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Message: from the President of BioNatural Healing College (BNHC)



Greetings!

First and foremost, I am extremely thankful to Almighty God for granting me this opportunity to present the BioNatural Healing College (BNHC), BNHC E-Magazine to our dear readers. Also, I would like to thank you all, especially those that are the dear readers that send us their valuable feedback and support. The information in this magazine is solely for educational purposes.

We hope this BNHC- E-Magazine will be useful to you based on the contribution and dedication of many other respected researchers and colleagues around the globe. Thanking and wishing you all have the best health and prosperous life.

Best regards,

Dr. Nadir Sidiqi Ph.D.



BioNatural Healing College

BioNatural Healing College Hope you and your loved ones are staying healthy and safe during this pandemic (COVID-19). What we need to do especially during this uncertain time as follows:

1. Vaccination, Sanitation and Isolation from Social Interaction.
2. Positive Attitude will Increase the Power of Mind and Immune System.
3. Healthy Diet and Drink Plenty of Water (Honey with green tea, vitamin D₃, vitamin C), Get Enough Sleep.
4. Exercise (any type of physical activity for 30 minutes daily).
5. A Lot of Prayer to Almighty God (be patient, calm).

May Almighty God bless, guide us all (Humanity) and grant us the ability to find a cure for the elimination of COVID-19.

Understanding the Inflammation and Curcumin: An Approach to Health

By: Dr. Nadir Sidiqi Ph.D.

Introduction

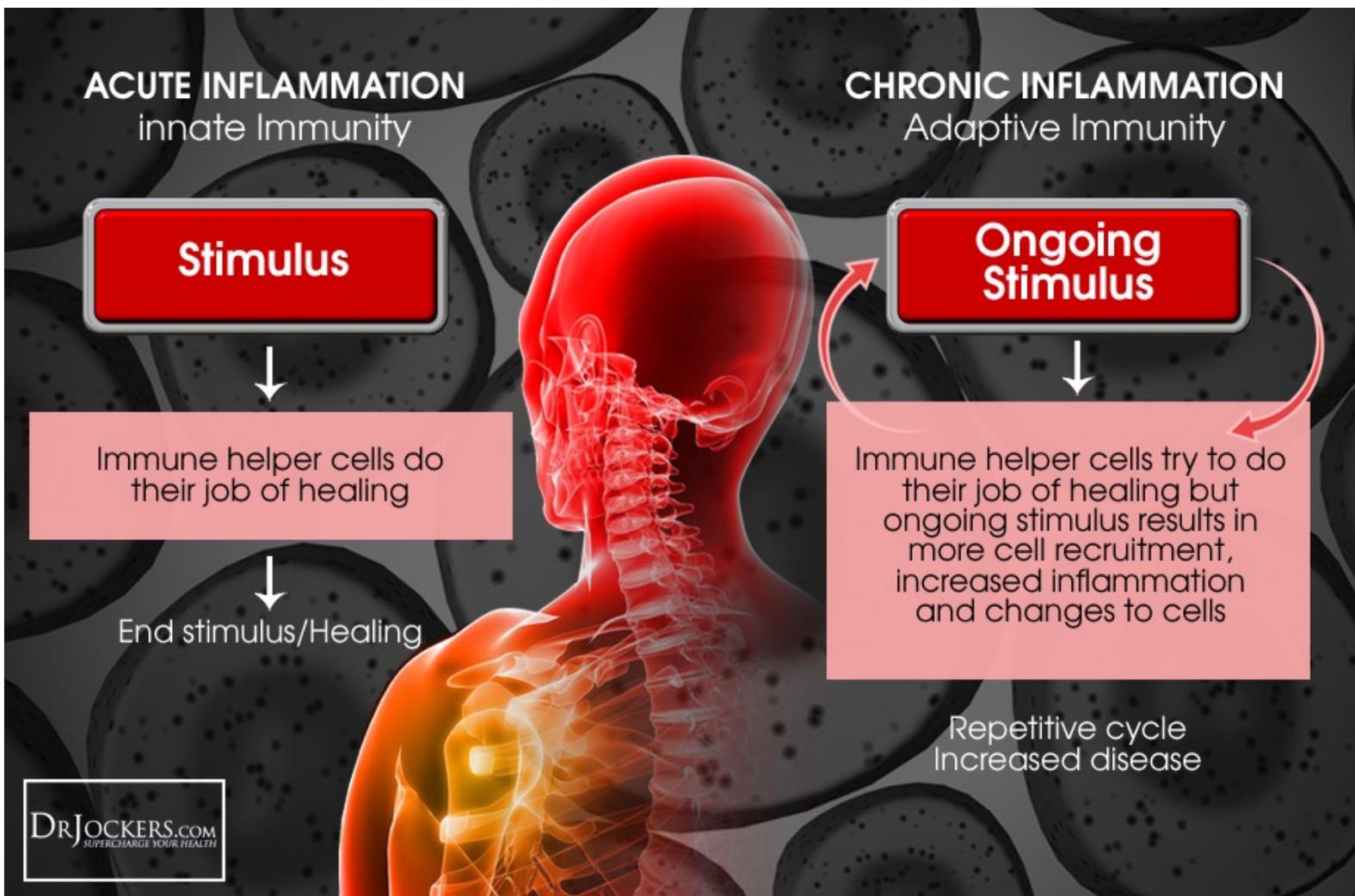
The human body in certain situations faces unexpected health problems, due to fever, cold and congestion, body pains, infections, digestive symptoms, heart disease, shortness of breath, allergies, arteritis, mood disorders, headaches, and much more are linked directly or indirectly to the inflammation. Moreover, the human body has an amazing ability with respect to inflammation that reacts in certain conditions to protect itself from harmful stimuli, including irritants, damaged cells, or pathogens. It is important to understand and distinguish between inflammation and infection. Inflammation whereas occurs when the human body fights to remove those invaders. While infection occurs when bacteria, fungi, viruses, or plasmodium invade the body. However, there are certain foods, herbs, and supplements, that human eats play important role in the prevention of inflammation, while other certain foods that consumers will initiate the development of inflammatory diseases. For example, red meat, high-fat dairy products, and unhealthy fat (saturated and trans-fat)¹. Indeed, consuming what type of foods and lifestyle is important in the quality of health and prevention of inflammation such as curcumin which will be the topic of this study. The author Sunil Pai MD “An Inflammation Nation (2016)” described in his book that inflammation is a fundamental pathologic process. It consists of a dynamic complex of cellular changes that are visible only under a microscope. These changes include cellular infiltration and mediator release, which occur in the affected blood vessels and adjacent tissues in response to an injury or abnormal stimulation caused by a physical, chemical, or biological agent.

