# X-linked Epilepsy with Variable Learning Disabilities and Behavior Disorders: SYN1 Gene Sequencing

**Test Code:** SSYN1  
**Turnaround time:** 4 weeks  
**CPT Codes:** 81479 x1

## Condition Description

A mutation in the SYN1 gene (Xp11.4-p11.2) has been described in members of a family with epilepsy, variable learning disabilities, and behavior disorders. Some of the affected males were of normal intelligence with epilepsy only and others had various combinations of epilepsy, learning difficulties, macrocephaly, and aggressive behavior. The natural history of the epilepsy was variable. Some individuals had episodes only during childhood, others developed epilepsy later in life, and others had epilepsy only in association with specific stimuli.

The SYN1 gene encodes the synapsin I protein, a synaptic vesicle associated protein involved in the regulation of neurotransmitter release.

For patients with suspected X-linked epilepsy with variable learning disabilities and behavior 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:

- OMIM #300497: Epilepsy, X-Linked, with variable learning disabilities and behavior disorders.
- OMIM #313440: Synapsin I.

## Genes

**SYN1**

### Indications

This test is indicated for:

- Confirmation of a clinical diagnosis of X-linked epilepsy with variable learning disabilities and behavior disorders.
- Carrier testing in adults with a family history of X-linked epilepsy with variable learning disabilities and behavior disorders.

### Methodology

PCR amplification of 13 exons contained in the SYN1 gene is performed on the patient's genomic DNA. Direct sequencing of amplification products is performed in both forward and reverse directions, using automated fluorescence dideoxy sequencing methods. The patient's gene sequences are then compared to a normal reference sequence. Sequence variations are classified as mutations, benign variants unrelated to disease, or variations of unknown clinical significance. Variants of unknown clinical significance may require further studies of the patient and/or family members. This assay does not interrogate the promoter region, deep intronic regions, or other regulatory elements, and does not detect large deletions.

### Detection

Clinical Sensitivity: Unknown. Mutations in the promoter region, some mutations in the introns and other regulatory element mutations cannot be detected by this analysis. Large deletions will not be detected by this analysis. Results of molecular analysis should be interpreted in the context of the patient's biochemical phenotype.  
Analytical Sensitivity: ~99%

### Specimen Requirements

Submit only 1 of the following specimen types

* Preferred specimen type: Whole Blood

**Type: Whole Blood**

Specimen Requirements:

In EDTA (purple top) or ACD (yellow top) tube:  
Infants (2 years): 3-5 ml  
Older Children & Adults: 5-10 ml

Specimen Collection and Shipping: Refrigerate until time of shipment. Ship sample within 5 days of collection at room temperature with overnight delivery.
Type: Saliva

Specimen Requirements:

Oragene™ Saliva Collection kit (available through EGL) used according to manufacturer instructions.

Specimen Collection and Shipping: Store sample at room temperature. Ship sample within 5 days of collection at room temperature with overnight delivery.

**Special Instructions**

Submit copies of diagnostic biochemical test results with the sample, if appropriate. Contact the laboratory if further information is needed.

Sequence analysis is required before deletion/duplication analysis by targeted CGH array. If sequencing is performed outside of Emory Genetics Laboratory, please submit a copy of the sequencing report with the test requisition.

**Related Tests**

- Deletion/duplication analysis of the SYN1 gene by CGH array is available for those individuals in whom sequence analysis is negative.
- 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.