CURCUMIN

The Miracle of TURMERIC

2016 EDITION

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Curcumin
The Miracle of Turmeric
Eastern Wisdom, Western Science

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*This guide is part of the **James Lee Digest** series, which is a collection of short-form, "to the point" guides for those seeking information on a specific topic and don't want to sift through a full-length book to find it.*

For this and much, much more, check out James' top-selling book – The Biohacking Manifesto –The scientific blueprint for a long, healthy and happy life using cutting edge anti-aging and neuroscience based hacks

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Introduction

This is the first instalment of my *James Lee Digest* series of guides covering a selected number of herbs, natural compounds and other supplements which have some amazing properties (some of which you may never have heard). For example, many people have heard of curcumin for its anti-inflammatory properties, however its effects on the brain (and therefore, mood and cognition) are less well-known.

The goal of this series (and this guide) is to distil all the information I find on various research papers down to just the key points, for those seeking highly-specialised information in the most concise format possible. Most people who want to learn more about a supplement such as curcumin, don't care what things like *TNF Alpha* or *IL-6* are or why they are important. In my experience, most people want to know –

a) What is it?

b) What does it treat?

c) Are there side effects or toxic effects on the body?

d) Does it interact with my existing medication?

If you are the type of person who wants to know exactly how something works or why it works, including all the biological nomenclature, put down this sample and hit PubMed. Similarly, I have elected not to clutter these quick guides with endless references. If you wish to check any of the facts I mention in these guides, here are the current results for the search term "curcumin" on Pubmed.

However, if you are the type of person who doesn't want to wade through page after page of clinical trial data to find out if something works, read on…

The world of medicine and the world of natural therapies are often seen as bitter enemies. Scientists and doctors often view natural therapies as ineffective or as having a lack of rigorous testing, and naturopaths often see pharmaceuticals as having damaging side-effects, with efficacy which is unclear due to the cherry picking of data by profit-hungry drug companies.

However, increasingly, both sides of the debate are finding more common ground when looking for natural substances which may provide unique benefits to either complement existing medicine or provide alternatives.

Examples of this include the beneficial effects of omega 3 fatty acids (fish & krill oils), or co-enzyme Q10 (CoQ10) supplementation for patients on statins, to reduce the side-effects of those drugs.

One of the most interesting examples of this would be the recent fuss over the substance curcumin, which is extracted from turmeric – yes, the same turmeric used in Indian curries! There is a long history in certain Eastern cultures where turmeric is used for a range of health complaints. These properties are now being backed up by rigorous, placebo-controlled clinical trials.

Curcumin has beneficial effects on an astounding number of places in the brain and body, however to date, most attention has been given to curcumin's abilities as an anti-inflammatory, anti-depressant and anti-cancer agent.

To give you an idea of the esteem in which I hold curcumin, this guide was the first one I ever published. When I sat down to produce an updated edition, two things immediately jumped out at me. Firstly, I realised how much my writing has changed since I first published this guide. It is still awful, however slightly less so now. Secondly, I noticed just how much new research has been going on since I first put the guide together. In recent years, the attention being placed on curcumin has only accelerated.

I have been droning on about this amazing compound to anyone with the inclination to listen (and perhaps, occasionally, even those not inclined) for the past five years or more. My wife has informed me that the mere mention of the word "curcumin" will constitute immediate grounds for divorce. It is worth the risk…

Firstly, what exactly is curcumin, and the Turmeric plant from which it is extracted?

Turmeric, or *curcuma longa*, is a member of the ginger family. It is a perennial plant which grows to about 5-6 feet tall in the tropical regions of southern Asia. The roots of turmeric are the bulbs that are responsible for producing rhizomes which then produce stems as well as roots for subsequent offshoots. Turmeric has been used for over 4000 years both as a medicinal herb as well as a spice for cooking. It is fragrant, with a bitter and sharp character to taste. Fat-soluble, polyphenolic substances known as *curcuminoids* are responsible for the distinctive bright yellow colour of turmeric.

Turmeric is made up of three compounds; *desmethoxycurcumin*, *bis-desmethoxycurcumin* and *curcumin*, with curcumin being the most active curcuminoid of the turmeric plant and hence where the majority of attention is focused. In traditional medicine and naturopathic modalities, such as India's Ayurvedic system, turmeric has been used to treat a wide range of problems including arthritis, jaundice, heartburn (dyspepsia), stomach pain, diarrhea, intestinal gas, stomach bloating, appetite loss, liver issues, gallbladder disorders, laryngitis, bronchitis, diabetes, headaches, bronchitis, lung infections, fibromyalgia, colds, leprosy and cancer. Now, that is a pretty long list and naturally many of these traditional applications remain to be backed up by enough scientific evidence to be recommended by the medical community.

