The Opposite of Sugar
(First edition)

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A brief review at the risks of refined sugar consumption and one natural herbal compound which counteracts most of these undesired sugar induced side effects.

Taking a closer look at this herbal compound the exact reverse opposite of sugar reveals.

Abstract

First part:
Sugar Induced Damages
Refined sugar is a concentrated substance. Excess refined sugar consumption has recognized as a cause and cofactor of serious health problems all over the world. Refined Sugars cause or contribute to a wide variety of inflammatory responses, liver diseases, cirrhosis, hepatitis, coronary heart disease and cardiovascular risks, Type 2 diabetes, cancer, neurodegenerative diseases, depression and mood disorders (newest research).

Second part:
Defines the Sugar problem with TCM, spots the opposing element, names the herbs and the compound which counteracts the Sugar Induced Damages
With the Traditional Chinese Medicine TCM five elements systematic correspondance I am going to spot the opposite element of these aggrevated inflammatory symptoms and reveal a variety of herbs (Mahonia aquifolium, Coptis chinesis, Phellodendron amurense and more) which can counteract the inflammation. I’m going to show their sources and name the key compound (berberine) which counteracts Refined Sugars.

Third part:
A collection of scientic studies proving that the compound counteracts all the Sugar Induced Damages.
With a collection of research articles, meta studies, systematic reviews I ’m going to prove that the compound’s effects are the exact reverse opposite of Refined Sugar’s effects.
Where the compound (berberine) exerted: Anti-aging, Anti-Inflammatory, Anti-neuroinflammatory, Anti-cancer, Antibacterial, Antidiabetic, Anti-fibrotic, Hypotensive, Antidepressant, Anti-arrhythmic, Renoprotective, Neuroprotective and a lot more effects.
Refined sugar other names: dextrose, sucore, table sugar, common sugar, white sugar, granulated sugar, brown sugar, cane sugar

Refined sugar is a concentrated substance. Excess refined sugar consumption has recognized as a cause and cofactor of serious health problems all over the world. Especially in the developed countries where the majority of the foods contain the sugar. For example the processed foods including diary products, sweets, soda and SSB (sugar sweetened beverages), fruit based products and even many salty, canned foods, pastry, prepared foods, semi-prepared dishes, cereals, ketchup, all kinds of sauces in the stores contain the added refined sugar as sucrose or high fructose corn syrup. Because of these circumstances most people cannot spend a single day in their lives without eating some of these refined sugars.

Thus people have been exposed to sugar spikes from fetal age in their mother’s womb. The existing opposite of the concentrated substance sugar was not even introduced to people’s system since they cannot get it from the stores they weren’t educated in a way that they can do more to their health.

Sugar is the generalized name for a class of chemically-related sweet-flavored substances, most of which are used as food. They are carbohydrates, composed of carbon, hydrogen and oxygen. Simple sugars are monosaccharides include glucose or dextrose and blood sugar concentration or blood glucose level is the amount of glucose (sugar) that is present in the blood. High Blood Sugar hyperglycemia is a blood sugar that is higher than 130mg/dL after not eating or drinking for 8 hours. After meal hyperglycemia is when your Blood Sugar is higher than 180mg/dL 2 hours after you eat. [1]

HCFS - High Fructose Corn Syrup

HCFS is a semi-synthetic sweetener made from corn starch. It gives you more hunger after taking it, it has similar and worse effects than Refined Sugars.

Damages and Diseases by Refined Sugar

The frequently elevated or ongoing blood sugar can cause nerve damages, blood vessel damages and organ damages. [1]

The B cells in the pancreas create insulin to keep blood glucose in a normal range. Elevated blood sugar levels caused by sucrose led to the suppression or destruction of pancreatic cells β-cells in pancreatic islets and this contributes to the pathophysiology of type 2 diabetes. [22]

While the blood sugar is elevated it will attack the cells of your weakest organ. Could be the kidney cells (pyelonephritis, glomerulonephritis), liver cells (fatty liver disease and scarring, similar damages like alcohol consumption), nerve cells, pancreatic cells, cells of the blood vessels, heart tissue cells, cells of the reproductive organs, thyroid cells...

