MAYO CLINIC LABORATORIES

Test Definition: THIO

Thiopurine Metabolites, B

Overview

Useful For

Aids physicians in dose adjustments, minimizing dose-dependent toxicity, and monitoring compliance of thiopurine drug therapy

Testing Algorithm

Red blood cell (RBC) count is first performed and then the thiopurine metabolites' values are determined by liquid chromatography-tandem mass spectrometry (LC-MS/MS). Values are utilized to calculate and report a final result (unit of measure: pmol/8 x 10[8] RBC) for 6-thioguanine nucleotides and 6-methylmercaptopurine derivative analyte.

Method Name

Liquid Chromatography-Tandem Mass Spectrometry (LC-MS/MS)

NY State Available

Yes

Specimen

Specimen Type

Whole Blood EDTA

Shipping Instructions

Specimen **must** be shipped refrigerated.

Specimen Required

Container/Tube: Lavender top (EDTA)

Specimen Volume: 3 mL

Collection Instructions: Send specimen in original tube. **Do not** aliquot, centrifuge, or freeze.

Forms

If not ordering electronically, complete, print, and send Gastroenterology and Hepatology Client Test Request (T728) with the specimen

Reject Due To

Gross hemolysis	Reject
Moderate hemolysis	Reject
Gross lipemia	Reject
Gross icterus	Reject
Clotted	Reject

Specimen Minimum Volume

1.5 mL

Specimen Stability Information

Specimen Type	Temperature	Time	Special Container
Whole Blood EDTA	Refrigerated (preferred)	8 days	
	Ambient		

Clinical & Interpretive

Clinical Information

This test is primarily used to verify compliance, optimize therapy, and identify elevated metabolite concentrations that may result in toxicity after initiation of thiopurine drug therapy for the treatment of inflammatory bowel disease. Recommended time points for monitoring include: 4 weeks after starting treatment to verify patient compliance and look for early risk of toxicity; 12 to 16 weeks after starting therapy when 6-thioguanine nucleotides have reached steady-state; and annually.(1) It may also be ordered in patients who do not respond to therapy as expected or as needed for dose changes, flare-ups, signs of toxicity, or suspicion of noncompliance. The test will measure 6-methylmercaptopurine (6-MMP) and 6-thioguanine nucleotides (6-TGN) in erythrocytes.

Reference Values

6-Thioguanine Nucleotides (6-TGN): 235-450 pmol/8x10(8) RBC
6-Methylmercaptopurine (6-MMP): Less than or equal to 5700 pmol/8x10(8) RBC

Interpretation

Target 6-thioguanine (6-TGN) concentrations are 235 to 450 pmol/8x10(8) RBC with lower levels suggesting suboptimal dosing and higher levels associated with increased risk of myelotoxicity and leukopenia. High 6-methylmercaptopurine (6-MMP) levels (greater than 5700 pmol/8x10[8] RBC) suggest an increased risk for hepatotoxicity and potentially "thiopurine hypermethylation."

Cautions

This test cannot be used to predict optimal starting dose. It is sensitive to hemolysis and transport conditions. This test does not replace monitoring of patients using other laboratory tests (ie, CBC, liver function tests).

Clinical Reference

1. Goel RM, Blaker P, Mentzer A, et al: Optimizing the use of thiopurines in inflammatory bowel disease. Ther Adv Chronic Dis. 2015;6(3):138-146
2. Shipkova M, Armstrong V, Wieland E, Oellerich M. Differences in Nucleotide Hydrolysis Contribute to the Differences between Erythrocyte 6-Thioguanine Nucleotide Concentrations Determined by Two Widely Used Methods. Clin Chem. 2003:49(2):260-268
3. Boulieu R, Dervieux T: High-performance liquid chromatographic determination of methyl 6-mercaptopurine nucleotides (Me6-MPN) in red blood cells: analysis of Me6-MPN per se or Me6-MPN derivative? J Chromatogr B. 1999:730:273-274
4. Kirchherr H, Shipkova M, Ahsen N: Improved Method for Therapeutic Drug Monitoring of 6-Thioguanine Nucleotides and 6-Methylmercaptopurine in Whole-Blood by LC/MSMS Using Isotope-Labeled Internal Standards. Ther Drug Monit. 2013:35(3):313-321

Performance

Method Description
Red blood cell (RBC) count is first performed and then the thiopurine metabolites values are determined by mass spectrometry.(Unpublished Mayo Method)

PDF Report
No

Specimen Retention Time
14 days

Performing Laboratory Location
Rochester

Fees & Codes

Test Classification
This test was developed, and its performance characteristics 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
80299