Test Definition: TCZ

Tocilizumab QN, S

Overview

Useful For

Quantitation of tocilizumab

Method Name

Electrochemiluminescent Bridging Immunoassay

NY State Available

Yes

Specimen

Specimen Type

Serum

Specimen Required

Container/Tube:

Preferred: Â Serum gel

Acceptable: Red top

Specimen Volume: 0.6 mL

Specimen Minimum Volume

0.5 mL

Specimen Stability Information

Specimen Type	Temperature	Time	Special Container
Serum	Refrigerated (preferred)	28 days	
	Frozen	28 days	

Clinical and Interpretive

Clinical Information

Tocilizumab is a recombinant humanized IgG1 kappa monoclonal antibody that targets the interleukin-6 (IL-6) receptor. By binding soluble and membrane-bound IL-6 receptors, it blocks the pro-inflammatory effects of IL-6 mediated signaling. IL-6 has been shown to be involved in diverse physiological processes such as T-cell activation, induction of immunoglobulin secretion, initiation of hepatic acute phase protein synthesis, and stimulation of hematopoietic precursor cell proliferation and differentiation. Although a critical component of the immune response against infection, IL-6 is an important mediator in many autoimmune diseases. For example, IL-6 is produced by synovial and endothelial cells leading to local production of IL-6 in joints affected by inflammatory processes such as rheumatoid arthritis (RA). Studies in a variety of autoimmune diseases demonstrated that blocking IL-6 led to improved clinical outcomes. Tocilizumab is currently Food and Drug Administration-approved for the treatment of RA

(moderate to severe), giant cell arteritis, systemic juvenile idiopathic arthritis (JIA), and polyarticular JIA.

IL-6 is also a critical component of the cytokine release syndrome (CRS). CRS results from an overactive immune response and leads to significantly enhanced expression of multiple inflammatory cytokines. CRS can occur in a variety of situations, including autoimmune disease, infection, and immune therapies. Chimeric antigen receptor (CAR) T-cell therapy is approved for the treatment of large B-cell non-Hodgkin lymphomas and acute lymphoblastic leukemia. In this therapy, the patientâ€™s T cells are isolated and genetically engineered to express chimeric antigen receptors, which target the tumor cells. Some patients experience CRS after the engineered T cells are re-administered; in some cases the magnitude of the CRS can be life-threatening with manifestations including hypotension, tachycardia, and multi-organ failure. Tocilizumab is approved for treatment of CRS associated with CAR T-cell therapy. It is also being investigated for treatment of CRS in other clinical situations.

Pharmacokinetics of tocilizumab is characterized by nonlinear elimination, which is a combination of linear clearance and Michaelis-Menten elimination. The nonlinear part of tocilizumab elimination leads to an increase in exposure that is more than dose-proportional. The pharmacokinetic parameters of tocilizumab do not change with time. Due to the dependence of total clearance on tocilizumab serum concentrations, the half-life of tocilizumab is also concentration-dependent and varies depending on the serum concentration level. Population pharmacokinetic analyses in any patient population tested so far indicate no relationship between apparent clearance and the presence of anti-drug antibodies.(1)

Reference Values

Tocilizumab limit of quantitation =0.5 mcg/mL

Interpretation

Measured concentrations of tocilizumab will be impacted by the route of administration, the dosage, and the time interval between drug administration and blood collection. Measured concentrations should be interpreted in the context of the last administered dose of tocilizumab.

Cautions

Therapeutic concentrations for tocilizumab have not been defined for any of the approved clinical indications.

Clinical Reference

1. ACTEMRA (tocilizaumab). Medication Guide and Instructions for Use. Genetech, Inc; 05/2020. Available at: www.gene.com/download/pdf/actemra_prescribing.pdf

2. Tanaka T, Narazaki M, Kishimoto T: IL-6 in inflammation, immunity, and disease. Cold Spring Harb Perspect Biol. 2014;6(10):a016295

3. Sheppard M, Laskou F, Stapleton PP, Hadavi S, Dasgupta B: Tocilizumab (Actemra). Hum Vaccin Immunother. 2017;13(9):1972-1988

Performance

Method Description

This immunoassay is designed to determine tocilizumab (TOC) concentrations in human serum by means of electrochemiluminescence (ECL). The assay uses a "bridging" format in which TOC forms a link between biotin labeled anti-tocilizumab and Sulfo-Tag labeled anti-tocilizumab. During sample preparation, biotinylated and Sulfo-Tagged antibodies to tocilizumab are added and bind with drug that is present in the sample. After the incubation with the labeled antibodies, the calibrators, controls, and samples are added to a streptavidin plate that has been blocked with a solution of bovine serum albumin. After an incubation period, the plate is washed and read buffer is added. Immediately after the addition of read buffer, the plate is analyzed. The read buffer provides an appropriate

chemical environment for ECL when a voltage is applied to the electrodes on the plate. This voltage causes bound Sulfo-Tagged anti-tocilizumab to emit measureable light. The intensity of emitted light is measured and is correlated to a set of standards with known concentrations of TOC by means of a 4-point logistics curve fitting method.(Unpublished Mayo method)

PDF Report

No

Day(s) and Time(s) Test Performed

Monday, Thursday

Analytic Time

1 day

Maximum Laboratory Time

5 days

Specimen Retention Time

14 days

Performing Laboratory Location

Rochester

Fees and 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 Regional Manager. 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. This test has not been cleared or approved by the U.S. Food and Drug Administration.

CPT Code Information

80299

LOINC® Information

Test ID	Test Order Name	Order LOINC Value
TCZ	Tocilizumab QN, S	95922-1

Result ID	Test Result Name	Result LOINC Value
609499	Tocilizumab QN, S	95922-1