Indian Solid Gold
Dried and powdered turmeric has been used in India as both a spice and a medicine for centuries. In addition to flavoring food, turmeric was used to treat conditions as varied as toothache, gas, chest pain and menstrual problems. Modern research has found that the effectiveness of turmeric is because of a natural compound it contains: curcumin. By extracting curcumin from turmeric, we have an even more powerful way to treat disease. Enhancing the absorption of curcumin with micronization (making a very fine powder) and blending in turmeric essential oil has resulted in a natural substance that is as potent – or even more potent – at treating disease as prescription drugs, but without the adverse effects.

Why is Curcumin Good for So Many Problems?
One of the reasons that curcumin works so well on such a wide range of diseases is because it is such a powerful anti-inflammatory. We know that almost all chronic diseases – from diabetes to heart disease to arthritis to Alzheimer’s disease – have something in common: unchecked, destructive inflammation. Unlike synthetic drugs, which typically work against only a single inflammation pathway, natural curcumin reduces inflammation through its effects on multiple inflammation targets.1

In technical terms, curcumin has been found to:

- Suppress the activation of the NF-kB, which regulates the expression of pro-inflammatory gene products
- Downregulate COX-2, the enzyme linked to most inflammation
- Inhibit 5-LOX, another pro-inflammatory enzyme
- Downregulate the expression of cell surface adhesion molecules linked to inflammation
- Inhibit the activity of TNF, one of the most pro-inflammatory cytokines (cell-signaling protein molecules)

Because of this anti-inflammatory activity, as well as its ability to kill tumor cells, increase activity of protective antioxidants such as glutathione, and modulate tumor growth cell factors, curcumin is effective against hundreds of diseases (see Figure 1).2

Curcumin is also a potent antioxidant, able to neutralize unstable, reactive free radicals. Free radicals are molecules with a missing electron that stabilize themselves by “stealing” electrons from neighboring molecules, creating another free radical in the process. This chain reaction of free radical formation is known as a free radical cascade, and it can result in cellular damage (called oxidative stress) leading to inflammation and chronic disease – including cancer. Free radicals can negatively impact all body systems, including the immune system. Curcumin, like other antioxidants, is able to stop free radical cascades without becoming unstable itself. Its ability to neutralize free radicals is extraordinarily strong. In fact, a specially prepared extract of curcumin has an antioxidant value of over 1,000,000 – many times higher than that of blueberries (6,552), strawberries (3,577) or dark chocolate (powder) (40,200) – well known food-based antioxidants. The dual properties of curcumin as both anti-inflammatory and super antioxidant may also explain why it has no side effects.

Although the information on how curcumin works at a cellular level is very technical, what you need to remember is that curcumin is not a synthetic drug that poisons your body’s systems – instead, it works with your body’s own processes to help bring back natural function. If you would like more in-depth information on curcumin’s many mechanisms of action, please see the reference list at the end of this document.
Curcumin for Cancer

Our bodies have a natural ability to fight cancer through the activity of tumor suppressing genes. However, aging and environmental factors can turn off, or silence, these genes, allowing the cancer to grow and spread unchecked. Researchers have now found that one of the ways curcumin fights cancer is by re-awakening these “sleeping genes,” turning them back on to stop cancer. This branch of science is known as epigenetics, and it may hold the answer to treating many types of cancer.3

Curcumin has been shown to stop cancer initiation, promotion and progression, meaning that it stops the changes that cause normal cells to become cancerous, stops the replication of cancerous cells (tumor formation), and stops cancerous cells from migrating to other parts of the body (known as metastasis). Published studies on curcumin’s anticancer activity (so far) have found that it can suppress breast, prostate, liver, skin, colon and lung cancer.4,5

Curcumin has also been shown to increase the activity of cancer drugs and to decrease drug resistance in cancer cells (meaning it helps cancer drugs kill tumors more efficiently). Additionally, it protects normal cells from the toxic effects of chemotherapy drugs and radiation treatments.6

Taking curcumin in combination with chemotherapy drugs may mean less of the toxic drugs are required, but the results will be better, with significantly reduced side effects. However, this is very early research and more studies need to be done.

Researchers believe that curcumin works similarly against all types of cancer, so no matter what kind of cancer you may have curcumin can be helpful.

Curcumin, Inflammation, and Chronic Disease

Inflammation is normal. It is a natural physical response that is triggered when the body begins to
repair damage or injuries. However, inflammation should be limited, with a definite beginning and end. It should not continue, day after day. On-going, persistent inflammation is destructive, not restorative. One of the keys to improving chronic diseases (heart disease, diabetes, arthritis, asthma, etc.) is stopping the cycle of chronic inflammation. As discussed earlier, curcumin, unlike synthetic drugs, works on multiple inflammation pathways to help return the body to a normal inflammation balance. Additionally, curcumin has specific, unique mechanisms of action that make it invaluable in treating chronic diseases.