One of the misinformed and unfortunately common comments I read on various internet forums or the comments section of certain sites is that *"Herb X or Supplement X is not investigated by drug companies because they can't make any money from it"*. This is incorrect. Drug companies are always studying various natural compounds for two key reasons –

1. By understanding how a particular substance works, researchers can sometimes use this understanding to develop proprietary drugs
2. If a natural compound proves itself in clinical trials or initial research, drug companies can develop more potent forms or proprietary formulations with better bioavailability

Curcumin is a perfect example of both of these scenarios, as it possesses an unusually powerful anti-inflammatory ability (for a natural compound) and unfortunately also tends to have poor bioavailability in its natural state.

The recent explosion of research into curcumin is a testament to just how interesting a substance it is. There are many studies already underway looking to determine if curcumin demonstrates any ability to manage or treat arthritis, stomach ulcers, Alzheimer's disease and high cholesterol, to mention just a few possible applications.

However, that doesn't mean that curcumin hasn't already been extensively studied. In PubMed (the database of various clinical trials), curcumin is cited almost 4000 times, with strong evidence to suggest effectiveness – as an antioxidant, anti-inflammatory, anti-atherosclerotic, preventing liver and kidney toxicity, as a potential treatment for psoriasis, diabetes, multiple

sclerosis, Alzheimer's, HIV disease, septic shock, cardiovascular disease, lung fibrosis, arthritis, and inflammatory bowel disease!

That long list alone would be sufficient to justify further studies, however curcumin also shows in vitro (i.e. – in a test tube essentially, not in a human or animal subject) anti-cancer benefits, appearing to treat a number of cancers including breast, colon, kidney, liver, basal cell carcinoma, prostate, melanoma and also leukemia.

Notes for the updated edition (January 2015)

Since I wrote this book more than a year and a half ago, the reputation and renown of curcumin has exploded as I knew it would. Finally, when I walk into my local supplement store, I notice that large supplement brands are now starting to incorporate curcumin into their products. Curcumin is now included in a popular liver supplement (along with silymarin and several other herbs) and is now starting to be incorporated into joint mobility/arthritis supplements. However disappointingly, here in Australia, the large supplement companies such as Swisse are only using the cheaper, straight curcumin and are not utilising bioactive forms such as BCM-95, Longvida or Meriva, making the inclusion of curcumin into their products essentially useless (more on why this is the case later in the guide).

There has also been an explosion in clinical trials for curcumin, investigating a dizzying array of potential applications from heart disease to cancer to depression. As the results of these trials emerge (positive or negative), I will update this guide.

Lastly, I recently received a wonderful email from a very nice lady who asked me some questions around the application of curcumin for ameliorating epilepsy (which, unfortunately, I have nothing on as of yet). As her situation is rather unique, to avoid disclosing her identity I have not named her, however I found her email fascinating and with her permission I have included it at the end of this guide (with certain details changed to protect privacy). I included my email address in earlier versions of my books however removed it as I was concerned about receiving requests for advice, which I cannot provide. However receiving fascinating emails such as this has me reconsidering this position, so I may put my email address back in certain books soon.

What are the different beneficial effects curcumin has on the human body?

Amongst all known natural, plant-based substances, curcumin is relatively unique in its wide range of beneficial effects on the human body such as –

Fighting inflammation

Curcumin appears to possess potent anti-inflammatory properties by inhibiting the production of pro-inflammatory compounds such as *prostaglandins*, *thromboxanes* and *leukotrienes*. These compounds are not inherently harmful per se – the inflammatory response is vital for your survival – however there is strong evidence to say that, for various reasons (which are still the subject of debate, such as the omega-6 theory of inflammation) modern-day humans (read : Westerners) have a tendency to have the internal balanced tipped towards a pro-inflammatory state. A pro-inflammatory state is strongly correlated with a range of problems including heart disease, cancer and joint pain, although which direction the arrow of causation is going is unclear in some of these (i.e. – Does cancer cause the biomarkers of inflammation to rise or does chronic, long term inflammation create a risk factor for cancer?).

Fighting Cancer

One of the reasons why curcumin is being so actively studied as a potential anti-cancer agent is that it appears to fight cancer from several angles.

Firstly, curcumin enhances the process by which your body eliminates potentially carcinogenic substances from the body. It does this by boosting the activity of certain enzymes such as glutathione S-transferase.

Secondly, curcumin appears to inhibit the ability of tumours to grow by blocking the process, known as *angiogenesis*, where tumours generate the blood vessels needed to support their out of control growth.

Despite this, we are still only in the early stages of research into curcumin's ability to fight cancer. We certainly aren't at the stage where anyone should be viewing curcumin as an alternative to conventional cancer treatments. For example, much of the research to date has either been in-vitro (ie – in a test tube/laboratory) or in mice, so we would need to see more human trials

before scientists would have enough confidence in releasing a curcumin-based treatment for cancer. Despite this, there have already been some human trials looking at curcumin's anti-cancer abilities. Trial results so far have been mixed, with the strongest evidence being seen in cancers involving the human GI tract, such as stomach and bowel cancers.