Obesity is not a cause it is one of the wide variety of symptoms Refined Sugars can cause. Focusing on obesity instead of Sugar Induced Damages confuses people because it supports a delusion that normal weight or light weight people do not suffer from sugar damages therefore they can eat it. Their weight gives them a false sense that they eat right or their immunity is better and they can assume that they probably do not suffer from a fatty liver disease or a liver cirrhosis or prediabetes, nephritis, diabetes or worse. They allow themselves to eat the worst quality carbohydrates without thinking about the health consequences. This false belief is supported by the uneducated social environment and the media. Medical doctors do not warn people about these dietary risks and serious side effects and they avoid to make any statement about sugar.

Non-Alcoholic Fatty Liver Disease NAFLD

Just overeating can cause fatty liver disease. In Hungary there is a traditional delicacy the goose liver when geese get fatty liver disease and it is made in a spacial way. Geese forcefully fed with corn then they held captive in conditions where they are unable to
move. Those geese are going to get the fatty liver disease with 100% certainty their liver enlarges it becomes a large piece of fat. Because the lack of the geese exercise the process takes just 16-21 days. Their tasty fatty liver then cooked (most of that liver is just fat and it melts in the cookware) and served as a delicious Hungarian food thereafter.

The liver uses fructose, to make fat. Too much refined sugar and high-fructose corn syrup causes a fatty buildup that can lead to liver disease. When fatty buildup happens in the liver you do not necessarily see fatty buildup or signs of obesity in other parts of the body. Some studies have shown that sugar can be as damaging to the liver as alcohol, even if you’re not overweight. It’s one more reason to limit foods with added sugars, such as soda, pastries, and candy. [32]

Dietary sugar consumption, in particular sugar-sweetened beverages and the monosaccharide fructose, has been linked to the incidence and severity of non-alcoholic fatty liver disease (NAFLD) [6].

Non-alcoholic Liver Cirrhosis

With the continuous inflammation the next stage is when the swollen fatty liver is hardening and scar liver tissue, cirrhosis appears. Cirrhosis is an abnormal condition in which healthy liver tissue is replaced by scar tissue. In cirrhosis, those cells will not function the liver no longer works well to digest food or protect us from toxins. Eventually, liver failure will occur when most normal parts of the liver have been replaced by scar tissue. Then the only treatment is liver transplant. Liver recovery difficult even with improved diet, but faster if sugar intake is low [33].

Non-Alcoholic SteatoHepatitis NASH

Some individuals with non-alcoholic fatty liver disease (NAFLD) can develop nonalcoholic steatohepatitis (NASH), an aggressive form of fatty liver disease, which is marked by liver inflammation and may progress to advanced scarring (cirrhosis) and liver failure. This damage is similar to the damage caused by heavy alcohol use. [9].

CHD Coronary Heary Disease, cardiovascular risks

JAMA article in 2016 officially uncovered „Project 226“ the systematic misrepresentation of sugar consumption’s dangers by Harvard University scientists who were paid by the Sugar Research Foundation. [29] The sugar industry sponsored it’s first CHD research project in 1965 to downplay early warning signals that sucrose consumption was a risk factor in Coronary Heart Disease. [29] The Sugar Research Foundation initially offered $500 to Professor Mark Hegsted (Harvard University) [51] and $1000 to Dr. Robert McGandy (Harvard University) nutritionists. “half to be paid when you start work on the project and the remainder when you inform me that the article has been accepted for publication.” [29] Their falsified documents served as a basis and reference for further dietary advices by nutritionists, medical doctors, healthcare professionals and others worldwide for decades. The directives of the whole healthcare industry built on that, pharmaceutical developments, sales from drugs and drug advices by medical doctors in the last 60 years (cholesterol drugs). They blamed fat and cholesterol where the real correlating factors for CHD (professedly in the document) is sugar consumption, blood sugar levels and raised blood trygliceride levels.

A year after the uncover of Project 226 in 2017 The Lancet wrote: Relationship between macronutrients and CHD is „controversial“ then they made a cohort study finding: The high carbohydrate intake results higher risk of total mortality while fat and total fat consumption were not associated with Cardiovascular disease mortality, myocardial infarction. [86]

If you eat a low fat diet studies have shown that the quality of the carbohydrates you eat has a greater impact on your health compared to a higher fat diet, means that the damages from sucrose and HFCS are even more severe with a low fat diet.