**Heart Disease**

In an experimental model of heart disease, curcumin was compared to the cholesterol-lowering drug lovastatin. The researchers found that curcumin protected against the effects of a high cholesterol diet just as effectively as lovastatin, preventing the inflammatory changes that lead to plaque buildup (and eventually, a heart attack), reducing triglycerides and increasing protective HDL cholesterol levels. Just a 1% increase in the "good" form of cholesterol can reduce your risk of heart disease by 2-3%, so this finding is very important. Curcumin has also been found to lower serum triglycerides by 27%. Triglycerides are an undesirable form of fat that circulates in the bloodstream. Although much attention has been focused on cholesterol levels in connection with risk of heart disease, new research is finding that reducing triglyceride levels is likely more important than controlling cholesterol levels. In fact, one recent scientific paper noted that high triglyceride levels nearly tripled the risk of a heart attack. Therefore, the ability of curcumin to reduce triglyceride levels is crucial in reducing your risk of heart disease.

**Arthritis**

The hallmarks of osteoarthritis are cartilage destruction and inflammation — two conditions that curcumin is able to prevent. An interesting property of curcumin is that it is able to protect chondrocytes, specialized cells found in joint cartilage, from being broken down by inflammatory compounds in the body (IL-1beta, MMP3). In fact, in a recent clinical study that looked at a combination of bioavailable curcumin and boswellia (also an excellent natural anti-inflammatory) or the prescription drug celecoxib (Celebrex®) in the treatment of patients with arthritis, the herbal combination worked better than the drug, with no side effects! The researchers in this study found that 93% of the participants receiving the herbal combination reported reduced or no pain, compared to only 86% of the prescription drug group. The group receiving the special curcumin and boswellia extract were also able to walk further, and had less pain and better range of movement, all without significant adverse effects. Prescription drugs such as celecoxib are classified as non-steroidal anti-inflammatory drugs (NSAIDs), and are well known to cause adverse effects such as stomach and intestinal bleeding ulcers, reduced kidney function, and increased blood pressure and risk of heart attack. Curcumin works just as effectively at reducing inflammation — without these potentially lifethreatening adverse effects.

**Diabetes**

While diabetes is a disorder of blood sugar metabolism, inflammation plays a very strong role in its development and progression. In fact, some researchers now believe that chronic, low-level inflammation, especially when associated with obesity, is actually the cause of insulin resistance leading to Type 2 diabetes. In an experimental model of diabetes, curcumin was compared to the drug rosiglitazone (Avandia), and found to be equally as effective in reducing insulin resistance, inflammatory markers, and fats in the bloodstream. Other studies looking at the effects of curcumin in models of diabetes have found similar results: improved insulin response and reduced blood glucose levels. Additionally, other scientific studies have found that curcumin may protect against other problems associated with diabetes, such as breakdown of eye tissue, potential brain damage, nerve pain (neuropathy), and heart disease.

**Alzheimer’s disease**

The cause of Alzheimer’s disease (AD) is not entirely known. However, certain characteristic changes are found in the brains of people with this condition — accumulated clusters of a protein called beta amyloid, and clumps of dead and dying nerve and brain cells. These clusters and clumps, called plaques and tangles, are believed to interfere with the proper transmission of messages between brain cells, and the death of the cells themselves. Inflammation is also believed to be involved, causing the accumulation of plaques and tangles to have even more damaging effects. Because of the known anti-inflammatory effects of curcumin, researchers are now looking at its effects in treating AD. What they have discovered is astonishing. Not only does curcumin protect brain cells from damaging inflammation, in experimental models of Alzheimer’s disease, curcumin was able to reduce beta amyloid levels and shrink the size of accumulated plaques by over 30%! In fact, curcumin is more effective in inhibiting formation of beta amyloid protein fragments than many other drugs being tested as Alzheimer’s treatments. One of the most prestigious Alzheimer’s research institutes in the world, the McCusker Alzheimer’s Research Foundation (supporting research at Edith Cowan University, Perth, Australia) is focused on learning more on the benefits of curcumin for treating AD. In a ground-breaking new study, a specialized, highly absorbable form of curcumin is being administered to patients with mild to moderate dementia in order to learn more about how curcumin can be used as an effective treatment of AD.