Scavenging free-radicals

For anyone who has already read The Methuselah Project, you are probably sick of hearing about reactive oxygen species (ROS). These nasties, which are often referred to as *free radicals*, are one of the (probable) causes of premature aging at the cellular level. These free radicals are the reason why you have probably read so much about the importance of anti-oxidants.

Curcumin acts as an antioxidant in two ways. Firstly, it acts directly as an antioxidant itself and secondly it enhances the activity of your body's primary endogenous antioxidant - glutathione

Preventing Alzheimer's disease

Alzheimer's disease is caused by the formation of beta-amyloid plaque (BAP) in the brain. Imagine an invasive creeping plant in your garden which covers and strangles a tree, gradually killing it. Curcumin appears to inhibit the formation of BAP (as a preventative, not as a treatment). The exact mechanism is yet to be elucidated, however as Alzheimer's is thought to be triggered by stressors such as oxidative stress and chronic inflammation, it may help to prevent Alzheimer's by the mechanisms mentioned above.

Unfortunately there is no evidence to suggest that curcumin would be of benefit in the advanced stages of Alzheimer's, however there are clinical trials underway looking at whether curcumin inhibits the progression of Alzheimer's in early stage cases.

What has curcumin been demonstrated effective for?

Of all the various supplements I research, curcumin (along with omega 3 fatty acids and astaxanthin) has one of the most diverse ranges of therapeutic applications of any commonly available supplement. Naturally, as a relatively new agent (in terms of Western research), there are varying degrees of evidence depending on the application. However we will only see more discoveries come to light regarding this amazing substance, as our knowledge of it advances.

Here are some of the more widely-known applications -

Bacteria, Viruses and Fungi –

Curcumin appears to function as a potent antimicrobial, antiviral and antifungal agent. It has demonstrated effectiveness against *staphylococcus aureus, Bacillus subtilis, E.coli, Pseudomonas aeruginosa, Penicillium notatum, Aspergillus niger, Helicobacter pylori, C. albicans* and *C. glabrata.*

However, most excitingly, curcumin appears to inhibit the HIV virus' ability to replicate itself. Naturally, this is not a cure per se, but another potential arsenal in the various weapons used to fight AIDS.

Inflammation and the Immune System

In my opinion, curcumin's most dramatic and easily demonstrated biological effect is its ability to reduce inflammation. As the human body uses inflammation in a short-term fashion as one of the ways it fights off invaders, the anti-inflammatory effects of curcumin are also related to its ability to affect the immune system in positive ways. Various studies have shown that curcumin helps the body to fight infection and to reduce some of the unpleasant aspects of infection including lethargy and diarrhea.

Curcumin is therefore of great interest to sufferers of the various illnesses where inflammation is either a cause or unpleasant effect. Trials have shown improvements in various measures of pain for sufferers of osteoarthritis and rheumatoid arthritis.

Studies done in the past have found that curcumin is capable of reducing the

painful symptoms of osteoarthritis as well as rheumatoid arthritis. In one of the studies, curcumin worked almost as well as ibuprofen (a popular anti-inflammatory often sold as Advil or Nurofen) for reducing pain. In this study it was hypothesized that curcumin suppresses the activity of major pro-inflammatory substances as well as reducing the ability of platelets clumping together to form blood clots.

The anti-inflammatory effects of curcumin are not limited to the joints. Curcumin demonstrates potent anti-inflammatory effects in many different parts of the body including the joints, the internal organs, the teeth & gums, the cardiovascular system and the brain.

The Heart and Cardiovascular System

The single greatest negative health consequence of the modern-day inflammation epidemic is the incidence of heart disease. Many people do not realize that inflammation of the cardiovascular system is behind the majority of incidences of heart disease. For a long time, cholesterol has been the 'bad guy' – and unfairly so. Blaming cholesterol for heart disease is like blaming a fireman for a fire. The cholesterol is just there to put out the fire (inflammation). Exactly what is causing the inflammation is beyond the scope of this guide (hint – the modern diet based on Omega 6-rich grains and polyunsaturated vegetable oils like soybean oil – yes – the oils that you have been told are 'healthy').

However irrespective of what is causing inflamed arteries, curcumin is proving to be a potent treatment for arterial inflammation alongside other substances such as Omega 3 fatty acids. Various studies have shown that curcumin is able to suppress or reverse the effects of certain pro-inflammatory substances in the body such as cytokines.

