January 27, 2014

Midterm-1

Basic Immunology

Department of Biochemistry and Molecular Biology

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Marks: 10 **Time: 1 hour**

1. In a classical experiment Pasteur inject healthy chicken with aged culture of cholera bacterium and found no cholera symptom in the chicken (Experiment 1, figure 1). However, later in another experiment when he injects fresh culture of cholera bacterium to healthy chicken, the chicken died of cholera. On the contrary, when he injects fresh culture of cholera bacterium to chicken that was previously injected with aged culture; the chicken remains healthy (Experiment 2, figure 1). Provide an immunological explanation of the experiments **2.5**

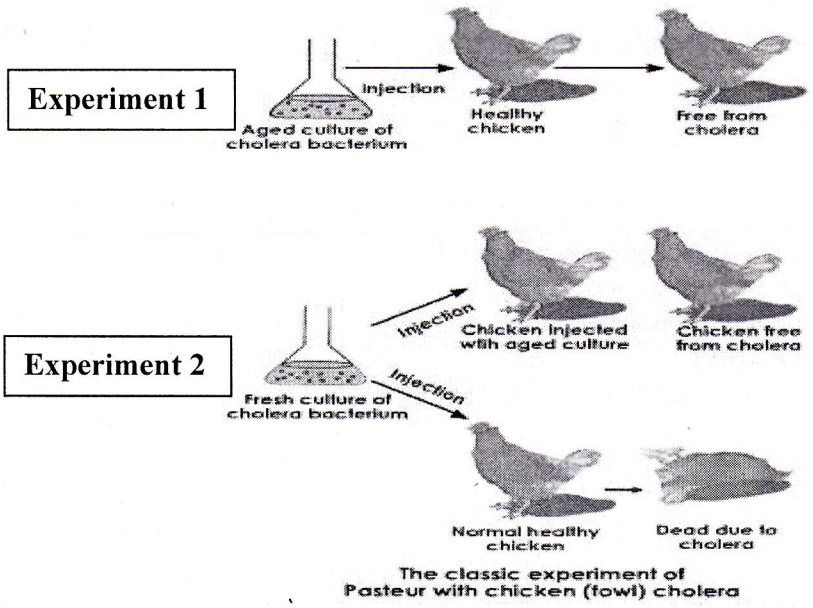

Figure 1: The classical experiments of Pasteur with chicken

2. Describe the functions of the following cells in one sentence – **5*0.2= 1.0**
   a) Mast cell
   b) Basophil
   c) Eosinophil
   d) Dendritic cell
   e) Neutrophil

3. Arrange the following events in correct order to describe a) phagocytosis and b) inflammation (just write down numbers in correct order). **1.25*2=2.5**

a)

I. Vacuoles form, enclosing pathogen 3
II. Vacuoles from pathogen is released by exocytosis 6
III. Pseudoposia surrounds pathogen 1
IV. Pathogen are engulfed by endocytosis 2
V. Vacuole and lysosome fused 4
VI. Toxic compounds and lysosomal enzymes destroy pathogens 5

b)

i. Vasoactive and chamotactic factors released 2
ii. Phagocytes and antibacterial components destroy pathogen 6
iii. Phagocytes migrates to sites of inflammation 5
iv. Increase blood flow and capillary permeability 3
v. Tissue damage 1
vi. Influx of fluid and cells 4

4. Match the functions with the provided organ/ biomolecules **1.0**

I.	Acidic P^H (3-5) retards growth of microbes	a.	skin
II.	Propels microbes out of body	b.	stomach
III.	Cleaves cell wall of bacteria	c.	mucous
IV.	Recognizes PAMPs	d.	cilia
V.	Induces antiviral states to uninfected cells	e.	lysozyme
		f.	IFN
		g.	TLR

5. You are given three test tubes. One of them contain B cells, and the other two contains Th cells and CTL respectively. How can you identify which tubes contain which type of cells? **1.0**

6. Pathogens can be classified into two types depending on their residence in the host. Pathogens those reside and multiply inside the cells are termed as intracellular pathogen. On the other hand, pathogens which reside and multiply outside the cells are known as extracellular pathogen. Normally viruses are intracellular pathogen and bacteria are extracellular pathogen. Describe the immune defense mechanisms against viruses and bacteria (major cells and soluble materials involved, antigen presentation pathway)? **2.0**