Epilepsy and Seizure Disorders: Deletion/Duplication Panel

Condition Description

Epilepsy is defined as a disorder in which an individual has recurrent, unprovoked seizures. It has a prevalence of about 5-10 per 1000 people. While the causes of epilepsy are diverse, a significant proportion are considered to be genetic in origin. Epilepsy can occur as part of a clinical spectrum that is associated with a particular genetic syndrome, such as Mowat Wilson syndrome, Dravet syndrome, and “chromosomal” epilepsies. Common “chromosomal” epilepsies include 1p36 deletion syndrome, Wolf-Hirschhorn syndrome, Angelman syndrome, Miller-Dieker syndrome, 15q inversion-duplication, Down syndrome and ring chromosome 14 and 20. In addition, epilepsy can occur as an isolated finding, 40% of which are believed to be due to genetic causes. Approximately 2% of the genetic causes of isolated epilepsy are due to monogenic causes while the rest are thought to be due to multifactorial genetic and environmental causes. Of the monogenic genes identified, the majority code for ion channel subunits and neurotransmitter receptors.

This test includes deletion/duplication analysis for syndromic and non-syndromic causes of seizures. It is recommended that individuals with seizures have a chromosomal microarray as a first tier test. Please click here for information on our EmArray Cyto and CytoScan SNP Array.

Support for the development of this panel was provided, in part, by a grant from the Epilepsy Foundation to Dr. Andrew Escayg, Associate Professor, Department of Human Genetics.

References:

Genes

ABAT, ADGRG1, ADGRV1, ADSL, ALDH7A1, ARHGEF9, ARX, ASPM, ATP1A2, ATP6AP2, BCKD, CACNA1A, CACNB4, CASK, CASB, CDKL5, CENPJ, CHRNA2, CHRNB2, CLN3, CLN5, CLN6, CLN8, CNTNAP2, CPA1, CSTB, CTSD, DCX, DNM2, EFHC1, EMX2, EP300, FLNA, FOLR1, FOXG1, GABRA1, GABRB2, GATM, GATN, GOSR2, GRIN2A, HCN1, HCN4, KCNA1, KCNJ10, KCNJ11, KCNMA1, KCNQ2, KCNQ3, KCNT1, KCNT1L, LGI1, LIAS, MAGI2, MBDS, MCPH1, MEG2, MEF2C, MFSDS, MTHFR, NDE1, NDUFA1, NHLRC1, NRXN1, OPN1L, PAFAH1B1, PCDH19, PHF6, PLCB1, PNKP, PNPO, POLG, PPT1, PRICKLE1, PRICKLE2, RELN, SCA2B, SCN1A, SCN1B, SCN2A, SCN3A, SCN8A, SCN9A, SHH, SIX3, SLC19A3, SLC25A19, SLC2A2, SLC2A1, SLC9A6, SPTAN1, SRPX2, ST3GAL3, ST3GAL5, STIL, STXBP1, SYN1, TBC1D24, TCF4, TPPI, TSC1, TSC2, TSEN54,UBE3A, WDR62, ZEB2

Indications

This test is indicated for:
- Individuals with epilepsy.

Methodology

Deletion/Duplication Analysis: DNA isolated from peripheral blood is hybridized to a gene-targeted CGH array to detect deletions and duplications. The targeted CGH array has overlapping probes that 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.

Detection

Deletion/Duplication Analysis: 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**

Specimen Requirements:

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

Specimen Collection and Shipping: Ship sample at room temperature with overnight delivery.

**Type: Isolated DNA**

Specimen Requirements:

In microtainer: 10 ug

Isolation using the Qiagen™ Puregene kit for DNA extraction is recommended.

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

**Related Tests**

- CytoScan + SNP and EmArray Cyto.
- 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 only for known familial mutations to individuals who are confirmed carriers of mutations. Please contact the laboratory genetic counselor to discuss appropriate testing prior to collecting a prenatal specimen.
- Epilepsy and Seizure Disorders: Sequencing Panel.