Incredibly, the suppression of pro-inflammatory substances is not curcumin's only mechanism for helping prevent cardiovascular disease. Curcumin also functions as a potent antioxidant, preventing oxidative damage to the cardiovascular system. One of the ways it does this is by increasing levels of glutathione, which is the body's 'master antioxidant'. The human body uses glutathione for various repair jobs and to recycle other antioxidants such as vitamin C. It is a lack of glutathione which is behind certain cases of liver failure as the liver uses glutathione to detoxify itself from harmful substances - such as an overdose of certain drugs such as acetaminophen/paracetamol

(Tylenol, Panadol). Unfortunately you can't supplement glutathione as it doesn't survive digestion, however you can take certain supplements to increase levels. The only supplements which increase glutathione levels in any meaningful way are N-acetylcysteine, alpha lipoic acid, silymarin and yes, you guessed it, curcumin.

That alone would be impressive enough however as well as the above, curcumin not only decreases blood pressure but has also been shown to decrease serum triglycerides, total cholesterol and LDL cholesterol. Curcumin has been shown to reduce the build-up of fatty plaque which can block arteries and cause heart disease. This, along with the fact that it also reduces blood clotting, means that curcumin has the potential to dramatically decrease overall heart disease risk.

Cancer

Curcumin first came to the attention of scientists due to its perceived anti-cancer benefits. Naturally, any whiff of a 'cure for cancer' attracts a lot of both attention and research dollars so this is the area where a lot of work is already under way.

Excitingly, curcumin has already been shown to inhibit the growth of certain tumours, prevent them from metastasizing (spreading) and has even been shown to kill certain cancers.

Most research into curcumin's ability to fight cancer has centred on its ability to induce *apoptosis* in cancer cells. Apoptosis is your body's natural process of programmed cell death. Cancer occurs when this process is turned off in rogue cells which then divide and spread in an uncontrolled fashion. Curcumin appears to possess the ability to induce this programmed cell death in cancer cells, so is consequently the subject of considerable interest at present. Curcumin has been shown to possess this ability in terms of colon, liver and stomach cancer. However unfortunately curcumin has not been able to demonstrate any effectiveness in treating breast cancer. Also, unfortunately oral curcumin supplementation has not demonstrated any ability to prevent cancer, despite the large body of anecdotal reports to the contrary. Therefore, whilst there are clear theoretical mechanisms through which curcumin should confer a degree of protection against cancer, this has not yet been borne out in clinical trials.

Whilst there are certain studies supporting the use in human cancer patients, it must be pointed out that to date we are really only at the mice/rodent stage of testing. However the results of these tests have been largely positive.

Another area of interest in the fight against cancer is that curcumin works synergistically with chemotherapy drugs such as paclitaxel. This is interesting as it potentially negates one of my chief concerns with cancer patients taking supplements – whether the supplements may interfere with their conventional treatment. Certain supplements taken while suffering from certain cancers or while receiving treatment can actually encourage the spread of the cancer, so every supplement that a cancer patient is taking needs to be cleared with his or her doctor – right down to good old vitamin C.

The Brain & Nervous System

The other part of the body where curcumin is garnering strong interest is the brain and nervous system. Again, there appear to be a wide range of diseases and disorders where curcumin appears to have great promise.

A recent study showed clear benefit for treating Alzheimer's patients with curcumin. As well as reducing inflammation, curcumin appears to modulate the beta-amyloid plaque responsible for this disease.

It is the anti-inflammatory aspect which is also behind curcumin's recent rise as a potential future depression treatment. The other day I was listening to the radio in my car when there was an interview with a scientist from a local prestigious hospital here in my hometown. He was invited on the show because they were conducting a study into a new hope for treating depression. Surprise, surprise – turns out it was curcumin! The scientist indicated that they had already seen positive results.

How does curcumin treat depression? This is where it gets interesting as it attacks depression from several different angles. Firstly, it reduces inflammation. Increasingly, many researchers are starting to believe that inflammation and depression are closely linked. It has long been known that depressed people have higher levels of certain pro-inflammatory biomarkers. We still don't know whether it is causation or correlation however there is a definite link. Curcumin, by reducing inflammation, appears to act as a potent antidepressant.

Secondly, curcumin functions as a Monoamine Oxidase Inhibitor (MAOI).

MAOIs inhibit the action of an enzyme which breaks down serotonin, norepinephrine and dopamine in your brain, thereby increasing levels. You may remember MAOIs from the 'good old days' of psychiatry – before the advent of SSRIs like Prozac, MAOIs (and another class called "tricyclics") were the only options for treating depression. However MAOIs were quite dangerous if you consumed certain foods like aged cheese or red wine. Fortunately, curcumin is known as a "reversible MAOI" so doesn't have the same health risks.