Let us discuss the types of inflammatory diseases according to Melanie Finley, the author of “Fighting Inflammatory Disease: Inflammation Explained + Anti-Inflammatory Recipes (2017)”.

Types: Inflammatory diseases and oxidative stress: According to Harvard Health Publishing Harvard Medical School “What is inflammation: by Deepak Bhat M.D., M.PH.” often time people are concerned that inflammation is dangerous, especially in terms of contributing to heart disease. What exactly is inflammation, and how does a person know if he or she has it? The answer is that think of inflammation as the body’s natural response to protect itself against harm. There are two types: acute and chronic. Acute type, for example, occurs when a person bangs his knee or cuts his finger, the immune system dispatches an army of white blood cells to surround and protect the area, creating visible redness and swelling. The process works similarly if the human body has an infection like flu or pneumonia. Therefore, in these situations, inflammation is essential without it, injuries could fester, and simple infections could be deadly. However, chronic inflammation can also occur in response to other unwanted substances in the body, such as toxins from cigarette smoke or an excess of fat cells (especially fat in the belly area). Inside arteries, inflammation helps kick off atherosclerosis the buildup of fatty, cholesterol-rich plaque. As such as the body perceives this plaque as abnormal and foreign, so it attempts to wall off the plaque from the flowing blood. But if that wall breaks down, the plaque may rupture. The contents then mingle with blood, forming a clot that blocks blood flow.

These clots are responsible for most heart attacks and strokes. A simple blood test called the hs-CRP test can measure C-reactive protein (CRP), which is a marker for inflammation, including arterial inflammation. Nearly 20 years ago, Harvard researchers found that men with higher CRP levels, approximately 2 milligrams per liter (mg/L) or greater had three times the risk of heart attack and twice the risk of stroke as men with little or no chronic inflammation. They also found that people with the greatest degree of arterial inflammation benefited the most from aspirin, a drug that helps prevent blood clots and damps down inflammation.

However, many doctors don't routinely recommend the hs-CRP test because, for the most part, they believe the results would not change a person's treatment. If a young and healthy and at low risk for heart disease, there is no evidence that knowing a person CRP level is helpful. If a person has heart disease, should already be taking medications that lower the heart attack risk, such as a cholesterol-lowering statin. Like aspirin, statins also appear to work particularly well in people with arterial inflammation (<https://www.health.harvard.edu/heart-disease-overview/ask-the-doctor-what-is-inflammation>). Inflammation and oxidative stress have a strong relationship. The negative impact of oxidative stress that induce cells and prevent them from functioning normally makes the environment for the formation of inflammation. Recently, research emphasis on antioxidants (substances derived from fruits and vegetables that create a protective barrier against oxidative stress).



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Chronic inflammation and digestive system: The digestive system does not only play in the digestion, absorption, and excretion of waste food particles but also plays and is connected to the other systems of the body that are significantly important in the health and well-being of a person. It's like a domino game. Two-thirds of the body's immune system is sustained by the way the gastrointestinal tract works, and yet the digestive system is often the last place where the cause of the inflammatory disease is sought. Further, research indicates that gastrointestinal disorders, diarrhea, constipation, bloating flatulence, abdominal pain, stomach burning, and gastroesophageal reflux are some of the first signs of digestive tract inflammation.

It is important to understand that the digestive system plays a crucial function in the body to eliminate toxins as well as resist harmful pathogens such as bacteria, viruses, fungi, and other related inflammatory agents. For instance, inflammatory bowel disease (Chron disease, ulcero-hemorrhagic-rectocolitis) occurs when the digestive system clogs under the burden of factors that aggravate bad habits, eating, sedentariness, etc.²

Inflammation and nutrition: The right diet selection is an important factor in the prevention of inflammation. It is important to note that not all food products have negative effects. However, examples of food that enhance in development of inflammation are white sugar, food additives, red meat, fast food, white pasta, white flour, white rice, salt, and many other processing foods. Avoiding these foods is important in maintaining good health and preventing inflammation. It is important to clarify that for most people, eating high in carbohydrates and low in protein is one that causes the development of inflammatory diseases.

Inflammation and environmental factors: Adverse environmental factors such as toxins from the food, and pollutant chemicals (pesticides, synthetic materials) from the air and water are significantly important in the development of inflammatory diseases. For example, headache is one of the common types of inflammation, which is temporary.

Inflammation and STD (sexually transmitted diseases): Researchers blamed that sexually transmitted diseases may induce inflammatory diseases. For example, STDs can cause inflammation or infection of upper reproductive organs in women, (pelvic inflammatory disease, Bacterial vaginosis is also a cause that can cause pelvic inflammatory disease).

