

Birch bark ingredient comes with many metabolic benefits

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An ingredient found in abundance in birch bark appears to have an array of metabolic benefits, according to new studies in animals that are reported in the January issue of *Cell Metabolism*. In mice, the compound known as betulin lowered cholesterol, helped prevent diet-induced obesity, and improved insulin sensitivity. Betulin-treated mice were also more resistant to developing atherosclerotic plaques in their arteries.

Betulin works by targeting so-called sterol regulatory element-binding proteins (SREBPs), [transcription factors](#) that are known to be important for activating the expression of genes involved in the [biosynthesis](#) of cholesterol, [fatty acids](#), and triglycerides.

"Our study shows that the SREBP pathway is a good target for several metabolic diseases," said Bao-Liang Song of the Shanghai Institutes for Biological Sciences. "We also identify a leading compound."

In the new study, Song and his colleagues went in search of a compound that might act directly on SREBP. That chemical screen turned up betulin as a top contender. They then confirmed in cells that betulin lowered the activity of genes that are normally switched "on" by SREBP. It also lowered [lipid levels](#) within cells.

Song's team then treated mice on a high-fat, Western diet with betulin, the cholesterol-lowering statin known as [lovastatin](#), or a placebo (saline) for 6 weeks. Compared to placebo, both drugs led the mice to gain less weight on the high-fat diet, though by different means. Betulin caused

the animals to burn more calories while lovastatin appeared to reduce the amount of lipid taken up from the diet.

Further investigations showed that betulin also lowered lipid levels in blood, liver, and fat tissue. Betulin also made the animals more sensitive to insulin. Mice with a mutation that makes them prone to develop atherosclerosis showed fewer plaques when treated with either lovastatin or betulin.

"Betulin has several major metabolic effects," Song said.

The researchers say that their findings suggest that betulin may have similar or even better effects than lovastatin, a member of the most widely prescribed drug class for treating high cholesterol. For instance, in their studies betulin decreased lipids in liver and fat to a greater extent than lovastatin did. Betulin also improved insulin resistance through its effects on fatty acid and triglyceride synthesis.

Song notes that betulin is a readily available compound and is already in use as a precursor in the manufacture of other drugs.

Although betulin appears to have very low toxicity, he says future studies will need to further investigate the safety of betulin and its metabolic effects. Researchers will also explore the possibility that a derivative of betulin might have even greater potency. "That may be the path forward to move this clinically," Song said.

Provided by Cell Press

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