

LS3101

Roll.No.



Course Code: LS 3101 IISER KOLKATA Subject: Immunology Year 2018

Date: 29<sup>th</sup> November 2018

Total marks: 50 Time: 3h

**Part 1 (Each question carry one marks) (40x1=40)**

1. Which of the following substances will not stimulate an immune response unless they are bound to a larger molecule?
  - a. Antigen
  - b. Virus
  - c. Hapten
  - d. Antibody
2. Which of the following convey the longest lasting immunity to an infectious agent?
  - a. Naturally acquired passive immunity
  - b. Artificially acquired passive immunity
  - c. Naturally acquired active immunity
  - d. All of these
  - e. None of these
3. In agglutination reactions, the antigen is.....in precipitation reactions, the antigen is.....
  - a. whole cell/soluble molecule
  - b. Particulate /soluble molecules
  - c. Bacterium/virus
  - d. Protein/carbohydrates
5. IgE antibodies play a role in protection against helminth infection. True or False?
6. A patient skin-tested with purified protein derivative (PPD) to determine previous exposure to *Mycobacterium tuberculosis* develops induration at the skin test site 48 hours later. Histologically, the reaction site would MOST probably show:
  - a. Helper T cells and macrophages
  - b. B cells
  - c. Eosinophils
  - d. Neutrophils
7. Which category of hypersensitivity BEST describes hemolytic disease of the newborn caused by Rh incompatibility?
  - a. Immune complex formation
  - b. Atopic or anaphylactic reaction
  - c. Cytotoxic
  - d. Delayed HPS response
8. A patient with rheumatic fever develops a sore throat from which  $\beta$ -hemolytic streptococci are cultured. The patient is started on treatment with penicillin, and the sore throat resolves within

*A. Mani*

**several days. However, 7 days after initiation of penicillin therapy, the patient develops a fever of 103°F, a generalized rash, and proteinuria. This MOST probably resulted from**

- a. A delayed hypersensitivity reaction to penicillin
- b. An IgE response to penicillin
- c. Recurrence of the rheumatic fever

**9. Type I hypersensitivity includes all of the following except:**

- a. Hay fever
- b. Anaphylaxis
- c. Autoimmune hemolytic anemia
- d. Extrinsic asthma

**10. Influenza virus contains hemagglutinin and neuraminidase. What does these represent?**

- a. Glycoproteins on influenza virus that contribute to virulence
- b. Exotoxins produced by the influenza virus
- c. Glycoprotein receptors on influenza's target cells
- d. Proteins that surround each segment of the nucleic acid in influenza
- e. Proteins found in the nucleus of influenza virus

**11. In TCR-CD3 complex,  $\gamma/\delta/\epsilon$  chain contain ..... copy of ITAM while  $\zeta$  contain ..... Copies.**

**12. CTLA-4/B7 interaction sends an inhibitory signal to the T cell rather than an activating signal. (True/False)**

**13. TCR signaling in resting T cells initiated by the phosphorylation of**

- a.  $p56^{Lck}$  protein kinase
- b. ZAP-70
- c. PLC  $\gamma$
- d. IP3

**14. What is the major structural difference between CD8 and CD4?**

- a. CD8 is a homo-dimer of alpha chain and CD4 monomer consisting of 2 domains
- b. CD8 is a heterodimer consisting of alpha and beta chain and CD4 monomer consisting of 4 domains
- c. CD8 is a homodimer consisting of gamma and epsilon chain and CD4 monomer consisting of 3 domains

**15. Class 1 cytokine receptor Family contains conserved amino acid sequence motifs in extracellular domain.**

They have 4 conserved ----- and one -----motif.