Inflammation and menopause: Aging is a critical issue among women as well as men. However, around menopause, the risk of osteoporosis is higher because of changes occurring at the hormonal level. For instance, estrogen, progesterone, and testosterone have varying levels, which can lead to apathy and inflammation of the bone system.

Inflammation and its root causes: As pointed out by Melanie Finley, in his book, “Fighting Inflammatory Disease: Inflammation Explained + Anti-Inflammatory Recipes (2017)”.

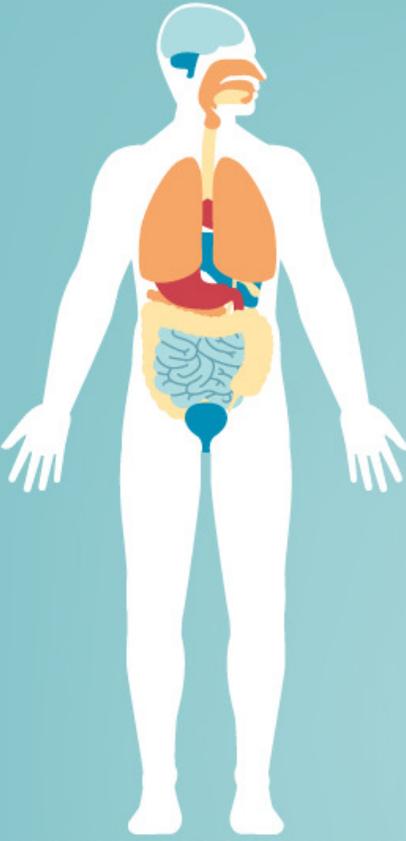
- Low level of glutathione (the peptide that contains amino acids and plays an important role in the oxide-reduction reaction)
- Low levels of vitamin D and antioxidant substances
- A high level of malondialdehyde (a marker of oxidative stress that is formed when fats are oxidized)
- Increased levels of oxidized glutathione
- High levels of fructosamine (are compounds that result from glycation reactions between a sugar and a primary amine)
- High levels of homocysteine (is a non-proteinogenic α -amino acid.)
- High level of peroxidation (is the oxidative degradation of lipids)
- Isoprostane (makers of oxidative stress that are formed when fats are oxidized)

As mentioned above consuming certain food types are unhealthy and helps in the development of inflammation, however, other food types or medicinal plants will help in the prevention and treatment of inflammation. As such, a review article by Yan He et al., “Curcumin, Inflammation, and Chronic Disease: How are They Linked? (2015)”. Inflammation is an adaptive physiological response induced by deleterious circumstances including infection and tissue injuries. Studies have suggested that inflammation is the product of complex series of responses triggered by the immune system. Inflammation also causes a wide range of physiological and pathological morbidities³. Researchers are agreed that inflammation is associated with alteration of signaling pathways, which results in increased levels of inflammatory markers, lipid peroxides, and free radicals.

Further, a report stated that hypothesized that inflammation plays a central role in the wound healing process and in combating infection. Two stages of inflammation exist such as acute and chronic inflammation. Acute inflammation is an initial stage of inflammation (innate immunity) mediated through the activation of the immune system, which persists only for a short time and is usually beneficial for the host. Chronic inflammation lasts for a longer time, the second stage of inflammation (chronic inflammation) starts and may initialize various chronic diseases such as obesity, diabetes, arthritis, pancreatitis, cardiovascular, neurodegenerative, and metabolic diseases, as well as certain types of cancer.⁴ So, far it has been mentioned in brief about the inflammation and diseases relationship, however, it is necessary to explore the significant role of curcumin in the prevention of inflammatory diseases.

How Inflammation Affects the Body?

"Inflammation is at the root of practically all known chronic health conditions"



 <p>BRAIN</p> <p>Pro-inflammatory cytokines cause autoimmune reactions in the brain, which can lead to depression, autism, poor memory, Alzheimer's disease and MS.</p>	 <p>THYROID</p> <p>Autoimmunity as a result of inflammation can reduce total thyroid receptor count and disrupts thyroid hormone function.</p>
 <p>CARDIOVASCULAR</p> <p>Inflammation in the heart & arterial & venous walls contributes to heart disease, strokes, high blood sugar (diabetes) and anemia.</p>	 <p>LUNGS</p> <p>Inflammation induces autoimmune reactions against the linings of airways. Can result in allergies or asthma.</p>
 <p>MUSCLE</p> <p>Inflammatory cytokines can cause muscle pain and weakness. Can manifest as carpal tunnel syndrome, or polymyalgia rheumatica, to name a few.</p>	 <p>GI TRACT</p> <p>Chronic inflammation damages our intestinal lining and can result in issues like GERD, Chron's disease and Celiac disease.</p>
 <p>BONES</p> <p>Inflammation interferes with the body's natural ability to repair bone mass, increasing the number of fractures & leading to conditions like osteoporosis.</p>	 <p>KIDNEYS</p> <p>Inflammatory cytokines restrict blood flow to the kidneys. Complications like edema, hypertension, nephritis & kidney failure can result.</p>
 <p>SKIN</p> <p>Chronic inflammation compromises the liver & kidneys, resulting in rashes, dermatitis, eczema, acne, psoriasis, wrinkles & fine lines.</p>	 <p>LIVER</p> <p>Build-up of inflammation leads to an enlarged liver or fatty liver disease. Increased toxic load build-up in the body.</p>

