The People's Democratic Republic of Algeria Ministry of Higher Education and Scientific Research University Center of Mila Faculty of Science and Technology Department of Natural and Life Sciences

TD 03 – Immunology

Exercise 01:

The following table represents the blood analysis of 3 individuals:

		Individ 1	Individ 2	Individ 3
Red blood cells		4 10 ⁶ /mm ³	5.7 10 ⁶ /mm ³	$4.1 \ 10^6 \ /mm^3$
White blood cells		$5 \ 10^3 \ /mm^3$	$4.5 \ 10^3 \ /mm^3$	$10 \ 10^3 / \text{mm}^3$
Neutrophils	(%)	55	70	32
Basophils	(%)	0,5	0,4	0,5
Eosinophils	(%)	9	2	2
Lymphocytes	(%)	29	31	56,5
Monocytes	(%)	8	7,5	9

Given that one of these individuals is healthy and serves as a reference, identify this person; comment on the results of the other two and suggest a diagnosis for each of them.

Exercise 02:

The interaction between antibodies (Ab) and antigens (Ag) is one of the mechanisms of specific humoral immunity.

a) Define the interaction zone leading to the formation of the immune complex, specifying the types of bonds that may be involved.

b) From this interaction, two concepts can be highlighted: **Affinity** and **Avidity**. What does each term represent?

c) Is the specificity of the interaction between an antibody and an antigen absolute?

Exercise 03:

You have the following experiments. Discuss the results and draw a conclusion for each experiment.

Experiment 01:

T cells from two mouse strains (X and Y) are cultured in the presence of dendritic cells from strain X, which were incubated for 1 hour with the antigen (Ag) and then washed. The proliferative response of T cells is then measured.

Result:

- Co-culturing T cells from strain X with dendritic cells from strain X induces T cell proliferation.
- T cells from strain Y do not proliferate when co-cultured with dendritic cells from strain X.

Experiment 02:

Newborn mice from strain X undergo thymectomy a few hours after birth and are then reconstituted with thymic cells from strain Y just before being immunized with sheep red blood cells (SRBC). After 7 days, splenic cells are harvested and separated into two aliquots. One part of the cells is treated with cells from strain Y.

Result:

- Antibody-producing cells are detected in aliquot 1.
- No antibody-producing cells are detected in aliquot 2.