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

Physician: Doctor, Example

Patient: Patient, Example

DOB	2/4/1992
Gender:	Male
Patient Identifiers:	01234567890ABCD, 012345
Visit Number (FIN):	01234567890ABCD
Collection Date:	01/01/2017 12:34

Lymphocyte Subset Panel 7 - Congenital Immunodeficiencies

ARUP test code 0095899

% CD2	85 %	(Ref Interval: 73-91)
Absolute CD2	1686 cells/uL	(Ref Interval: 700-2600)
% CD3	79 %	(Ref Interval: 62-87)
Absolute CD3	1678 cells/uL	(Ref Interval: 570-2400)
% CD4	48 %	(Ref Interval: 32-64)
Absolute CD4	1013 cells/uL	(Ref Interval: 430-1800)
% CD8	28 %	(Ref Interval: 15-46)
Absolute CD8	602 cells/uL	(Ref Interval: 210-1200)
CD4:CD8 Ratio	1.71 ratio	(Ref Interval: 0.80-3.90)
% Natural Killer Cells	11 %	(Ref Interval: 4-26)
Absolute Natural Killer Cells	241 cells/uL	(Ref Interval: 78-470)

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

% CD19	9 %	(Ref Interval: 6-23)
Absolute CD19	198 cells/uL	(Ref Interval: 91-610)
% CD45RA	61 %	(Ref Interval: 28-71)
Absolute CD45RA	573 cells/uL	(Ref Interval: 150-870)
% CD45RO	39 %	(Ref Interval: 28-72)
Absolute CD45RO	361 cells/uL	(Ref Interval: 190-1050)
% HLA-DR	10 %	(Ref Interval: 8-24)
Absolute HLA-DR	208 cells/uL	(Ref Interval: 100-640)
Lymphocyte Subset Panel 7 Information	See Note	

INTERPRETIVE INFORMATION: Lymphocyte Subset 7, Congenital Immunodeficiencies

This profile screens for inherited immunodeficiencies. The CD4 cells are Helper T-cells expressing both CD3 and CD4. The CD8 cells are Cytotoxic T-cells expressing both CD3 and CD8. The B-cells express CD19 but not CD3. The NK-cells express either CD16 or CD56 (or both) but not CD3. CD3, CD4, CD8, CD19 and NK-cell percentages are reported as a percent of total lymphocytes. The CD45RA cells express both CD4 and "naive" CD45RA antigens while CD45RO cells express both CD4 and CD45RO "memory" antigens. CD45RA and CD45RO percentages are reported as a percent of total CD4 cells. Primary immune deficiencies that show phenotypic abnormalities include X-linked hypogammaglobulinemia, DiGeorge syndrome, bare lymphocyte syndrome, and severe combined immunodeficiency disease (SCID).

X-linked hypogammaglobulinemia (X-linked agammaglobulinemia, Bruton's agammaglobulinemia) is caused by defective B-cell maturation secondary to mutations in the BTK (Bruton/B-cell tyrosine kinase) gene. T-cells (CD2, CD3) are normal or increased in number, and the CD4:CD8 ratio is normal or decreased. Most of the CD4 cells express the CD45RA antigen characteristic of naive rather than memory cells. B-cells (CD19, HLA-DR) are severely decreased or absent in the peripheral blood.

X-linked hypogammaglobulinemia can be distinguished from transient hypogammaglobulinemia of infancy by the absence of B-cells. Transient hypogammaglobulinemia of infancy results from delayed capacity for immunoglobulin synthesis and spontaneously resolves with age.

Thymic aplasia (congenital thymic aplasia, DiGeorge syndrome)

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results in impaired T-cell maturation and function. B-cells (CD19, HLA-DR) and NK-cells (CD16/CD56) are normal but T-cells (CD2, CD3) are usually decreased with an elevated CD4:CD8 ratio. The clinical course is variable, ranging from "partial DiGeorge syndrome" to cases that resemble SCID.

SCID has multiple genetic causes, including mutations in the gamma chain of the interleukin 2 receptor and the purine degradation enzymes, adenosine deaminase, and nucleoside phosphorylase. In adenosine deaminase deficiency, both B-cells (CD19, HLA-DR) and T-cells (CD2, CD3) are decreased in the peripheral blood. In other forms of SCID, the lymphopenia is not as severe, but the lymphocyte count is usually less than 1,000/uL even though B-cells (CD19, HLA-DR) may be normal or increased. In contrast to thymic aplasia, any T-cells present may have an immature phenotype.

