Galactosemia: Galactose-1-Phosphate, Quantitative, Red Blood Cells

Test Code: GP
Turnaround time: 7 days - 10 days
CPT Codes: 84378 x1

Condition Description

Galactosemia is an autosomal recessive disorder of galactose metabolism that often presents in the newborn period with poor suck, vomiting, diarrhea, bleeding diathesis, lethargy, jaundice, and sepsis. If left untreated, an individual may progress to irreversible liver disease and mental retardation. The prevalence of galactosemia is approximately 1 in 30,000 newborns.

Most often galactosemia is caused by a deficiency of the galactose-1-phosphate uridyltransferase (GALT) enzyme, due to mutations in the GALT gene located on chromosome 9p13. The galactose-1-phosphate uridyltransferase (GALT) enzyme catalyzes the production of glucose-1-phosphate and UDP-galactose from gal-1-P and UDP-glucose. Deficiency results in the accumulation of galactose-1-phosphate, galactose, and urine galactitol.

There are other biochemical defects in the galactosemia pathway, such as epimerase and galactokinase deficiencies. Galactokinase deficiency should be considered in patients with cataracts and galactosemia who have normal gal-1-P and normal GALT activity. Epimerase deficiency should be considered in patients with liver disease, sensorineural deafness, failure to thrive, and elevated gal-1-P but normal GALT activity.

Please click here for the GeneReviews summary on this condition.


Indications

This test is indicated for:

- Monitoring the effectiveness of therapy in individuals with a biochemical diagnosis of classical, Duarte, or epimerase deficient galactosemia.

Please note that this test alone is NOT recommended for galactosemia screening or diagnosis in persons with a positive newborn screen. Please refer to the Galactosemia Comprehensive Panel (GS).

Methodology

Measures the concentration of galactose-1-phosphate in red blood cells, using a coupled enzymatic reaction detected by a spectrophotometric assay.

Detection

Results should be interpreted in the context of the patient's biochemical diagnosis and treatment plan.

Reference Range

Normal: 0-1.0 mg/100 ml red blood cells.

Classic Galactosemia Therapeutic range: <3.5 mg/100 ml red blood cells.

Specimen Requirements

Submit only 1 of the following specimen types

Type: Whole Blood (Sodium Heparin)

Specimen Requirements:
Sodium Heparin (Green Top)
3-5 ml

Specimen Collection and Shipping:
Ship sample at room temperature for receipt at EGL within 24 hours of collection. Do not refrigerate or freeze. Not accepted on Saturday. (Late Friday collections may be stored at room temperature over the weekend for Monday receipt.)

Type: Washed Blood Cells

Specimen Requirements:
Sodium Heparin
3-5 ml

Washed Red Blood Cell Preparation:
Step 1: Centrifuge the whole blood at 3000rpm (1800rcf) for 5 minutes.
Step 2: Remove plasma and buffy coat layer.
Step 3: Resuspend the red cells in normal saline (0.9% NaCl) with approximately 2 times the volume of the red cells, and invert the tube to mix.
Step 4: Centrifuge for 5 minutes at 2000 rpm and discard the supernatant.
Step 5: Repeat Steps 3 & 4 twice for a total of 3 washes or until the supernatant is clear.
Step 6: Completely remove the supernatant and freeze the red cells at -20°C, preferably at -80° C.
Specimen Collection and Shipping:
Ship frozen

<table>
<thead>
<tr>
<th>Related Tests</th>
</tr>
</thead>
<tbody>
<tr>
<td>Galactitol (test code GL) - biochemical screening test for diagnosis and monitoring or patients with galactosemia.</td>
</tr>
<tr>
<td>Galactosemia: GALT Enzyme Activity (test code GT) - Gal-1-P uridylytransferase enzyme activity.</td>
</tr>
<tr>
<td>Galactosemia: Comprehensive Panel (test code GS) - GALT activity and GAL-1-P.</td>
</tr>
<tr>
<td>Galactosemia: Nonclassic Galactosemia Panel (GALK &amp; GALE Enzymes and Galactose-1-Phosphate) (test code BGKEP)</td>
</tr>
<tr>
<td>Galactosemia: (Galactokinase Deficiency): GALK Enzyme Activity (test code GK).</td>
</tr>
</tbody>
</table>