

Topiramate (TOPAMAX®) Test Information

Topiramate (TOPAMAX®), a sulfamate derivative of the naturally-occurring sugar D-fructose, is a broad-spectrum antiepileptic drug (AED). As a blockbuster drug approved by many world markets, topiramate is mainly used for treatment of epilepsy in children and adults. For example, it is dedicated to treat Lennox-Gastaut syndrome in children, which causes seizures and developmental delay. Topiramate is also frequently prescribed for adult migraines. In addition, topiramate has various off-label and investigational uses in the treatment of bipolar disorder, alcoholism, post traumatic stress, and more due to its multiple mechanisms of action.

Monitoring serum topiramate concentration is necessary because it is often used in combination with other anticonvulsant drugs (eg. phenytoin, carbamazepine, posaconazole, or phenobarbital) and may have complex drug-drug interactions. Therapeutic drug monitoring (TDM) of topiramate can be useful in dose adjustment/optimization of topiramate and thus is required for patients with concomitant AED therapy. The recommended therapeutic range for topiramate in serum is 5.0 to 20.0 mcg/mL.

Various analytical methodologies have been developed for the analysis of topiramate in biological matrices. However, due to the lack of chromophore in its structure, electrospray ionization (ESI) LC-MS is the method of choice for its simplicity (no derivatization needed), sensitivity and selectivity. Our lab offers a fast and sensitive stable-isotope dilution LC-MS assay for serum topiramate based on solid phase extraction (SPE) method. For more information, call the lab at (513) 636-4203.

Sample Type:

Serum (Gold or Red, no gel)

Volume:

2.0 mL

1.0 mL (minimum)

Specimen Preparation:

Spin/pour off, freeze.

Unacceptable Specimens:

Whole blood; serum outside stability.

Stability:

Refrigerated: 7 days

Frozen: 4 weeks

Methodology:

Liquid chromatography-mass spectrometry (LC-MS)

Reporting Units:

Quantitative: mcg/mL

LC-MS/MS Calibration range:

0.1 – 40 mcg/mL

Therapeutic Range:

0 – 20 mcg/mL

Shipping Conditions:

Frozen (dry ice), next day.

Testing Schedule:

Tue, 1st Shift (for testing outside this schedule, please call 513-636-4203). **Turnaround Time:** 2-8 days.

CPT Code:

80201

Contact Information:

Clinical Mass Spectrometry

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Fax: 513-803-5014

Email: pathology@cchmc.org

Website: <https://www.cincinnatichildrens.org/mass-spec>

Shipping Address:

Clinical Mass Spectrometry Facility, MLC 7019

Department of Pathology and Laboratory Medicine

Cincinnati Children's Hospital Medical Center

240 Albert Sabin Way

Cincinnati, Ohio 45229-3039

References:

1. Maryanoff BE. Pharmaceutical Gold from neurostabilizing agents: topiramate and successor molecules. *J. Med. Chem.* 2009 (52) 3431-3440.
2. Maryanoff BE. Sugar sulfamate for seizure control: discovery and development of topiramate, a structurally unique antiepileptic drug. *Curr Top Med Chem.* 2009 (9) 1049-1062.
3. Pinto EC. Et al. Topiramate: a review of analytical approaches for biological matrices. *Biomed. Chromatogr.* 2015 (29) 1461-1472.