1. **What is the substrate of the secondary immune response:**

a) Immunological memory

b) Proliferation of B lymphocytes in the lymphoid tissue

c) Complement activation

d) Degranulation of mast cells

e) Clonal selection of lymphocytes

2. **What is the characteristic of IgD:**

a) Found in plasma and cerebrospinal fluid

b) It is resistant to proteolytic degradation

c) It is a component of the BCR (B lymphocyte receptor)

d) It is a pentamer

e) Does not participate in the secondary immune response

3**. Indicate the cells on the surface of which MHC class II molecules may be present:**

a) Macrophages

b) B lymphocytes

c) Endotheliocytes

d) Neutrophils

e) Plasmocytes

4. **Characterize a hapten:**

a) It is a large non-protein molecule

b) It is a small non-protein molecule

c) It is a conformational epitope

d) It is processed only by MHC I

e) It is processed only by MHC II

5. **Characterize superantigens:**

a) It binds to the antigen-specific site of MHC I

b) It binds to the antigen-specific site of MHC II

c) Binds to antigen-nonspecific sites of MHC and TCR (T lymphocyte receptor)

d) It causes clonal anergy

e) Activates Th1 lymphocytes

6. **What are the effects of the C3b component of the complement:**

a) It alters vascular permeability

b) Stimulates phagocytosis of neutrophils

c) Inhibits C3-convertase

d) Initiates the formation of the MAC complex

e) It stimulates the transendothelial passage of the Ag+Ac immune complex

7. **What are the effects of the C3a and C5a components of the complement:**

a) Lysis of bacteria

b) Increased vascular permeability

c) Activation of oxidative stress in macrophages

d) Mast cell degranulation

e) Opsonization of bacteria

8. **Characterize IL-1 (interleukin 1):**

a) It is secreted by activated Th lymphocytes

b) It is an endogenous pyrogen

c) It is a stimulator of hematopoiesis

d) Triggers apoptosis by intrinsic pathway

e) Increases vascular permeability

9. **Exotoxins can be neutralized with the help of:**

a) Antibodies

b) Complement

c) Anatoxins

d) Interferon

e) Proteolytic enzymes

10. **Indicate the activator of macrophages in the phagocytosis of facultatively-intracellular bacteria:**

a) Properdin

b) Anaphylatoxin C3a

c) Interferon gamma

d) Anaphylatoxin C3a

e) IgM

11. **Which cells are activated by MHC I:**

a) CD4 T lymphocytes

b) CD8 T lymphocytes

c) CD3 lymphocytes

d) Th2 lymphocytes

e) Th17 lymphocytes

12. **Characterize IgG:**

a) Neutralizes bacterial toxins

b) Opsonizes phagocytes

c) It is a receptor of myeloid-derived densitrocytes

d) Appears during a primary immune response

e) It is a receptor of dendrites derived from the lymphoid lineage

13. **Which Ig prevails quantitatively in blood serum:**

a) IgA

b) IgG1

c) IgG2

d) IgD

e) IgM

14. **What are the characteristics of acquired immunity:**

a. The ability to intervene immediately after encountering an antigen

b. Tolerance to own antigens

c. Specific recognition of antigens

d. Immunity to reinfection

e. Immunological memory

15. **What are the characteristics of humoral immunity:**

a. It is carried out by means of antibodies (Ig)

b. It is directed against extracellular microorganisms

c. Neutralizes bacterial toxins and enzymes

d. Acts on intracellular parasites and modified cells

e. The main effectors are CD8 T lymphocytes

16. **What are the characteristics of cellular immunity:**

a. It is carried out by means of T lymphocytes

b. It is directed against extracellular microorganisms

c. It is directed against bacterial endotoxins

d. It is activated by complement C3a

e. Participates in the activation of macrophages

17. **What are the characteristics of an incomplete antigen:**

a. It has a low molecular weight

b. It has high molecular mass

c. It is not immunogenic

d. Possesses antigenicity

e. It does not cross the blood-brain barrier

18. **What are the peripheral organs of the immune system:**

a. Spleen

b. The thymus

c. Payer plates

d. Tonsils

e. Bone marrow

19. **Characterize the antigen receptor present on mature B lymphocytes (BCR):**

a. It is represented by the IgM monomer

b. It is represented by the IgG pentamer

c. It is represented by the IgA dimer

d. Recognizes and interacts with soluble antigens

e. Recognizes and interacts with membrane antigens

20. **Characterize the processing of endogenous antigens:**

a. Association with MHC class II

b. Disintegration in the phagolysosome

c. Disintegration in the proteasome

d. Dissociation of the invariable chain

e. Association with MHC class I

21**. Characterize CD4 T lymphocytes**:

a. Recognize antigenic peptides combined with MHC class II molecules

b. They recognize antigenic peptides combined with CMH class I molecules

c. Upon an antigenic stimulus, they differentiate into Th effector cells

d. Upon an antigenic stimulus they differentiate into Tc effector cells

e. Participates in the establishment of the humoral and cellular immune response

22. **Characterize CD8 T lymphocytes:**

a. They recognize antigenic peptides combined with MHC class II molecules

b. Recognize antigenic peptides combined with MHC class I molecules

c. Upon an antigenic stimulus, as a result of activation, they differentiate into Th effector cells

d. Represents 60% of the total number of lymphocytes

e. Represents 40% of the total number of lymphocytes

23. **Characterize Th1 lymphocytes:**

a. Differentiation into Th1 is favored by IL-12, secreted by macrophages

b. Th1 differentiation is favored by IL-12, secreted by dendritic cells

c. They do not recognize antigens presented by B lymphocytes

d. Triggers anaphylactic reactions

e. Th1 cytokines stimulate the proliferation and differentiation of Tc lymphocytes

24. **Characterize Th2 lymphocytes:**

a. They do not recognize antigens presented by B lymphocytes

b. Secretes the cytokines IFN-gamma, IL-2, TNF-a

c. Th2 cytokines stimulate the proliferation and differentiation of Tc lymphocytes

d. Th2 cytokines cause anaphylactic reactions

e. Recognize antigens presented by B lymphocytes

25. **Characterize MHC I molecules:**

a. They are expressed by dendrites

b. They are expressed by B lymphocytes

c. Participates in the presentation of processed exogenous antigens in the phagolysosome

d. Participates in the presentation of endogenous antigens processed in the proteosome

e. They recognize and interact with the CD4 receptor on T lymphocytes

26. **Characterize MHC II molecules:**

a. They are expressed by B lymphocytes

b. They are expressed by monocytes

c. Participates in the presentation of exogenous antigens processed in the phagolysosome

d. Participates in the presentation of endogenous antigens processed in the proteosome

e. They recognize and interact with the CD8 receptor on T lymphocytes

27. **What are the consequences of B lymphocyte activation by a T-independent antigen:**

a. Death by apoptosis

b. Direct proliferation (clonal expansion)

c. Differentiation into plasma cells

d. IgG synthesis

e. Induction of immunological memory

28. **What are the consequences of B lymphocyte activation by a T-dependent antigen:**

A. Proliferation under the action of the Th lymphocyte activated by any complete antigen

B. Death by apoptosis

C. Synthesis of Ig G

D. Differentiation into plasma cells

E. Induction of immunological memory

29**. Characterize the primary humoral immune response:**

A. The latency phase lasts 4-7 days

B. The latency phase lasts several hours

C. Initially, antibodies represented by IgM are synthesized

D. Initially, antibodies represented by IgG are synthesized

E. It is provided by B-memory lymphocytes

30. **Characterize secondary humoral immune response:**

A. The latency phase lasts 4-7 days

B. The latency phase lasts several hours

C. Initially, antibodies represented by IgM are synthesized

D. Initially, antibodies represented by IgG are synthesized

E. It is provided by B-memory lymphocytes

31. **What are the cytokines produced by Th2 lymphocytes:**

a) IFN-gamma

b) TNF-α

c) IL-5

d) IL-4

e) IL-1

32. **What are the cytokines produced by Th1 lymphocytes:**

a) IFN-gamma

b) TNF

c) IL-5

d) IL-4

e) IL-1

33. **What are the humoral factors of innate immunity:**

a) Natural antibodies

b) Complement

c) Interferon

d) Ig M immunoglobulins

e) Ig G immunoglobulins

34. **Which cells are involved in the humoral immune response:**

a) Tc lymphocytes

b) Th lymphocytes

c) B lymphocytes

d) Plasmocytes

e) NK cells

35. **Which cells are involved in the humoral immune response:**

a) TCD8+ lymphocytes

b) TCD4+ lymphocytes

c) Dendrites

d) Macrophages

e) NK cells

36. **What are the effects of IgG:**

a) Neutralization of bacterial toxins

b) Opsonization of helminths

c) Opsonization of bacteria

d) Neutralization of viruses

e) Degranulation of mast cells

37. **What are the effects of IgE:**

a) Neutralization of bacterial toxins

b) Opsonization of helminths

c) Opsonization of bacteria

d) Neutralization of viruses

e) Degranulation of mast cells

38. **What are the effects of IgM:**

a) Degranulation of mast cells

b) Opsonization of helminths

c) Opsonization of bacteria

d) Complement activation

e) Agglutination of bacteria

39. **Characterize the properties of B lymphocytes:**

a) Express MHC I

b) Expresses MHC II

c) Expresses receptor composed of IgG

d) Expresses receptor consisting of IgM

e) It does not react with T-independent antigen

40**. Characterize the properties of T lymphocytes:**

a) Proliferate and differentiate into cytotoxic cells

b) They respond to activation by a T-independent antigen

c) They respond to activation by a T-dependent antigen

d) Can recognize antigens presented by CMH I

e) Can recognize antigens presented by CMH II

41. **What are the mechanisms of immune suppression carried out by CD3 regulatory lymphocytes:**

a. CD28 ligand expression

b. CD25 ligand expression to TNF-a

c. Expression of CD25 ligand to IL-2

d. FoxP3 transcription factor expression

e. CD86 receptor expression

42. **What are the mechanisms of immune suppression carried out by CD3 regulatory lymphocytes:**

a. CTLA4 ligand expression

b. CD25 ligand expression to TNF-a

c. Expression of CD25 ligand to IL-2

d. B7-1 receptor expression

e. B7-2 receptor expression

1. **What are the physiopathological landmarks of chronic granulomatous disease:**

a. Excess superoxide anion

b. Superoxide anion deficiency

c. NADPH-oxidase deficiency

d. Reduction of regulatory T lymphocytes

e. Reduction of NK cells

1. **What binds the antigen epitope?**
2. The Fb fragment of the antibody
3. The Fc fragment of the antibody
4. Complement component C4b
5. Complement component C3b
6. Interferon gamma
7. **Which cells recognize MHC class I and II molecules?**

a. T-helper lymphocytes (CD4)

b. Macrophages activated by INF-γ (CD68)

c. Cytotoxic T lymphocytes (CD8)

d. Neutrophils

e. T-regulatory lymphocytes (CD3)

1. **Where does the MHC class I molecule associate with the epitope peptide?**

a. Cytosol

b. Ribosomes

c. Endoplasmic reticulum

d. Golgi apparatus

e. Proteasome

1. **What do HLA class III genes express?**

a. Complement C2

b. Complement C4

c. Convertase 3

d. Convertase 5

e. Heat shock proteins (HSP)

1. **What is the antigenic composition of MHC molecules?**

a. They contain self antigens

b. They contain non-self antigens

c. They do not contain self antigens to avoid autoimmune response

d. MHC II endoantigens

e. MHC I exoantigens

1. **What is characteristic of endoantigen processing?**

a. Passive transport of the polypeptide containing the antigenic epitope into the endoplasmic reticulum

b. Transport of MHC I molecules into the endoplasmic reticulum

c. Transport of MHC II molecules into the endoplasmic reticulum

d. Carrier-mediated transport of the polypeptide containing the antigenic epitope into the endoplasmic reticulum

e. Assembly of the MHC I - epitope complex in ribosomes

1. **What is characteristic of endoantigen processing?**

a. Assembly of the MHC I - epitope complex in ribosomes

b. Assembly of the MHC I - epitope complex in the Golgi apparatus

c. Assembly of the MHC I - epitope complex in the endoplasmic reticulum

d. Assembly of the MHC I - epitope complex in proteasomes

e. Assembly of the MHC II - epitope complex in ribosomes

1. **What can be exoantigens?**

a. Gram-positive bacteria

b. Gram-negative bacteria

c. Viruses

d. Donor's red blood cells

e. Haptens

1. **Characterize the invariant chain (LI):**

a. Protein chain in MHC I

b. Protein chain in MHC II

c. Main protein in the antigenic epitope of an endoallergen

d. Main protein in the antigenic epitope of an exoallergen

e. It is a component of the endoplasmic reticulum (ER) membrane.

1. **Characterize the process of translocating the MHC-antigen complex to the membrane surface**

a. MHC I-antigen by exocytosis

b. MHC I-antigen through specific channels activated by the invariant chain

c. MHC II-antigen through specific channels activated by the invariant chain

d. MHC II-antigen by ribosome fusion with the outer membrane

e. MHC I-antigen and MHC II-antigen through energy-consuming carriers (ATP).

1. **Characterize the process of identifying the antigen expressed by MHC-II**

a. By Th lymphocytes (CD-4) through glycoprotein receptors

b. By Tc lymphocytes (CD-8) through glycoprotein receptors

c. By neutrophils through glycoprotein receptors

d. By immunoglobulin E

e. By immunoglobulin M

1. **Characterize the process of identifying the antigen expressed by MHC-II**

a. Carried out by Tc lymphocytes (CD-8) through glycoprotein receptors

b. Inhibited by the CD40L-CD40R system

c. Activated by the CD40L-CD40R system

d. Activated by INF-γ

e. Carried out by immunoglobulin M

1. **Which antigen-presenting cells can activate naive T lymphocytes?**

a. Macrophages stimulated by INF-γ

b. Macrophages stimulated by TNF-α

c. Tissue dendritic cells

d. Memory B cells

e. Follicular dendritic cells

1. **Which cells can present antigens to B lymphocytes?**

a. Macrophages stimulated by INF-γ

b. Macrophages stimulated by TNF-α

c. Macrophages stimulated by TGF-β growth factor

d. Tissue dendritic cells

e. Follicular dendritic cells

1. **Which factors directly contribute to graft rejection?**

a. Tc lymphocytes (CD8)

b. Antibodies

c. Th lymphocytes (CD4)

d. Tr lymphocytes (CD3)

e. NK cells

1. **Characterize the HLA-I-B27 gene:**

a. Belongs to MHC class I

b. Belongs to MHC class II

c. Associates with rheumatic diseases

d. Associates with systemic lupus erythematosus

e. Associates with IL-23-mediated inflammatory-immune response

1. **Characterize the properties of the HLA-B27 molecule:**

a. Can have common sequences with different bacteria

b. Can become an antigen for antibodies

c. Can be a cell entry point for microorganisms

d. Associates with the expression of NK cell receptors

e. Associates with the inhibition of the inflammatory-immune response

1. **Characterize natural killer (NK) cells:**

a. Express receptors for HLA-I-A proteins

b. Express receptors for HLA-I-B proteins

c. Express receptors for HLA-I-E proteins

d. Do not mediate graft rejection

e. Can affect infected or tumor cells even under low MHC-I expression

1. **Which cytokines facilitate the activation of naive T cells by macrophages?**

a. IL-1β

b. TNF-α

c. IL-12

d. IL-18

e. MCP-1 (Monocyte chemoattractant protein)

1. **Which cytokines facilitate the activation of naive T lymphocytes by dendritic cells?**

a. IL-6

b. IL-10

c. INF-β

d. INF-α

e. MCP-1 (Monocyte chemoattractant protein)

1. **Which factors expressed by naive T lymphocytes facilitate their activation by antigen-presenting cells?**

a. CD-28

b. CD-2

c. B7

d. CD-8

e. LFA-3 (Lymphocyte function-associated antigen 3)

