

The Normal Range Reference for Peripheral Blood Lymphocyte Subsets in Regional Arab Population

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ABSTRACT

By utilising monoclonal antibodies, relative proportion of peripheral blood B and T lymphocytes subsets found in healthy regional Arab population were analysed and normal reference ranges within 2.5 to 97.5 percentile were established. The reference ranges for the B-lymphocytes, total T-lymphocytes (CD 3), T-helper/inducer cells (CD 4) and T-suppressor/cytotoxic cells (CD 8) were 2.84 - 11.65, 64.50 - 86.87, 38.50 - 56.44 and 19.11 - 33.72 percent respectively. These values are similar to those reported for western populations.

The laboratory enumeration of lymphocytes subpopulation is called in many clinical situation such as leucaemia, lymphadenopathy, persistent or repeated viral, fungal or protozoan infections that may accompany immune deficiency, suspicion of acquired immune deficiency syndrome, bone marrow transplantation and subsequent immune regeneration, immune reconstitution for immune deficiency disorders, immunosuppressive drug regimens for organ transplant and autoimmune diseases, to mention a few. Ideally laboratory investigations must correlate the enumeration of various lymphocyte populations with their functional properties, however, functional lymphocytes constitute only a small proportion of sub-phenotypic group. Therefore, numeric evaluation of sub-phenotypic groups may be sufficient to predict functional alterations/deviations caused by or secondary to a disease.

The normal reference range values for various peripheral blood lymphocyte subsets found in regional Arab population are not available in literature. Such values, however, are available for western population.¹⁻⁹ The extrapolation of these values to our regional Arab population is not satisfactory as this may cause difficulties in the interpretation of laboratory clinical investigation of patients. The present studies were therefore undertaken to establish reference ranges for various subpopulation of peripheral blood lymphocytes in

normal adult regional Arab population.

METHODS

Peripheral blood samples from 120 healthy men and women volunteers aged between 18-50 years were collected in EDTA-tubes, and processed within two hours following collection to isolate mononuclear cells utilising established density gradient centrifugation.¹ Murine monoclonal antibodies, namely: OKT3, OKT4, and OKT8 specific to markers exclusively present at the surface of various T-lymphocytes subsets were purchased from Orthodiagnostics (Raritan, New Jersey, USA). Visualisation of T-lymphocyte bound monoclonal antibodies was accomplished by utilising FITC-conjugated goat anti-mouse affinity purified polyclonal antibodies also purchased from Orthodiagnostics. The B-lymphocytes were quantified by utilising FITC-conjugated B cells surface immunoglobulin marker antibody purchase from Orthodiagnostics. Instructions provided by the manufacturer were followed to label and enumerate various lymphocyte subsets. Computer assisted statistical analysis of data obtained was carried out by utilising STATPAC IBM software by employing unpaired student's t-test.

RESULTS

Table 1 summarises the results and exhibits the normal reference ranges for lymphocyte subset in regional Arab population. These values provide us with the guidelines to discriminate between normal and abnormal values with 95% confidence interval. Mean values for total B, total T (OKT3 or CD3), T-helper/inducer (OKT4 or CD4), and T-suppressor/cytotoxic (OKT8 or CD8) lymphocytes were found to be 7.24, 75.68, 47.47 and 26.42 percent respectively. The normal reference ranges for various lymphocytes subsets encompassing 95% interval were as follows: B-lymphocytes 2.84-11.65, total T-lymphocytes 64.54-86.87, helper/inducer T-lymphocytes 38.50-56.44 and suppressor/cytotoxic T-lymphocytes 19.11-33.72 percent.

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Table 1
Reference values for lymphocyte subsets in normal Saudi population

Percentile	% of Lymphocytes				CD4 / CD8 Ratio
	Total B-cells	CD3 (Total T)	CD4 (T-helper/ inducer)	CD8 (T-suppressor/ cytotoxic)	
Median	7.00	76.00	48.00	27.00	1.82
5	3.53	66.26	39.91	20.27	1.23
10	3.74	66.84	40.37	20.64	1.36
90	10.74	84.53	54.56	32.19	2.30
95	10.95	85.10	55.02	32.57	2.43
Mean	7.24	75.68	47.47	26.42	1.83
95% confidence interval	(2.84-11.65)	(64.50-86.87)	(38.50-56.44)	(19.11-33.72)	(1.12-2.55)

DISCUSSION

B-lymphocytes are responsible for the production of antibodies following their differentiation to the antibody secreting plasma cells. In addition to serving as effector cells for a variety of cell mediated immune interactions, T-lymphocytes are also responsible for the maintenance of homeostatic balance in immune system. The T-helper/inducer cells are responsible for the overall orchestration of immune response. The suppressor/cytotoxic T-lymphocytes, on the other hand, are responsible for the overall dampening of T-lymphocyte effector functions. To operate effectively, the different T-lymphocytes must be within a maximum/minimum range and changes in these ranges may reflect either a dynamic response of a healthy immune system to an immunologic challenge or an alteration consistent with a disorder of the immune system.

The relative proportion or absolute value of lymphocyte subsets in healthy population varies greatly¹⁻⁹ and does not approximate to a bell shaped curve or normal distribution. Despite such variability, the effect of disease or immunologic manipulation such as organ transplant,^{10,11} autoimmune disorder,^{5,12} viral infections,¹³⁻¹⁵ bacterial infections,^{16,17} immunomodulation,¹⁸⁻²⁰ and lymphoid malignancies^{6,12} could be so profound that alteration in lymphocyte subset population in affected individuals falls well outside the reference range. The reference normal ranges reported here for the regional population provide us with the means to recognise such clinical presentations.

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