Mucopolysaccharidosis Type VII: \textit{GUSB} Gene Deletion/Duplication

\textbf{Test Code:} NC  
\textbf{Turnaround time:} 2 weeks  
\textbf{CPT Codes:} 81228 x1

\section*{Condition Description}

Mucopolysaccharidosis type VII (MPS VII) is a member of a group of inherited metabolic disorders collectively termed mucopolysaccharidoses (MPSs). The MPSs are caused by a deficiency of lysosomal enzymes required for the degradation of mucopolysaccharides also called glycosaminoglycans (GAGs) within the lysosome. When functioning normally, the lysosomal enzymes break down these GAGs, however when the enzyme is deficient, the GAG build up in the lysosomes causing damage to the body's tissues. The MPSs share a chronic progressive course with multisystem involvement, several physical features, laboratory findings, and radiographic abnormalities; these include facial coarsening, hepatomegaly, excretion of urinary GAG fragments, and leukocyte inclusion bodies.

Mucopolysaccharidosis type VII (MPS VII) is an autosomal recessive that occurs when certain mucopolysaccharides, specifically dermatan, heparan, and chondroitin sulfates accumulate in lysosomes due to a deficiency of the enzyme beta-glucuronidase. Unlike other lysosomal storage disorders in which patients begin life with a period of normal development, patients with MPS VII have a high incidence of hydrops fetalis \cite{1}. Clinical features of MPS VII vary widely between patients and include short stature, coarse facial features, hepatosplenomegaly, respiratory difficulties, hearing loss, and mental retardation.

Mutations in the \textit{GUSB} gene cause deficiency of beta-glucuronidase leading to MPS VII. A pseudodeficiency allele, a mutation that reduce enzyme activity but does not cause disease, has been described \cite{2} and will be detected by this sequencing analysis. Diagnostic sequencing analysis of the \textit{GUSB} gene coding region is available for MPS type VII patients and their at-risk relatives on a clinical basis.

For further clinical information about lysosomal storage diseases, including management and treatment, call the Emory Lysosomal Storage Disease Center at (404) 778-8565 or (800) 200-1524.

\section*{References}


\section*{Genes}

\textit{GUSB}

\section*{Indications}

- Confirmation of a clinical diagnosis of MPS VII  
- Prenatal testing for known familial mutations.  
- Assessment of carrier status in high risk family members known mutation analysis.

\section*{Methodology}

DNA isolated from peripheral blood is hybridized to a CGH array to detect deletions and duplications. The targeted CGH array has overlapping probes which cover the entire genomic region.

\section*{Detection}

Detection is limited to duplications and deletions. Array CGH will not detect point mutations or intronic mutations. Results of molecular analysis must 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
3µg
Isolation using the Perkin Elmer™Chemagen™ Chemagen™ Automated Extraction method or Qiagen™ Puregene kit for DNA extraction is recommended.

Specimen Collection and Shipping:
Refrigerate until time of shipment in 100 ng/µL in TE buffer. Ship sample at room temperature with overnight delivery.

Type: Whole Blood (EDTA)

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
Autopsy: 2-3 ml unclotted cord or cardiac blood

Specimen Collection and Shipping:
Ship sample at room temperature for receipt at EGL within 72 hours of collection. Do not freeze.

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
- Mucopolysaccharide screen (urine GAG) (GA)
- Lysosomal enzyme screening panel (LS)
- Known mutation analysis (Custom Diagnostics) is available to test family members.
- Prenatal testing is available for known familial mutations only. Please call the Laboratory Genetic Counselor for specific requirements for prenatal testing before collecting a fetal sample.