



## **NUTIN - Biotin 300mcg Tablet/Capsule**

### **INDICATED CLAIMS:**

- Helps to maintenance of good health
- Helps the body to metabolize carbohydrates, fats and proteins
- Helps to prevent biotin deficiency

### **GENERAL INFORMATION**

Biotin, a member of the B-vitamin family, is an essential nutrient in human nutrition. It is involved in the biosynthesis of fatty acids, gluconeogenesis, and energy production, the metabolism of the branched-chain amino acids (L-leucine, L-isoleucine, and L-valine) and the *de novo* synthesis of purine nucleotides. Recent research indicates that biotin plays a role in gene expression, both at the transcriptional and translational levels, and that it may also play a role in DNA replication.

Biotin is widely distributed in natural foodstuffs. However, the absolute amounts of biotin in foodstuffs is relatively low when compared with the other B vitamins. Some of the better food sources of biotin are egg yolk, liver, kidney, pancreas, milk, soya and barley. Brewer's yeast or *Saccharomyces cerevisiae*, which is used as a nutritional supplement, is one of the richest sources of biotin as well as the other B vitamins. Royal jelly, also used nutritional supplement, is another rich source of biotin. Mammals and many plant species are unable to synthesize biotin. Biotin is synthesized by bacteria, yeast and other fungi, algae and certain plant species. In fact the microfloras of the human large intestine appear to contribute to the biotin requirements of the body.

Although clinical biotin deficiency in humans is rare, it does occur. Prolonged consumption of raw egg white, long-term total parenteral nutrition without biotin supplementation and malabsorption syndromes, such as short-gut syndrome, have resulted in biotin deficiency states. The symptoms and signs of biotin deficiency include a generalized erythematous scaly skin eruption, alopecia, conjunctivitis and neurological abnormalities. The rash may be distributed around the eyes, nose, mouth, ears and perineal orifices. The facial appearance associated with

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the deficiency, with the rash around the eyes, nose and mouth along with an unusual distribution of facial fat, is called biotin deficiency facies. In biotin deficient infants, the neurological findings are hypotonia, lethargy and developmental delay. In adults, the neurological findings are lethargy, depression, hallucinations and paresthesias of the extremities. Marginal biotin status may occur under c conditions, e.g., during the first trimester of pregame it is thought that this situation may be teratogenic. Functional biotin deficiency occurs in certain genetic disorders.

Biotin is the coenzyme for four carboxylases. Acetyl coenzyme A (CoA) carboxylase, found in both the mitochondria and cytosol, catalyzes the carboxylation of acetyl-CoA to malonyl-CoA. Malonyl-CoA is the immediate precursor of 14 of the 16 carbon atoms of the fatty acid palmitic acid. It is also the immediate precursor of all of the fatty acids up o palmitic acid. Further, the reaction catalyzed by acetyl-coA carboxylase, a complex reaction, is the primary regulatory or rate-limiting, step in the biosynthesis of fatty acids. Pyruvate carboxylase, which is located in the mitochondria, catalyzes the carboxylation of pyruvate to form oxaloacetate. Oxaloacetate can be metabolized in the tricarboxylic acid cycle or it can be converted to glucose in the liver and kidney and other tissues that are involved in gluconeogenesis. The formation of oxaloacetate from pyruvate is known as an anaplerotic reaction. Anaplerotic is from the Greek word anaplerosis, meaning filling up or restoration. The pyruvatecarboxylate reaction is the principal reaction which replenishes tricarboxylic acid cycle intermediates, Methylerotonyl-CoA carboxylase, also located in the mitochondria, is involved in the metabolism of Lieu:ine, while the mitochondrial enzyme propionyl-CoA carboxylase is involved in the metabolism of L-isoleucine and L-valinc, as well as L-threonine and L-methionine. All four of the carboxylase enzymes, which use bicarbonate as their one-carbon substrate, share a common biochemical mechanism.

