CYREX Laboratories
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PRACTITIONER

PATIENT
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TEST	RESULTS				
The Lymphocyte MAP™ - Comprehensive Lymphocyte Immunophenotyping	**LOW**	**IN RANGE** (Normal)	**HIGH**	**REFERENCE RANGE**	**UNITS**
Total WBC		6944		4000 - 11000	Cells/uL
Total Lymphocyte		1000		1000 - 4000	Cells/uL
% Lymphocyte	14.4			20.0 - 40.0	%
Total T Cell		731		440 - 1600	Cells/uL
% T Cell		73.09		46.0 - 82.0	%
Total B Cell	48			90 - 400	Cells/uL
% B Cell	4.77			6.0 - 18.0	%
T Cell/B Cell Ratio			15.2	4.0 - 11.0	Ratio
Total T-Helper (CD4) Cell	432			500 - 1100	Cells/uL
% T-Helper (CD4) Cell		43.15		28.0 - 55.0	%
Total Cytotoxic (CD8) T Cell	195			200 - 500	Cells/uL
% Cytotoxic (CD8) T Cell		19.51		10.0 - 30.0	%
CD4/CD8 Ratio		2.2		1.0 - 4.0	Ratio
Total T-Helper-1 Cell		210		150 - 530	Cells/uL
% T-Helper-1 Cell		21.0		18.0 - 34.0	%
Total T-Helper-2 Cell		105		39 - 120	Cells/uL
% T-Helper-2 Cell			10.5	3.2 - 6.6	%
TH1/TH2 Ratio		2.0		1.0 - 5.0	Ratio
Total T-Helper-17 (Th17)	21			35 - 80	Cells/uL
% T-Helper-17	2.1			2.5 - 6.2	%
Total Regulatory T Cell (Treg)		28		15 - 45	Cells/uL
% Regulatory T Cell		2.8		1.8 - 3.3	%
Th17/Treg Ratio	0.8			1.0 - 3.0	Ratio
Total NK Cell (CD56+)		162		60 - 220	Cells/uL
% NK Cell (CD56+)			16.2	3.0 - 15.0	%
Total Cytotoxic NK cells (CD16+)		149		30 - 200	Cells/uL
% Cytotoxic NK cells (CD16+)			14.91	2.0 - 10.0	%
Total NKT (CD56+ CD16+ T Cell)		93		10.0 - 120.0	Cells/uL
% NKT (CD56+ CD16+ T Cell)			9.29	1.0 - 6.0	%
Total CD3- CD57+ Lymphocyte		68		22.0 - 174.0	Cells/uL
% CD3- CD57+ Lymphocyte		6.82		1.4 - 9.7	%
Total CD57+ CD8+ T Cell		58		30.0 - 317.0	Cells/uL
% CD57+ CD8+ T Cell		5.81		2.5 - 15.8	%
Total CD57+ CD16+ NK Cell		117		25.0 - 162.0	Cells/uL
% CD57+ CD16+ NK Cell			11.69	1.5 - 9.2	%

***A: Alert value.** Alert value(s) identified which exceeds established limits (high or low) to a degree that may constitute an immediate health risk to the individual or require immediate action on the part of the ordering physician. Cyrex Laboratories' Clinical Consultants are available to discuss by calling (602) 759-1245 to schedule an appointment.

< > symbols are shown when the result is beyond the reportable range. The number shown after symbol represents the minimum or maximum reportable measurement respectively.
Sadi Koksoy, DVM, PhD, HCLD (ABB), Laboratory Director

Cyrex Laboratories is certified under the Clinical Laboratory Improvement Amendments of 1988 ("CLIA") as qualified to perform high-complexity clinical testing. Test result data on its own does not constitute a diagnosis of any disease. Only a physician or qualified healthcare professional should interpret the significance of a clinical lab test or make a diagnosis. This test was developed and its performance characteristics determined by Cyrex Laboratories, LLC. This test is a laboratory developed test and therefore not subject to clearance or approval by the US Food and Drug Administration. The names and titles of tests and arrays are for reference purposes only.

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THE LYMPHOCYTE MAP™ EXPLANATORY INFORMATION

Circulating peripheral blood lymphocytes are a major component of the immune system. The status of this part of the immune system in an individual may be determined by counting the populations of these lymphocytes and comparing their relative frequencies.