Prediabetes

Regularly eating foods with high sugar content can overload the body’s ability to produce enough insulin. It can also limit the ability of cells to absorb the sugar. We call that insulin resistance. Insulin resistance is the cause of prediabetes. or glucose, they will gradually respond less and less to insulin. [34] Insulin resistance when the body does not respond properly to insulin. The pancreatic B cells aren’t making enough insulin to keep blood glucose in a normal range, blood glucose abnormally high which damages cells. This highly increases the risk of serious health problems, including type 2 diabetes and problems with your heart, blood vessels, eyes, and kidneys. Prediabetes diagnosed when Fasting plasma glucose (FPG) 100-125mg/dL, Glucose tolerance test 140-199mg/dL, A1C average estimated blood sugar over the past 3 months 5.7%-6.4%.

Type 2 diabetes

Type 2 diabetes is the aggregated version of the prediabetic condition, when the destruction of pancreatic cells β-cells are at a higher degree. Diagnosed when Fasting plasma glucose (FPG) 126mg/dL or higher, Glucose tolerance test 200mg/dL or higher, A1C average estimated blood sugar over the past 3 months 6.5% or higher. Raises your risk for heart disease, blindness, nerve and organ damage, and other serious conditions.

Diabetic neuropathy

Diabetic neuropathy is the most common complication of diabetes mellitus and up to 90% of patients with type 1
and type 2 diabetes mellitus has neuropathy. Diabetic neuropathy remains an unmet clinical problem and is poorly relieved by conventional analgesics. Neuropathy is diagnosed when diabetic patients complain of symptoms and/or show signs of peripheral nerve dysfunction after the exclusion of other etiologies such as pain, paraesthesiae and loss of sensation. It has been shown that activation of polyol pathway plays a key role in the pathogenesis of diabetic neuropathy. Diabetic neuropathy is a common complication of both type 1 and type 2 diabetes, which affects over 90% of the diabetic patients. Although pain is one of the main symptoms of diabetic neuropathy, its pathophysiological mechanisms are not yet fully known.

**Diabetic nephropathy**

High blood sugar levels can damage the kidneys attacks it’s filtration system, damages the capillary walls and proteins might appear in the urine. Pyelonephritis, glomerulonephritis, proteinuria

**Sugar cravings, dependency and withdrawal**

Studies shown that the same addictive behavior, anxiety and withdrawal symptoms occurred after excessive sugar intake as with opioids, morphine or nicotine.

“Repeated, excessive intake of sugar created a state in which an opioid antagonist caused behavioral and neurochemical signs of opioid withdrawal. The indices of anxiety and DA/ACh imbalance were qualitatively similar to withdrawal from morphine or nicotine, suggesting that the rats had become sugar-dependent.”

„a diet of intermittent excessive sugar consumption produces a state with neurochemical and behavioral similarities to drug dependency“ On top of that it causes behavioral cross-sensitization to a low dose of amphetamine [22]

**Sugar increases inflammation**

Low to moderate sugar-sweetened beverage consumption impairs glucose and lipid metabolism and promotes inflammation in healthy young men: a randomized controlled trial [10]. Raised inflammation mark-ers in short-term exposed rats to 10% liquid sucrose solution. [11]

**Sugar consumption and elevated triglycerid levels**

High blood lipids increase the clotting of blood “Yes. Added sugars intake does appear to be connected with increased triglyceride levels.” [49]. Dietary glucose caused increase in tryglyceride production, dietary fructose impaired the tryglyceride removal from the blood both caused elevated triglyceride levels. [105] From the uncover of Project 226 the 2016 JAMA article the systematic misrepresentation of sugar damages in the 50’s and 60’s we know that high triglycerides and elevated blood sugar levels contribute to the development of coronary heart disease while fat and cholesterol is not relevant. [29]

**Sugar consumption and High Cholesterol**

Studies shown that the consumption of added sugar lowered the HDL (good cholesterol) and increased the LDL (bad cholesterol) in the blood. [36]

**Sugar consumption and High Blood Pressure**

Sugar-sweetened beverage consumption, a significant source of dietary fructose, is associated with higher serum uric acid levels and blood pressure in adolescents. [26]

