevent the development of Alzheimer's brain lesions. There is also evidence that curcumin may actually untangle the brain lesions (Sikora).

The disease process of Alzheimer's begins decades before the onset of cognitive decline. It is thought to be triggered by the accumulation of beta-amyloid (Abeta) fibrils that form plaques in the brain. However, the progressive disruption of memory involves a complex pathological cascade arising from multiple causes, including inflammation, oxidative damage, tau pathology, neuron loss, synapse loss,

and aberrant signalling. This multiplicity of causes has led some researchers to conclude that only pleiotropic (having several different actions) intervention will be effective. Curcumin exhibits pleiotropic activities relevant to neuroprotection and Alzheimer's, including its antioxidant, anti-inflammatory, and antiamyloid properties. Research shows it also inhibits formation of Abeta fibrils, promotes neurogenesis and heat shock protein synthesis, and limits JNK, an enzyme that can disrupt the tau protein inside nerve cells (Frautschy).

In studies with aged mice, curcumin was found to cross the blood-brain barrier and decrease the formation of the Abeta fibrils that form plaques. The effect increased with a higher dose, confirming that curcumin was the active agent. Curcumin was shown to be more effective than ibuprofen and naproxen. In recent animal studies using the new curcumin formulations it was found that they are able to achieve the plasma level required to produce neuroprotective effects. Clinical trials for Alzheimer's and other neurodegenerative diseases of aging are now in progress (Frautschy).

PREVENTION AND TREATMENT OF CANCER

Several studies have found that curcumin protects DNA against damage caused by toxins in the environment that increase the risk of cancer. In a recent study, curcumin supplements were given to people in a community with a high level of arsenic in their groundwater. Arsenic is extremely carcinogenic because it causes severe oxidative damage to DNA. Blood samples prior to curcumin supplementation showed increased levels of free radicals, damage to cell membranes via lipid peroxidation, and severe DNA damage. After three months of curcumin intervention there was an increase in antioxidant activity, plus a reduction in free radicals, lipid peroxidation, and DNA damage (Biswas). A study of cigarette smokers measured the level of mutagens excreted in the urine. Smokers receiving turmeric showed a significant reduction in excreted mutagens, indicating the body had eliminated more cancer-causing compounds (Shehzad).

Curcumin has pleiotropic cancer-preventive properties which:

- Protects against free radical damage to DNA
- Inhibits the formation of cancer-causing nitrosamines
- Enhances the body's production of cancer-fighting compounds such as glutathione
- Promotes the liver's detoxification of cancer-causing compounds
- Prevents overproduction of cyclooxygenase 2 (COX-2), an enzyme that may contribute to the development of tumours

Curcumin has also been shown to inhibit the growth of tumours by:

- Inhibiting epidermal growth factor (EGF) receptor sites, which are abundant on many cancer cells, thereby decreasing their tendency to proliferate
- Inhibiting formation of new blood vessels that would feed the tumour
- Reducing cell proliferation by inhibiting nuclear factor kappa beta (NF-kb)
- Increasing the expression of nuclear p53 protein, essential for apoptosis, the normal process of cell "suicide"
- Inhibiting enzymes that promote cancer cell growth

Evidence also suggests that curcumin can cause tumours to shrink. In a clinical trial, 21 patients with advanced pancreatic cancer received 8 g curcumin daily. Blood samples were taken to measure serum cytokine and COX-2 levels. Cytokine is an indicator of immune system activity. COX-2 is higher in many cancers and can cause tumours to progress. The curcumin was found to reduce the COX-2 levels, and one patient experienced significant increases in serum cytokine levels (4- to 35-fold) accompanied by a brief, but marked, tumour regression of 73%. A second patient experienced disease stabilization for 18 months (Dhillon).

POTENT ANTI-INFLAMMATORY EFFECTS

Inflammation has been shown to play a major role in most chronic illnesses, including neurodegenerative, cardiovascular, pulmonary, metabolic, autoimmune, and neoplastic diseases. In numerous clinical studies, curcumin has been shown to have anti-inflammatory effects comparable to the potent drugs hydrocortisone and phenylbutazone, and over-the-counter anti-inflammatories such as ibuprofen (Jurenka).

In a preliminary, double-blind, randomized, controlled trial, 1,200 mg per day of curcumin was compared to 300 mg per day of the NSAID drug phenylbutazone in patients with rheumatoid arthritis. Curcumin was found to be comparable to drug therapy for improving morning stiffness, walking time, and joint swelling (Deodhar). In a study of men undergoing hernia repair, curcumin was compared to phenylbutazone or placebo. Forty-five patients (aged 15–68) received 400 mg curcumin, 100 mg phenylbutazone, or 250 mg lactose powder placebo three times daily for six days postoperatively. Tenderness, pain, and swelling were scored. On day 6, curcumin, but not phenylbutazone, had reduced the tenderness score at the operative site. The total score decreased by 84% for the curcumin group, 86% for the phenylbutazone group, and 62% for the placebo group (Satoskar).

DOSAGE

1–2 capsules daily or as directed by a health care practitioner.

SAFETY

Through clinical trials as well as centuries of traditional use, curcumin has been shown to be safe.

Pregnancy and lactation: The effects of CurcuminRich in pregnancy and lactation have not been evaluated. It should not be used during these times unless under the direction of a health care practitioner.

Children: Not recommended for children.

Drug interactions: There is evidence that curcumin can decrease the activity of certain chemotherapy drugs, and enhance the effects of other chemotherapy drugs. If you are using any of these drugs, consult a health care practitioner prior to use.

Contraindications: None known.

Daily supplementation with CurcuminRich, thanks to its superior bioavailability, reduces inflammation, provides antioxidant protection to your cells, and reduces the risk of chronic degenerative diseases, including Alzheimer's and cancer.

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