



Beta glucan (*B-glucan, Beta 1,3/1,6-D glucan, Beta 1,3-D glucan*)

Common Indications:

- Immune Support, including cancer prevention and treatment
- Antioxidant
- Cardiovascular protection, including lipid balance and blood pressure regulation
- Glycemic and insulin regulation
- Aids healthy digestion

General Comments:

Beta-glucans (or β -Glucans) are polysaccharides of D-glucose monomers linked by Beta-glycosidic bonds. β -Glucans occur in the bran of cereal grains (beta-1,3 and 1,4 glucans), the cell wall of baker's yeast, certain seaweeds (and certain types of fungi (mushrooms) such as shiitake, maitake and reishi. Yeast and fungi-derived β -Glucan (beta-1,3/1,6 glucans) is reported to have more effect on immune balance, whereas bran derived β -Glucan is considered a soluble fiber and has more effect on lipid levels and gastrointestinal health.¹ There are several types of beta-glucan supplements on the market. Shiitake mushroom (*Lentinus edodes*) are high in the beta-glucan compound lentinan. Beta 1,3/1,6-D glucans (mushrooms and yeast) are reported to be more absorbable and have more physiological activity than the beta 1,3/1,4-D glucans (bran).²

Benefits & Mechanism of Action:

Immune Support, including cancer prevention and treatment

Beta glucan stimulates the activity of macrophages, neutrophils, B-cells and natural killer cells activity.^{3,4} Reported to function as an antibiotic, antiviral, antifungal and antiparasitic agent.⁵ Beta-glucans are reported in laboratory studies to have tumoricidal and antitumor activity.^{6,7,8}

Antioxidant

Beta glucan provides antioxidant activity and stimulates the repair and regeneration of injured tissues.⁹

Cardiovascular protection, including lipid balance and blood pressure regulation

Beta-glucans from cereal brans are reported to decrease LDL cholesterol levels and improve HDL. Beta-glucan is the key factor for the cholesterol-lowering effect of oat bran. As with other soluble-fiber components, the binding of cholesterol (and bile acids) by beta-glucan and the elimination of these molecules in the feces are very helpful for reducing blood cholesterol.^{10,11,12,13} Results from a number of double-blind trials with either oat- or yeast-derived beta-glucan indicate typical reductions, after at least four weeks of use, of approximately 10% for total cholesterol and 8% for LDL cholesterol, with elevations in HDL cholesterol ranging from zero to 16%.^{14,15,16,17} A 2011 meta-analysis reported that increased beta-glucan intake did positively affect total cholesterol levels and may help regulate blood glucose imbalances, although the latter effects need more conclusive evidence.¹⁸

Beta-glucans have also been shown to reduce systolic and diastolic blood pressure and reduce the need for hypertension medications.¹⁹

Glycemic and insulin regulation

Oat beta-glucans have been reported in several clinical trials to reduce glucose levels and postprandial glycemia in humans.^{20,21} They increase the viscosity of food and slow gastric emptying leading to delayed glucose absorption.^{22,23} Beta-glucans have been reported to increase PI3K/Akt through several receptors, leading to improved glycemic control.^{1,24,25}

Dose:

- Up to 3 gm daily for support of lipid balance and immunity.
- Up to 25 mg/kg has been used in people with a weakened immune system.
- For maximum effectiveness, it should be taken on an empty stomach about 30 minutes before meals.

Symptoms of Depletion:

Beta glucan has no known deficiency associated with it.

Cautions & Side Effects:

There is no known toxicity when using beta glucan as a dietary supplement.

Symptoms that may indicate acute toxicity include:

- Flatulence
- Anal Irritation

Medication interactions

Medications with increased effects while taking beta-glucan include:

- Antihypertensive medications

- Lipid lowering medications
- Insulin
- Blood glucose lowering medications

Patients with the following disease states or conditions should not use beta-glucan:

- Intestinal obstruction

Food Sources:

Although beta-1,3 glucans occur in baker's yeast, seaweed, grains such as oats and barley, and numerous mushrooms, they are not readily usable in their natural state. The indigestible cell walls of these substances must be processed in order to free up the beta-1,3 glucans and make them available for useful purposes.

References:

General Comments

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Immune Support

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Cardiovascular protection

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Glycemic and insulin regulation

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