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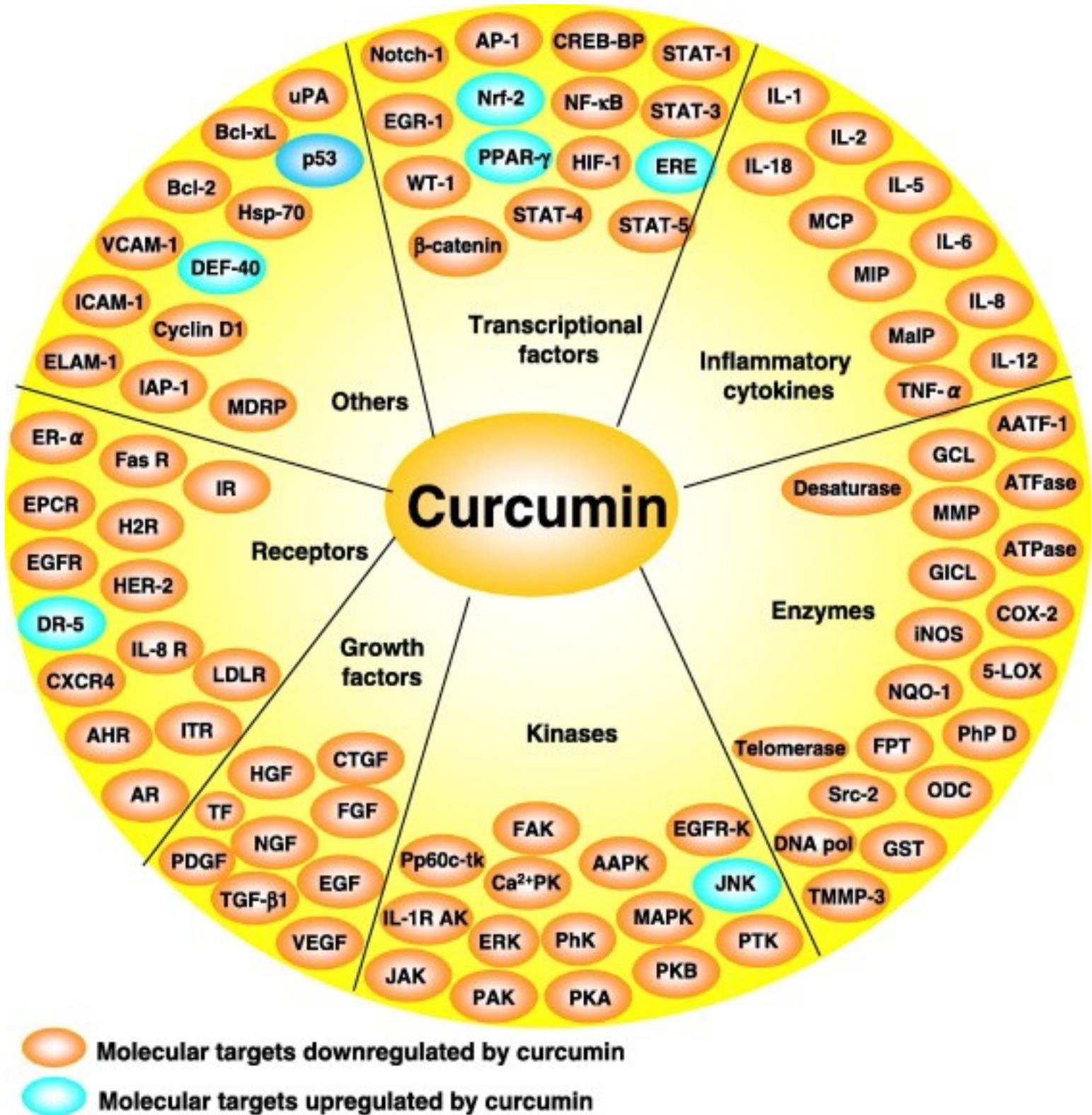
Anti-inflammation and curcumin association: Turmeric (*Curcuma longa*) is a rhizomatous herbaceous perennial plant of the ginger family Zingiberaceae. Turmeric (*Curcuma longa*) has a long traditional history as a medicinal herb in the treatment of inflammatory conditions in China, India, and Southeast Asia. Turmeric constituents include three curcuminoids (curcumin, desmethoxycurcumin, and bisdemethoxycurcumin). Over 7000 studies have shown that curcumin has strong anti-oxidation and anti-inflammatory activities based on the molecular basis of curcumin's attributed antioxidant, anti-inflammatory, anti-bacterial, anti-apoptosis, anti-cancer, and other related activities.

For example, the mechanism by which persistent oxidative stress can lead to chronic inflammation, which in turn could cause many chronic diseases including cardiovascular diseases, neurological diseases, pulmonary diseases, diabetes, and cancers⁵. Curcumin has been used as a remedy for the prevention and treatment of many organ and tissue disorders, most of which are associated with inflammation and oxidative stress. Curcumin alleviates oxidative stress, and inflammation in chronic diseases and regulates inflammatory and pro-inflammatory pathways related to most chronic diseases⁶. Let us discuss in brief diseases of the gastrointestinal tract and associated glands.



Source: <https://www.emedihealth.com/nutrition/turmeric-health-benefits>

Molecular and pleiotropic effects of curcumin:



Source: <http://www.donnieyance.com/wp-content/uploads/2015/10/curcumin.png>

Inflammatory Bowel Disease: Inflammatory bowel disease (IBD) is a chronic relapsing inflammatory disease characterized by oxidative and nitrosative stress (The [reaction](#) of body tissues to [nitric-oxide](#), [nitrous-oxide](#), or similar species at levels greater than can be neutralized), leucocyte infiltration and up-regulation of proinflammatory cytokines. NF-kB is a key target for numerous IBD therapies, which is involved in the production of cytokines and chemokines integral to inflammation⁷. Studies have been conducted to evaluate curcumin's potential in patients with IBD for its efficacy as an anti-inflammatory without significant side effects^{8,9}. McCann et al., found different turmeric extracts could benefit the variants of SLC22A4 and IL-10 associated with IBD, reducing inappropriate epithelial cell transport (SLC22A4, 503F) and increasing anti-inflammatory cytokine gene promoter activity (IL-10, -1082A)¹⁰.

