### Condition Description

Congenital disorders of glycosylation (CDG) comprise a group of multi-system diseases with an extremely variable phenotype. Manifestations range from severe developmental delay and hypotonia with multiple organ system involvement beginning in infancy, to hypoglycemia and protein-losing enteropathy with normal development, or isolated failure to thrive. Type I CDG comprises those disorders in which there are defects that affect the biosynthesis of dolichol-linked oligosaccharides in the cytosol or the endoplasmic reticulum (ER), as well as defects involving the transfer of oligosaccharides onto nascent glycoproteins. Type II CDG comprises all defects of further trimming and elongation of N-linked oligosaccharides in the ER and Golgi.

Serum or plasma N-glycan profile can be used to identify most subtypes of CDG type II, combined type I and type II, and multiple glycosylation disorders, such as various types of COG complex deficiencies (Conserved Oligomeric Golgi).

### References:


### Indications

Manifestations of CDG range from severe developmental delay and hypotonia with multiple organ system involvement to hypoglycemia and protein-losing enteropathy with normal development. The diagnosis should be considered in all patients with failure to thrive, mental retardation, cerebellar hypoplasia, liver dysfunction, or seizures and stroke-like episodes.

### Methodology

N-Glycan chains are released from SDS denaturated serum glycoproteins via PNGase F digestion, and then permethylated. The permethylated N-glycan are measured by liquid chromatography - tandem mass spectrometry (LC-MS/MS) with quadrupole - time of flight detection (QTOF). The structure of the glycans can be further analyzed by LC-MS/MS (QTOF).

### Detection

Comparing to normal serum or plasma, the changes in the N-glycan structure monitored by LC-MS/MS profile are used to identify the associated congenital disorders of glycosylation (CDGs) in patients serum or plasma.

### Specimen Requirements

**Submit only 1 of the following specimen types**

**Type: Whole Blood (No additive)**

**Specimen Requirements:**  
No Additive (Red Top) or SST (Serum Separator Tube - no additives)  
1-2 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

**Type: Plasma**

**Specimen Requirements:**  
Sodium Heparin (Green Top)  
1-2 ml

Sample should be collected while fasting or 2-4 hours post prandial. Centrifuge to separate plasma and freeze.

**Specimen Collection and Shipping:**  
Ship frozen sample on dry ice with overnight delivery.

**Type: Whole Blood (Sodium Heparin)**

**Specimen Requirements:**  
Sodium Heparin (Green Top)  
1-2 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.

**Type: Serum**

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Specimen Requirements:
Clean container without additives
1-2 ml
Spin down, transfer, and ship frozen.

Specimen Collection and Shipping:
Ship frozen sample on dry ice with overnight delivery.

Special Instructions

Please provide a copy of clinic notes. Any additional test results, including carbohydrate deficient transferrin analysis and molecular results may assist in the interpretation of results

Related Tests

- Carbohydrate Deficient Transferrin for Congenital Disorders of Glycosylation (BCDGS)
- N-glycan and Carbohydrate Deficient Transferrin Panel for CDGs (BCDGP)
- Congenital Disorders of Glycosylation: O-glycan Profile and Quantification (BOGLY)
- Oligosaccharide and Glycan Screening (OS)
- Sequencing analysis of individual CDG genes is available.
- Sequencing analysis of different panels for CDG genes are also available.
- Custom diagnostic mutation analysis (KM) is available to family members if mutations are identified by targeted mutation testing or sequencing analysis.
- Prenatal testing is available to adult couples who are confirmed carriers of mutations. Please contact the laboratory genetic counselor to discuss appropriate testing prior to collecting a prenatal specimen.