Major histocompatibility complex class II deficiency, bare lymphocyte syndrome, is caused by defective transcription of HLA class II genes; B-cells (CD19) and T-cells (CD2, CD3) are present in normal numbers, but HLA-DR is absent. The CD4+ cells are usually CD45RA+.

Common variable immunodeficiency (CVID) describes a heterogeneous group of disorders with defective antibody formation. B-cells (CD19, HLA-DR) and T-cells (CD2, CD3) are usually normal in number, although B-cells may be decreased when CVID occurs concurrently with systemic lupus erythematosus. The CD4:CD8 ratio may be normal or decreased.

Wiskott-Aldrich syndrome includes immunodeficiency with thrombocytopenia and eczema. Lymphopenia is usually present with a progressive decline in T-cells numbers. The CD4:CD8 ratio is normal. The gene is X-linked and encodes the Wiskott-Aldrich syndrome protein.

Immunophenotyping is generally not useful in characterizing selective IgA deficiency, IgG subclass deficiencies, the hyper IgM syndrome, or hyperimmunoglobulin E syndrome (Job syndrome).

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

VERIFIED/REPORTED DATES

Procedure	Accession	Collected	Received	Verified/Reported
% CD2	20-051-400652	2/19/2020 11:50:00 AM	2/20/2020 11:40:26 AM	2/20/2020 8:18:00 PM
Absolute CD2	20-051-400652	2/19/2020 11:50:00 AM	2/20/2020 11:40:26 AM	2/20/2020 8:18:00 PM
% CD3	20-051-400652	2/19/2020 11:50:00 AM	2/20/2020 11:40:26 AM	2/20/2020 8:18:00 PM
Absolute CD3	20-051-400652	2/19/2020 11:50:00 AM	2/20/2020 11:40:26 AM	2/20/2020 8:18:00 PM
% CD4	20-051-400652	2/19/2020 11:50:00 AM	2/20/2020 11:40:26 AM	2/20/2020 8:18:00 PM
Absolute CD4	20-051-400652	2/19/2020 11:50:00 AM	2/20/2020 11:40:26 AM	2/20/2020 8:18:00 PM
% CD8	20-051-400652	2/19/2020 11:50:00 AM	2/20/2020 11:40:26 AM	2/20/2020 8:18:00 PM
Absolute CD8	20-051-400652	2/19/2020 11:50:00 AM	2/20/2020 11:40:26 AM	2/20/2020 8:18:00 PM
CD4:CD8 Ratio	20-051-400652	2/19/2020 11:50:00 AM	2/20/2020 11:40:26 AM	2/20/2020 8:18:00 PM
% Natural Killer Cells	20-051-400652	2/19/2020 11:50:00 AM	2/20/2020 11:40:26 AM	2/20/2020 8:18:00 PM
Absolute Natural Killer Cells	20-051-400652	2/19/2020 11:50:00 AM	2/20/2020 11:40:26 AM	2/20/2020 8:18:00 PM
% CD19	20-051-400652	2/19/2020 11:50:00 AM	2/20/2020 11:40:26 AM	2/20/2020 8:18:00 PM
Absolute CD19	20-051-400652	2/19/2020 11:50:00 AM	2/20/2020 11:40:26 AM	2/20/2020 8:18:00 PM
% CD45RA	20-051-400652	2/19/2020 11:50:00 AM	2/20/2020 11:40:26 AM	2/20/2020 8:18:00 PM
Absolute CD45RA	20-051-400652	2/19/2020 11:50:00 AM	2/20/2020 11:40:26 AM	2/20/2020 8:18:00 PM
% CD45RO	20-051-400652	2/19/2020 11:50:00 AM	2/20/2020 11:40:26 AM	2/20/2020 8:18:00 PM
Absolute CD45RO	20-051-400652	2/19/2020 11:50:00 AM	2/20/2020 11:40:26 AM	2/20/2020 8:18:00 PM
% HLA-DR	20-051-400652	2/19/2020 11:50:00 AM	2/20/2020 11:40:26 AM	2/20/2020 8:18:00 PM
Absolute HLA-DR	20-051-400652	2/19/2020 11:50:00 AM	2/20/2020 11:40:26 AM	2/20/2020 8:18:00 PM
Lymphocyte Subset Panel 7 Information	20-051-400652	2/19/2020 11:50:00 AM	2/20/2020 11:40:26 AM	2/20/2020 8:18:00 PM

END OF CHART

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