Pancreatitis: Chronic pancreatitis is associated with progressive fibrosis, pain and/or loss of exocrine and endocrine functions, of which pain is the main symptom¹¹. The key etiological factors in chronic pancreatitis are alcohol and tobacco abuse, genetic, environmental, hypertriglyceridemia, hypercalcemia, autoimmune, and sometimes idiopathic¹². A study indicates that in the rat's model of induced pancreatitis, curcumin reduced inflammation by dramatically decreasing activation of NF-kB and AP-1 as well as suppressing mRNA induction of iNOS, TNF-a, and IL-6 in the pancreas¹³. In addition, curcumin acted on inflammatory mediators to improve disease severity as measured by histology, serum amylase, pancreatic trypsin, and neutrophil infiltration in both ethanol-and cerulein-induced pancreatitis¹⁴. It would be appropriate to talk about diseases of other organs.

Neurodegenerative diseases: May affect millions of people yearly and the incidence is increasing as the population ages. About one in five Americans over the age of 65 will be diagnosed with a neurodegenerative disease by 2030 as shown by the NIH¹⁵. Studies have shown that the progression of age-dependent neurodegeneration is associated with decreased antioxidants and increased oxidative damage to proteins, DNA, and lipids^{16,17}. Kim et al. summarized that curcuminoids possess diverse biological properties that modulate debilitating biochemical processes involved in Alzheimer's diseases, which include attenuation of mitochondrial dysfunction-induced oxidative stress and inflammatory responses to inflammatory cytokines, COX-2, and nitric oxide synthase (iNOS), in addition to neuron-damage caused by heavy metal poisoning¹⁸. Curcumin has been evaluated in a clinical trial for the prevention of Alzheimer's disease^{19,20}.

Cardiovascular diseases: heart disease, vascular disease, and atherosclerosis are the most critical current global health problems. Epidemiological and clinical trials have shown strongly consistent relationships between the inflammation markers and the risk of cardiovascular diseases²¹. Numerous research suggested the key mechanisms in the development of CVDs are inflammation and C reactive protein (CRP)²². Thus, cytokines, other bioactive molecules, and cells that are characteristic of inflammation are believed to be involved in atherogenesis. Researchers suggest that curcumin mediates its effects against CVDs through diverse mechanisms such as oxidative stress, inflammation, and cell death.^{23,24} Curcumin was able to protect against inflammation, cardiac hypertrophy, and fibrosis by the inhibition of p300-HAT activity and downstream NF-kB, GATA4, and other signal pathways.

Allergy, Asthma, and Bronchitis: Allergy, asthma, and bronchitis are associated with inflammation which is relevant to the perplexing rise of these chronic inflammatory disorders. That allergy, a proinflammatory disease, is normally mediated by inflammatory cytokines, such as T helper-2 CD4 T (Th2) cells and Th2-associated cytokines, as well as IL-17 associated neutrophilic airway inflammation²⁵. Asthma is also an inflammatory disease in which eotaxins (are a CC chemokine subfamily of eosinophil chemotactic proteins), MCP-1, and MCP-3 play a crucial role²⁶. Eosinophils are key cells of allergic inflammation and their adhesion to human bronchial epithelial cells is mediated by a CD18-intracellular adhesion molecule (ICAM)-1-dependent interaction. Studies have shown that curcumin has a wide range of preventive effects on allergy, asthma, and bronchitis.

Rheumatoid arthritis: This is a systemic chronic inflammatory disorder and may impact many organs and tissues but mainly attack the flexible (synovial) joint²⁷. It was reported that oxidative stress made an important contribution to joint destruction in RA^{28,29}. Curcumin has raised interest as an agent of potential use in the therapy of RA with the regulatory function of the related inflammatory factors associated with anti-oxidation³⁰. In another study, curcumin (500mg) and diclofenac sodium (50 mg), alone or together, were administered to three groups of patients with RA. Curcumin may be the RA therapy candidate with the best improvement in the overall Disease Activity Score and American College of Rheumatology scores (tests used in clinical practice and clinical trials to evaluate symptoms of RA and disease progression) of all three groups³¹.

Chronic kidney diseases: These are the type of inflammatory disease, which is defined by either progressive atrophy of glomerular filtration rate (GFR) and/or the presence of abnormalities in the urine such as white blood cells, protein, and red blood cells^{32,33}.

Two main causes of chronic kidney diseases can be attributed to hypertension and diabetes mellitus which are major pathological and are end-stage interstitial fibrosis, glomerular hypertrophy and sclerosis, accumulation of extracellular matrix (ECM) in the glomerular basement membrane, and mesangial cell proliferation^{34,35}. Siddhartha et al. summarized that curcumin can blunt and/or strengthen the action and generation of some inflammatory mediators playing a role in chronic kidney diseases, such as eicosanoids, cytokines, reactive oxygen species (ROS), growth factors, and transcription factors, thus showing potential anti-inflammatory effects in chronic kidney diseases. Jane et al., demonstrated that curcumin could inhibit p300 and NF-kB actions and decrease oxidative stress through down-regulation of vasoactive factors (endothelial nitric oxide synthase and endothelin-1), transcriptase-polymerase chain reaction analyses. Let us consider the relationship between metabolic diseases and inflammation with respect to the role of curcumin.

