

Biotinidase Deficiency (NBS)

Use

Determination of biotinidase enzyme activity in blood specimens dried on filter paper as an aid in screening newborns for biotinidase deficiency.

Clinical Significance

Biotinidase-deficient newborns have an inborn error of metabolism characterized by the inability to utilize dietary protein-bound vitamin or to recycle endogenous biotin derived from the turnover of carboxylases. Biotin deficiency develops progressively, resulting in deficiency of the biotin dependent carboxylases: propionyl-CoA carboxylase, 3-methyl-crotonyl-CoA carboxylase, and pyruvate carboxylase. The disorder is autosomal recessive. Individuals lacking biotinidase activity exhibit a variety of symptoms, which are frequently not present at birth, thus making it difficult to diagnose the disease by clinical observation. Symptoms and the time of onset vary greatly. *Profound biotinidase deficiency*, the more severe form of the condition, occurs when the activity of biotinidase is reduced to < 10% of normal and usually manifests itself in infants between two and six months of age. By contrast, *partial biotinidase deficiency*, the milder form of the condition, occurs when biotinidase activity is reduced to between 10 and 30% of normal, and presents later in life. Affected infants between two and six months of age usually develop hypotonia, ataxia, seizures, breathing difficulties, and display developmental delay. Cutaneous abnormalities (skin rash, alopecia) also may be manifested. Treatment with biotin is effective; however, if the therapy is delayed, neurological damage may not be completely reversed.

Further information and ACT Sheets can be found at the OSDH Newborn Screening Program [website](#).

Methodology

GSP Neonatal Biotinidase solid phase, time resolved, fluoroimmunoassay

Specimen Type

See [Guidance for Collection of NBS Dried Blood Spots](#)

Minimum Volume/Size

See [Guidance for Collection of NBS Dried Blood Spots](#)

Collection Instructions

See [Guidance for Collection of NBS Dried Blood Spots](#)

Common Causes for Rejection

See [Guidance for Collection of NBS Dried Blood Spots](#)

Shipping

See [Guidance for Collection of NBS Dried Blood Spots](#)

Turn-around Time

Within 5 working days of receipt

Reference Range

BIO ≥ 57 U/dL

Reportable Results

- Within Normal Limits
- Outside Normal Limits

Interpretation

- Within Normal Limits: Not consistent with biotinidase deficiency
- Outside Normal Limits
 - Decreased: Decreased biotinidase enzyme observed; submit repeat specimen as soon as possible
 - Repeat Decreased: Possible biotinidase deficiency; recommend immediate confirmatory testing
 - Low: Consistent with biotinidase deficiency; recommend immediate confirmatory testing

Limitations/Interferences

- This is a screening test only. It should not be used to distinguish partial from profound biotinidase deficiency. A diagnostic procedure should be used to confirm a diagnosis of biotinidase deficiency.
- Abnormal neonatal conjugated bilirubin levels (> 2.5 mg/dL) or triglycerides (≥ 250 mg/dL) may decrease biotinidase activity measured using this assay (i.e., produce a false positive reaction)
- Elevated glutathione (> 30.0 mg/dL), unconjugated bilirubin (10 mg/dL), sulfisoxazole (≥ 7.5 mg/dL), and ampicillin (≥ 1.4 mg/dL) can increase biotinidase activity measured using this assay (i.e., produce false negative reaction).
- Variables such as hematocrit, prematurity, and age of infants may affect the interpretation of the values produced.
- Specimens improperly collected, processed or transported may result in erroneous results.

CPT Code

82261

Notes

This test is approved for *in vitro* diagnostic use by the U.S. Food and Drug Administration.