Mucopolysaccharidosis Type IVB: \textit{GLB1} Gene Deletion/Duplication

\textbf{Condition Description}

Mucopolysaccharidosis type IVB (Morquio syndrome, MPS IV B) 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 or glycosaminoglycans (GAGs). Morquio syndrome type IVB is caused by deficiency of the enzyme beta galactosidase. Deficiency of this enzyme leads to accumulation of the GAG, keratan sulfate, in the lysosomes.

Symptoms of Morquio syndrome include the excretion of specific urinary glycosaminoglycans and skeletal abnormalities. Most individuals affected by Morquio syndrome do not have coarse facial features or mental retardation. Skeletal manifestations of Morquio syndrome include: odontoid hypoplasia, a striking short trunk dwarfism, and genu valgus. Compared to other patients with MPS, those with Morquio syndrome tend to have greater spine involvement with scoliosis, kyphosis, and severe gibbus, as well as platyspondyly, rib flaring, pectus carinatum, and ligamentous laxity. Odontoid hypoplasia is the most critical skeletal feature to recognize in any patient with Morquio syndrome. In earlier clinical descriptions, MPS Type IVA was considered to have more severe manifestations than type IVB. However, with the ability to differentiate between types A and B by enzyme analysis, it is understood that significant variability in clinical expression exists within both groups. No clear clinical differentiation between Morquio syndrome type IVA and IVB exists.

Mutations to the \textit{GLB1} gene cause deficiency of beta-galactosidase. Diagnostic sequencing analysis of the \textit{GLB1} gene coding region is available for MPS IV B patients and their at-risk relatives on a clinical basis.

For questions about testing for MPS IV B, call EGL Genetics at (470) 378-2200 or (855) 831-7447. 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.

\textbf{References:}


\textbf{Genes}

\textit{GLB1}

\textbf{Indications}

- Confirmation of a clinical diagnosis of MPS IV B Disease
- Prenatal testing for known familial mutation(s).
- Assessment of carrier status in high risk family members - known mutation analysis.

\textbf{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.

Please note that a “backbone” of probes across the entire genome are included on the array for analytical and quality control purposes. Rarely, off-target copy number variants causative of disease may be identified that may or may not be related to the patient's phenotype. Only known pathogenic off-target copy number variants will be reported. Off-target copy number variants of unknown clinical significance will not be reported.

\textbf{Detection}

Detection is limited to duplications and deletions. Array CGH will not detect point mutations or intronic mutations. Results of molecular analysis must be interpreted in the context of the patient's clinical and/or biochemical phenotype.

\textbf{Specimen Requirements}

Submit only 1 of the following specimen types

* Preferred specimen type: Whole Blood

\textbf{Type: Whole Blood}

Specimen Requirements:
In EDTA (purple top) tube:
Infants (2 years): 3-5 ml
Older Children & Adults: 5-10 ml

Specimen Collection and Shipping: Refrigerate until time of shipment. Ship sample within 5 days of collection at room temperature with overnight delivery.

**Type: Saliva**

Specimen Requirements:

Oragene™ Saliva Collection kit (available through EGL) used according to manufacturer instructions.

Specimen Collection and Shipping: Store sample at room temperature. Ship sample within 5 days of collection at room temperature with overnight delivery.

**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.