Spinal Muscular Atrophy: SMN1 Common Deletion Testing

Test Code: SM
Turnaround time: 2 weeks
CPT Codes: 81400 x1

Condition Description

Spinal muscular atrophy (SMA) is the second most common lethal, autosomal recessive disorder in Caucasians. SMA is characterized by anterior horn cell degeneration which causes a symmetrical muscle weakness and wasting. Three types of SMA are described:

- **Type I (Werdnig-Hoffman disease):** most severe form of SMA with an onset of symptoms before 6 months of age; affected individuals usually die by 2 years of age.
- **Type II (intermediate form):** intermediate in severity between Types I and III, with an onset of symptoms between 6 and 18 months of age; death occurs after 2 years of age.
- **Type III (Wohlfart-Kugelberg-Welander disease):** mildest form of childhood onset SMA, with symptoms beginning between 18 months and 17 years of age; affected individuals survive into adulthood.

All three SMA types are linked to chromosome 5q11.2-q13.3. A telomeric gene, known as the *survival motor neuron (SMN1)* gene, was found to be deleted in about 98% of patients. Point mutations are also known in this gene.

SMN1 is deleted in about 95% of individuals with SMA. This assay tests for the common SMN1 deletion only; other pathogenic variants will not be detected. Note that approximately 5-8% of individuals that are carriers of SMA carry two copies of SMN1 on one chromosome with a deletion on the second chromosome, and will not be detected with this assay. This assay will not report SMN2 copy number.

Please click here for the GeneReviews clinical summary on this condition.

Visit www.ThinkGenetic.com for patient-friendly information on spinal muscular atrophy.

Genes

SMN1

Indications

Methodology

SMN1 gene deletions were quantified by multiplex ligation polymerase chain reaction amplification (MLPA) of exons 7 and 8. Gene dosage ratios of SMN1 are calculated relative to the average of 16 reference loci and are expressed as gene dosage, and/or copy number, according to the SALSA protocol available from MRC Holland. Two copies of the SMN1 genes most often indicate normal (not affected) status and one copy of a deletion of this region most likely indicates carrier status.

Detection

Deletions of the SMN1 gene are found in approximately 95% of individuals with SMA. This carrier assay tests for the common SMN1 deletion only; other pathogenic variants will not be detected. Approximately 5-8% of carrier individuals will have a normal SMN1 copy number of two, but both copies will be on the same chromosome (in cis) with a deletion on the second chromosome. This assay will not detect these carrier individuals. SMN2 copy number is not assessed.

Reference Range

Qualitative assay.

Specimen Requirements

Submit only 1 of the following specimen types

**Type: Whole Blood (EDTA)**

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 72 hours of collection. Do not freeze.

**Type: DNA, Isolated**
Specimen Requirements:
Microtainer
3µg
Isolation using the Perkin Elmer™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.

Special Instructions
Diagnostic testing only. No prenatal or carrier testing available.

Related Tests
- Congenital Hypotonia Panel