Galactosemia: \textit{GALT} Gene Sequencing

\textbf{Test Code:} SG  
\textbf{Turnaround time:} 4 weeks  
\textbf{CPT Codes:} 81406 x1

\section*{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 oftentimes galactosemia is caused by a deficiency of the galactose-1-phosphate uridyltransferase (GALT) enzyme, which catalyzes the conversion of the galactose-1-phosphate to glucose-1-phosphate. This is a critical step in the metabolism of galactose to glucose.

The \textit{GALT} gene is encoded by 11 exons on chromosome 9p13. Galactosemia caused by mutations in the \textit{GALT} gene is inherited in an autosomal recessive manner.

Family members of individuals with galactosemia are at risk to be carriers of the disorder. Biochemical and molecular screening is available to family members or partners of individuals with galactosemia using a combination of mutation analysis and enzyme activity.


Reference:  
\begin{itemize}
  \item \url{GeneReviews Clinical Summary}
\end{itemize}

\section*{Genes}

\textbf{GALT}

\section*{Indications}

This test is indicated for individuals with biochemical diagnosis of a galactosemia or carrier status and a negative or unknown result from mutation analysis for common \textit{GALT} gene mutations.

This test is \textbf{NOT} recommended for galactosemia screening or diagnosis in persons with a positive newborn screen. Please refer to the Classic Galactosemia Panel.

\section*{Methodology}

PCR is used to amplify the 11 coding exons, immediate flanking regions, and the 4bp promoter deletion region of the \textit{GALT} gene. The 5.0kb deletion is tested for by allele specific PCR.

\section*{Detection}

This assay will detect over 95% of the sequence variants in the coding region and splice junctions. Mutations in the promoter region, some mutations in the introns, and other regulatory elements cannot be detected by this analysis. Large deletion and insertion mutations will not be detected by this assay. It is possible that some patients with a typical presentation may not carry a mutation detected by this analysis. This analysis may detect novel variants of unclear effect, which may require further studies.

Results of molecular analysis must be interpreted in the context of the patient's clinical and/or biochemical phenotype.

\section*{Specimen Requirements}

\textit{Submit only 1 of the following specimen types}

\textbf{Type:} DNA, Isolated

\textbf{Specimen Requirements:}

- Microtainer
- 8\mu g

Isolation using the Perkin Elmer\textsuperscript{TM}Chemagen\textsuperscript{TM} Automated Extraction method or QiaGen\textsuperscript{TM} Puregene kit for DNA extraction is recommended.

\textbf{Specimen Collection and Shipping:}

Refrigerate until time of shipment in 100 ng/\mu L in TE buffer. Ship sample at room temperature with overnight delivery.

\textbf{Type:} Whole Blood (EDTA)

\textbf{Specimen Requirements:}

- EDTA (Purple Top)
- Infants and Young Children (2 years of age to 10 years old): 3-5 ml
- Older Children & Adults: 5-10 ml

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Autopsy: 2-3 ml unclotted cord or cardiac blood

**Specimen Collection and Shipping:**
Ship sample at room temperature for receipt at EGL within 24 hours of collection. Do not refrigerate or freeze.

**Type: Saliva**

**Specimen Requirements:**
Oragene™ Saliva Collection Kit
Oragene™ Saliva Collection Kit used according to manufacturer instructions. Please contact EGL for a Saliva Collection Kit for patients that cannot provide a blood sample.

**Specimen Collection and Shipping:**
Please do not refrigerate or freeze saliva sample. Please store and ship at room temperature.

**Special Instructions**
Submit copies of diagnostic biochemical test results with the sample. Sequence analysis is required before deletion/duplication analysis by targeted CGH array. If sequencing is performed outside EGL Genetics, please submit a copy of the sequencing report with the test requisition. Contact the laboratory if further information is needed.

**Related Tests**
- **Comprehensive GALT Analysis** includes GALT enzyme activity, isozyme pattern (phenotyping), and gal-1-p level.
- **Carrier Testing for Galactosemia** is accomplished by looking at GALT and isozyme.
- **Custom Diagnostic Mutation Analysis** is available to individuals if the familial mutation is not included in the common mutation panel. Please contact the laboratory genetic counselor to arrange testing.
- **A Deletion/Duplication Assay** is available separately for individuals where mutations are not identified by sequence analysis. Refer to the test requisition or contact the laboratory for more information.
- **Prenatal testing** may be available to couples who are confirmed carriers of galactosemia by molecular and biochemical analysis. Please contact the laboratory genetic counselor to determine the availability of prenatal testing.