Operated by:
Veracyte Inc.
737 N 5th St, Suite 600. Richmond, VA 23219
(804) 944-2000 FAX (804) 944-2001
Medical Director: Alfred LUI M.D., FCAP- CLIA#49D2159558

PATIENT INFORMATION	SPECIMEN		ORDERING PROVIDER
Female, AGE 29 YEARS 11 May 1990 **ACCESSION #: PR15**	**COLLECTED**	01 June 2021	
	RECEIVED	07 June 2021	
	REPORTED	09 June 2021	
	SPECIMEN: SERUM		

Test: Drug Level / Anti-Drug Antibody level

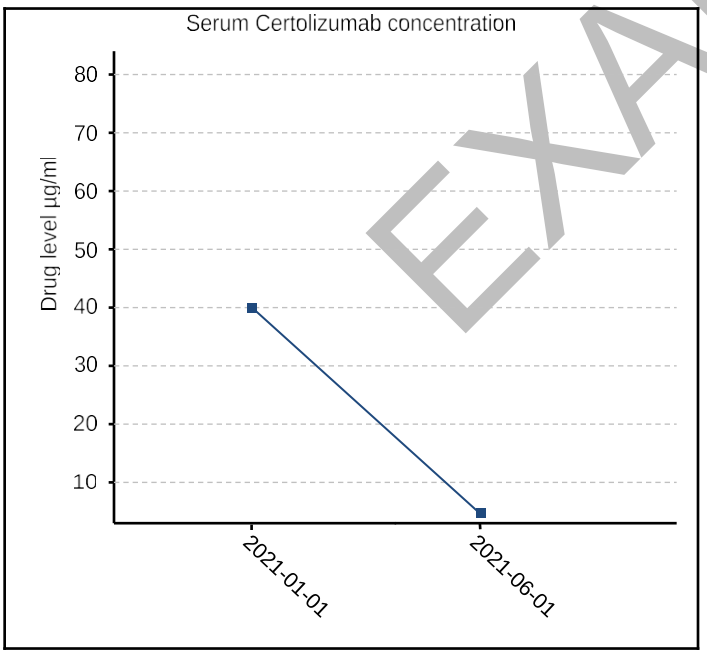
Drug : Certolizumab

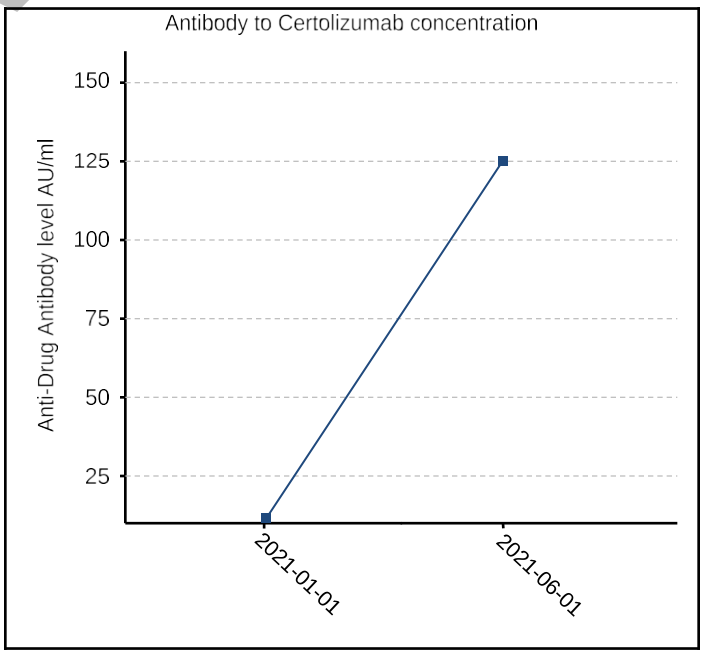
Results :

DETECTABLE SERUM CERTOLIZUMAB

UNDETECTABLE ANTIBODIES TO CERTOLIZUMAB

Drug	Collection Date	Drug Level µg/ml	Anti-Drug Antibody Level AU/ml
Certolizumab	**01 Jan 2021**	**40**	**< 10**
Certolizumab	**01 June 2021**	**3**	**125**





The clinically reportable range for the Certolizumab assay is 3-84 µg/ml.
The clinically reportable range for the anti-Certolizumab antibody assay is 10-160 AU/ml.

CPT Code(s): 80299, 83520

This test was developed by Theradiag and its performance characteristics determined by Veracyte Inc. Veracyte Inc. is regulated under the Clinical Laboratory Act Improvement Amendments of 1988 (CLIA) as qualified to perform high-complexity clinical testing. Test results are not diagnostic and should be used to supplement clinical findings from the ordering physician's workup. The clinical reportable range was validated for monitoring IBD patients and may not reflect levels nor clinical interpretation for non-IBD patients. Any concentrations above the CRR will be reported as greater than upper limit.

Method: Automated ELISA assay for simultaneous analysis of both drug and anti-drug antibody.

