1. **Interferons**
   a) activate B cells to make virus-specific antibodies.
   b) Are Th2 cytokines.
   c) Are virus proteins that interfere with activation of cytotoxic T cells.
   d) Block virus infection of host cells.
   e) Inhibit virus replication by infected cells.
2. **The T-cell receptor**
   a) Is composed of five polypeptide chains
   b) is secreted into the plasma by the T-cell
   c) Is the recognition element of the humeral arm of the immune system
   d) recognizes antigen fragments via the alpha and beta chains
   e) It resembles B cell receptor by having two antigen combining sites
3. **Several cytokines may have the same effect on the cells they bind. This is an example of**
   a) Cascade.
   b) Antagonism.
   c) pleiotropism.
   d) Redundancy.
   e) Synergy.
4. **Which of the followings is TRUE regarding MHC proteins?**
   a) Class 1 proteins bind extracellular antigen and are recognized by the T-cell receptor and the CD8 protein
   b) Class I proteins generally occur just on cells of the immune system
   c) Class II proteins bind antigen fragments and are recognized by the T-cell receptor and the CD4 protein
   d) Class II proteins carrying antigen fragments identity normal cells as foreign and result in their cytotoxic destruction
   e) Class 1 proteins have their antigen binding sites on alpha and beta chains
5. **Class I MHC proteins are**
   a) Retained in endosome where they bind peptide
   b) recognized by the CD4 protein
   c) used in combination with an antigen fragment to mark a cell for killing by natural killer cells
   d) used to participate in helper function
   e) Alpha 3 is the constant region that bind CD8
6. **Killer T-cells (CD8 T cells) affect their killing**
   a) by secreting antibodies with specific recognition capabilities
   b) by Inserting the complement components, C5 and C9, into the target cell membrane
   c) by the T- cell antigen receptor and Class 2 MHC proteins
   d) by inserting a pore forming protein called perforin into the target cell membrane
   e) by secreting specific cytokines that directly induce cell apoptosis

7. **Which of the following uniquely distinguishes the T-cell receptor (TCR) from an antibody?**
   a) The TCR can bind an antigen fragment only in a complex with either the class I or class II surface proteins of the major histocompatibility complex
   b) The TCR can function as a cell surface antigen receptor
   c) The TCR is composed of two different types of polypeptide chains

d) The TCR is capable of participating in a cytotoxic reaction.
e) The TCR polypeptides is composed of domains - an amino terminal variable portion that determines the binding specificity and a constant portion that determines the class of the polypeptide chain

8. **A helper T lymphocyte is known to recognize which one of the following on a presenting cell?**
   a) HLA class I antigen
   b) Surface immunoglobulin
   c) Processed antigen
   d) CD4
   e) B and c
9. **Which of the following statements apply to MHC class I antigens?**
   a) MHC class I antigens are heterodimers of two transmembrane polypeptides.
   b) The floor of the peptide-binding cleft is formed by amino acids from both the alpha and beta chains
   c) The peptide-binding cleft is open-ended.
   d) The optimal length of peptide for binding in the cleft is ~8-10 amino acids.
   e) Peptide binding to MHC class I is enhanced in the presence of HLA-DM.
10. **Double negative T cells**
   a) Can give rise to both αß and γδ T cells.
   b) Migrate into the periphery lacking all cell surface molecules.
   c) Enter into the medulla of the thymus and mature in the cortex.
   d) Undergo negative selection but not positive selection.
   e) express a pre-TCR comprising a TCR alpha chain associated with pre- T beta chain
11. **When a B-cell undergoes immunoglobulin class switching**
   a) the variable region of the light chain changes, but its constant region remains the same
   b) the variable region of the light chain remains the same, but its constant region changes
   c) the variable region of the heavy chain remains the same but its constant region changes
   d) the variable region of the heavy chain changes but its constant region remains the same
   e) both the variable and constant regions change
12. **Two cytokines, produced by macrophages, that are involved in fever production, as well as septic shock and the effects of superantigen toxins are:**
   a) IL 2 and IL-3
   b) IL-3 and IL-4
   c) IL-1 and TNF alpha
   d) IL-10 and IL-8.
   e) IL-6 and IL-2

13. **A skin test for the hypersensitivity reaction was done and the result shows large (> 50mm) and less identified erythema after 5-12 hours. This type of reaction is**
   a) Hypersensitivity type 1
   b) Antibody- mediated hypersensitivity reaction
   c) Hypersensitivity type 3
   d) Hypersensitivity type 4
   e) Non of all

14. This cytokine is a major antagonist to IL-4, activates macrophages, and also has antiviral activity. It is:

a) IL-1
b) IL-2
c) interferon gamma
d) IL-8
e) IL-10

15. Which of the following statements about a secondary antibody response to lipopolysaccharide is TRUE?

a) the secondary response comes from memory B cells
b) the secondary response is faster
c) the secondary response is primarily IgG
d) the secondary response comes from poly clonal B cells activation
e) The antibody affinity in the secondary response is lower

16. This chemokine is produced by endothelial cells during inflammation; it helps in the process of extravasation. It is:

a) IL-1
b) IL-2
c) interferon gamma
d) IL-8
e) IL-6

17. A person becomes anemic after antibiotic therapy, showing blood in the urine. The attending physician finds that antibiotic bound to patient RBCs and these RBCs lysed when treated with the patient's serum. This response is called

a) Hypersensitivity type 1
b) Hypersensitivity type 2
c) Hypersensitivity type 3
d) Hypersensitivity type 4
e) Non of all