**Sugar consumption and tooth decay**

„Ancient Romans ‘had perfect teeth’ thanks to healthy low-sugar diet” [52]. There is a decreasing diversity of oral bacteria with more processed foods introduced to our society compared to the hunter-gatherers. After the change to agriculture and especially after the Industrial Revolution the diversity of oral bacteria has decreased. Streptococcus mutans creates lactic acid while metabolizing sugar, lactic acid eats away the mineralized enamel surface of teeth. Thus more sugar creates more lactic acid cases more decay. [52]

**Sugar and Cancer**

Cancer cells consume 200 times more sugar than normal cells also refined sugar makes cancer cells grow faster. [37]

Fructose-rich sweeteners like high-fructose corn syrup (HFCS) are particularly offensive, as cancer cells have been shown to quickly and easily metabolize them in order to multiply. [53]

**Discovery of Tumor M2-PK Proves Cancer Cells Shift From Oxygen to Glucose as Source of Energy**

M2-PK helps cancer cells shift to greater glycolytic pathways. It is only found in cancer cells and not in normal healthy cells, making M2-PK an excellent marker for monitoring excelled growth or tracking improvement in treatment, depending if levels are high or low. [53]

„The high fructose corn syrup and other refined sugars are the major cancer-causing food. The brown sugar is highly refined sugar with the removed molasses added back in it for flavor and color. Refined sugars and foods prepared with them lead to major insulin spikes. The sugar is the best feed for the growth of cancer cells. So the oncologists are using diabetes medication to fight cancer cells. Also the majority of the sugar is made using genetically modified (GMO) sugar beets in USA. Organic honey, coconut sugar, or maple sugar may be better alternatives.” [63]

**Sugar and mood disorders**

Heavy sugar consumption is connected to increased risk of depression. Poor glycemic control is associated with more diabetes complications, depression, and worse quality of life. Data suggest that greater glycemic
variability may be associated with lower quality of life and negative moods. Implications include replication of the study in a larger sample for the assessment of blood glucose fluctuations as they impact mood and quality of life. [90]

Sugar and the growth of pathogenic microorganisms
Sugar supports the growth of bad bacteria in the bowel flora, also the overgrowth of candida which can cause candidiasis. Sugar supports bad bacteria in the mouth, throat and all parts of the body. Parasites thrive on sugar too. Candida infections were observed at increased frequencies among subjects with high blood sugar levels and PPDs ≥ 5. [64]

Sugar and premature aging, aging processes
Sugar-induced premature aging in the skin [43] “Excess added sugar plays a central role in age related diseases and in the process of aging.” [44] Further evidence exits that the type and amount of dietary carbohydrate can significantly affect the health and life span of elderly people. [91]

Sugar and neurodegenerative diseases
High-sucrose diet is a mild model of neurodegeneration in wild-type female rodents, as evidenced by exaggerated glucocorticoid expression, spatial learning deficits, irregularities within the insulin pathway, and increased β-amyloid production and Tau phosphorylation. [88] A wealth of evidence indicates a strong link between type 2 diabetes (T2D) and neurodegenerative diseases such as Alzheimer’s disease (AD). Although the precise mechanism remains unclear, T2D can exacerbate neurodegenerative processes. Brain atrophy, reduced cerebral glucose metabolism, and central nervous system insulin resistance are features of both AD and T2D. [89] Intake of Sucrose-sweetened Water Induces Insulin Resistance and Exacerbates Memory Deficits and Amyloidosis in a Transgenic Mouse Model of Alzheimer Disease. [92]

Regarding to the literatures refined sugars are able to severely decrease the quality of life and health for people. By definition a poison is “a substance that is capable of causing the illness or death of a living organism when introduced or absorbed.” Sugar shouldn’t be a poison in a society with a balanced diet, but in this society with these circumstances it satisfies the definition. To consider Refined Sugars as poisonous substances is well founded.
Applying the Five Element systematic correspondence from Traditional Chinese Medicine (TCM)

Your food is your medicine -> Everything you eat has a property. If some foods or herbs has an effect there is something else which has the opposite effect.

In TCM Sugar belongs to the Earth element which acts on Stomach – Spleen. Overconsumption of Sugar can damage the spleen and it will lead to more sugar cravings. Your spleen is responsible for the digestion of your food, water metabolism, menstrual cycles, and controls the overall peace and harmony in our bodies. Spleen has a function that keeps the organs at their place. [87]

TCM damaged Spleen may cause: Weight gain, Fatigue, Depression, Problems with water metabolism, Sugar cravings, Irregular menstruation, diarrhea, acne

In female genital area spleen damage, excessive dampness can cause foul-smelling discharge. In the intestines, it results in loose stools. Other symptoms of dampness include: bloating, nausea, vomiting, dizziness, heaviness feeling in the body or limbs and a thick greasy tongue coating.

Additionally the excess dampness in the Earth element creates moist in the lungs (METAL element) may lead to sinusitis, phlegm-type asthma. This contributes to the upper respiratory symptoms among children.

Excess Earth requests excess Fire weakening it and the related organs Heart, Pericardium, Small Intestine, Blood vessels. Inflammation also appears where the solution is the Water element with it’s Cold nature controls the Fire and washes away the dampness in the Earth.

We can separate the problem to at least two stages. 1. The spleen imbalance created at young ages. 2. Then the imbalance was sustained, inflammation aggravated the conditions since most foods people consume is sugars and sweeteners, dairy products, processed foods, alcohol.

Imbalance 2 is vast and it was sustained for decades.

To undo the damages we need to apply Anti-inflammatory herbs first which corresponds to the Water element and they are cold in nature.

Then we need to balance the Spleen to counteract the excessive dampness and the damage dealt to the spleen.

EATING Refined Sugars
1. The spleen imbalance, damage at young ages. 2. Then the imbalance was sustained, inflammation aggravated and multiplied the conditions since most foods people consume is sugars and sweeteners, dairy products, processed foods, alcohol.

**Initial spleen damage**

**Inflammation**
Continuous consumption of bad foods
- Refined Sugars, processed foods, dairy, alcohol

**Undo the damages**

**Balance the Spleen**
- Ginseng, Codonopsis, Yam

**Anti-inflammatory herbs**
Water element cold in nature
- Coptis rhizome, Phellodendron amurense, Berberis vulgaris, Mahonia aquifolium

To undo the damages we need anti-inflammatory herbs they belong to the water element and cold in nature. need to be such as Coptis rhizome, Phellodendron amurense, Berberis vulgaris, Mahonia aquifolium, Hydrastis canadensis. Then we can balance the spleen and repair it’s damages with Ginseng, Codonopsis, Chinese Yam, Poria, Jujuba.

**A simplified model of the branches of traumas starting with the Initial spleen damage as the first bifurcation point, besides a trauma can branch in more than two ways. The initial damage to the spleen caused by Sugar upsets the control of the metabolism, all kinds of inflammation appear all over the body, depending on personal weaknesses.**
Cool down the inflammation with cold herbs
TCM Water element cold and cooling means anti-inflammatory effects oppose the heat and excess heat which is connected to inflammation. Our bodies kept in inflammation states with high blood sugar levels which is known and common in our westernized diet. To counteract a substance which causes heat we need cold herbs. It will cool down that inflammatory process with the cold herb’s anti-inflammatory effects.

Copis Chinesis is the rhizome of the Chinese goldthread. This is one of the 50 fundamental herbs in TCM and it is one of its coldest herbs. It is an „extremely bitter“ herb. Not just clears the excess inflammation but removes the Earth element’s excess dampness caused by sugar which responsible for weight gain and a lot other undesired effects discussed above. On top of that it is a strong antimicrobial. Phellodendron cortex has similar effects. Their color is the same yellowish which refers to the same bitter substance they contain.

The common compound
Looking at the pharmacognosy of these herbs the substance which is common in all of them and which is responsible for that bitterness and the related anti-inflammatory effects is BERBERINE. Berberine is an extremely bitter yellow substance derived from the rhizome of Coptis chinesis, root cortex of Phellodendron amurense (from China), root cortex of Mahonia aquifolium and herba or root of Hydrastis canadensis (from North America) or root cortex of Berberis vulgaris (from Europe). These are traditionally used herbs in herbal medicines all over the world. About the berberine containing herbs the extracted natural berberine works as well as the whole herb.

Berberine is a natural herbal compound available from many different herbs. It is probably in your backyard or the bush that you pass every day on the street where you live. Mahonia species, Berberis species are widely available and there are a lot herbs with Berberine in every country around the world.
I will take a look at the state of the art scientific research about berberine. It is one of the most studied natural substances in the world.

Pharmacist say berberine is almost as strong as synthetic medications. While Berberine’s side effects are negligible.

Berberine is an isoquinoline alkaloid, Berberine based formulations, are widely used in traditional systems of medicine including, Ayurveda and Traditional Chinese Medicine. Berberine has demonstrated wide range of pharmacological activities including; antihypertensive, anti-inflammatory, antioxidant, antidepressant, anticancer, anti-diarrhoeal, cholagogue, hepatoprotective and above all, antimicrobial. Recent studies, have thrown light on antidiabetic and hypolipidemic activities of the alkaloid. Berberine has been tested clinically in the treatment of oriental sore, diarrhoea, trachoma diabetes mellitus type-2, hypercholesterolemia, and congestive cardiac failure and more [58].

Scientific studies about Berberine

Anti-inflammatory effects

Anti-inflammatory activity of berberine in non-alcoholic fatty liver disease, [55]. Natural compound BBR has antioxidant and anti-inflammatory activities which might contribute in part to its therapeutic efficacies against diabetes mellitus and insulin resistance [54].

Non-Alcoholic Fatty Liver Disease

There is evidence, berberine can significantly improve blood lipids and liver function in patients with NAFLD and has good advantage in reducing blood glucose in patients with NAFLD, which might be a new choice for the treatment of NAFLD (META study) [82] [84] [104] [108].

Prediabetes, Type 2 diabetes, Blood sugar lowering and stabilizing effects

There is strong scientific evidence from the highest quality (systematic reviews) about the side effect free treatment of Type 2 diabetes with Berberine. Berberine was able to lower glucose levels in liver cells. [39] Recent studies suggest that berberine could have a direct action on carbohydrate metabolism in the intestines. It affects glucose metabolism, increases insulin secretion, stimulates glycolysis, suppresses adipogenesis, inhibits mitochondrial function. [41] Enhances insulin sensitivity, resuscitates exhausted pancreatic islets. Extra beneficial effects on diabetic cardiovascular complications [14].

Lowering triglycerid levels

Berberine partially mediated by the up-regulation of lipogenesis gene expressions and down-regulation of lipogenesis gene expressions through activation of the AMPK signaling pathway. [112] Lipid-lowering effect of berberine in human subjects: berberine treatment produced a mild weight loss and significant lipid-lowering effects without side effects. [114]

Blood Pressure Lowering

Berberine has a hypotensive effect, at least in part, via the inhibition of ACE and direct release of NO/cGMP in the vascular tissues [108].

Cholesterol lowering

Human experiment shown lipid-lowering effects of berberine with significant cholesterol level decrease 9% in the 12 weeks 500mg berberine orally 3 times a day continuous consumption. A mild weight loss effect in obese patients were present. [114].

Antimicrobial effects of Berberine

Starting with the strongest antimicrobial activity S. aureus >P. aeruginosa S (sensitive) >E. coli S>P. aeruginosa R (resistant) >E. coli R>B. subtilis>Z. ramigera>C. albicans>S. cerevisiae>A. pullulans B (black)>A. pullulans W (white)>T. viride Br (brown)>M. gypseum>A. niger>F. nivale>P. chrysogenum>T. viride G. [107] Berberine has shown strong antibacterial effects while it’s effect on funguses was weaker.

Caries tooth decay

Berberine shown bactericidal against oral bacteria responsible for dental caries. Streptococcus mutans and other streptococcus species. [117].

Neuropathy - Inflammation of the nerves

Berberine suppresses diabetic neuroinflammatory response, Berberine shown anti-neuroinflammatory effects Using berberine to treat diabetic neuropathy in rats induced by STZ and in diabetic patients demonstrated that berberine could significantly improve the median nerve, peroneal in nerve conduction velocity (NCV) [46].

Nephropathy – Inflammation of the kidneys

Berberine reduced renal injury, Berberine attenuated the systemic and renal cortex inflammatory response [47]. Berberine shown renoprotective, decreased renal inflammation [48].
Anticancer
There is strong scientific evidence about the effectiveness of Berberine for cancer. Anti-tumor effects in a variety of tumors in vivo, especially breast cancer and lung cancer. Has positive effects on colorectal cancer and gastric cancer. Berberine exerted anti-tumor mechanisms was anti-angiogenesis and there was a dose-response relationship in these anti-tumor effects. [85]

Anxiety
With the decrease of 5-HT, NE, and DA levels, Binding with GABAA receptor, Inhibition of glutamate receptors, Increase in turnover rates of monoamines, Activation of 5-HT1A and inhibition of 5-HT1A and 5-HT2 receptors [59]

Alzheimer’s disease
Berberine prevents brain damages. Berberine could impede the development of dementia via multiple mechanisms: preventing brain damages and enhancing cognition directly in the brain, and indirectly through alleviating risk factors such as metabolic dysfunction, cerebral ischemia, mental depression, schizophrenia and cardiovascular, kidney and liver diseases. This study [83] provided evidence to support the value of berberine in the prevention of dementia associated with metabolic syndrome. [83]

Depression
Berberine has effects on neurotransmitters, antioxidation, nitric oxide synthesis, neuroinflammation, neurotrophic factors, hormonal regulation in depression. New association found between irritable bowel syndrome and depression, while berberine reversed the physical damage brought about by stress within the gastric mucosa and intestinal microvilli of the stomach, ileum, caecum, and colon. [71] Dysregulation of neurotransmitters can cause depression. Berberine can regulate brain neurotransmitters, especially biogenic amines (NE, 5-HT, DA) [12] [57]

Norepinephrine (NE), serotonin (5-HT) and dopamine (DA) are neurotransmitters released from neurons during synaptic transmission in the nervous system. [12] Studies demonstrated that berberine (10, 20 mg/kg, p.o.), dramatically reduced the immobility time during the forced swim test and the tail suspension test. [18] Either acute or chronic administration of berberine at low doses results in increased levels of NE, 5-HT, and DA in whole-brain samples. Kulkarni et al showed that acute administration of berberine (5 mg/kg, i.p.) in mice caused increased levels of norepinephrine (31%), serotonin (47%), and dopamine (31%). Chronic administration of berberine (5 mg/kg, ip) for 15 days significantly increased the levels of norepinephrine (29%), serotonin (19%) as well as dopamine (52%). [59]
High concentrations of berberine can protect rats from various symptoms of chronic stress and depression, indicating its potential clinical use. [59]

“Our findings indicate that berberine may have antidepressant effects, based on its ability to decrease the immobility time in the forced swimming test in OVX mice without affecting body weight. [57]

Cognitive impairment
Berberine ameliorates cognitive impairment caused by diabetes. with the activation of the cholinergic anti-inflammatory and insulin signaling pathways

Ameliorated spatial learning memory impairment
Berberine restored hippocampal synaptic plasticity which is the changes of the synaptic connection strength between neurons by it’s activity preferences. [106] [61] [60]

Bipolar disorders
Berberine inhibits human prolyl oligopeptidase which is associated with schizophrenia, bipolar affective disorder, and related neuropsychiatric disorders. Study suggests the initiation of clinical trials in patients with schizophrenia, bipolar affective disorder, or related diseases like cognitive capabilities. [60]

Antiaging
Chinese herb rhizoma coptidis and its main bioactive components (berberine) has been used in aging-related diseases widely, i.e. hyperglycemia, hyperlipidemia and some neurodegenerative diseases. Berberine, has found to extend life span, overall health, and attenuate premature cellular senescence in animal models. Berberine as a natural supplement that can potentially combat aging. [56]

Scientists learn from berberine’s killer mechanism
NorA is a drug efflux pump found in resistant pathogenic bacteria such as MRSA. Berberine inhibits NorA action.

Berberine causes DNA damage: creates genomic lesions in bacteria then Tumor suppressor P53 protein induces cell cycle arrest causes the bacteria’s programmed death.

Berberine inhibits Nuclear factor kappa B (NF-κB) inflammatory response and COX-2 transcriptional activity which has a key role in colon tumor cell growth.

Antimutagenic activity of berberine from the inhibition of DNA Topoisomerase enzyme which participates in the overwinding and underwinding of the DNA. Induced cell cycle arrest in gastric cancer cells, leukemia cells and many others.
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<td>Prediabetes, Type 2 diabetes</td>
<td>Berberine affects glucose metabolism, increases insulin secretion, stimulates glycolysis, suppresses adipogenesis, inhibits mitochondrial function. Offers side effect free Type2 diabetes treatment [14] [39] [41], (Systematic Review strong evidence)</td>
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<td>Cancer</td>
<td>Anticancer activites, strongest effects on breast cancer and lung cancer, colorectal cancer and gastric cancer, cell cycle arrest in a wide variety of cancer cell lines [80]</td>
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<td>Prevented brain damage, prevents brain inflammation, enhances cognition, + improves Alzheimer’s indirectly through alleviating risk factors such as metabolic dysfunction, , cerebral ischaemia, mental depression, schizophrenia and cardiovascular, kidney and liver diseases. [68] [71] [83]</td>
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<td>Growth of pathogenic microorganisms</td>
<td>Antimicrobial, mostly antibacterial including MRSA</td>
</tr>
</tbody>
</table>
### High Blood Pressure
- Hypotensive by alpha adrenoceptor blockage [95], [109]  
- Improved vasodilation by activation of BKCa channel in smooth muscle cells [95]

### High Triglyceride levels
- Triglyceride lowering effects [113], [114]

### High Cholesterol
- Berberine Lowers Cholesterol [114]

### Sugar cravings, dependency withdrawal
- Reduced the acquisition and reinstatement from morphine [116] (sugar causes similar addictions)

### Depression
- Antioxidation, Regulation of nitric oxide synthesis, neuroinflammation, neurotrophic factors, hormonal regulation in depression; regulates biogenic amines [12] [57]

### Anxiety
- Significant anxiolytic effect, increased turnover rates of monoamines in the brain stem, decreased serotonergic system activity, berberine binds to benzodiazepine site on the GABAA receptor [59]

### Bipolar disorders
- Berberine inhibits human prolyl oligopeptidase which is associated with schizophrenia, bipolar affective disorder and related neuropsychiatric disorders [60]

### Mood disorders
- Shown to alleviate mood disorders in a number of ways has the potential to become a mainstream drug for treating mood disorders [59]

### Caries tooth decay
- Inhibited the growth of streptococcus mutans and other streptococcus species [117]

Probably most people suffer from smaller or bigger side effects of the Refined Sugars. It can be acquired in younger ages and we know that the continuous eating of Refined Sugars and processed foods just aggrevate the conditions every day.

Is there any other remedy that have broad benefits to human health, such as berberine?

I have examined part of this incredible literature of studies, review articles, research articles, systematic reviews about berberine. For all of the examined side effects Refined Sugars caused can be opposed with one or more effect of berberine. Berberine is the single substance which is able to counteract all of the above conditions. Berberine is the Opposite of Sugar.

Safety: A review [115] presented that berberine is a safe Anti-cancer agent. Human and animal trials - tests of hematological, cardiovascular, liver, and kidney function following berberine treatment showed no detrimental side effects to this natural compound. [114]

Regardless how effective berberine was in the research articles there is no guarantee that it will work for you. A lot depends on the quality of the herbs you can get, the way you take them and your whole diet and lifestyle is a huge factor. Besides berberine is something worth to try for everyone.
**Get Well**

Our complex Berberine formula offers you pure natural biologically active berberine and an added absorption booster. Includes multiple sources of Berberine.

Additive Free- We do not use synthetic Additives or binders, fillers, whiteners other unnecessary chemicals

A special aroma protective packaging ensures the freshness of these herbal ingredients.


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**Spleen Balance**

Spleen has the function to keep our organs in their right places. It stores energy from the food also has key role in gathering the nutrition from the food what we eat. Because of the dietary imbalances we need to support our spleen.

Balances the Spleen,
Alleviates Spleen deficiency
Counteracts dampness caused by Refined Sugars and processed food.

**COMING SOON**
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