Diabetes and inflammation: Diabetes is a problem and millions of people suffer that causes blood glucose (sugar) levels to rise higher than normal which is also called hyperglycemia. Type 2 diabetes is the most common form of diabetes, and the body does not use insulin properly. This is called insulin resistance, where cells have reduced insulin signaling, and long-term complications, such as heart, kidney, and liver disease. Recently, numerous studies have shown the critical roles of oxidative stress and inflammatory reactions in the pathogenesis of diabetes. When macrophages are activated by drying or stressed cells, the transcription factor NF-kB is induced and thus leads to the production of pro-inflammatory cytokines including TNF and IL-6. Curcumin is an antioxidant and NF-kB inhibitor and can be considered helpful for the prevention and amelioration of diabetes.

Obesity and inflammation: There is a strong relationship between obesity and inflammation which will lead to a major risk for atherosclerosis, cancer, type 2 diabetes, and other chronic diseases. Curcumin exhibits its activity against obesity through anti-inflammatory and antioxidant mechanisms. Curcumin as a treatment for obesity and obesity-related metabolic diseases has been shown extensively through suppressing the pro-inflammatory NF- κ B, signal transducer and activators of STAT3, and Wnt/ β -catenin as reported by researchers. It is time to mention about skin diseases.

Scleroderma and inflammation: This is a kind of connective tissue disease, typically resulting in vasculopathy and fibrosis of the skin and other organs³⁶. A study has reported that fibrosis vascular abnormalities and increased extracellular matrix production may be the causes³⁷. Inflammation can be initiated and propagated by extracellular matrix production disruption in all tissues. Molecules of extracellular matrix production, newly liberated by injury or inflammation, include hyaluronan fragments, tenascins, and sulfated proteoglycans. These act as damage-associated molecular patterns or ‘alarmins’ that trigger and subsequently amplify inflammation³⁸. Curcumin possesses the effects of anti-fibrosis which is characterized by the reduction of collagen deposition, extracellular matrix production in pulmonary fibrosis, and keloid formation³⁹. Suggestions draw the attention that curcumin has a potential function in the treatment of scleroderma, however, further research is needed.

Psoriasis and inflammation: This is a chronic inflammatory skin disease characterized by thick, red, and scaly lesions on any part of the body which affects approximately 2 percent of the population worldwide⁴⁰.

Studies have demonstrated that oxidative stress and autoimmune skin diseases are associated. The skin is continually under attack by reactive oxygen species from both exogenous and endogenous sources. Curcumin is well known due to its remarkable medicinal properties for the treatment of various skin disorders. Curcumin protects the skin by reducing inflammation and quenching free radicals through modulating TGF- β , NF- κ B, and mitogen-activated protein kinase pathways. Curcumin also regulates the phase II detoxification enzymes which are crucial in detoxification reactions and oxidative stress⁴¹. Jun Sun stated that curcumin could also demonstrate the inhibitory effect of Imiquimod-induced psoriasis-like inflammation by decreasing the levels of IL-1 β and IL-6. “Curcumin Inhibits Imiquimod-Induced Psoriasis-Like Inflammation by Inhibiting IL-1beta and IL-6 Production in Mice (2013)”

Cancer and inflammation: Inflammation plays decisive roles in all the ways of tumorigenesis and therapy response^{42,43}. Activation and interaction between STAT3 and NF- κ B are very vital in the control of cancer cells and inflammatory cells^{44,45}. Further, studies suggest that TNF- α , VEGF, IL-10, MMP-2 and MMP-9, MCP, CD4+T, AP-1, Akt, PPAR- γ , MAP kinases, and mTORC1 are also important linking factors between inflammation and cancer. Curcumin has been found to have clinical therapeutic and prevention potential for cancer patients in vitro and vivo animal and human clinical studies for colorectal, liver, pancreatic, lung, breast, uterine, ovarian, prostate, bladder, kidney, renal, brain, non-Hodgkin lymphoma and leukemia cancers^{46,47}.

Bioavailability and mode of action of curcumin: It has been mentioned that curcumin plays an important role in the treatment and prevention of various inflammatory diseases, however, clinical uses have been hindered by poor absorption, rapid metabolism, short biological half-life, and low oral bioavailability (only 1% in rats) as reported by researchers. Very high doses (>3.6 g/day in humans) are required to produce any medicinal effect as pointed out by Shama et al. Another study indicates that curcumin may also be poor in humans, as either undetectable or extremely low serum levels of curcumin (0.006+0.005 µg/mL at 1 h) were observed in humans after an oral dose of 2 g/kg⁴⁸. It has been demonstrated that 10mg/kg of curcumin given intravenously in rats gave a maximum serum curcumin level of 0.36 µg/mL., whereas a 50-fold higher curcumin dose administered orally gave only 0.06 ± 0.01 µg/mL maximum serum level in rat⁴⁹. According to Sun et al., intravenous administration of 2 mg/kg of curcumin to rats showed better availability with a concentration was 6.6 µg/mL of blood plasma.

Conclusion: Inflammation development in certain situations is a part of the human body. It depends upon the types of inflammation, for example, two stages of inflammation exist such as acute and chronic inflammation. Acute inflammation is an initial stage of inflammation (innate immunity) mediated through the activation of the immune system, which persists only for a short time and is usually beneficial for the host. Chronic inflammation lasts for a longer time, the second stage of inflammation (chronic inflammation) starts and may initialize various chronic diseases such as obesity, diabetes, arthritis, pancreatitis, cardiovascular, neurodegenerative, and metabolic diseases, as well as certain types of cancer. It is important to understand and distinguish between inflammation and infection. Inflammation whereas occurs when the human body fights to remove those invaders.

