

Client: Example Client ABC123  
123 Test Drive  
Salt Lake City, UT 84108  
UNITED STATES

Physician: Doctor, Example

**Patient: Patient, Example**

**DOB:** 1/9/1992  
**Gender:** Female  
**Patient Identifiers:** 01234567890ABCD, 012345  
**Visit Number (FIN):** 01234567890ABCD  
**Collection Date:** 00/00/0000 00:00

**B Cell Subset Analysis**

ARUP test code 3002216

CD19+ B cells %	14.0 % Lymphs	(Ref Interval: 6.4-22.0)
CD19+ B cells	232 cells/uL	(Ref Interval: 110-450)
CD20+ %	98.3 % of CD19	(Ref Interval: 96.0-100.0)
CD20+	228 cells/uL	(Ref Interval: 110-450)
Total Memory CD27+ %	19.6 % of CD19	(Ref Interval: 10.0-33.0)
Total Memory CD27+	45 cells/uL	(Ref Interval: 23-110)
Non switched CD27+IgD+IgM+ %	6.4 % of CD19	(Ref Interval: 2.4-15.0)
Non switched CD27+IgD+IgM+	15 cells/uL	(Ref Interval: 5-46)
Class-switched CD27+IgD-IgM- %	10.8 % of CD19	(Ref Interval: 5.1-22.0)
Class-switched CD27+IgD-IgM-	25 cells/uL	(Ref Interval: 11-61)
Transitional CD38+IgM+ %	4.0 % of CD19	(Ref Interval: 0.7-5.9)
Transitional CD38+IgM+	9 cells/uL	(Ref Interval: 1-17)

**H=High, L=Low, \*=Abnormal, C=Critical**

Plasmablasts CD38+IgM- %	1.5 % of CD19	(Ref Interval: 0.4-4.1)
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Plasmablasts CD38+IgM-	3 cells/uL	(Ref Interval: 1-8)
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Activated CD21low CD38- %	2.7 % of CD19	(Ref Interval: 1.2-9.0)
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Activated CD21low CD38-	6 cells/uL	(Ref Interval: 3-26)
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**INTERPRETIVE INFORMATION: B Cell Subset Analysis**

This panel identifies B-cell dysregulation. B-cells start development in the bone marrow (stem-cell, pro-B, pre-B), then transition to the spleen and lymph nodes where some mature by acquiring CD27 and switching immunoglobulin class from IgD and IgM to IgG or IgA. Class-switched B-cells may further progress to plasmablasts and finally plasma cells. Different disorders may block different parts of this pathway, disrupting immunoglobulin production.

This panel can also be used to monitor B-cell reconstitution after bone marrow transplantation or targeted B-cell depletion therapy.

This panel can assist in the diagnosis and subclassification of Common Variable Immune Deficiency (CVID). CVID is a heterogeneous group of disorders characterized by low antibody production, defective antibody responses, and recurrent infections. Most cases of CVID have a severe reduction in class switched memory B-cells (CD27+, IgD-, IgM-) that correlates with granulomatous disease. Many also have an expanded population of CD21low, CD38low B-cells that correlates with splenomegaly. Increased transitional B-cells (CD38+, IgM+) in CVID correlates with lymphadenopathy. Most CVID patients have a low percentage of plasmablasts (CD38+, IgM-) that has a correlation with autoimmune cytopenia.

Class switched memory B-cells are also low in ALPS, but are typically increased in SLE and infection.

Please note: Reference intervals for CD20+ B-cells were not established for patients less than 16 years of age. For all other B-cell subsets, reference intervals for populations younger than 16-years are adopted from literature. Piatosa B, Wolska-Kusnierz B, Pac M, Siewiera K, Galkowska E, Bernatowska E. B cell subsets in healthy children: Reference values for evaluation of B cell maturation process in peripheral blood. Cytometry Part B 2010; 78B: 372381.

Test developed and characteristics determined by ARUP Laboratories. See Compliance Statement A: aruplab.com/CS

**H=High, L=Low, \*=Abnormal, C=Critical**

VERIFIED/REPORTED DATES

Procedure	Accession	Collected	Received	Verified/Reported
CD19+ B cells %	23-019-401949	00/00/0000 00:00	00/00/0000 00:00	00/00/0000 00:00
CD19+ B cells	23-019-401949	00/00/0000 00:00	00/00/0000 00:00	00/00/0000 00:00
CD20+ %	23-019-401949	00/00/0000 00:00	00/00/0000 00:00	00/00/0000 00:00
CD20+	23-019-401949	00/00/0000 00:00	00/00/0000 00:00	00/00/0000 00:00
Total Memory CD27+ %	23-019-401949	00/00/0000 00:00	00/00/0000 00:00	00/00/0000 00:00
Total Memory CD27+	23-019-401949	00/00/0000 00:00	00/00/0000 00:00	00/00/0000 00:00
Non switched CD27+IgD+IgM+ %	23-019-401949	00/00/0000 00:00	00/00/0000 00:00	00/00/0000 00:00
Non switched CD27+IgD+IgM+	23-019-401949	00/00/0000 00:00	00/00/0000 00:00	00/00/0000 00:00
Class-switched CD27+IgD-IgM- %	23-019-401949	00/00/0000 00:00	00/00/0000 00:00	00/00/0000 00:00
Class-switched CD27+IgD-IgM-	23-019-401949	00/00/0000 00:00	00/00/0000 00:00	00/00/0000 00:00
Transitional CD38+IgM+ %	23-019-401949	00/00/0000 00:00	00/00/0000 00:00	00/00/0000 00:00
Transitional CD38+IgM+	23-019-401949	00/00/0000 00:00	00/00/0000 00:00	00/00/0000 00:00
Plasmablasts CD38+IgM- %	23-019-401949	00/00/0000 00:00	00/00/0000 00:00	00/00/0000 00:00
Plasmablasts CD38+IgM-	23-019-401949	00/00/0000 00:00	00/00/0000 00:00	00/00/0000 00:00
Activated CD21low CD38- %	23-019-401949	00/00/0000 00:00	00/00/0000 00:00	00/00/0000 00:00
Activated CD21low CD38-	23-019-401949	00/00/0000 00:00	00/00/0000 00:00	00/00/0000 00:00

END OF CHART

H=High, L=Low, \*=Abnormal, C=Critical

Unless otherwise indicated, testing performed at:

ARUP LABORATORIES | 800-522-2787 | aruplab.com  
500 Chipeta Way, Salt Lake City, UT 84108-1221  
Jonathan R. Genzen, MD, PhD, Laboratory Director

Patient: Patient, Example  
ARUP Accession: 23-019-401949  
Patient Identifiers: 01234567890ABCD, 012345  
Visit Number (FIN): 01234567890ABCD  
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