

BIOTINIDASE DEFICIENCY

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Biotinidase is an enzyme which cleaves biotin from biotinylated and biocytin, thereby recycling the vitamin. Biotin (vitamin H) is a member of the water-soluble B-complex group of vitamins and, as such, must be provided in the diet. Biotin is an essential cofactor for the following enzymes: pyruvate carboxylase, propionyl-CoA carboxylase, β -methylcrotonyl-CoA carboxylase and acetyl-CoA carboxylase and is vital because these enzymes participate in gluconeogenesis, fatty acid synthesis and amino acid catabolism.

Individuals with biotinidase deficiency cannot recycle endogenous biotin and cannot release dietary protein-bound biotin. If untreated, they become biotin-depleted, resulting in deficiencies of the above-named enzymes. Children with severe biotinidase deficiency commonly present with clinical features such as seizures, hypotonia, ataxia, breathing difficulties, hearing loss, optic atrophy, developmental delay, skin rash and alopecia. Other symptoms include conjunctivitis and fungal infections which are probably due to abnormalities in immunoregulation. The clinical expression of the disorder is highly variable. The age of onset of symptoms ranges from several weeks to several years of age. Most, but not all, symptomatic children exhibit metabolic ketoacidosis and organic aciduria. Older patients may present solely with neurodevelopmental delay.

Diagnosis is made by determining the activity of biotinidase in plasma or serum. The reference range is 4.2 - 1.8 nmol/ml/min; completely deficient patients exhibit virtually no activity. There are a number of patients with partial deficiency (10--30% of normal activity) who may only become symptomatic at times of metabolic stress.

When diagnosed, biotinidase deficiency is readily treatable! Profoundly deficient patients should be given a starting oral dose of 20 mg biotin per day, tapering to 10 mg per day maintenance. Continuous treatment with biotin can alleviate symptoms and if initiated early, can prevent them.

Sample requirement: 2 ml EDTA plasma or serum , frozen

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