Curcumin also increases levels of a valuable substance in the brain called Brain Derived Neurotrophic Factor ("BDNF"). BDNF is kind of like fertilizer for the brain – stimulating the growth of neurons. You may have heard that cardio exercise has been found to be an excellent treatment for depression. One of the reasons for this is thought to be that exercise is a potent stimulator of BDNF levels. In depressed patients, often a smaller hippocampus is seen. The hippocampus, as well as being strongly related to memory and context detection, is strongly implicated in depression also. It is thought that by increasing levels of BDNF, you are helping your brain to 'regrow' after a bout of depression.

Antioxidant ability

As I extensively detail in my anti-aging book The Methuselah Project, under the "oxidative stress" theory of aging, the ability of a substance to scavenge reactive oxygen species is vital for preventing premature aging. In vitro (test tube), curcumin has been shown to act as a potent antioxidant. However, as with the various other benefits of curcumin, this activity is highly dependent on the form of curcumin ingested. If you just consume turmeric in its natural form, it is unclear how much antioxidant benefit you are receiving due to its terribly low bioavailability.

Despite this, some studies have found that curcumin inhibits oxidative DNA damage in malignant colorectal tissue. It has been theorized that this may be either due to curcumin's ability to inhibit inflammation or due to the ability of curcumin to increase levels of glutathione (Your body's master antioxidant).

Diabetes

Researchers are slowly beginning to think that inflammation is intrinsically

related to the onset of type 2 diabetes and therefore, curcumin, with its anti-inflammatory properties, should be of interest.

Indeed, a recent Egyptian study in mice, showed that curcumin treated various aspects of type 2 diabetes including hyperglycemia (high blood sugar) and glucose intolerance. Curcumin also reduced markers of diabetic retinopathy (damage to a part of the eye causes by diabetes).

Not only does this show curcumin's promise in treating diabetes but also highlights the inflammatory nature of high sugar levels in the body.

The Kidneys

Another recent study also showed the curcumin has a protective effect on the kidneys – particularly in terms of reversing acute damage to the kidneys. Curcumin also significantly reduced pro-inflammatory markers associated with chronic kidney disease.

The Lungs

Another study demonstrated that curcumin also has beneficial effects on the lungs. Again, one of the primary mechanisms appears to be via reducing inflammation. Results are preliminary at this stage however in the future, curcumin could be a possible treatment for chronic lung disease or cystic fibrosis.

Gastrointestinal System

Recent studies have also backed up age-old Indian Ayurvedic recommendations to use curcumin for digestive upsets. A recent study showed that curcumin reduced the severity of diarrhea, bloating, abdominal cramps and other aspects of Irritable Bowel Syndrome (IBS) – an extremely common disorder in the general population.

Research has shown that curcumin is effective for the treatment of dyspepsia, which is characterized by a painful and inflamed gastrointestinal system. Naturally, curcumin is effective partially due to its anti-inflammatory properties, however scientists also found that curcumin stimulated the production of bile, which assists in the digestion of fats. The evidence has been sufficiently strong for the German Commission E (the scientific advisory board for Germany's equivalent of the Food & Drug

Administration) to approves turmeric as a treatment for gastrointestinal problems.

Curcumin has also been studied as a treatment for the debilitating condition Ulcerative Colitis which is characterized by inflammation and ulcers of the digestive tract. In a double blind placebo-controlled study, those who took curcumin had a lower relapse rate than their counterparts who were only taking a placebo.

The Reproductive System

Another study showed that curcumin increased sperm motility, meaning, that it increased the sperm's ability waggle its tail and get to the egg to fertilize it.

Is Curcumin Safe?

Curcumin has stood up to a massive amount of testing to confirm its safety. In the Unites States, curcumin is designated *generally recognised as safe* ("GRAS") by the FDA.

Amazingly, curcumin has demonstrated no obvious toxic effects on the body. On the contrary, several studies have shown that administration of curcumin reduces the toxicity of other poisons such as arsenic.

If I was forced to imagine a potential downside, it could be in cases where some degree of inflammation is required and curcumin suppresses this. However, this scenario would be exceedingly rare. The human inflammation system is an 'over-reacting' system. This means that it usually creates inflammation far in excess of what is required, as, in evolutionary terms, this would be the better outcome for the body. As curcumin only reduces inflammation and doesn't eliminate it altogether, I would still think that there would be very few occasions where curcumin could be dangerous due to its anti-inflammatory properties.

As curcumin reduces clotting, it would be advisable to avoid curcumin leading up to any surgery, as the body's clotting ability is vital after any major procedure.

The only other precautions regarding curcumin are for people with gallstones to avoid curcumin as a study found the potential to worsen this condition.

As with any supplement, I would avoid using curcumin if you are pregnant. When pregnant, only take supplements specifically recommended by your doctor, such as folic acid or Omega 3.

