Autosomal Dominant Optic Atrophy (Kjer Type): \textit{OPA1} Gene Deletion/Duplication

\textbf{Test Code:} KO  
\textbf{Turnaround time:} 2 weeks  
\textbf{CPT Codes:} 81406 x1

\textbf{Condition Description}

Autosomal dominant optic atrophy, Kjer type, is the most common form of hereditary optic neuropathy. The incidence of ADOA is approximately 1 in 50,000 to 1 in 10,000 live births. It is a childhood onset disorder typically characterized by a progressive loss in central vision, color vision deficits (dyschromatopsia), decreased visual acuity, decreased sensitivity of the central retinal field (paracentral scotomas), and asymmetric degeneration of the retinal ganglion cells visible as pallor of the optic disk. The underlying defect is retinal ganglion cell degeneration. The disease phenotype displays both inter- and intra-familial variability with incomplete penetrance.

Mutations in the \textit{OPA1} gene, located on chromosome 3q28-q29, cause Kjer type autosomal dominant optic atrophy. \textit{OPA1} consists of 31 exons and encodes a mitochondrial dynamin-related GTPase, a protein thought to be involved in maintaining the structure and function of mitochondria. Approximately 90\% of autosomal dominant optic atrophy patients carry a mutation in \textit{OPA1}.

\textbf{Genes}

\textit{OPA1}

\textbf{Indications}

This test is indicated for patients with a diagnosis of optic atrophy. Sequencing is not appropriate for prenatal samples in which familial mutations have not been identified.

\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.

\textbf{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.

\textbf{Specimen Requirements}

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

\textbf{Type: DNA, Isolated}

\textbf{Specimen Requirements:}

- Microtainer
- 3\µg

Isolation using the Perkin Elmer™Chemagen™ Chemagen™ Automated Extraction method or Qiagen™ Puregene kit for DNA extraction is recommended.

\textbf{Specimen Collection and Shipping:}

Refrigerate until time of shipment in 100 ng/µL 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
- Autopsy: 2-3 ml unclotted cord or cardiac blood

\textbf{Specimen Collection and Shipping:}

Ship sample at room temperature for receipt at EGL within 72 hours of collection. Do not freeze.

\textbf{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.

\textbf{Related Tests}

- Leber Hereditary Optic Neuropathy (QC) is a mitochondrial disorder characterized by atrophy of the optic nerve.
- \textit{OPA3} gene sequencing.

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Custom diagnostic mutation analysis (KM) is available to family members if mutations are identified by sequencing. Prenatal testing may be available to couples who are confirmed carriers of OPA1 mutations. Please contact the laboratory genetic counselor to arrange prior to collecting a prenatal specimen.