Part I: Introduction

Turmeric is a golden-colored spice widely used in South Eastern and Middle Eastern cooking. Besides being a popular spice, it is also an important herb used in many disciplines of medicine. The medicinal use of turmeric dates back to 4000 years ago in India. It takes on many different names: Indian saffron, haldi, rhizoma curcumae (jiang huang), asterre merite. Some people call it the yellow root because the rhizome (root) part of the plant, *Curcuma longa*, is yellow in color. *Curcuma longa* belongs to the same family as ginger. The major components of turmeric are curcumin and volatile oils.\(^1\) This article examines the role of turmeric in Ayurvedic medicine, Chinese medicine, Western herbal medicine and its safety.

In Ayurvedic medicine, turmeric has the property of generally strengthening the body (tonifying effects), and is therefore used in many different conditions. It is commonly used to treat gastrointestinal ailments such as liver, gallbladder disorders, indigestion, excessive gas, anorexia, and intestinal parasites. It is also used to treat skin conditions such as cuts, burns, bruises, wounds, or simply to add glow to the skin. Other uses include arthritis, respiratory conditions, irregular menses, and diabetes.\(^1\)

In Chinese medicine, rhizoma curcumae (jiang huang) acts on the spleen, the stomach, and the liver channels. It exhibits acrid, bitter, and warming properties. There are three main actions of this herb: it invigorates blood, moves *Qi*, and stimulates bile secretion. The property of invigorating blood is used to treat amenorrhea (absence of the menses) and dysmenorrhea (painful menstruation). The property of moving *Qi* is used to treat indigestion with excessive gas, and arthritis with stagnant *Qi*. It is also used to treat gall-bladder and liver disorders because it stimulates bile secretion.\(^2\)

In Western herbal medicine, turmeric is known to have anticancer, anti-inflammatory, antioxidant, antibacterial, antiviral, and cholesterol-lowering effects.\(^3\)
In terms of safety, turmeric has been used for centuries both as a spice and as a household remedy. The U.S. Food and Drug Administration (FDA) published a monograph of turmeric and rated its active component, curcumin, as Generally Regarded As Safe (GRAS).[1] In a number of clinical trials, curcumin appears to be extremely safe at a dosage of up to 8 g daily.[4] However, due to its bile-stimulant effect, turmeric should be avoided in patients who have bile-duct obstruction, gallstones, or stomach ulcers. Turmeric also stimulates the uterus and should be avoided in pregnant women. Patients taking blood thinners should avoid turmeric supplementation because of its antiplatelet and anticoagulant effects.[5]

Turmeric has a wide variety of medicinal properties; many studies have investigated its effects on cancer, arthritis, and skin aging. The next parts will look at the application of turmeric in managing these conditions.

References

Turmeric

A Cancer-Fighting Agent
by: Wendy Chiu, BMath, ND
Doncrest Rehabilitation Centre
420 Hwy 7 East
Richmond Hill, Ontario L4B 3K2
www.drwchiu.com

Part II: Anticancer Mechanisms
Curcumin (also known by its chemical name, diferuloylmethane) is a major constituent in turmeric and exhibits numerous pharmacological activities that are of interest in oncology. This article focuses on the types of cancer it inhibits, its cancer-fighting mechanisms, its effects on conventional cancer therapies, and the challenge of utilizing it in cancer treatment.
Curcumin inhibits the growth and spread of different types of cancer cells, in particular leukemia, hepatic, colorectal, pancreatic, gastric, prostate, breast, and oral cancer cells.[1, 2] Even some cancers which are resistant to chemotherapy, multidrug therapy, and radiotherapy become responsive to these therapies when curcumin is added to the protocol.[2]

One way that curcumin inhibits cancer is by restoring normal cell-death signalling in a cancerous cell. A normal cell is signalled to die if it is damaged or after it completes its designated functions. Cancer occurs when there is a problem with this signal; the damaged cell keeps growing and multiplying. Normal cell-death signalling is mediated by various cell proteins: some signal the cell to survive and some signal the cell to die. Studies show that curcumin inhibits different types of cancer such as hepatocellular carcinoma and cholangiocarcinoma by influencing these signalling proteins.[3, 4]