Cyrex Labs™ comprehensive lymphocyte immunophenotyping uses an advanced flow cytometry method that combines fluorescently labeled monoclonal antibodies and laser technology to measure the properties of cells based on size, shape, density, and marker expression resulting in high-precision counts of targeted lymphocytes. This includes T cells, B cells, and the specialized counting of T helper cell subpopulations (Th1, Th2, Th17 and T regulatory cells). Cyrex uses a proprietary method to directly stain the surface of these cells, delivering precise counts of these lymphocyte subpopulations. Imbalance in T cell subsets are implicated in patients with allergies, hypersensitivities, asthma, and immune deficiencies, including primary immune deficiencies and viral infections (such as SARS-CoV-2). This technology also enables us to measure cytotoxic T lymphocytes (formerly known as suppressor cells), natural killer (NK) cells, cytotoxic NK cells, and natural killer T cells (NKTs) CD57+ and CD57+CD16+ NK cells, and CD57+CD8+ cytotoxic T cells. Together these 7 kinds of special cells protect the body from viruses and cancer cells. The determination of T helper and other lymphocyte subpopulations may provide valuable insight in the care of patients suffering from or forming diverse autoimmune disorders.

The classification of lymphocyte subpopulations into different immunotypes can identify weaknesses or imbalance in the immune fitness of patients and can help practitioners to recommend treatment plans to prevent or halt the progression of many immune disorders that affect a significant percentage of the world's population.

Cyrex Immunotype classifications are based solely on, and refer solely to, absolute lymphocyte counts and their subsets. Immunotypes are identifiable patterns that show the immune system is responding to circumstances or environmental factors. While cell counts and immunotypes may provide valuable insights, they are not indicative of any specific condition or disease and should not be used alone to interpret the results. The Lymphocyte MAP™ provides two important categories of information: (1) each parameter/determinant provides important information on its own, and (2) the relationship between parameters provides another set of invaluable information categorized in multiple immunotypes (immunophenotype patterns).

The following immunophenotype pattern(s) have been identified in your test results:

T CELL DOMINANCE at the time of testing, due to one of the following: high T cell with normal or low B cell, or normal T cell with low B cell results. This correlates with IMMUNOTYPE-2™ in the following general information pages.

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Potential Clinical Associations

Immunotype/Pattern	May be induced by	May be associated with
IMMUNOTYPE-1 **Immune Balance or Harmony in total cell counts**	Genetics, lifestyle or other factor	N/A (1, 16-18)
IMMUNOTYPE-2 **T Cell Dominance** ·High T cell, low B ·High T, normal B ·Normal T, low B	Too many T cells but too few B cells may be due to excessive exposure to toxic chemicals and other environmental factors such as lectins and agglutinins. Low B cell numbers could also be due to some environmental factors that induce B cells to undergo programmed cell death.	Immune dysregulation, excessive inflammatory reaction, autoimmune lymphoproliferative syndrome, affecting T cell numbers. Low levels of antibody production, immunodeficiencies, viral and bacterial infection (14,22,32,35,70,171-176)
IMMUNOTYPE-3 **B Cell Dominance** ·High B cell, low T ·High B, normal T ·Normal B, low T	Gut dysbiosis, exposure to environmental factors, toxic chemicals, bacterial toxins that induce T cells to undergo programmed cell death, and change in the balance between T and B cells	Immune activation, autoimmunities, allergies, hypersensitivities, neuropsychiatric disorders, CFS, depression (3,31,35-43,70,161,167-175,177,179)
IMMUNOTYPE-4 **Immune Hyperactivity CD4 Dominance** ·High CD4, low CD8 ·High CD4, normal CD8 ·Normal CD4, low CD8	Excessive exposure to toxic chemicals and other environmental factors, molds, mycotoxins, and T cell mitogens such as lectins and agglutinins	Higher CD4/CD8 ratio, immune activation, excessive inflammation, autoimmune diseases, T cell proliferative disorders (3,26,45-51,178,180)
IMMUNOTYPE-5 **Immune Deficiency CD8 Dominance** ·High CD8, low CD4 ·High CD8, normal CD4 ·Normal CD8, low CD4	Exposure to toxic chemicals that affect the plasticity of T cells and change their CD markers, turning them into CD8+ cells	Lower CD4/CD8 ratio, protection against some pathogens, immune dysfunction, different immunodeficiencies (including AIDS and cancers), and chemical-induced immunodeficiency syndrome (CIDS) (52-57,180)
IMMUNOTYPE-6 **Th1 Dominance** ·High Th1, low Th2 ·High Th1, normal Th2 ·Normal Th1, low Th2	Stress, regulatory T cell dysfunction, gut dysbiosis, conversion of too many Th0 cells into Th1 due to exposure to many environmental factors, unhealthy lifestyle	Higher Th1/Th2 ratio, excessive inflammation and autoimmunities, especially cellular-mediated autoimmune disorders due to Th1 cells acting as autoreactive lymphocytes in many autoimmune diseases (58-70)
IMMUNOTYPE-7 **Th2 Dominance** ·High Th2, low Th1 ·High Th2, normal Th1 ·Normal Th2, low Th1	Dysregulation of Tregs by lifestyle, gut dysbiosis, and exposure to many environmental factors, especially allergens, resulting in conversion of too many Th0 cells into Th2 cells	Lower ratio of Th1/Th2, allergies, asthma, hyper-sensitivities, and antibody-mediated or Th2 associated autoimmune disorders (65-74)
IMMUNOTYPE-8 **Regulatory T Cell Imbalance High or Low Tregs**	Unhealthy lifestyle (including diet, vitamin A, C and D deficiency), many environmental toxins, including bacterial toxins (LPS, BCDT)	Breakdown in peripheral, central and oral tolerance, immune suppression, immune deficiencies, some autoimmune disorders, cancer, lower or higher Th17/Treg ratio (19-21,75-111)