Specific results of other clinical trials

The therapeutic benefits of curcumin were detailed in an overview published in the journal *Advances in Experimental Medicine & Biology* in 2007, stating that "*Curcumin has been shown to exhibit antioxidant, anti-inflammatory, antiviral, antibacterial, antifungal, and anticancer activities and thus has a potential against various malignant diseases, diabetes, allergies, arthritis, Alzheimer's disease and other chronic illnesses.*"

Researchers at the Medical University Graz in Austria revealed that curcumin as a compound delays the onset of liver damage caused by cirrhosis.

Further research done by scientists at the University of South Dakota discovered that using curcumin for pretreatment cause cancer cells to become more vulnerable to chemotherapy and radiotherapy.

Another clinical research study at the University of Texas on rodents revealed that curcumin prevents the growth melanoma, a deadly form of skin cancer, while at the same time inhibiting the spread of breast cancer into the lungs.

If you would like further proof of just how seriously the medical establishment are taking curcumin and its potential, here is a list of recently completed and ongoing trials into the effectiveness of curcumin to treat a range of conditions from psoriasis to cancer (Sourced from - http://www.curcuminresearch.org/)

Phase 1

Phase-I

Phase 1

Rheumatoid arthritis

Postoperative inflammation

External cancerous lesions

Cardiovascular

Atherosclerosis

HIV

Gall bladder function

Gall bladder function
Chronic anterior uveitis
Idiopathic Inflammation
Orbital pseudotumors
Psoriasis
Psoriasis
Colorectal cancer
Colorectal cancer
Irritable bowel syndrome
Liver metastasis of CRC
Colorectal cancer
Cadaveric renal transplantation
Tropical pancreatitis
Ulcerative proctitis
Crohn's disease
Ulcerative colitis
Familial adenomatous polyposis
Cognitive function
Prostatic intra-epithelial neoplasia (PIN)
Helicobacter pylori infection
Colorectal cancer
Colon cancer
Colorectal cancer
Aberrant crypt foci Prevention
Pancreatic cancer
Pancreatic cancer
Pharmacokinetics Treatment
Myelodysplactic syndrome

Alzheimer's disease
Alzheimer's disease
Multiple myeloma
Myelodysplastic syndrome
Psoriasis
Epilepsy
Advanced HNSCC
HNSCC
Cervical cancer
Oral premalignant lesions
Oral premalignant lesions
Oral leukoplakia
Gall bladder cancer
Pancreatic cancer
Ulcerative colitis
Barretts Metaplasia

Research summary

As mentioned previously, curcumin has been extensively researched in clinical trials, and this activity has recently started to accelerate as interest in curcumin booms within pharmaceutical companies and research bodies. There are thousands of references and citations in Pubmed, however I thought it may be instructive to mention a few selected studies and clinical reviews, with the key findings in layman's terms, as sometimes these studies are written in gobbledygook research-speak –

Stress changes the spatial arrangement of neurons and glial cells of medial prefrontal cortex and sertraline andcurcumin prevent it

What it found – Stress messes with your brain cells. Curcumin (and the SSRI sertraline, by the way) were found to prevent this.

The Multifaceted Role of Curcumin in Cancer Prevention and Treatment

What it found – "Curcumin has been found to suppress initiation, progression, and metastasis of a variety of tumors". It does this by suppressing various inflammatory compounds and by causing apoptosis (programmed cell death) in cancer cells.

Curcumin improves neural function after spinal cord injury by the joint inhibition of the intracellular and extracellular components of glial scar

What it found – Curcumin helps promote the restoration of brain function after spinal cord injury.

Transdermal delivery of curcumin via microemulsion

What it found – This is just looking at the ability of various curcumin formulations to be absorbed by the skin. The results are not the interesting part. I wanted to include this to point out that researchers are already looking at novel delivery methods to overcome curcumin's poor bioavailability.

Effect of curcumin supplementation on physiological fatigue and physical performance in mice

What it found – This is a Chinese study. You can tell because the abstract is much less circumspect than a Western researcher would write. They found that *"CCM (curcumin) supplementation may have a wide spectrum of*

bioactivities for promoting health, improving exercise performance and preventing fatigue."

Curcumin Suppresses the Production of Pro-inflammatory Cytokine Interleukin-18 in Lipopolysaccharide Stimulated Murine Macrophage-Like Cells

What it found – The conclusion of this one is relatively straight-forward – *"Our findings suggest that curcumin may be used as a potential therapeutic agent for the treatment of inflammatory diseases."*

Curcumin as a putative antidepressant

What it found – The authors of this clinical review found that the trials to date have shown that curcumin may have benefit as an antidepressant, however that the effects are comparatively modest. I would agree with this conclusion.

To summarise, which conditions can curcumin potentially help treat?

