MAYO CLINIC LABORATORIES

Test Definition: EVROL

Everolimus, Blood

Overview

Useful For

Managing everolimus immunosuppression in solid organ transplant

Method Name

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

NY State Available

Yes

Specimen

Specimen Type

Whole Blood EDTA

Specimen Required

Container/Tube: Lavender top (EDTA)

Specimen Volume: 3 mL

Collection Instructions:

1. Draw blood immediately before a scheduled dose.

2. Do not centrifuge.

3. Send whole blood specimen in original tube. **Do not aliquot.**

Additional Information: Therapeutic range applies to trough specimens collected immediately prior to a.m. dose.

Forms

If not ordering electronically, complete, print, and send 1 of the following forms with the specimen:

-Therapeutics Test Request (T831)

-Kidney Transplant Test Request

Specimen Minimum Volume

1 mL

Reject Due To

Gross hemolysis	OK
Gross lipemia	OK
Gross icterus	OK
Clotted specimens	Reject

Specimen Stability Information

Specimen Type	Temperature	Time	Special Container
Whole Blood EDTA	Refrigerated (preferred)	28 days	
	Ambient	14 days	
	Frozen	28 days	

Clinical & Interpretive

Clinical Information

Everolimus is an immunosuppressive agent derived from sirolimus (rapamycin). Both drugs function via inhibition of mTOR (mechanistic target of rapamycin) signaling and share similar pharmacokinetic and toxicity profiles. Everolimus has a shorter half-life than sirolimus, which allows for more rapid achievement of steady-state pharmacokinetics. Everolimus is extensively metabolized, primarily by cytochrome P450 (CYP) 3A4, thus its use with inducers or inhibitors of that enzyme may require dose adjustment. The most common adverse effects include hyperlipidemia, thrombocytopenia, and nephrotoxicity. Everolimus is useful as adjuvant therapy in renal cell carcinoma and other cancers. It recently gained US Food and Drug Administration approval for prophylaxis of graft rejection in solid organ transplant, an application that has been accepted for years in Europe. The utility of therapeutic drug monitoring has not been established for everolimus as an oncology chemotherapy agent; however, measuring blood drug concentrations is common practice for its use in transplant. Therapeutic targets vary depending on the transplant site and institution protocol. Guidelines for heart and kidney transplants suggest that trough (immediately prior to the next scheduled dose) blood concentrations between 3 and 8 ng/mL provide optimal outcomes.

Reference Values

3-8 ng/mL

Target steady-state trough concentrations vary depending on the type of transplant, concomitant immunosuppression, clinical/institutional protocols, and time post-transplant. Results should be interpreted in conjunction with this clinical information and any physical signs/symptoms of rejection/toxicity.

Interpretation

Therapeutic targets vary by transplant site and institution protocol. Heart and kidney transplant guidelines suggest a therapeutic range of 3 to 8 ng/mL.

Measurement of drug concentrations in oncology chemotherapy is less common, thus no therapeutic range is established for this application.

Cautions

Therapeutic targets vary by transplant site and institution protocol. Established ranges refer to trough (predose) concentrations.

Clinical Reference

1. Eisen HJ, Tuzcu EM, Dorent R, et al. Everolimus for the prevention of allograft rejection and vasculopathy in cardiac-transplant recipients. N Engl J Med. 2003;349(9):847-858
2. Kovarik JM, Beyer D, Schmouder RL. Everolimus drug interactions: application of a classification system for clinical

decision making. Biopharm Drug Dispos. 2006;27(9):421-426
3. Rothenburger M, Zuckermann A, Bara C, et al. Recommendations for the use of everolimus (Certican) in heart transplantation: results from the second German-Austrian Certican Consensus Conference. J Heart Lung Transplant. 2007;26(4):305-311
4. Sanchez-Fructuoso AI. Everolimus: an update on the mechanism of action, pharmacokinetics and recent clinical trials. Expert Opin Drug Metab Toxicol. 2008;4(6):807-819
5. Milone MC, Shaw LM. Therapeutic drugs and their management. In: Rifai N, Horvath AR, Wittwer CT, eds. Tietz Textbook of Clinical Chemistry and Molecular Diagnostics. 6th ed. Elsevier; 2018:800-831
6.van Gelder T, Fischer L, Shihab F, Shipkova M. Optimizing everolimus exposure when combined with calcineurin inhibitors in solid organ transplantation. Transplant Rev (Orlando). 2017;31(3):151-157. doi:10.1016/j.trre.2017.02.007

Performance

Method Description
Whole blood samples are mixed with methanolic zinc sulfate to lyse blood cells. The supernatant is removed and analyzed by liquid chromatography tandem mass spectrometry.(Unpublished Mayo method)

PDF Report
No

Day(s) Performed
Monday through Sunday

Report Available
Same day/1 to 2 days

Specimen Retention Time
14 days

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 was developed and its performance characteristics determined by Mayo Clinic in a manner consistent with CLIA requirements. It has not been cleared or approved by the US Food and Drug Administration.

CPT Code Information

80169

LOINC® Information

Test ID	Test Order Name	Order LOINC® Value
EVROL	Everolimus, B	50544-6

Result ID	Test Result Name	Result LOINC® Value
35146	Everolimus, B	50544-6