While infection occurs when bacteria, fungi, viruses, or plasmodium invade the body. However, there are certain foods, herbs, and supplements, that human eats play important role in the prevention of inflammation, while other certain foods that consumers will initiate the development of inflammatory diseases. For example, red meat, high-fat dairy products, and unhealthy fat (saturated and trans). Turmeric constituents include three curcuminoids (curcumin, desmethoxycurcumin, and bisdemethoxycurcumin). Over 7000 studies have shown that curcumin has strong anti-oxidation and anti-inflammatory activities based on the molecular basis of curcumin's attributed antioxidant, anti-inflammatory, anti-bacterial, anti-apoptosis, anti-cancer, and other related activities. Curcumin has been used as a remedy for the prevention and treatment of many organ and tissue disorders, most of which are associated with inflammation and oxidative stress. Curcumin alleviates oxidative stress, and inflammation in chronic diseases and regulates inflammatory and pro-inflammatory pathways related to most chronic diseases. Many factors are involved in the management and prevention of inflammation as mentioned. However, need further research regarding curcumin dose and concentration is based on clinical trials in humans, especially in the treatment of chronic inflammatory diseases. Also, need further research on other medicinal plants and natural products concerning inflammation.

References

1. Finley Melanie, *Fighting Inflammatory Disease: Inflammation Explained + Anti-Inflammatory Recipes* (2017).
2. Finley Melanie, *Fighting Inflammatory Disease: Inflammation Explained + Anti-Inflammatory Recipes* (2017).
3. Allison, D.J.; Ditor, D.S. Immune dysfunction and chronic inflammation following spinal cord injury. *Spinal Cord* 2014, 53, 14–18.
4. Schraufstatter, I.; Hyslop, P.A.; Jackson, J.H.; Cochrane, C.G. Oxidant-induced DNA damage of target cell. *J. Clin. Investig.* 1988, 82, 1040–1050.

5. Reuter, S.; Gupta, S.C.; Chaturvedi, M.M.; Aggarwal, B.B. Oxidative stress, inflammation, and cancer, How are they linked? *Free Radic. Biol. Med.* 2010, 49, 1603–1616.
6. He Yan, et al., *Curcumin, Inflammation, and Chronic Diseases: How Are They Linked?* (2015).
7. Atreya, I.; Atreya, R.; Neurath, M.F. NF-kappaB in inflammatory bowel disease. *J. Intern. Med.* 2008, 263, 591–596.
8. Taylor, R.A.; Leonard, M.C. Curcumin for inflammatory bowel disease, a review of human studies. *Altern. Med. Rev.* 2011, 16, 152–156.
9. Sugimoto, K.; Hanai, H.; Tozawa, K.; Aoshi, T.; Uchijima, M.; Nagata, T.; Koide, Y. Curcumin prevents and ameliorates trinitrobenzene sulfonic acid induced colitis in mice. *Gastroenterology* 2002, 123, 1912–1922.
10. McCann, M.J.; Johnston, S.; Reilly, K.; Men, X.; Burgess, E.J.; Perry, N.B.; Roy, N.C. The Effect of Turmeric (*Curcuma longa*) Extract on the Functionality of the Solute Carrier Protein 22 A4 (SLC22A4) and Interleukin-10 (IL-10) Variants Associated with Inflammatory Bowel Disease. *Nutrients* 2014, 6, 4178–4190.
11. Talukdar, R.; Tandon, R.K. Pancreatic stellate cells: New target in the treatment of chronic pancreatitis. *J. Gastroenterol. Hepatol.* 2008, 23, 34–41.
12. Bhardwaj, P.; Yadav, R.K. Chronic pancreatitis, role of oxidative stress and antioxidants. *Free Radic. Res.* 2013, 47, 941–949.
13. Gulcubuk, A.; Haktanir, D.; Cakiris, A.; Ustek, D.; Guzel, O.; Erturk, M.; Karabagli, M.; Akyazi, I.; Cicekci, H.; Altunatmaz, K.; et al. Effects of curcumin on proinflammatory cytokines and tissue injury in the early and late phases of experimental acute pancreatitis. *Pancreatology* 2013, 13, 347–354.
14. Nagar, A.B.; Gorelick, F.S. Acute pancreatitis. *Curr. Opin. Gastroenterol.* 2004, 20, 439–443.
15. Dorsey, E.R.; George, B.P.; Leff, B.; Willis, A.W. The coming crisis, obtaining care for the growing burden of neurodegenerative conditions. *Neurology* 2013, 80, 1989–1996.
16. Lee, J.; Giordano, S.; Zhang, J. Autophagy, mitochondria and oxidative stress, cross-talk and redox signalling. *Biochem. J.* 2012, 441, 523–540.