Another way that curcumin suppresses cancer is by exerting its anti-inflammatory and antioxidant properties. Cancer is promoted through inflammation and free radicals. Curcumin protects our body from this damage by supporting liver detoxification pathways and boosting the body’s immunity, all while decreasing proinflammatory enzymes and scavenging free radicals. These anti-inflammatory and antioxidant actions are seen through the various stages of cancer, including initiation, promotion, and progression.[1]

Curcumin may be a good adjuvant to conventional cancer therapies, due to its anti-inflammatory and antioxidant effects. Antioxidants protect noncancerous cells from the toxicity of chemotherapy and prevent free-radical damage involved in cancer development and treatment. One study showed that when curcumin is used together with tamoxifen in treating melanoma (the deadliest form of skin cancer), the combined therapy selectively killed cancerous cells while preserving noncancerous cells.[5] Another study showed that curcumin significantly increased the effectiveness of a cancer fighting agent, BM-ANF1, in inhibiting the growth of colon cancer.[6] Curcumin may also be used with other herbs such as astragalus and ginseng to reduce the complications and side effects of chemo- and radiation-therapy including fatigue, pain, diarrhea, nausea, vomiting, respiratory tract infections, liver toxicity, and body weight loss.[2] Although promising, there is the potential that curcumin may change the metabolism of chemotherapy drugs; for this reason, it is recommended that in order to minimize the risk of negative interactions, individuals with cancer consult with a naturopathic doctor prior to use.

Despite these encouraging findings, there is some controversy about the therapeutic effects of curcumin, due to its poor absorption in the gastrointestinal tract. Once absorbed, it is rapidly broken down into other compounds, modified by the liver, and excreted.[1] For this reason, more advanced technologies are being used to create curcumin products with enhanced absorption and solubility.
In conclusion, curcumin demonstrates great potential in treating different types and stages of cancer. Its ability to increase the effectiveness of chemo- and radiation-therapy while decreasing their side effects and complications are very promising. More investigation is needed with respect to improving its absorption to attain therapeutic results. In addition, there is a need for better evaluation of potential interactions with chemotherapy drugs; consult your health-care provider prior to using if you are on prescription medications.

References

Turmeric

Sheds Light in Treating Arthritis

by: Wendy Chiu, BMath, ND
Doncrest Rehabilitation Centre
420 Hwy 7 East
Richmond Hill, Ontario L4B 3K2
[www.drwchui.com](http://www.drwchui.com)

Part III: Arthritis

Turmeric has long been used in Ayurvedic and Chinese medicine to treat arthritis. About 40% of arthritis sufferers seek alternative therapies to manage their condition. This trend has increased since the FDA announced health warnings against anti-inflammatory drugs.[1] This article evaluates the effectiveness of curcumin in treating Rheumatoid Arthritis (RA) during different phases of the disease, using different routes of administration, and by comparing it to other pharmaceutical drugs. The recommended dosage of curcumin in treating RA will also be discussed.
Curcumin appears to be effective in treating RA throughout the course of the disease including both acute and chronic phases of disease. Studies showed that curcumin reduced joint swelling by modifying gene expression; inhibited inflammation by regulating NF-κB, a pro-inflammatory protein; and slowed down joint destruction by decreasing activity of osteoblasts, cells involved in bone breakdown.[2] An animal study showed that 4 mg/kg/d curcuminoid reduced joint swelling by 75% during the acute phase and 68% during the chronic phase.[3]

The effectiveness of curcumin in treating RA varies based on the route of administration. An animal study showed that curcumin administered via intraperitoneal injection (injection into body cavity) improved joint inflammation more significantly than the oral route; 75% and 48% respectively.[3] This may be a reflection of curcumin’s poor intestinal absorption, which is bypassed through an injection directly into the body.

