

Berberine: A Promising Therapeutic Agent for Metabolic Health

A Comprehensive Review of Multiple Research Studies

Because there is so much internet buzz about berberine, we're focusing this issue just on the research supporting berberine for metabolic health – and introducing a new, well-absorbed berberine phytosome. Although berberine is being touted as the latest natural solution to weight loss, rather than having direct fat-burning or appetite-suppressive effects, for example, berberine has more indirect effects by supporting blood sugar, fat, and hormone metabolism. In this issue, you will find study summaries of berberine for hyperlipidemia, blood sugar management, NAFLD, and PCOS.

This is just a small selection of the dozens of studies on the metabolic effects of berberine. For a more comprehensive look at the research, request a copy of the newly updated Berberine Clinical Research Report from one of our representatives.

Berberine Compared to Myo-inositol or Metformin for Metabolic Derangements in PCOS

In a randomized trial, 129 women with PCOS were assigned to one of three groups: (1) 500 mg berberine twice daily, (2) 1,000 mg Myo-inositol twice daily, or (3) 500 mg metformin HCl twice daily for three months.

At the end of the trial, lipid parameters were improved in the three groups, but more significantly in the berberine group compared to the other two: decreased total- and LDL-cholesterol and triglycerides and increased HDL. Regarding hormone changes, improvements were seen in all three groups: decreased total testosterone and free androgen index and increased SHBG. Improvements in SHBG and free androgen index were more significant in the berberine group. And regarding glucose regulation, improvements were seen in all three groups: decreased fasting glucose and fasting insulin and increased glucose-to-insulin ratio (a measure of insulin sensitivity). However, the group taking Myo-inositol had significantly greater decreases in fasting insulin and increases in fasting glucose-to-insulin ratio – representing greater benefit for insulin resistance. Thus, berberine was superior for sex hormone and lipid balance, while Myo-inositol was superior for improving insulin sensitivity.

Note: Consider adding [Ovarian Care](#), containing D-chiro and myo-inositol along with other supportive nutrients, to your protocol for patients with PCOS.

Reference

Mishra N, Verma R, Jadaun P. Study on the effect of berberine, myoinositol, and metformin in women with polycystic ovary syndrome: a prospective randomized study. *Cureus* 2022;14(1):e21781. doi: 10.7759/cureus.21781.

Berberine for Hyperlipidemia

After a 6-month period of diet and exercise changes, 144 hypercholesterolemic people who were otherwise low risk for cardiovascular disease (CVD) were randomized to 500 mg berberine or placebo twice daily for three months. This was followed by a 2-month washout consisting of only diet and exercise and then an additional three months of berberine or placebo.

Bodyweight and BMI were the only improvements observed after the 6-month diet and exercise run-in period. After three months of berberine, total- and LDL-cholesterol and triglycerides were significantly decreased, while HDL was increased – compared to both baseline and placebo values. During the 2-month washout, this worsened with significant increases in lipids; however, these values again decreased significantly after berberine was resumed for an additional three months.

Reference

Derosa G, D'Angelo A, Bonaventura A, et al. Effects of berberine on lipid profile in subjects with low cardiovascular risk. *Expert Opin Biol Ther* 2013;13(4):475-482. doi: 10.1517/14712598.2013.776037.

Berberine for Blood Sugar and Lipid Support in Type 2 Diabetes

In a 3-month clinical study, 116 subjects with type 2 diabetes and dyslipidemia received either 1 g berberine daily or placebo. Statistically significant decreases were seen in the berberine group in fasting and post-prandial glucose levels, hemoglobin A1c (HbA1c), triglycerides, and total- and LDL-cholesterol.

Reference

Zhang Y, Li X, Zou D, et al. Treatment of type 2 diabetes and dyslipidemia with the natural plant alkaloid berberine. *J Clin Endocrinol Metab* 2008;93:2559-2565.

In another 3-month study, 36 individuals with newly diagnosed type 2 diabetes were given 500 mg three times daily of berberine or metformin. Significant improvements in glucose metabolism (fasting and post-prandial glucose and HbA1c) were seen in both groups (e.g., berberine resulted in a decrease of HbA1c from 9.47 ± 0.65 to 7.48 ± 0.40), while berberine was more effective than metformin at decreasing total cholesterol.

Reference

Yin J, Xing H, Ye J. Efficacy of berberine in patients with type 2 diabetes. *Metabolism* 2008;57:712-717.

Berberine for Non-Alcoholic Fatty Liver (NAFLD)

In a randomized, open-label trial, 184 patients with NAFLD received one of three treatments: (1) lifestyle intervention, (2) lifestyle intervention plus berberine (500 mg three times daily), or (3) lifestyle intervention plus pioglitazone for 16 weeks. Hepatic fat content, liver enzymes, glucose, insulin resistance (HOMA-IR), lipids, and anthropometrics were measured before and after treatment. Significant decreases in liver fat content, insulin resistance, body weight, and lipid profiles were seen in the berberine group compared to the lifestyle-only group; and berberine was superior to pioglitazone for reducing body weight and improving lipids. Liver fat decreased in the berberine group by 57.2 percent compared to 36.4 percent in the lifestyle-only group.

Reference

Yan HM, Xia MF, Wang Y, et al. Efficacy of berberine in patients with non-alcoholic fatty liver disease. *PLoS One* 2015;10(8):e0134172. doi: 10.1371/journal.pone.0134172.

Berberine Phytosome for Enhanced Absorption

Like many plant extracts, berberine by itself exhibits poor absorption. Although this is generally accounted for when clinical studies are conducted, a better-absorbed form could reduce the amount of berberine needed to support specific health goals. Berberine phytosome is a berberine extract bound to phospholipids and pea protein for enhanced absorption. Grapeseed extract is added to the phospholipid matrix to provide antioxidant support and protect the GI mucosa from potential irritation often seen with traditional berberine formulations. A pK study in healthy volunteers found 10 times better absorption with the phytosome compared to unbound berberine, with a linear, dose-dependent increase.

Reference

[Petrangolini G, Corti F, Ronchi M, et al. Development of an innovative berberine food-grade formulation with an ameliorated absorption: in vitro evidence confirmed by healthy human volunteer pharmacokinetic study. Evid Based Complement Alternat Med 2021;2021:7563889. doi: 10.1155/2021/7563889.](#)

Berberine Phytosome Benefits PCOS

In a small pilot study, 12 normal-to-overweight women (average age 26) diagnosed with PCOS were given 550 mg berberine phytosome twice daily for 60 days. Numerous blood biomarkers, acne assessments, and a DEXA scan for body composition were conducted at the beginning of the study and after 60 days of supplementation. A statistically significant decrease in insulin resistance (measured by HOMA-IR), fasting blood sugar, inflammation (assessed by CRP and TNF- α), triglycerides, testosterone, BMI, visceral adipose tissue, fat mass, and acne assessed by two acne grading scales, along with a statistically significant increase in sex hormone-binding globulin, were observed after 60 days of supplementation.

Note: [Thorne's higher-dose berberine](#) has a new formula that combines 550 mg berberine phytosome with 450 mg berberine HCl per 2-capsule serving.

Reference

[Rondanelli M, Riva A, Petrangolini G, et al. Berberine phospholipid is an effective insulin sensitizer and improves metabolic and hormonal disorders in women with polycystic ovary syndrome: a one-group pretest-post-test explanatory study. Nutrients 2021;13\(10\):3665. doi: 10.3390/nu13103665.](#)

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