BERB-EVAIL®

HIGHLY BIOAVAILABLE BERBERINE

60 SOFTGELS | NPN80077030 | BEV060-CN

Berb-Evail™ contains 400 mg of the plant alkaloid berberine (from *Berberis aristata*) for the primary purpose of maintaining cardiovascular health and supporting healthy cholesterol levels, healthy lipid metabolism and normal blood glucose levels. As downstream effects of these main actions, berberine may also help improve other features of metabolic syndrome. Additionally, berberine has been shown to exhibit antimicrobial properties.

The Designs for Health Evail™ Process – for enhanced absorption of berberine

Berb-Evail™ is manufactured using the Designs for Health Evail™ technology, which is an all-natural formulation that improves the absorption and delivery of berberine. This process uses a proprietary blend of MCT oils, non-soy derived lecithin, and vitamin E, without the use of potentially harmful surfactants.

Blood Lipids and Liver Health

Berberine has been shown to exert favourable effects on blood lipids. Unlike statin drugs, berberine does not affect the complex cholesterol biosynthesis pathway, and therefore does not present the same undesirable side-effects. Berberine upregulates the expression of LDL receptor mRNA and increases liver expression of LDL receptors, allowing for more effective clearance of LDLs from the bloodstream.[9,10] Diabetic, dyslipidemic rats supplemented with berberine showed favorable changes to total cholesterol, triglycerides, LDL-C, ApoB, and HDL-C. For some parameters, the effects were more powerful than those achieved with rosiglitazone and fenofibrate.[11]

In rats fed a fatty liver-inducing diet, supplemental berberine resulted in decreased total body weight, visceral adiposity, total cholesterol, LDL-C and triglycerides, while also reducing serum ALT and AST, which suggests a protective effect for liver function. These markers were reduced compared to fatty liver rats not supplemented with berberine, but more notably, some of these parameters were reduced to levels seen in a healthy control group fed a normal diet. Rats supplemented with berberine had lower liver weights and lower triglyceride content in the liver. Researchers concluded that berberine has direct effects upon the methylation status of genes involved in deposition of triglycerides in the liver.[12]

Blood Glucose Metabolism

There are multiple mechanisms behind berberine's influence on blood glucose metabolism and insulin sensitivity. In people with diabetes using insulin, the addition of berberine resulted in increased fasting and postprandial C-peptide levels, which suggests that long-term use of berberine might improve endogenous insulin secretion in patients who fail to respond, or who

respond poorly, to oral hypoglycemic agents.[11] In addition to increasing insulin secretion, berberine has been shown to increase insulin receptor expression in cultured human liver and muscle cells, which may improve insulin sensitivity.[3] Moreover, contrary to thiazolidinedione drugs (TZDs), berberine "suppresses the differentiation of preadipocytes, and reduces the accumulation of lipid droplets."[3]

Another biochemical mechanism behind berberine's impressive effects may be the potential inhibition of intestinal carbohydrate-digesting enzymes. Diabetic rats supplemented orally with berberine showed significant, dose-dependent decreases in intestinal disaccharidase activity. Even in non-diabetic rats treated with berberine, two-hour area under the curve (AUC) blood glucose levels after sucrose and maltose loading were lower than those of untreated controls. Similar observations have been made in cultured human cell lines, which suggests berberine may be helpful for pre-diabetic patients and others presenting with early indicators of carbohydrate intolerance or metabolic syndrome that has not yet progressed to overt diabetes.[4]

Additional effects of berberine are achieved via inhibition of dipeptidyl peptidase IV (DPP IV). As DPP IV degrades incretin hormones—which stimulate post-prandial insulin secretion—increasing the half-life of incretins may help increase endogenous insulin secretion in response to a meal.[5] Berberine may also exert blood glucose lowering effects by stimulating glycolysis via inhibition of mitochondrial glucose oxidation (specifically at complex I of the electron transport chain), and by increasing cellular glucose uptake independently of insulin.[6] (The DPP IV inhibitor category of drugs is becoming more popular due to the efficacy of this mechanism in contributing to type-2 diabetes management.[7]) Berberine may increase phosphorylation of AMP-kinase (AMPK), which occurs naturally in response to physical exercise, fasting, and caloric restriction.[8]

Antimicrobial Effects

Beyond its role as a powerful agent for healthy lipid metabolism, berberine has long been recognized as an antimicrobial, antiviral, and anti-parasitic compound. Berberine extracts have demonstrated bactericidal effects against diarrhea-causing strains of *Vibrio cholera* and *Escherichia coli*, and anti-parasitic effects against *Giardia lamblia*, and *Entamoeba histolytica*.[15] Berberine may be as effective as the common antibiotic Flagyl against giardiasis.[16] Other common organisms shown to be subject to the antimicrobial action of berberine include *Candida*, *Salmonella*, *Klebsiella*, *Clostridium*, *Shigella*, and *Cryptococcus*.[17]

Cautions

- Due to the potential for additive effects resulting from inhibition of DPP IV by berberine, special consideration should be given when adding this product to the supplement regimen of patients who may already be taking a DPP IV inhibitor.

Dosing recommendations are given for typical use based on an average 150 pound healthy adult. Healthcare practitioners are encouraged to use clinical judgement with case-specific dosing based on intended goals, subject body weight, medical history, and concomitant medication and supplement usage.

Medicinal Ingredients (per softgel):

Berberine(*Berberis aristata*-Root) .....400 mg

Non-Medicinal Ingredients: Medium chain triglycerides, vitamin E, mixed tocopherol concentrate, sunflower lecithin, gelatin, water, glycerine, annatto. **Recommended Dose:** Adults: Take 1 softgel twice daily, or as directed by your health care practitioner. For use beyond 3 months, consult a health care practitioner.

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REFERENCES

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