The list of potential conditions in which curcumin may be helpful is long, however here are some of the main applications for curcumin -

- Rheumatoid & osteoarthritis
- Cancer
- Liver damage
- High cholesterol
- High blood pressure
- Depression
- Gastrointestinal disorders such as Ulcerative Colitis and Irritable Bowel Syndrome
- Diabetes

Drug Interactions

The general rule given to all patients is that you should take the time to consult a physician before taking any supplements. Curcumin should not be taken along with blood thinners such as Warfarin and certain drugs used to treat diabetes, high cholesterol, stomach ulcers or high blood pressure.

Interaction with Other Herbal Supplements

Again, it is advised to avoid taking curcumin along with other supplements which suppress clotting. These include ginger, ginseng and red clover.

Available Forms

Turmeric is available in three forms namely: capsules which contain the powder, fluid extract and tincture.

Often other substances are added to curcumin supplements for certain reasons. Bromelain is sometimes added to increase the anti-inflammatory effect, however the majority of additives are included to increase bioavailability (the ability of your body to use the curcumin you take). Certain substances such as piperine increase the bioavailablity of curcumin dramatically and thereby increasing the effectiveness of the dose you take. Curcumin has low bioavailability so if you are consuming, say, an Indian curry, your body is generally unable to take up much of the curcumin.

This point bears repeating – If the curcumin in the supplement you take is not "optimised", you are unlikely to absorb enough to make a difference. At this point, there are really only three forms of curcumin I can recommend – BCM-95, Longvida and Meriva. Each of these proprietary products has undergone modification to improve bioavailability. Longvida and Meriva use phospholipids to improve absorption and BCM-95 combines curcumin with a form of lipid to improve fat solubility.

In addition to these three, there is a new kid on the block known as Theracurmin, which achieves the same goal by creating super-fine particles of curcumin to improve solubility.

So which of these is "the best"? This is difficult to answer due to the lack of trials where these are all pitched against each other. Each of these

undoubtedly improves absorption dramatically with reference to unmodified curcumin, however it is unclear how they perform against each other. The only data I have seen, shows Theracurmin performs much better than the other forms, however (surprise, surprise) it is published by the creators of Theracurmin, so should be treated with scepticism until independent third party data emerges.

I have used all of these except Longvida (which I plan to trial on myself next) and have not experienced any difference in effects, however I should point out that much of what curcumin does is not readily sensed in the short term. An exception would be arthritic problems, where a decrease in pain would slowly become apparent, however I don't have arthritis so can't report specifically on this.

Of all four, at this stage, I believe Meriva has the weakest evidence and potentially the poorest bioavailability, however it would still be better than straight, un-optimised curcumin.

One to keep an eye out for is NovaSOL, which looks like being the next competitor in the optimised curcumin space. As of yet, it is not commercially available however that may change soon, so I will update this when more information emerges.

A fascinating real-world anecdote

Recently I received the following rather touching and intriguing email, which, with the permission of the sender, I am including below. These kinds of emails are interesting to read, in the sense that it can point our understanding of certain compounds or illnesses in new directions.

"I loved your guide on Curcumin and your book the Methuselah project! My friend who is fighting prostate cancer is now taking Curcumin, my son who may have IBS, my mother's arthritis and my husband for epilepsy - I am taking it simply as a control but have noticed improvements in circulation and skin tone. I've read that Canada has the strictest supplement manufacturing rules, along with New Zealand, so we are fortunate in that regard. BCM-95 is working very well for us.

*I love PubMed and edu.Harvard, Google Scholar in general. In 1997 *name removed* underwent a temporal lobectomy - brain surgery to alleviate his seizures. At the time, we were told that he had a 60% chance of improvement, 30% stayed the same and so on with only 2% getting worse. This was based on the fact they saw a 'focus' that they could excise. Then in post-op, the surgeon tells us it turned out to be Dysplasia - malformation which would have occurred in the third trimester when he was a fetus (*name removed* did not have epilepsy growing up and only 'came down with it' at age 22 when our son was two years old). I found out years later through Google Scholar that Dysplasia has significantly different outcomes from surgery - the opposite of what happens with a defined focus, Dysplasia is three dimensional and not a clean excise scenario. Basically *name removed* was far worse after surgery than before - up to five bad seizures a day instead of two or three in a year; he had to give up on a fourteen year career as a journalist.*

*After trying all the possible AEDs, before and after surgery, the neurologists called it 'intractable' epilepsy and waited for new pharmaceuticals to emerge. After a few years of that, this past summer they proposed to send him back to surgery without a good explanation of how it would be more appropriate this time than last time. We asked them about the new anti-inflammatory implications for epilepsy, but they wanted *name removed* to try surgery again and if that didn't work then they would 'look into' anti inflammatories.*

