GALACTOSEMIA

Definition
Galactosemia is an inherited disorder of carbohydrate metabolism, in which galactose cannot be converted to glucose because of the missing or deficient enzyme, galactose-1-phosphate uridyl transferase (GALT). The major sugar of milk (and most non-soy commercial infant formulas) is lactose. Lactose is digested to galactose and glucose in the intestine. Galactosemia (elevation of blood galactose levels) results when an infant missing the GALT enzyme is fed regular infant formula or breast milk. The galactose builds up in the body, causes cellular damage to the liver, eye and brain, and even death.

Incidence
Classic galactosemia (absence of the GALT enzyme) is rare, occurring in 1 in 70,000 live births. Variants of galactosemia with reduced GALT activity are more frequent and occur in 1 in 6,000 live births.

Inheritance
Galactosemia is inherited as an autosomal recessive metabolic disorder.

Characteristics
The severe form of this disorder, classic galactosemia, is due to almost total deficiency of galactose-1-phosphate uridyl transferase enzyme (GALT) activity in all cells of the body. The infant may appear normal at birth, but symptoms appear within a few days. The early clinical features of classic galactosemia include liver dysfunction, manifested as jaundice and hypoglycemia; neurological findings of irritability and seizures; and gastrointestinal findings of poor feeding, failure to thrive, vomiting, and diarrhea. Death may result from gram-negative sepsis within one to two weeks of birth. If the infant is untreated and survives the neonatal period, cataracts, cirrhosis, Fanconi syndrome, and mental retardation are usual consequences.

Variant Forms
There are several genetic variants, which are characterized by a less severe reduction in GALT enzyme activity (e.g., Duarte variant). Most of these variants are asymptomatic and are detected because of a persistent abnormality in the newborn screen. However, some of these infants may benefit from dietary therapy if galactose-1-phosphate accumulates. For this reason, infants with any abnormality on the galactosemia screen require further testing and possibly evaluation by a pediatric metabolic specialist.

Newborn Screening Methodology
The laboratory method used is a semi-quantitative fluorometric assay, which measures the activity of the GALT enzyme.

<table>
<thead>
<tr>
<th>Results</th>
<th>Actions</th>
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<tbody>
<tr>
<td>Within Normal Limits (&gt; 3.7 GALT Units/g Hb)</td>
<td>Normal report is sent to submitter.</td>
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<tr>
<td>Borderline</td>
<td>Attending physician will be notified by the program</td>
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### Confirmation

Confirmation of galactosemia is made by measurement of the galactose-1-phosphate uridyl transferase enzyme activity. Immediate consultation with a Pediatric Metabolic Specialist or Geneticist should be obtained for confirmation and diagnosis, (319) 356-2674.

### Treatment and Outcome

Classic galactosemia is treated by rigid dietary exclusion of lactose and galactose from the diet. This diet must be followed for life and requires close supervision. Even with early diagnosis and strict adherence to the diet, these children remain at risk for some problems. They will achieve satisfactory general health, but remain at risk for speech disorders, growth and developmental delays and, in females, ovarian failure. Children with galactosemia should be followed regularly by a Pediatric Metabolic Specialist or Geneticist.

### Screening Practice Considerations

- Galactosemia can cause death quickly. Prompt follow-up of an abnormal screen is important.
- If screening results are positive for galactosemia, the consultant will recommend that the physician takes the child off milk feedings and collect a new specimen for repeat screening and/or confirmatory testing.
- Because the newborn screen measures enzyme activity in red blood cells, false negatives can result following blood transfusions.
- Galactosemia should be considered in any infant with reducing substances in the urine. If galactosemia is suspected, immediate consultation with a Pediatric Metabolic Specialist or Geneticist is advised.

### Other Sites of Reference

- Galactosemia Discussions
  Website: www.galactosemics.org/forums/

- Miele-Herndon Galactosemia Discussion Group
  Website: www.miele-herndon.com/

- Texas Department of Health - Galactosemia
  Website: www.tdh.state.tx.us/newborn/galac_1.htm

- Texas Department of Health - What is Galactosemia Brochure
  Website: www.tdh.state.tx.us/newborn/galac_1.htm
National Organization For Rare Disorders - Galactosemia
http://www.rarediseases.org/search/rdbdetail_abstract.html?disname=Galactosemia

Galactosemia - American Liver Foundation
http://64.227.163.135/cgi-bin/dbs/articles.cgi?db=articles&uid=default&ID=1046&view_records=1

Organization For Endocrine & Metabolic Diseases

Galactosemia - Washington Dept of Health
http://www.doh.wa.gov/EHSPHL/PHL/Newborn/galactosemia.htm

Dr. Holmes Morton on treating a metabolic crisis specifically for a Glutaric Aciduria
http://www.crynwr.com/amish/ga.html

MUMS - National Parent-to-Parent Network
http://www.netnet.net/mums/

**Support Groups**
Parents of Galactosemic Children
http://www.galactosemia.org/
885 Del Sol Street
Sparks, NV 89436
Contact Person: Evelyn Rice
Phone: (775) 626-0885
E-mail: mesameadow@aol.com