The *SOX2* (SRY (Sex Determining Region Y)-Box 2) is an intronless gene located on chromosome 3q26.33, and encodes a member of the SRY-related HMG-box (SOX) family of transcription factors involved in the regulation of embryonic development and in the determination of cell fate. *SOX2* is required for stem-cell maintenance in the central nervous system. *SOX2* gene contains one exon and spans around 2.5 Kb of genomic sequences. Mutations in this gene have been associated with optic nerve hypoplasia and with syndromic anophthalmia and microphthalmia, severe forms of structural eye malformation. The spectrum of phenotypes associated with *SOX2* mutations ranges from severe forms of anophthalmia syndrome, genital anomalies in males, brain malformations and learning disabilities to motor delay. *SOX2* mutations demonstrate autosomal dominant 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 *SOX2* mutations. Individuals are tested by DNA sequencing of the coding exons of the *SOX2*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 disorders CHD and anophthalmia syndrome.

### METHODOLOGY

Genomic DNA is analyzed for *SOX2* mutations by DNA sequencing of the coding exons of the *SOX2*gene, as well as the exon/intron junctions and a portion of the 5’ and 3’ untranslated region. 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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<tr>
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<th>Direct and Institutional Billing</th>
<th>CPT Codes</th>
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<tr>
<td><strong>Index Case (Male or Female)</strong></td>
<td>$500 per sample</td>
<td>81403</td>
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<tr>
<td><strong>Additional Family Members</strong></td>
<td>$300 per sample; known familial mutation only</td>
<td>81403</td>
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### SENSITIVITY

DNA Sequencing Analysis: Approximately 99 percent detection of mutations in the coding exon 1 of *SOX2*.

### 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 or Formalin-fixed, Paraffin-embedded Tissue**: Call to inquire