Some studies compared the efficacy of curcumin and pharmaceuticals in treating RA. Dicolfenac is an anti-inflammatory drug used to treat RA. One study compared diclofenac to curcumin 500 mg in 45 patients with active RA.[4] The study found that the patients who received curcumin had superior outcomes with respect to symptom scores (up to 70%) compared to patients who received diclofenac only.[4] Curcumin was safe and not associated with adverse events.[4] Another study found that curcumin was effective for the treatment of osteoarthritis (wear-and-tear arthritis), decreasing a series of proinflammatory chemicals in the body, including IL-1 and IL-6, and improving symptoms of stiffness, pain, and range of motion compared to the control group.[5]

An additional advantage of curcumin is its excellent safety profile. Unlike anti-inflammatory medications or corticosteroids, curcumin does not cause side effects such as fluid retention, bloating, high blood pressure, intestinal bleeding, peptic ulcer, or increased risk of diabetes and osteoporosis.[4, 5]

Regarding the dosage of curcumin in treating arthritis, some researchers recommend 8–60 g of fresh turmeric root three times daily,[3] while others suggest the active extract, curcumin, at 400 mg three times daily.[6] It seems that given the problems with absorption, using a supplement that has been shown to have high bioavailability is prudent.

In conclusion, human studies have shown that curcumin is a valuable antiarthritic agent. It reduces arthritis symptoms, tissue inflammation, and bone destruction. Importantly, curcumin is not associated with the undesirable side effect profile of conventional pharmaceutical medications such as corticosteroids and anti-inflammatories. More research should be done on the therapeutic dosage and the effects of curcumin using different routes of administration in order to unravel the full potential of this herb.
Part IV

Aging is an inevitable process that we all have to go through. Skin shows the most visible sign of aging. Skin ages as a result of internal and external factors. Internal factors such as decreases in blood flow and changes in hormone levels cause the skin to lose its volume and elasticity, leading to sagging and wrinkles. External factors such as ultraviolet radiation (UV) and toxins also damage skin cells, leading to redness, discoloration, yellowing, abnormal growth, and poor texture.[1] These signs appear as a result of oxidative stress, decreased fibroblasts, and reduced collagen.[2] This article looks at how curcumin affects these activities and obstacles in combating skin aging.

UV light exposure and other environmental toxins cause oxidative stress to our skin. Oxidative stress occurs when reactive oxygen species (ROS) react with various substances in the body to produce unstable compounds called free radicals. These free radicals damage cells in a cascade manner.[3] Damaged skin cells appear as fine lines, loss of elasticity, and hyperpigmentation. Antioxidants remove free radicals and stop the
chain reaction. In a study, the antioxidant capacity of curcumin was compared to 15 compounds that were similar in chemical structure. It was found that curcumin is the strongest free-radical inhibitor.[4]

Collagen, specifically type 1 collagen, is the main protein constituent in the human connective tissue. Fibroblasts are the cells that make collagen. Skin integrity depends heavily on both collagen and fibroblasts. Thus, supporting these components helps fight against skin aging. In one research study, 47 medicinal and edible plants were studied to evaluate their potential therapeutic effects in skin care. Among these 47 plants, only six plants showed that they can increase fibroblasts by more than 10% when compared to the control, and curcumin was one of them. The research study further tested these six plants for their ability to make collagen. It was found that the production rate of type 1 collagen was highest in curcumin. Curcumin even showed a higher collagen production rate than ascorbic acid, the well-known type 1 collagen booster. The test also showed that curcumin increased TFG-B1, a growth factor which increases collagen production, skin cell growth, and skin cell renewal.[5]

One study found that sunlight and acid-alkali hydrolysis (a chemical reaction) breaks down curcumin easily, thus diminishing its therapeutic effects. But administering curcumin using a different pharmaceutical delivery system, solid lipid nanoparticles (SLN), improves its stability and lengthens its time of release, resulting in better skin penetration. When compared to conventional creams, SLN curcumin improves skin hydration and elasticity more effectively.[3]

In conclusion, curcumin demonstrates potent antioxidant effects, supports the growth of fibroblast, and stimulates type 1 collagen. These properties make curcumin a great candidate as an antiaging skin therapy. Not many studies were done on the safety of applying curcumin via SLN. More studies in this area may open up a new era in antiaging skin therapy.

References