17. Höhn, A.; Grune, T. Lipofuscin, formation, effects and role of macroautophagy. *Redox Biol.* 2013, 1, 140–144.
18. Kim, D.S.; Kim, J.Y.; Han, Y. Curcuminoids in neurodegenerative diseases. *Recent Pat. CNS Drug Discov.* 2012, 7, 184–204.
19. Monroy, A.; Lithgow, G.J.; Alavez, S. Curcumin and neurodegenerative diseases. *Biofactors* 2013, 39, 122–132.
20. Hamaguchi, T.; Ono, K.; Yamada, M. Review: Curcumin and Alzheimer's disease. *CNS Neurosci. Ther.* 2010, 16, 285–297.
21. Libby, P. Inflammation and cardiovascular disease mechanisms. *Am. J. Clin. Nutr.* 2006, 83, 456S–460S.
22. Wongcharoen, W.; Phrommintikul, A. The protective role of curcumin in cardiovascular diseases. *Int. J. Cardiol.* 2009, 133, 145–151.
23. Wongcharoen, W.; Phrommintikul, A. The protective role of curcumin in cardiovascular diseases. *Int. J. Cardiol.* 2009, 133, 145–151.
24. Bronte, E.; Coppola, G.; di Miceli, R.; Sucato, V.; Russo, A.; Novo, S. Role of curcumin in idiopathic pulmonary arterial hypertension treatment, a new therapeutic possibility. *Med. Hypotheses* 2013, 81, 923–926.
25. Locksley, R.M. Asthma and allergic inflammation. *Cell* 2010, 140, 777–783.
26. Redwan, M.; Solomon, O.O. Allergy, asthma, and inflammation, which inflammatory cell type is more important? *Allergy Asthma Clin. Immunol.* 2008, 4, 150–156.
27. Mahobia, N.; Chaudhary, P.; Kamat, Y. *Rothia* prosthetic knee joint infection, report and mini-review. *New Microbes New Infect.* 2013, 1, 2–5.
28. Tyagi, P.; Khan, H.A. Amelioration of oxidative stress in the joint tissue may be the basis for the antiarthritic activity of *Terminalia arjuna* bark extract. *Int. J. Rheum. Dis.* 2014, doi:10.1111/1756-185X.
29. González-Reimers, E.; Santolaria-Fernández, F.; Martín-González, M.C.; Fernández-Rodríguez, C.M.; Quintero-Platt, G. Alcoholism: A systemic proinflammatory condition. *World J. Gastroenterol.* 2014, 20, 14660–14671.
30. Kloesch, B.; Becker, T.; Dietersdorfer, E.; Kiener, H.; Steiner, G. Anti-inflammatory and apoptotic effects of the polyphenol curcumin on human fibroblast-like synoviocytes. *Int. Immunopharmacol.* 2013, 15, 400–405.
31. Yang, C.; Su, X.; Liu, A.; Zhang, L.; Yu, A.; Xi, Y.; Zhai, G. Advances in clinical study of curcumin. *Curr. Pharm. Des.* 2013, 19, 1966–1973.
32. Ghosh, S.S.; Gehr, T.W.; Ghosh, S. Curcumin and chronic kidney disease (CKD): Major mode of action through stimulating endogenous intestinal alkaline phosphatase. *Molecules* 2014, 19, 20139–20156.

33. Himmelfarb, J.; Stenvinkel, P.; Ikizler, T.A.; Hakim, R.M. The elephant in uremia: Oxidant stress as a unifying concept of cardiovascular disease in uremia. *Kidney Int.* 2002, 62, 1524–1538.
34. Moradi, H.; Sica, D.A.; Kalantar-Zadeh, K. Cardiovascular burden associated with uremic toxins in patients with chronic kidney disease. *Am. J. Nephrol.* 2013, 38, 136–148.
35. Choi, B.H.; Kang, K.S.; Kwak, M.K. Effect of Redox modulating NRF2 activators on chronic kidney disease. *Molecules* 2014, 19, 12727–12759.
36. Lambova, S. Cardiac manifestations in systemic sclerosis. *World J. Cardiol.* 2014, 6, 993–1005.
37. Nguyen, T.A.; Friedman, A.J. Curcumin, a novel treatment for skin-related disorders. *J. Drugs Dermatol.* 2013, 12, 1131–1137.
38. Servettaz, A.; Goulvestre, C.; Kavian, N.; Nicco, C.; Guilpain, P.; Chéreau, C.; Vuiblet, V.; Guillevin, L.; Mouthon, L.; Weill, B.; et al. Selective oxidation of DNA topoisomerase 1 induces systemic sclerosis in the mouse. *J. Immunol.* 2009, 182, 5855–5864.
39. Hsu, Y.C.; Chen, M.J.; Yu, Y.M.; Ko, S.Y.; Chang, C.C. Suppression of TGF-beta1/SMAD pathway and extracellular matrix production in primary keloid fibroblasts by curcuminoids, its potential therapeutic use in the chemoprevention of keloid. *Arch. Dermatol. Res.* 2010, 302, 717–724.
40. Haniffa, M.; Gunawan, M.; Jardine, L. Human skin dendritic cells in health and disease. *J. Dermatol. Sci.* 2015, 77, 85–92.
41. Thangapazham, R.L.; Sharad, S.; Maheshwari, R.K. Skin regenerative potentials of curcumin. *Biofactors* 2013, 39, 141–149.
42. Coussens, L.M.; Werb, Z. Inflammation and cancer. *Nature* 2002, 420, 860–867.
43. Lu, H.; Ouyang, W.; Huang, C. Inflammation, a key event in cancer development. *Mol. Cancer Res.* 2006, 4, 221–233.
44. Fan, Y.; Mao, R.; Yang, J. NF- κ B and STAT3 signaling pathways collaboratively link inflammation to cancer. *Protein Cell* 2013, 4, 176–185.
45. Grivennikov, S.I.; Karin, M. Dangerous liaisons, STAT3 and NF-kappaB collaboration and crosstalk in cancer. *Cytokine Growth Factor Rev.* 2010, 21, 11–19.
46. Shehzad, A.; Lee, J.; Lee, Y.S. Curcumin in various cancers. *Biofactors* 2013, 39, 56–68.
47. Goel, A.; Kunnumakkara, A.B.; Aggarwal, B.B. Curcumin as ‘curecumin’, from kitchen to clinic. *Biochem. Pharmacol.* 2008, 75, 787–809.
48. Shoba, G.; Joy, D.; Joseph, T.; Majeed, M.; Rajendran, R.; Srinivas, P.S. Influence of piperine on the pharmacokinetics of curcumin in animals and human volunteers. *Planta. Med.* 1998, 64, 353–356.
49. Yang, K.Y.; Lin, L.C.; Tseng, T.Y.; Wang, S.C.; Tsai, T.H. Oral bioavailability of curcumin in rat and the herbal analysis from *Curcuma longa* by LC-MS/MS. *J. Chromatogr. B Anal. Technol. Biomed. Life Sci.* 2007, 853, 183–189.



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