**RYR2-related Disorders: RYR2 Gene Deletion/Duplication**

**Test Code:** DRYR2  
**Turnaround time:** 2 weeks  
**CPT Codes:** 81228 x1

### Condition Description

**Catecholaminergic Polymorphic Ventricular Tachycardia**  
Catecholaminergic polymorphic ventricular tachycardia (CPVT) is characterized by cardiac electrical instability. This instability can be exacerbated by acute activation of the adrenergic nervous system, such as during exercise or extreme emotional events. These episodes have an underlying cause of ventricular tachycardia, which may progress into ventricular fibrillation. Two genes are known to cause CPVT. Mutation of the *RYR2* gene cause autosomal dominant CPVT while mutations of the *CASQ2* gene cause autosomal recessive CPVT.

**Arrhythmogenic Right Ventricular Dysplasia/Cardiomyopathy**  
Arrhythmogenic right ventricular dysplasia/cardiomyopathy (ARVD/C) is an autosomal dominant condition characterized by abnormalities in cardiac structure and rhythm. The fibrofatty replacement of myocardium can predispose affected individuals to ventricular tachycardia and sudden death in young individuals and athletes. Common presenting features include heart palpitation, syncope, and death. Other diagnostic criteria include right ventricular dilation and reduction of right ventricular function, and right ventricular aneurysms. The phenotype of ARVD/C is very variable and while it primarily affects the right ventricle, it may involve the left ventricle as well. Eight genes are known to cause ARVD/C; *TGFB3, RYR2, TMEM43, DSP, PKP2, DSG2, DSC2,* and *JUP*.

Please note that this is for the *RYR2* (1q42.1-q43) gene only.

For patients with suspected *RYR2*-related disorders, sequence analysis is recommended as the first step in mutation identification. For patients in whom mutations are not identified by full gene sequencing, deletion/duplication analysis is appropriate.

**References:**
- GeneReviews
- OMIM #180902: *RYR2* gene
- OMIM #604772: CPVT
- OMIM #600996: ARVD/C

### Genes

**RYR2**

### Indications

This test is indicated for:
- Confirmation of a clinical diagnosis of *RYR2*-related disorders in an individual in whom sequence analysis was negative.
- Carrier testing in adults with a family history of *RYR2*-related disorders in whom sequence analysis was negative.

### 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: DNA, Isolated**

**Specimen Requirements:**
- Microtainer
- 3µg
- Isolation using the Perkin Elmer™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.

**Type: Whole Blood (EDTA)**

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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.

Special Instructions
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
- Sequence analysis of the RYR2 gene is available and is required before deletion/duplication analysis.
- 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.