**name removed* unsurprisingly refused to pursue a surgical option.*

*In the intervening years since *name removed*'s original surgery, the Internet had exploded and information was readily available for us to research anti inflammatories related to brain function. I soon stumbled on Curcumin and GSE. Study after study pointed to fantastic results if only bioavailability could be addressed. Then BCM-95 emerged as one of the most bioavailable forms - I like that it uses turmeric oil in the lipid formulation, thus including all the curcuminoids available in turmeric.*

*Here is a synopsis of *name removed*'s treatment:*

1) Neurologists have prescribed these AEDs - Vimpat 300mg/d, Lamictal 400mg/d and Lyrica 200mg/d. These definitely help ameliorate seizures though at least one of them is contributing to brain inflammation. And they have had no effect on cluster-seizures, which were new since the surgery. It's terrible to witness seizure after seizure every couple hours.

*2) Neurologists have also prescribed Cannabis - 6g/day: *name removed* uses a vaporiser and cooks the cannabis twice, the second time yields pure cannabinoids as the THC is the first to burn off; so he gets as much benefit as possible out of each gram. This helps a lot and there have been times *name removed* would not be able to get out of bed without cannabis.*

*3) We let the neurologists know we are trying BCM-95 Curcumin as an anti-inflammatory, GSE as an anti-amyloid and Vitamin D to replace what is lost in metabolizing the AEDs. We started with Vitamin D, then added GSE, working up to a therapeutic dose. Curcumin was a 'take with meal' adjunct and only when we noticed how much better *name removed* was doing on the days he took Curcumin that we implemented a therapeutic dose. The effect of these is to give me back the essential *name removed* - my husband is back to his pre-operative self since taking Curcumin. Sense of humour, solicitousness of me :-) all the intangibles that matter in a person.*

*4) Omega-3 - *name removed* had actually been taking Omega-3 for many years without measurable improvement in seizures. Then we switched to dining on salmon once a week - that definitely had more of an effect. I work from home most days, and serve *name removed* salmon the night before a day I go in to the office, so now I feel safe leaving the house in the morning when his seizures are most likely to occur.*

*5) 3% DHA milk - *name removed* drinks a lot of milk so this was a no brainer. They feed the cows flax and they do all the work of converting it to DHA.*

*6) Whipped cream - then this month I noticed *name removed* hosted Dad's 90th birthday party with no seizure activity during or after (*name removed* missed Christmas morning and New Year's Day due to seizures as he does practically every other year) - go to see he'd also emptied a can of whipped cream over the same timeframe. Cans of whipped cream take up residence in the fridge as of this month :-)*

*7) Oatmeal porridge - another no brainer, some days after many seizures, it's all *name removed* can get down. But hopefully those days are gone for good.*

*8) No pasta - we do not cut out all gluten by any means (read *name removed* likes baked goods :-) but after not eating pasta for some time we found it definitely triggered seizures - so we switched to rice pasta; the fact it cooks in half the time is a bonus.*

*9) Chronopharmacology - some seizure prone people have a tendency for their seizures to be affected by circadian rhythm. *name removed*'s seizures occur soon after waking up - likely because his system works hard all night to clear his body of toxins (AEDs). Research shows that many of these 30% of epileptics are helped by doubling the AED dose at night compared to the day - with peak drug saturation occurring at noon in such people. This was the last piece of the puzzle seemingly.*

All in all, these are the takeaways: individual AEDs do have profiles related to specific types of seizures; however phytochemical anti inflammatories should benefit all types of seizures since inflammation is such a big part of seizure etiology - with AEDs and the seizures themselves adding to brain inflammation. Phytochemicals such as GSE and Curcumin are also very safe for long term use. (I've checked the research on drug interactions and they seem safe from that viewpoint too.)

Epilepsy essentially means 'unexplained seizure activity' - and the more you have, the more you're likely to have. Curcumin, GSE, DHA milk, whipped cream and chronopharmacology have done what AEDs could not do on their own. I wish neurologists would take the time to research and recommend

these types of approaches more often. That's what I loved about your books - lovely storyline of the individual research I'd read up.

Conclusion

As I mentioned in the introduction, curcumin for me is one of the 'blockbuster' supplements to come out in recent time. Many herbs and supplements are either ineffective or too weak in comparison to any pharmaceutical options to be viable as treatments. Curcumin is no such supplement. Its effects are surprisingly potent – especially in the area of inflammation reduction. I believe inflammation is one of the largely undiagnosed epidemics of recent times, causing anything from cancer to heart disease. If you think that you may have issue with inflammation, before you start curcumin I strongly recommend you ask your doctor for a "C-Reactive Protein" test, which gives you an idea of the level of systemic inflammation in your body. If your levels are high, curcumin can be one of your most effective options for getting your inflammation under control.

There are not too many supplements out there that have positive effects on the brain, heart, liver, kidneys, stomach, joints and blood sugar. Curcumin is one such supplement.