## **PNARMACOKINETICS**

The intestine is exposed to biotin from a few sources the diet, biotin supplements and biotin synthesized by bacteria in the large intestine. Dietary biotin exists in free and protein bound forms. Protein-bound biotin is digested by proteases and peptidases to biotin-containing oligopeptides and biocytin (epsilon-N-biotinyl-L-lysine). Biocytin and the biotin containing oligopeptides are converted to biotin via the enzyme biotinidase. Biotin-both dietary-derived

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biotin and supplementary biotin is efficiently absorbed from the small intestine. At doses of biotin derived from food, biotin appears to be transported into enterocytes by a sodium-dependent carrier. At higher doses of biotin, absorption appears to occur by passive diffusion. Absorption of the biotin produced by the colonic microflora, appears to occur by a carrier-mediated process in the proximal large intestine.

Biotin is transported to the liver via the portal circulation and by the systemic circulation, to the other tissues of the body. Biotin appears to be transported in the serum in both bound and unbound forms. Uptake of biotin by cells appears to occur by both a sodium-dependent carrier process and by passive diffusion. Transport of biotin across the blood-brain barrier appears to occur by a saturable transport mechanism. Placental transport of biotin appears to occur by a passive process. Within cells, the carboxylases (pyruvate carboxylase, acetyl-CoA carboxylase, 3-methylcrotonyl-CoA carboxylase, propionyl-CoA carboxylase) are biotinylated via holocarboxylase synthetase. Biotin and apocarboxylases the substrates. ATP and magnesium also participate in the reaction. Biotin is recycled from the holocarboxylases via the action of proteolytic enzymes and biotinidase. Biotin is catabolized to a number of different metabolites, including bisnorbiotin, biotin sulfoxide, biotin sulfone, bisnorbiotin methylketone and tetranorbiotin-1-sulfoxide. Biotin is excreted in the urine as biotin, bisnorbiotin, biotin sulfoxide, biotin sulfone, bisnorbiotin methyl ketone and tetranorbiotin-1-sulfoxide.

### **NUTIN - Biotin 300mcg Tablet/Capsule**

#### **Product information**

Available as 100 tablets

Each tablet contains:

Biotin – 300mcg

Non-medicinal ingredients: Microcrystalline cellulose, Dicalcium phosphates dehydrate, Magnesium Stearate, Hydroxypropyl methylcellulose, Carnauba Wax.

Directions for use: adult: take 1 tablet daily or as directed by a health care practitioner.

#### **Product information**

Available as 100 capsules

Each capsule contains:

Biotin – 300mcg

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**Non-medicinal ingredients:** Cellulose, Gelatin and Magnesium Stearate,

**Directions for use:** adult: take 1 capsule daily or as directed by a health care practitioner

### **Benefits**

- Nutralife's Biotin may be useful in the treatment of seborrheic dermatitis, infant cradle cap and to strengthen
- Improve the health of the nails and hair
- High doses of Biotin may be helpful in diabetes and the prevention and treatment of diabetic neuropathy.

### **CONTRAINDICATIONS**

Biotin is contraindicated in those hypersensitive to any component of a biotin-containing product.

### **PRECAUTIONS**

Pregnant women and nursing mothers should avoid supplemental doses of biotin greater than the adequate intakes (AI) recommended by the Food and Nutrition Board, unless higher doses are prescribed by their physicians. The AIs are 30 micrograms/day for pregnant women and 35 micrograms/ day for nursing mothers. The use of biotin for the treatment of biotin-responsive medical conditions requires medical supervision.

### **ADVERSE REACTIONS**

There are no reports of adverse reactions associated with biotin supplementation in the literature.

### **INTERACTIONS: DRUGS**

Antibiotics: Antibiotic use may decrease the biotin contribution to the body made by the microflora of the large intestine.

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Anticonvulsants (carbamazepine, phenytoin, Phenobarbital, primidone): Carbamazepine, phenytoin and Phenobarbital can accelerate biotin metabolism and may cause reduced biotin status. Long-term use of carbamazepine, phenytoin, phenobarbital and primidone has been associated with reduced plasma concentrations of biotin.

### **NUTRITIONAL SUPPLEMENTS**

Pantothenic Acid: High-doses of pantothenic acid may inhibit the absorption of biotin produced by the microflora in the large intestine. Pantothenic acid and biotin appear to use the same uptake carrier in colonocytes.

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