Joubert Syndrome: Deletion/Duplication Panel

**Test Code:** MD136  
**Turnaround time:** 2 weeks  
**CPT Codes:** 81228 x1, 81405 x1

### Condition Description

Joubert syndrome (JS) is an autosomal recessive multisystem disease characterized by cerebellar vermis hypoplasia with prominent superior cerebellar peduncles (resulting in the 'molar tooth sign', or MTS, on axial MRI), intellectual disability, hypotonia, irregular breathing pattern, and eye movement abnormalities. Some individuals with JS have retinal dystrophy and/or progressive renal failure characterized as nephronophthisis. The disorder in such patients is referred to as cerebellooculorenal syndrome, or CORS. Individuals with a mild form of JS have been shown to have a homozygous deletion of the NPHP1 gene identical, by mapping, to that in subjects with nephronophthisis alone. Please note, the CEP164 gene is not included in the NGS panel at this time due to presence of at least one pseudogene. For clinicians that would like CEP164 analysis in the event that all other genes test negative, we request that you contact EGL directly. Please note, the TMEM138 and TMEM231 genes are not included on the NGS panel at this time as these genes are only partially annotated in hg19. TMEM138 and TMEM231 will be re-evaluated with the release of hg20.

**References:**
- OMIM
- GeneReviews

### Genes

AH1, ARL13B, C5orf42, CC2D2A, CEP290, CEP41, KIF7, NPHP1, QFD1, RPGRIP1L, TCTN1, TCTN2, TCTN3, TMEM216, TMEM237, TMEM67, TTC21B, ZNF423

### Indications

This test is indicated for:
- Confirmation of a clinical diagnosis of Joubert syndrome.
- Carrier testing in adults with a family history of Joubert syndrome.

### 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:** Detection is limited to duplications and deletions. The CGH array will not detect point or intronic pathogenic variants. 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\textsuperscript{TM} 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.

**Special Instructions**

Please include fundus photographs, electroretinogram (ERG) findings, visual field findings, and visual acuity, if available, for expert review and clinical correlation with test results.

**Related Tests**

- Joubert Syndrome: Sequencing Panel
- Eye Disorders: Comprehensive Sequencing Panel
- Eye Disorders: Deletion/Duplication Panel