18. A type of lymphocyte that has no antigen receptor, and can non-specifically kill virus-infected cells and tumor cells is:

a) T helper cell
b) neutrophil
c) macrophage
d) NK cell
e) eosinophils

19. You are very sensitive to bee stings; you get stung, can't breath, lose blood pressure, and are alive only because you carry an antidote. This response is called

a) Hypersensitivity type 1
b) Antibody- mediated hypersensitivity reaction
c) Hypersensitivity type 3
d) Hypersensitivity type 4
e) Non of all

20. Myasthenia gravis disease is an example of

a) Hypersensitivity type 1
b) Antibody- mediated hypersensitivity reaction
c) Hypersensitivity type 3
d) Hypersensitivity type 4
e) Non of all

21. In working up a case of hemolytic disease of the newborn due to Rh incompatibility, you would most likely carry out an *indirect* Coomb's test on:

a) The newborn's serum
b) The newborn's RBCs
c) The mother's serum
d) The mother's RBCs
e) The mothers WBC

Directions (Questions 22-26).Select the <u>ONE</u> lettered option that is most closely associated with the numbered items

a) IgM
b) CD28 molecule
c) CD3
d) CD4
e) CD40L molecule

22. Promotes isotype switch of the antibody. E
23. Binds to MHC Class II. D
24. Signal-transducing part of the T-cell antigen receptor complex. C
25. Binds the B cell membrane. A
26. Promotes second signal for T cell activation. B

27. The small amounts of immune complexes which form in healthy individuals are normally removed in a process involving CR1 receptors expressed by:

a) Macrophages
b) PMNs
c) B cells
d) RBCs
e) Mast cells

28. Blood transfusion was done for a patient and suddenly he developed fever, hypotension and back pain

a) This reaction happen because he had antibodies against the foreign ABO antigens and these antibodies are always IGG
b) Previous exposure to that foreign ABO antigens should happen before
c) The suitable test for the preparation of blood transfusion is indirect coombs test
d) The RBC destruction was T helper cells mediated
e) Both a and c

29. Which of the following is produced by T-cells to stimulate T-cell differentiation?

a) IL-2
b) IL-4
c) TNF alpha
d) Both a and b.
e) Neither

30. In allergy

a) The first exposure characterized by binding the IgE to its high affinity receptor (FcεRII) on the mast cells
b) Mast cell degranulation occurs only when the allergen cross link 2 IgE antibodies
c) All the acute symptoms in the early phase result from the cytokines produced by TH2

d) IL-4 cytokine production from Th2 is the only signal needed to activate B cells
e) Both a and b

31. Immature dendritic cells

a) Differ from mature cells by the presence of MHC 2 molecules
b) Have no part in the immunological response
c) Are phagocytic and presenting cells
d) Have costimulatory molecules enough for presenting and activation of naïve T cells
e) Engulfing of a pathogen convert it to a mature DC.

32. Regarding Cell adhesion molecules on T cells all are TRUE except

a) Help in migration and activation of the T cells
b) L-selectin is expressed on the naïve T cells but not the activated ones
c) LFA-1 is an integrin that binds ICAM-1and 2 on APC
d) ICAM 1, 2 and 3 are immunoglobulin superfamily molecules that expressed on T cell
e) Very Late Antigen-4 (VLA-4) is expressed on activated T cells but not Naïve ones

33. Regarding the B cell activation by the T helper cells

a) The antigen can be lipo-polysaccharide
b) B cell is the most effective APC when the antigen is in low concentration
c) Plasma cells lose the expression of MHC 2 molecules
d) Antibody isotype switch from IGM to other isotypes occurs under the influence of IL-10
e) Both b and c

34. All of the following can regulate the lymphocyte response except

a) Expression of FasL on the killer cell that bind Fas on the T cell and induce apoptosis
b) Expression of CTLA-4 molecule on the T cell instead of B7 that inhibit T cell activity
c) Passive cell death as a result of antigen elimination
d) Production of IL-10 by the regulatory T cells
e) Priming the immune response toward TH2 in autoimmune diseases

35. Regarding the immune response against virally infected cells and tumor cells

a) NK cells can kill all the infected cells expressing MHC1 molecules
b) The cytokine environment contain interferon alpha and beta and IL-12
c) TH2 can activate the CD8 cells that have a cytotoxic effect against the target tissue
d) B cell activation and production of IGE can have an effect
e) Both b and d

36. Immune response against large extracellular parasites like warms include

a) High production of IL-12 from macrophages
b) Binding of Fc receptors on eosinophils to IGE on the parasite and releasing the eosinophilic toxic secretions
c) Helper T cells activation and production of interferon gamma
d) High production of IL-4 and T cell priming to be Th2
e) Both b and d

37. Interferon gamma

a) Is mainly produced by virally infected cells
b) Has a role in activation of cytotoxic T cells and macrophages
c) Induces the expression of MHC 2 molecules on APC to activate Th2 cells
d) It is type one interferon produced by Th1 cells

e) Both b and d

38. All the following are the characteristics of type 3 hypersensitivity except

a) Differ from the type 2 by the presence of soluble antigen
b) The formation of erythema on the injected skin after 72 hours
c) Decreased levels of c3 and c4 is an indicator of SLE
d) Can result from decreased C3b receptors on RBC
e) Can be tested by immunoflorescence microscope

39. In the sensitization phase of contact dermatitis or type 4 hypersensitivity reaction

a) Happen after the first exposure 10-14 days
b) Aim to produce memory T cells
c) Involve the production of TNF alpha and CSF cytokines
d) Result in the developing of local eczema after the first exposure
e) Both a and b

40. In a screening test for tuberculosis the tuberculin test was done for a patient and he develop fever and skin hardening after 72 hours

a) The reaction come from the activation of Th1 and macrophages
b) He had previous exposure to the same disease which result in inefficient or ineffectivecell mediated immune response
c) If the same patient has AIDS (impair T cell function) he will not develop a positive test
d) The expected cytokines released are TNF and IL-4
e) Both a and c