*KCNQ1* gene, also known as *KVLQT1*, contains 16 exons and spans 400 kb of genomic DNA that was mapped to chromosome 11p15.5-p15.4. The protein encoded by this gene can form heteromultimers with two other proteins, KCNE1 and KCNE3 to make the voltage-gated potassium channel required for repolarization phase of the cardiac action potential. This gene exhibits tissue-specific imprinting, with preferential expression from the maternal allele in some tissues, and biallelic expression in others. This gene is located among other imprinted genes that are associated with Beckwith-Wiedemann syndrome (BWS), and itself has been shown to be disrupted by chromosomal rearrangements in patients with BWS. Alternatively spliced transcript variants have been found for this gene. *KCNQ1* gene mutations are found in patients associated with familial atrial fibrillation 3, Jervell and Lange-Nielsen syndrome, long QT syndrome type 1 (LQT1), short QT syndrome type 2 (SQT2). *KCNQ1* mutations demonstrate autosomal dominant or recessive inheritance with a broad range of clinical severity both within and between families. Definitive genotype/phenotype correlations have not been described.

The John Welsh Cardiovascular Diagnostic Laboratory offers molecular genetic testing for *KCNQ1* mutations. Individuals are tested by DNA sequencing of the coding exons of the *KCNQ1* gene. We strongly recommend initial testing of a clearly affected individual, if available, in order to provide the greatest test sensitivity and clearest interpretation of results for subsequent family members. Genetic counseling is recommended for all individuals.

**REASONS FOR REFERRAL**

Molecular confirmation of the diagnosis of familial atrial fibrillation 3, Jervell and Lange-Nielsen syndrome, long QT syndrome type 1 (LQT1), short QT syndrome type 2 (SQT2).

**METHODOLOGY**

Genomic DNA is analyzed for *KCNQ1* mutations by DNA sequencing of the coding exons of the *KCNQ1* gene, as well as the exon/intron junctions and a portion of the 3’ and 5’ untranslated regions. Patient DNA is sequenced in both the forward and reverse orientations. If a mutation is identified, additional family members are analyzed only for the familial mutation by automatic fluorescent DNA sequencing.

**SERVICE FEES**

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<th>Direct and Institutional Billing</th>
<th>CPT Codes</th>
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<td>Index Case (Male or Female)</td>
<td>$1,000 per sample</td>
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<tr>
<td>Additional Family Members</td>
<td>$300 per sample; known familial mutation only</td>
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**SENSITIVITY**

DNA Sequencing Analysis: Approximately 99 percent detection of mutations in the coding exons 1-16 of *KCNQ1*.

**SPECIMEN REQUIREMENTS**

**Blood (preferred):** EDTA (purple-top) tubes: *Adult*: 5 cc  *Child*: 5 cc  *Infant*: 2-3 cc

**Tissue:** Frozen (preferred), RNAlater

**Other Body Fluids and Formalin-fixed, Paraffin-embedded Tissue:** Call to inquire