**Depression**

Depression is a debilitating and difficult to treat disease. Approximately 30% of patients who take prescription drugs to relieve their depression experience no benefits, and the remaining 70% will have only partial improvement. Additionally, the side effects can be significant, including nausea, weight gain, dizziness, dry mouth, blurred vision, insomnia and more. Because curcumin has been shown to be effective at treating other brain disorders, it has been theorized that it may also be helpful in relieving depression. First, inflammation is known to play a major role in the development of depression. Therefore, it seems logical that the anti-inflammatory properties of curcumin may be helpful. Second, curcumin is also able to modulate the levels of brain neurotransmitters.
(chemical messengers – serotonin, norepinephrine, and dopamine) which influence mood, behavior, appetite, emotions and even dreaming and memory. In experimental models of depression, curcumin has been shown to increase levels of the “feel good” neurotransmitter, serotonin, as well as relieve other symptoms of depression.21,22 A published study comparing a special absorption curcumin to two prescription drugs fluoxetine (Prozac®) and imipramine (Tofranil®) in an experimental model found the special curcumin just as effective as the two drugs – but without the adverse side effects.23 Researchers are now conducting human trials to compare the anti-depressant effects of curcumin with prescription drugs such as fluoxetine (one branded product is Prozac®).24

Gastrointestinal Inflammation (IBD and IBS)

Chronic inflammation of the intestines (the gastrointestinal tract) is associated with several commonly experienced diseases – particularly irritable bowel syndrome (IBS), inflammatory bowel disease (IBD) and Crohn’s disease. Bloating, frequent diarrhea or constipation, gas, abdominal pain, even heartburn and acid reflux, can all be signs that unchecked inflammation is affecting the proper function of your digestive system. A study including over 200 people with IBS found that use of a standardized extract was associated with up to a 25% reduction in abdominal pain, and 2/3 of participants reported an improvement in overall symptoms.25 In a small pilot study of patients with Crohn’s disease or ulcerative proctitis (a type of IBD) who received curcumin along with the standard anti-inflammatory drugs (including steroids), many of the patients were able to reduce or stop the medications, and inflammation markers decreased to within normal limits.26 One of the interesting benefits of curcumin is that it has not only been shown to reduce inflammatory compounds in the intestines, it can actually strengthen the intestinal wall to prevent harmful bacteria from passing out of the intestines and reaching other organs, such as the liver and kidneys.27

Wound Healing and Skin Conditions

Curcumin not only protects skin with its ability to quench damaging free radicals and reduce inflammation, but it is also has been shown to improve collagen deposition and vascular density in wounds. Collagen is the foundation upon which healthy skin is built; vascular density is what ensures adequate blood flow to carry in the nutrients needed for repair of damaged tissue.28 Many people who experience problems with slow healing of wounds also have diabetes. Diabetes interferes with wound healing because it causes reduced blood flow (nutrients needed for tissue repair are carried in the bloodstream). High blood sugar also interferes with the ability of the body to clear away damaged cells and build new skin cells. In an experimental model of diabetes, both oral and topical curcumin were able to speed wound repair and healing.29 Radiation treatment for cancer can also cause significant damage to skin and delay healing. Pretreatment with curcumin has been shown in multiple studies to speed skin repair and healing.29 And finally, curcumin has shown promise at reducing inflammatory skin conditions such as psoriasis, eczema, as well as skin cancer.29

Other Chronic Diseases

Curcumin has also shown promise in treating many other diseases and conditions, including obesity, kidney and liver disease, eye disorders, lung conditions, allergies, pancreatitis, and more.21,32 Curcumin may be able to protect against weight gain and body fat accumulation. In a study of animals fed a high fat diet, curcumin supplementation prevented the increase of adipose (fat) tissue as well as preventing fat deposits in the liver.30

Curcumin Safety

No toxicity issues have been reported for curcumin, even when used in dosages as high as 10 grams or more daily.34,35 Because of it is so safe and non-toxic, curcumin therapy is something to consider for almost any condition, especially conditions involving inflammation.

How Much Curcumin Do I Need Every Day?

For most people, 750 mg of bioavailable curcumin standardized to 500 mg pure curcuminoids will be very beneficial. Bioavailable curcumin can be combined with other ingredients to create targeted formulas for specific health concerns as well. See the other articles in the Terry Talks Nutrition series (available at www.TerryTalksNutrition.com) for more information.

The information provided here is meant to be used in conjunction with the advice of a healthcare practitioner, who can help develop a treatment plan that is designed to address your unique health concerns for an optimal outcome.

Why can’t I just use Turmeric?