**16. The high affinity IgE Fc Receptor composed of one  $\alpha$  and  $\beta$  chain with two -S-S- linked  $\gamma$  Chains. The specific ITAM motif/s are present in**

- a. Only in  $\alpha$  chain
- b. Both  $\beta$  and  $\gamma$
- c. All three chains
- d. Only in  $\gamma$  chain

17. Due to medical emergencies one A+ blood group individual receives regular blood transfusion with ABO matched blood (A+ or O+). But many times 2-6 hours after the transfusion the patient was reported to feel burning sensation at the site of the infusion, together with chills, fever, and pain in the back and flanks. Since the patient receive matched blood, what could be best possible reason for such complication.
- Mismatch for his Rh D antigen
  - Mismatch in Duffy blood group system
  - All of the above
18. Crossing the vascular endothelial cells by leucocytes in response to tissue injury is called:
- Transcytosis
  - Diapedesis
  - Infiltration
  - Chemotaxis
19. Serine, threonine and tyrosine residues are all subjected to phosphorylation in various signal transduction pathways. (True or False)
20. Which of the following is expressed on the surface of the mature B lymphocyte?
- CD40
  - MHC class II molecules
  - CD32
  - IgM and IgD
  - All of the above
21. These cells mostly do not show MHC restriction:
- Naïve T cells
  - CD4T cells
  - CD8T cells
  - $\gamma\delta$  T cells
22. If a newborn was accidentally given a drug that destroyed the thymus, what would most likely happen?
- His B cells would not mature.
  - His humoral immunity would be missing.
  - His T cells would not mature and differentiate appropriately.
23. The most efficient Ig involved in the classical pathway of complement activation is
- IgA
  - IgG
  - IgM
  - IgE
24. Hemolytic disease of the newborn due to RhD incompatibility depends upon the
- Transplacental passage of IgG anti-RhD antibodies.
  - Transplacental passage of IgM anti-RhD antibodies
  - Production of cytotoxic antibodies by the baby.
  - The first pregnancy of the mother.



- 25. To identify antigens on live cells can use**
- ELISA.
  - FACS
  - All of the above.
- 26. Which of the following best describes where class I MHC is found**
- B cells
  - Macrophages
  - Dendritic cells
  - All nucleated cells
- 27. This cytokine inhibit Th2 cells**
- IFN $\gamma$
  - IL12
  - IL10
  - IL4
- 28. Co-stimulatory molecules for foreign antigen presentation to T cells by MHC class II**
- CD40L-CD40
  - B7-CD28
  - B7-CTLA4
  - CD3-TCR
- 29. DNA vaccines elicit protective immune-response by against a pathogen by activating**
- Humoral immune system
  - Cellular immunity
  - Both a and b
  - None of them
- 30. All of the given vaccines are attenuated or inactivated whole pathogen except**
- Salk
  - Sabin
  - Tetanus
  - Hepatitis A
- 31. Which of the following statement is true regarding vaccination?**
- vaccination is a method of active immunization
  - vaccination is a method of passive immunization
  - vaccination is a method of artificial passive immunization
  - vaccination is a method of natural passive immunization
- 32. Costimulatory molecules help T cell responses by**
- Increasing T cell activation in an antigen specific manner
  - Increasing T cell activation regardless of the specificity of the T cell
  - Degrading antigen so it can bind in the MHC groove
  - Binding to MHC molecules containing immunogenic peptides
- 33. Inflammatory or Th1 CD4 T cells cells produce IL-4, IL-5, and IL-6 and Th2 cells secrete IL-2, IFN $\gamma$ , and TNF $\beta$  (True or False)**
- 34. Cytoplasmic signals generated in response to antigen binding and co-stimulatory signals to Tc cells. Chose the best possible answer.**
- Activation of transcription factors that up regulate synthesis of IL2.
  - Aggregation of TCR and CD8 in the T cell membrane
  - Tyrosine kinase binding to the cytoplasmic domains of CD3 and CD8.
  - All of the above

35. Which of the following is NOT true?

- a) TLR – 2 binds to peptidoglycan.
- b) TLR – 3 binds to ds RNA of viruses.
- c) TLR – 4 binds to gram-positive bacterial cell walls.
- d) TLR – 5 binds to flagellin of motile bacteria.

36-40. Match the table

	CDs		Cell types	
1	CD3	A	APCs	
2	CD4/CD8	B	T cells	
3	CTLA4	C	DCs	
4	B7 peptide	D	APCs	
5	CD40	E	T cells	

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Part B Answer any 4 questions (4x2.5=10)

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Write short note on the followings (Any 4)

- 1. DNA vaccine
- 2. ADCC
- 3. Gel and Coombs classification of hypersensitivity
- 4. Immune checkpoints for cancer therapy
- 5. Secretory IgA
- 6. T-Bet and GATA3

-----End of the questions-----

Signature with date :

Name: