The Many Benefits of Berberine

Proving the Value of Traditional Herbal Remedies with Modern Science

For thousand of years Western and Oriental herbalists have prized certain plants for fighting infections and fevers. It turns out that many of these herbs contain a yellow alkaloid known as berberine. Among these plants are popular Western botanical remedies like goldenseal, Oregon grape and barberry as well as Oriental herbs like Chinese golden thread (also known as coptis) and amur cork tree bark (known also as phellodendron).

Over 2,800 studies have been conducted on berberine and more than half of them have been published on PubMed in the past five years. This research confirms the traditional value of berberine-containing plants for infections, showing that berberine has antibacterial, anti-inflammatory, and immune-enhancing properties.

The research suggests that berberine (and therefore the herbs that contain it) are effective against a wide range of bacteria, protozoa, and fungi. Herbs containing berberine have long been used topically on cuts and other wounds. They have also been used in various cultures for gastrointestinal issues, including traveler’s diarrhea and food poisoning.

But, the research doesn’t stop at berberine’s anti-infective abilities. It turns out that berberine has numerous other benefits and may have efficacy in the treatment of insulin resistance, diabetes, arthritis and cancer. There is evidence it may also be helpful in preventing heart disease by lowering cholesterol and triglyceride levels. Berberine may even be helpful for hypertension (high blood pressure), brain health, immune dysfunction, low bone density and weight control.

How Berberine Works

In order to understand berberine’s potential and how it works, we need to look at adenosine monophosphate-activated protein kinase (AMPk). AMPk is an enzyme inside the body’s cells that functions like a metabolic “master switch” by regulating biological activities that normalize lipid, glucose and energy imbalances. Berberine helps to activate this enzyme.

Low AMPk activity can lead to accelerated aging, chronic inflammation, high blood cholesterol and triglycerides, insulin resistance, poor blood sugar regulation, increased visceral belly fat, obesity, neurodegeneration and mitochondrial insufficiency and dysfunction. Boosting AMPk activity helps shift energy toward cellular repair and maintenance, leading to homeostasis and improved health.

In other words, berberine turns “idle” cells on, thereby helping them to use glucose more efficiently. In fact, researchers have suggested that berberine can produce health benefits similar to the benefits of engaging in regular exercise and restricting calorie intake—two foundational pillars of health and longevity.

Berberine also supports healthy gut function to help combat endotoxins. High-carbohydrate diets have been shown to alter the microflora of the gut, increasing endotoxin-producing bacteria. These endotoxins are released into the bloodstream and interfere with normal glucose metabolism. Berberine supports gut health by inhibiting the ability of endotoxins to bind to muscle cells, thus helping to support proper glucose metabolism.

In this month’s Sunshine Sharing, we’ll explore the benefits of berberine and herbs that contain berberine. We’ll also tell you about formulas containing these herbs. You’ll discover the many ways this amazing phytochemical can benefit your health.

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Promising Research on Berberine

According to Jacob Schor, ND, berberine holds tremendous promise for major conditions such as metabolic syndrome, inflammation, and cancer.1 The Natural Medicine Journal goes a step further by stating, “Any condition that would be favorably impacted by a patient losing weight and/or exercising more may be impacted favorably with oral berberine supplementation. It makes sense to consider berberine for clients with insulin resistance, pre-diabetes, diabetes, metabolic syndrome, hypertension, heart disease, dyslipidemia, cancer, depression, and other neuropsychiatric diseases.”2 Here's a closer look at what berberine may do for some of these problems.

Metabolic Syndrome and Diabetes

In 2008, the journal Metabolism reported the results of two three-month human trials in which patients diagnosed with type-2 diabetes were treated with either berberine (500 mg three times a day) or the same dose of Metformin. The studies showed berberine reduced blood glucose levels similarly to the drug and also reduced hemoglobin A1c, another important marker of glucose metabolism.3

A recent meta-analysis by Dong, et al, combined data from 14 randomized trials involving 1,068 participants. Patients treated with berberine and lifestyle modification experienced a significant reduction in blood sugar levels. The effects were virtually identical to those obtained by the standard hypoglycemic drugs metformin, glipizide or rosiglitazone.4 Besides directly reducing blood sugar, berberine also may help with some of the side-effects of diabetes, such as diabetic nephropathy.

This research confirms one of the traditional uses for the berberine-rich herb goldenseal. Goldenseal has been historically used to lower blood sugar levels in type-2 diabetics. It is an ingredient in the traditional antidiabetic formulas Pro-Pancreas and PBS. Another herb with berberine, phellodendron, is an ingredient in the HY-C formula, which is helpful for metabolic syndrome.

Inflammation

Chronic inflammation lies at the heart of many degenerative diseases, and berberine has been shown to have anti-inflammatory action. While the mechanism of action is not yet fully understood, berberine does down-regulate proinflammatory responses in macrophages. It also affects cellular kinases and other inflammatory signaling mechanisms.5 Some researchers believe that berberine also acts as a COX-2 protein inhibitor without reducing enzyme activity.

Phellodendron extract is one of the ingredients in the anti-inflammatory and pain-relieving Relief Formula. It’s also found in the fever and inflammation relieving IF-C.

Heart Health

Research shows that berberine may be beneficial for heart health. A 2013 report published in the journal Planta Medica indicates that berberine may help reduce elevated cholesterol levels. In their analysis of 11 previously published clinical trials with a total of 874 participants, the report’s authors determined that berberine may reduce total cholesterol and LDL (“bad”) cholesterol levels while increasing levels of HDL (“good”) cholesterol. Berberine was also found to decrease triglyceride levels. It has also been shown to reduce apolipoprotein B, a risk factor for heart disease, by up to 15 percent.6

For people with heart problems, berberine’s AMPk activation slows the release of free fatty acids, which lowers lipid levels, prevents harmful fat deposition and boosts fat burning in the mitochondria. It also stimulates the release of nitric oxide, a signaling molecule that relaxes the arteries, increasing blood flow and lowering blood pressure, thus protecting against atherosclerosis. In one study, those who took berberine for eight weeks had improved heart function and increased ability to exercise compared to those who took a placebo.7 This research justifies goldenseal as an ingredient in the traditional cardiac formula GC-X.

References and Additional Information

For more information about berberine and the uses of herbs that contain it, contact the person who gave you this newsletter. You can also consult the references cited in this newsletter:

9. Lipid-lowering effect of berberine in human subjects and rats, phymed.2012.05.009
10. Berberine improves insulin sensitivity by inhibiting fat store and adjusting adipokine profile in human preadipo-ocytes and metabolic syndrome patients, PMID: 22474499

Photo Credits: Stephen Foster-Goldenseal, Steven Horne-Oregon Grape and Barberry, Wikipedia-Coptis
Cancer

Studies show that berberine slows cancer growth and causes cancer cell death through a variety of mechanisms, such as tumor cell apoptosis and cell cycle arrest. It also inhibits blood vessel growth in tumors while inhibiting tumor cellular invasion and metastases.

One of the main anti-cancer targets inhibited by berberine is NF-kappaB. NF-kappa B is one of the most important proteins in our cells, acting as a key switch in the development and progression of inflammation and cancer. Cancerous and precancerous cells often have a permanently activated NF-kappa B, which keeps the cells proliferating and prevents them from dying (apoptosis). Additionally, berberine acts as a radio-sensitizer of tumor cells without affecting normal cells. In fact, it may actually protect normal cells, potentially making radiation therapy more effective.

Berberine also inhibits the tendency of cancer cells to become drug resistant over time by inhibiting the cellular membrane proteins that pump drugs out of the cell. When berberine is taken with tamoxifen and other chemotherapy drugs, studies show that they work synergistically against cancer cells. Berberine also inhibits the development of cancer from carcinogen exposure.

Weight Loss

At least two studies have examined the effects of berberine on body weight. In a 12-week study of obese individuals, 500 mg taken three times per day caused about five pounds of weight loss, on average. The participants also lost 3.6% of their body fat. In another study involving 37 people, taking 300 mg of berberine three times daily for three months resulted in a drop in overall fat and belly fat, as well as other improved health markers. The researchers believe the weight loss was caused by improved function of fat-regulating hormones, such as insulin, adiponectin and leptin.

Because of berberine’s ability to inhibit fat storage and improve the function of hormones such as insulin, leptin and adiponectin, many researchers have concluded that berberine has potential application in reducing visceral fat and controlling central obesity.

Gut Health and Infection

Studies show that berberine can restructure the balance of microflora in the gut, thereby alleviating inflammation and preventing insulin resistance and obesity. One study abstract concluded, “…our findings suggest that the prevention of obesity and insulin resistance by berberine in HFD-fed rats is at least partially mediated by structural modulation of the gut microbiota, which may help to alleviate inflammation by reducing the exogenous antigen load in the host and elevating SCFA levels in the intestine.”

Herbal Sources of Berberine

Here are some herbs with berberine and their uses.

Goldenseal

Goldenseal has long been used as a remedy for infections of the digestive tract and urinary system, as well as a topical antibiotic and wound healer. It is particularly helpful for sub acute inflammation of the respiratory, digestive or urinary mucous membranes. Goldenseal also lowers blood sugar and stimulates digestion. It has been over harvested and other herbs should be used as substitutes where possible.

Besides being available as a single herb, goldenseal is an ingredient in numerous formulas. One of the most popular is the infection-fighting Echinacea/Goldenseal. It also lends infection-fighting power to the lymphatic formula IN-X and the Sinus Support formula for sinus infections. It lends tissue healing and antimicrobial properties to Golden Salve, PLS II and Black Ointment.

Oregon Grape

Oregon grape is often used as a more plentiful alternative to goldenseal. It not only has antimicrobial properties, it is a good lymphatic cleansing herb. It stimulates bile flow and has been used with other alternatives for liver conditions. It can be used both internally and externally to relieve skin conditions such as acne, boils and eczema and to reduce itching. Besides being available in liquid form (it is an ideal infection-fighting remedy for children), Oregon grape is an ingredient in the blood purifying and cleansing formulas All Cell Detox and BP-X. It’s also in Gall Bladder Formula as the principle agent for stimulating bile flow.

Barberry

There are many species of barberry, one being the source of the berberine in Berberine IR. Barberry is antifungal, increases bile production and is commonly used as a blood purifier. Barberry is an ingredient in liver formula LIV-J and the liquid laxative blend LB Extract.

Coptis root (Chinese Goldenthread)

Coptis is an infection-fighting herb used in traditional Chinese medicine (TCM). Like all berberine containing plants it’s a mild cholagogue and alterative. It’s an ingredient in the inflammation-reducing formula IF-C, the antidepressant Mood Elevator and the calming Chinese Stress Relief formula.

Phellodendron (Amur Cork Tree)

Amur cork tree bark is a cooling detoxifying agent, used for “damp heat” (inflammation) in TCM. It has been used for jaundice, arthritis, urinary tract infections and skin diseases, such as eczema. It is found in the blood sugar balancing formula HY-C, the anti-inflammatory formula IF-C and the stress-reducing Nature’s Cortisol Formula. An extract of this plant is also found in the pain and inflammation reducing Relief Formula.

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Berberine
The Yellow Alkaloid with Numerous Health Benefits

Many herbs traditionally used to fight infections and reduce inflammation contain a yellow-colored alkaloid known as berberine. Modern research is not only confirming the antimicrobial benefits of this alkaloid, it’s also showing that it has wide-ranging applications in blood sugar management, weight loss, prevention of cardiovascular diseases and cancer, and gastrointestinal health. Read all about the amazing benefits of berberine, and berberine-containing herbs in this issue of Sunshine Sharing.

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Polycystic Ovary Syndrome (PCOS)

Several studies suggest that berberine may be beneficial to women with polycystic ovary syndrome—a metabolic disorder closely associated with insulin resistance. In a clinical trial published in the European Journal of Endocrinology women who took berberine and with a drug used for this condition showed greater improvement than women treated with the drug and a placebo or another drug. What’s more, study members treated with berberine showed greater decreases in cholesterol levels and waist size.

Obtaining the Benefits of Berberine

Berberine is available as a supplement in the form of Berberine IR, which contains 335 mg of berberine from Indian barberry (Berberis aristata). A typical dose is one capsule three times daily. Berberine is generally safe for teenagers and adults, but is not recommended for pregnant or lactating women or for infants. Berberine IR may be useful for both GI and urinary tract infections, balancing gut microflora, stimulating liver function and reducing blood sugar and lipid levels and improving general health.

Researchers used to think that berberine was poorly absorbed when taken orally, but further research shows that berberine is actually metabolized so quickly that blood tests fail to measure it before the body uses it, which is why it is better to take several doses throughout the day to keep levels stable in your bloodstream.

You can also obtain the benefits of berberine by using any of the herbs that contain berberine listed on page three. A list of formulas containing those herbs is also found there.