MAYO CLINIC LABORATORIES

# Test Definition: ETX

Ethosuximide, Serum

## Overview

### Useful For

Monitoring ethosuximide therapy

Determining compliance

Assessing ethosuximide toxicity

### Method Name

Enzyme-Multiplied Immunoassay Technique (EMIT)

### NY State Available

Yes

## Specimen

### Specimen Type

Serum

### Specimen Required

**Supplies:** Sarstedt Aliquot Tube, 5 mL (T914)
**Collection Container/Tube:**
**Preferred:** Serum gel
**Acceptable:** Red top
**Submission Container/Tube:** Plastic vial
**Specimen Volume:** 0.5 mL Serum
**Collection Instructions:**
1. Within 2 hours of collection, centrifuge the specimen.
2. For serum gel tubes, serum may sit on the gel or be aliquoted into a plastic vial.
3. For red top tubes, aliquot serum into a plastic vial immediately after centrifugation.

### Forms

If not ordering electronically, complete, print, and send 1 of the following forms with the specimen:
-Therapeutics Test Request (T831)
-Neurology Specialty Testing Client Test Request (T732)

### Specimen Minimum Volume

Serum: 0.25 mL

### Reject Due To

| | |
|---|---|
| Gross hemolysis | Reject |

### Specimen Stability Information

| Specimen Type | Temperature | Time | Special Container |
|---|---|---|---|
| Serum | Refrigerated (preferred) | 14 days | |
| | Ambient | 14 days | |
| | Frozen | 28 days | |

## Clinical & Interpretive

### Clinical Information

Ethosuximide (Zarontin) is used in the treatment of absence (petit mal) epilepsy in adults and children 3 years and older. Ethosuximide is almost completely absorbed from the gastrointestinal tract, reaching a peak plasma concentration in 1 to 4 hours following oral administration.

Approximately 10% to 20% of the drug is excreted unchanged in the urine; the remainder is metabolized by hepatic microsomal enzymes. The volume of distribution of ethosuximide is approximately 0.7 L/kg, and its half-life is 17 to 56 hours (adult) and 30 hours (pediatric). Minimal ethosuximide circulating in the blood is bound to protein (approximately 22%).

Ethosuximide produces a barbiturate-like toxicity, characterized by central nervous system and respiratory depression, nausea, and vomiting, when the blood level is greater than 120 mcg/mL.

### Reference Values

Therapeutic: 40-100 mcg/mL
Critical value: >150 mcg/mL

### Interpretation

Dosage is guided by serum levels; the therapeutic range for ethosuximide is 40 to 100 mcg/mL.

Toxic concentration: above 120 mcg/mL.

### Cautions

No significant cautionary statements

### Clinical Reference

1. Milone MC, Shaw LM. Therapeutic drugs and their management. In: Rifai N, Chiu RWK, Young I, Burnham C-AD, Wittwer CT, eds. Tietz Textbook of Laboratory Medicine. 7th ed. Elsevier; 2023:420-453.e9
2. Brunton LL, Knollmann BC, eds. Goodman and Gilman's: The Pharmacological Basis of Therapeutics, 14th ed. McGraw-Hill Education, 2023
3. Hiemke C, Bergemann N, Clement HW, et al. Consensus guidelines for therapeutic drug monitoring in neuropsychopharmacology: Update 2017. Pharmacopsychiatry. 2018;51(1-02):9-62

## Performance

### Method Description

The enzyme-multiplied immunoassay technique assay is a homogeneous enzyme immunoassay technique used for the analysis of specific compounds in biological fluids. The assay is based on competition between drug in the sample and drug labeled with the enzyme glucose-6-phosphate dehydrogenase (G6PD) for antibody binding sites. Enzyme activity decreases upon binding to the antibody, so the drug concentration in the sample can be measured in terms of enzyme activity. Active enzyme converts oxidized nicotinamide adenine dinucleotide (NAD) to NADH, resulting in an absorbance change that is measured spectrophotometrically. Endogenous serum G6PD does not interfere, because the coenzyme functions only with the bacterial (*Leuconostoc mesenteroides*) enzyme employed in the assay.(Package insert: Ethosuximide reagent. Siemens Healthcare Diagnostics, Inc; 11/2024)

### PDF Report

No

### Day(s) Performed

Monday through Saturday

### Report Available

Same day/1 day

### Specimen Retention Time

2 weeks

### Performing Laboratory Location

Mayo Clinic Laboratories - Rochester Superior Drive

## Fees & Codes

### Fees

- Authorized users can sign in to Test Prices for detailed fee information.
- Clients without access to Test Prices can contact Customer Service 24 hours a day, seven days a week.
- Prospective clients should contact their account representative. For assistance, contact Customer Service.

### Test Classification

This test has been modified from the manufacturer's instructions. Its performance characteristics were determined by Mayo Clinic in a manner consistent with CLIA requirements. This test has not been cleared or approved by the US Food and Drug Administration.

### CPT Code Information

80168

## LOINC® Information

| Test ID | Test Order Name | Order LOINC® Value |
|---|---|---|
| ETX | Ethosuximide, S | 3616-0 |

| Result ID | Test Result Name | Result LOINC® Value |
|---|---|---|
| 8769 | Ethosuximide, S | 3616-0 |