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IMMUNOTYPE-9 **Th17 Dominance** ·High Th17, low Treg ·High Th17, normal Treg ·Normal Th17, low Treg	Stress, infections, xenobiotics, exposure to environmental factors that change many Th0 cells into IL-17- producing Th17 cells, and unhealthy lifestyle (including consumption of high amounts of salt, artificial sweeteners, and many food additives that result in gut dysbiosis)	Imbalance between Th17 and Treg cell resulting in high Th17/Treg cell, severe inflammatory and autoimmune disorders, as well as allergies and hypersensitivities. Th17 acts as an autoreactive lymphocyte in many autoimmune disorders (111-122,133-140,181)
IMMUNOTYPE-10 **Th1+Th17 Dominance** ·High Th1+Th17, low Treg ·High Th1+Th17, normal Treg	Stress, unhealthy lifestyle, exposure to many environmental factors (including toxic chemicals, food antigens, pathogens), regulatory T cell dysfunction, too many Th0 cells becoming Th1 and Th17 autoreactive T cells	Higher Th1/Th2 ratio, higher Th17/Treg cell ratio, severe inflammation and autoimmunities (including neuroautoimmune disorders), since these cells can damage the BBB and penetrate the protective layer of the brain (123-129)
IMMUNOTYPE-11 **Th2+Th17 Dominance** ·High Th2+Th17, low Treg ·High Th2+Th17, normal Treg	Exposure to many environmental factors (food additives, bacterial toxins), stress, unhealthy lifestyle that affects the gut, and conversion of too many Th0 cells into Th2 and Th17 cells	Lower Th1/Th2 ratio, higher Th17/Treg ratio, allergies, hypersensitivities, inflammation and autoimmune disorders (130-132)
IMMUNOTYPE-12 **NK Cell Imbalance** **High or Low NK or Cytotoxic NK Cells**	Environmental toxins and viral infection, unhealthy lifestyle, lack of exercise, and stress	Too few NK or cytotoxic NK cells: Viral and bacterial infections, autoimmune diseases, cancer. Too many NK or cytotoxic cells: Induction of some autoimmune disorders, loss of pregnancies, COPD, and NK proliferative disease (141-150, 161)
IMMUNOTYPE-13 **NKT Cell Imbalance** **High or Low NKT Cells**	Imbalance between T, B and NK cells, exposure to different environmental factors including viral antigens, unhealthy lifestyle, stress, and neuropsychiatric disorders, which may all induce low % of NKT cells	Too few NKT cells: Enhanced bacterial and viral infections, induction of autoimmunities, higher tumor burden Too many NKT cells: Protection against some infections and autoimmune diseases, increased chance of pregnancy in in vitro fertilization, but also contributes to phospholipid syndrome, COPD and neuroautoimmunities (151-160)
IMMUNOTYPE-14 **CD57+ Imbalance** **High or Low CD57+ Cells**	High antigenic load including environmental toxins and viral infection, unhealthy lifestyle, lack of exercise, and stress	Too few CD57+ NK and T cells: Enhanced bacterial and viral infections, induction of autoimmunities, higher tumor burden, long COVID ME/CFS Too many CD57+ NK and T cells: Protection against pathogens and cancers, prevention of some autoimmunities, but also induction of some autoimmunities, pregnancy loss, COPD, transplant rejection (162)

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The following are *Selected References* only. References cited in the preceding addendum refer to the complete list of 181 references contained in the Cyrex Labs Lymphocyte MAP™ Clinical Application Guide.

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