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Interpretive Guide:

Certolizumab Level	Detectable Antibody	Literature Findings**
Not detected or CTZ<27.5 µg/ml	<10 AU/ml	- Endoscopic response and remission are associated with higher plasma concentrations of certolizumab (CTZ).[1] - A significant inverse relationship has been found between plasma concentration of CTZ and C-reactive protein.[1] - In a study of CTZ dose optimization in patients with CD, remission rates were higher in patients whose CTZ levels were greater than 27.5 µg/ml.[2]
Response Interpretation/Action		
A higher dose of certolizumab or shortening the dosing interval may be appropriate.		

Certolizumab Level	Detectable Antibody	Literature Findings**
Not detected or CTZ<27.5 µg/ml	Detected	- Data are limited - Clinical trials exploring CTZ immunogenicity have not found a relationship between development of antibodies to certolizumab (ATC) and clinical response.[3, 4, 5, 6, 7] - Some patients on anti-TNF therapy may develop antibodies that resolve over time.[8, 9, 10] - The presence of antibodies to certolizumab has been associated with decreased serum CTZ levels and decreased clinical efficacy in rheumatoid arthritis trials.[11]
Response Interpretation/Action		
In good responders, repeat test to see if antibodies resolve. In poor responders, a change to another anti TNF drug and/or addition of concomitant immunosuppressant may be appropriate.		

Certolizumab Level	Detectable Antibody	Literature Findings**
CTZ>27.5 µg/ml	<10 AU/ml	- Data are limited. - In patients with CD that fail to respond to anti TNF therapy but have a therapeutic drug concentration and low or undetectable antibody levels, clinical guidelines suggest a switch to another drug class.[12]
Response Interpretation/Action		
In poor responders who do not have antibodies, a change to another therapeutic class (not targeting TNFa) may be appropriate.		

Certolizumab Level	Detectable Antibody	Literature Findings**
Upper range trough level	<10 AU/ml	- Data are limited - In patients with IBD with good response to other biologic therapies, supra therapeutic doses have been reduced without disease flares, resulting in significant cost savings.[13]
Response Interpretation/Action		
In good responders, consider a reduction in dose to reduce potential AEs.		

**These findings are not diagnostic. They should be independently evaluated by the treating physician and used to supplement clinical findings in accordance with the treating physician?s independent medical

1 Colombel J, Sandborn W, Allez M, et al. Association between plasma concentrations of certolizumab pegol and endoscopic outcomes of patients with Crohn's disease. Clin Gastroent Hep. 2014;12:423-431.
2 Sandborn W, Hanauer S, Pierre-Louis, B, et al. Certolizumab pegol plasma concentration and clinical remission in Crohn's Disease [abstract Su2079]. Gastroenterology. 2012;142: S563.
3 Schreiber S, Rutgeerts P, Fedorak R, et al. A randomized, placebo-controlled trial of certolizumab pegol (CDP870) for treatment of Crohn's disease. Gastroenterology. 2005;129: 807-818.
4 Schreiber S, Khaliq-Kareem, M, Lawrance I, et al. Maintenance therapy with certolizumab pegol for Crohn's disease. N Engl J Med. 2007;357: 239-250.
5 Sandborn W, Abre M, D'Haen G, et al. Certolizumab pegol in patients with moderate to severe Crohn's disease and secondary failure to infliximab. Clin Gastroenterol Hepatol. 2010;8: 688- 695.
6 Lichtenstein G. Comprehensive review: antitumor necrosis factor agents in inflammatory bowel disease and factors implicated in treatment response. Ther Adv Gastro. 2013;6(4):269-293.
7 Lin K, Mahadevan U. Pharmacokinetics of biologics and the role of therapeutic monitoring. Gastroenterol Clin N Am. 2014;43:565-579.
8 Yanai H, Lichtenstein L, Assa A, et al. Levels of drug and antidrug antibodies are associated with outcome of interventions after loss of response to infliximab or adalimumab. Clin Gastroenterol Hepatol. 2015 Mar;13(3):522-530.
9 Ungar B, Chowers Y, Yavzori M et al. The temporal evolution of antidrug antibodies in patients with inflammatory bowel disease treated with infliximab. Gut. 2014 Aug;63(8):1258-64.
10 Roblin X, Marotte H, Leclerc M, et al. Combination of C-reactive protein, infliximab trough levels and stable but not transient antibodies to infliximab are associated with loss of response to infliximab in inflammatory bowel disease. J Crohn's Colitis. 2015 Jul;9(7):525-31.
11 Prescribing information, certolizumab. Smyrna, GA:UCB;2006.
12 Sandborn W. Crohn's disease evaluation and treatment: Clinical decision tool. Gastroenterology. 2014;147:702-705.
13 Vande Casteele N, Ferrante M, Van Assche G, et al. Trough concentrations of infliximab guide dosing for patients with inflammatory bowel disease. Gastroenterology. 2015;148(6):1320-1329.