Von Hippel-Lindau Syndrome: VHL Gene Deletion/Duplication

Condition Description

Von Hippel-Lindau syndrome (VHL syndrome) is characterized by hemangioblastomas of the brain, spinal cord, and retina; renal cysts and clear cell renal cell carcinoma; pheochromocytoma; and endolymphatic sac tumors. Cerebellar hemangioblastomas may be associated with headache, vomiting, and gait disturbances or ataxia. Retinal hemangioblastomas may be the initial manifestation of VHL syndrome and can cause vision loss. Renal cell carcinoma occurs in about 40% of individuals with VHL syndrome and is the leading cause of mortality. Pheochromocytomas can be asymptomatic but may cause sustained or episodic hypertension. Endolymphatic sac tumors can cause hearing loss of varying severity, which can be a presenting symptom.

The diagnosis of VHL syndrome is suspected in individuals with characteristic lesions including hemangioblastomas, renal cysts and renal cell carcinoma, pheochromocytoma, and endolymphatic sac tumors. The clinical diagnosis of VHL syndrome is established in a simplex case (an individual with no known family history of VHL syndrome) presenting with two or more characteristic lesions or in an individual with a positive family history of VHL syndrome in whom one or more of the following disease manifestations is present: retinal angioma, spinal or cerebellar hemangioblastoma, pheochromocytoma, multiple pancreatic cysts, epididymal or broad ligament cystadenomas, multiple renal cysts, or renal cell carcinoma before age 60 years.

VHL is the only gene known to be associated with VHL syndrome. Molecular genetic testing of the VHL gene detects mutations in nearly 100% of affected individuals. Approximately 72% of VHL mutations are point mutations detected by sequence analysis. Approximately 28% of VHL mutations are partial or complete gene deletions detectable by gene-targeted CGH array. VHL syndrome is inherited in an autosomal dominant manner. Approximately 80% of individuals with VHL syndrome have an affected parent and about 20% have VHL syndrome as the result of a de novo gene mutation. The manifestations and severity of the disease are highly variable both within and between families, even among those with the same mutation.

Click here for the GeneTests summary on this condition.

Genes

VHL

Indications

This test is indicated for:

- Confirmation of a clinical diagnosis of VHL in individuals who have tested negative for sequence analysis
- Individuals at-risk for VHL due to family history who have tested negative for sequence analysis

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.

Detection

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

Specimen Requirements

Submit only 1 of the following specimen types

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 24 hours of collection. Do not refrigerate or freeze.

Type: DNA, Isolated

Specimen Requirements:

- Microtainer
  - 3µg
- Isolation using the PerkinElmer™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.

Special Instructions
Submit copies of diagnostic biochemical test results with the sample, if appropriate. Contact the laboratory if further information is needed.

Sequence analysis is required before deletion/duplication analysis by targeted CGH array. If sequencing is performed outside of EGL Genetics, please submit a copy of the sequencing report with the test requisition.

Related Tests
- Sequencing analysis of the VHL gene by sequencing is available (UV) and is required before deletion/duplication analysis.
- Prenatal testing is available to individuals who are confirmed carriers of mutations. Please contact the laboratory genetic counselor to discuss appropriate testing prior to collecting a prenatal specimen.