If you want to add a healthy, unique flavor to your cooking, by all means sprinkle in some turmeric. But if you want to treat serious health conditions, you need to extract curcumin from turmeric. Think of it this way... Just as oranges are a source of vitamin C, turmeric is a source of curcumin. But for medicinal effects it isn’t enough to use turmeric powder (containing only 2.5% curcumin content) just as you wouldn’t eat an orange if you had a cold – you would take 500 or 1,000 mg of pure vitamin C. Today, we extract curcumin from turmeric to use as a natural medicine for treating cancer, Alzheimer’s disease, arthritis, and many other chronic diseases. Save the turmeric powder for your next batch of curry!
### Bioavailable Curcumin – Summary of Research

#### Published Studies

<table>
<thead>
<tr>
<th>INDICATION</th>
<th>STUDY DETAILS</th>
<th>REFERENCE INFORMATION</th>
</tr>
</thead>
<tbody>
<tr>
<td>ALZHEIMER’S DISEASE</td>
<td>Design: This study involved 34 participants, aged 50 years and above who have been diagnosed with probable or possible Alzheimer’s disease. The participants were randomized to receive either 1 gram or 4 grams of a specialized curcumin, or a placebo. Benefits: Both groups who received the specialized curcumin extract saw improvement in their antioxidant status. The curcumin groups also noted an increase in the serum levels of plaque-forming beta-amyloid. More adverse effects were noted in the placebo group compared to either curcumin group.</td>
<td>Baum L, Lam CW, Cheung SK, et al. Six-month randomized, placebo-controlled, double-blind, pilot clinical trial of curcumin in patients with Alzheimer disease. J Clin Psychopharmacol. 2008;28(1):110-113.</td>
</tr>
<tr>
<td>OSTEOARTHRITIS</td>
<td>Design: This study involved 8 subjects with osteoarthritis of the knee who were randomized to two groups. One group took a 500 mg blend of curcumin and boswelia twice a day while the other took the prescription drug celecoxib (one brand name is Celebrex®) 100 mg twice a day. Benefits: Efficacy and tolerability of the herbal combination used in the current study was shown to be superior to those of celecoxib (NSAID) for treating active osteoarthritis. The curcumin and boswelia blend was better than celecoxib in relieving pain, walking distance and joint line tenderness scores. It was equally effective as celecoxib in alleviating crepitus, and range of joint movements.</td>
<td>B. Antony, R. Kiahakkadith, M. Benny, B. Karuvilla. Randomized, Controlled Human Clinical Study to Assess the Efficacy and Safety of BCM-95® &amp; BosPure® compared to Celecoxib in the management of Knee Osteoarthritis. Poster presented at the Osteoarthritis Research Symposium Internationale (OARSI) Annual World Congress on Osteoarthritis; September 2011. San Diego, CA. Abstract 316. Osteoarthritis Cartilage 2011;19(S1):S145-S146.</td>
</tr>
</tbody>
</table>

#### Studies In Pre-Publication

<table>
<thead>
<tr>
<th>INDICATION</th>
<th>STUDY DETAILS</th>
<th>REFERENCE INFORMATION</th>
</tr>
</thead>
<tbody>
<tr>
<td>RHEUMATOID ARTHRITIS</td>
<td>Design: 45 subjects randomized to BCM-95 (500 mg), diclofenac sodium (50 mg), or BCM-95 (500 mg) + diclofenac (50 mg) groups. (One brand name of diclofenac sodium is Voltaren®)</td>
<td>Randomized, Controlled Human Clinical Study to Assess the Efficacy and Safety of BCM-95 compared to Diclofenac Sodium in the Management of Active Rheumatoid Arthritis.</td>
</tr>
<tr>
<td>DEPRESSION</td>
<td>Design: 60 subjects divided into three groups: curcumin; fluoxetine (one brand name is Prozac®); and curcumin + fluoxetine.</td>
<td>Panchal B. Effect of curcumin as nutraceutical in patients of depression.</td>
</tr>
</tbody>
</table>

#### Studies In Progress

<table>
<thead>
<tr>
<th>INDICATION</th>
<th>STUDY DETAILS</th>
<th>REFERENCE INFORMATION</th>
</tr>
</thead>
<tbody>
<tr>
<td>ORAL &amp; CERVICAL CANCER</td>
<td>Design: 140 participants for 6 months Objective: To evaluate the clinical efficacy and safety of specialized curcumin oral therapy in subjects with oral premalignant lesions</td>
<td>Phase II randomized, multi-center, double-blind, placebo chemoprevention clinical trial of [BCM-95®] curcumin in oral premalignant lesions and cervical cancer.</td>
</tr>
<tr>
<td>ALZHEIMER’S DISEASE</td>
<td>Design: 150 participants with mild cognitive impairment/early stage Alzheimer’s disease Objective: To assess the efficacy of bioavailable curcumin at slowing the progression of Alzheimer’s disease and to determine impact on blood biomarkers of beta amyloid destruction.</td>
<td>Martins R. Evaluation of the nutritional extract Bio-curcumin (BCM-95) to preserve cognitive functioning in a cohort of mild cognitively impaired (MCI) patients over 12 months. Edin Covan University. Joondalup, Western Australia.</td>
</tr>
<tr>
<td>CANCER</td>
<td>Design: Human cancer cellular study Objective: Examine curcumin’s impact on the methylation process as it relates to gene activation/inactivation</td>
<td>BCM-95® curcumin impact on &quot;sleeping gene&quot; as partial mechanism of action for cancer prevention.</td>
</tr>
</tbody>
</table>

#### Bioavailability Studies

<table>
<thead>
<tr>
<th>INDICATION</th>
<th>STUDY DETAILS</th>
<th>REFERENCE INFORMATION</th>
</tr>
</thead>
<tbody>
<tr>
<td>ABSORPTION &amp; RETENTION</td>
<td>Design: 15 healthy volunteers (men and women ages 24-45 years old) were assigned to either the standard curcumin group or the specialized curcumin group. Blood samples were drawn before the volunteers were given the curcumin and then at regular intervals after they ingested the curcumin. Benefits: This study indicates that the bioavailability of the specialized curcumin extract was 7 times higher than that of the standard curcumin extract. Moreover, the results show that the specialized curcumin stays in the blood stream longer and at higher levels than the standard curcumin extract.</td>
<td>Benny M, Antony B. Bioavailability of BioCurcumin™ (BCM-95®). Spice India. September, 2006:11-15.</td>
</tr>
<tr>
<td>ABSORPTION &amp; RETENTION</td>
<td>Design: This study compared the absorption in human subjects of a specialized curcumin extract to that of a standard curcumin extract. Benefits: The results showed that the specialized curcumin extract was absorbed 7 times (or 700%) better than a standard curcumin extract. At its peak, the specialized curcumin extract showed a blood level 10 times that of standard curcumin.</td>
<td>Antony B, Menina B, Iyer YS, et al. A Pilot Cross-Over Study to Evaluate Human Oral Bioavailability of BCM-95CG (Biocurcumin). A Novel Bioenhanced Preparation of Curcumin. Indian J Pharm Sci. 2008;70(4):445-449.</td>
</tr>
</tbody>
</table>
Curcumin is Poorly Absorbed

The difficulty with using curcumin as a medicine is that it is poorly absorbed in the gastrointestinal tract. In some of the early clinical studies, researchers found it necessary to administer many grams of curcumin in order to see any significant increases in serum curcumin levels. Additionally, the curcumin did not remain at a therapeutic level very long. It has now been found that by micronizing (very fine particle size) curcumin and blending it with turmeric essential oil yields a curcumin formula that is up to 10 times better absorbed than standard curcumin and remains in the bloodstream at significant levels for longer. This specialized curcumin has been used in research studies at prestigious institutions, proving its positive effects on health as well as its enhanced absorption (see the following chart).24, 37

Bioavailability Studies

DEPRESSION

ALZHEIMER’S

INDICATION

Bioavailable Curcumin – Summary of Research

prescription drug celecoxib (one brand twice a day while the other took the randomized to two groups. One group took grams of a specialized curcumin, or a placebo. randomized to receive either 1 gram or 4 aged 50 years and above who have been Design:
obstructive lung disease and to determine impact on blood biomarkers Objective:
to assess the efficacy of bioavailable oral premalignant lesions of specialized curcumin oral therapy in subjects with Objective:
that curcumin is useful in relieving pain, walking distance and joint line impairment/early stage Alzheimer’s disease and to determine impact on blood biomarkers


Absorption Comparison of Different Formulations of Curcumin

Bioavailable BCM-95® Curcumin

Standard Curcumin

Absorption of Curcumin in Blood (ng/ml)

Time (hours)

0 1 2 3 4 5 6 7 8 9


20. Martins R. Evaluation of the nutritional extract Bio-curcumin (BCM-95) to preserve cognitive functioning in a cohort of mild cognitively impaired (MCI) patients over 12 months. Edith Cowan University. Joondalup, Western Australia.


24. Panchal B. Effect of curcumin as nutraceutical in patients of depression. Available at: https://www.clinicaltrials.gov. Identifier: NCT01026232