1. **What factors are expressed by naïve T-lymphocytes that facilitate their activation by APC?**

a. LFA-1 (Lymphocyte function associated antigen 1)

b. CD-2

c. B7

d. B27

e. LFA-3 (Lymphocyte function associated antigen 3)

1. **What factors expressed by APC that facilitate activation of naïve T-lymphocytes?**

a. LFA-1 (Lymphocyte function associated antigen 1)

b. CD40L

c. B7

d. CD40R

e. LFA-3 (Lymphocyte function associated antigen 3)

1. **Which cytokine stimulates Th1 proliferation?**

a. INF-γ

b. IL-2

c. TNF-β

d. INF- β

e. TGF-β (transformation growth factor beta)

1. **Which cytokine stimulates Th-naïve differentiation into Th2?**

a. IL-4

b. IL-5

c. IL-9

d. IL-10

e. IL-13

1. **What is the role of IL-4 in the immune response?**

a. It has chemo-attractant effect

b. Stimulates Th1 proliferation

c. Stimulates macrophage phagocytosis

d. Stimulates mast cell degranulation

e. Stimulates IgE production by B lymphocytes

1. **What is the role of negative selection of T-lymphocytes in the thymus?**

a. To test CD4 marker to MHC I molecules expressed by APC

b. To test CD8 marker to MHC II molecules expressed by APC

c. To test LT receptor to MHC I antigens

d. To test LT receptor to MHC II antigens

e. To test CD28 Costimulation Molecule

1. **What is the role of autoimmune regulatory protein in LT training in the thymus?**

a. Presentation of maximum number of antigen variations to LT self-receptor

b. Presentation of minimum number of antigen variations to LT self-receptor

c. Control of CD28 costimulation molecule expression

d. Control of CTLA-4 inhibition molecule expression

e. Control of CD-40 ligand expression

1. **What are the factors involved in promoting the effect of Th2 lymphocytes?**

a. CD-40 receptor

b. CD-40 ligand

c. IL-2

d. IL-4

e. INF-γ

1. **What is the CD pattern of the T-lymphocyte precursor that entering into the thymus?**

a. CD3-

b. CD4-

c. CD8-

d. CD4+/CD8+

e. CD3+

1. **Which cytokine stimulates Th1 proliferation in an autocrine manner?**

a. TNF-α

b. INF-γ

c. IL-2

d. TGF-β (transforming growth factor beta)

e. IL-4

1. **Which cytokines stimulate the expression of defensins in the skin?**

a. TNF-α

b. INF-γ

c. IL-22

d. IL-17

e. TGF-β (transforming growth factor beta)

1. **By what mechanisms does lymphocyte CD8 fight HIV infection?**

a. Stimulation of antibody (IgG) production by plasmocytes

b. Inhibition of HIV replication in Th4 lymphocyte

c. Release of INF-γ

d. Release of IL-4

e. TGF-β release (transforming growth factor beta)

1. **What is the consequence of mutation of the AIRE gene (the gene that controls the expression** of the autoimmune regulatory protein)?

a. Impaired positive selection of T-lymphocytes in the thymus

b. Impaired negative selection of T-lymphocytes in the thymus

c. Impaired positive selection of B lymphocytes

d. Impaired negative selection of B lymphocytes

e. Impaired the differentiation of B lymphocytes into memory cells

1. **How many Ag-Ab complexes can the complement component C1 bind in classical activation?**

a. 2

b. 4

c. 6

d. 8

e. 10

1. **Which of the C1 ingredients are serine proteases?**

a. C1s

b. C1q

c. C1r

d. C1t

e. C1p

1. **What is the structure of classically activated C3 convertase?**

a. C4bC2b

b. C4bC2a

c. C4aC2a

d. C4aC2b

e. C1qC4aC2b

1. **How many C3 convertase molecules can maximally derive from C1 component in the classical complement activation pathway?**

a. 2

b. 4

c. 6

d. 8

e. 10

1. **What is the structure of classically activated C5 convertase?**

a. C4bC2b3b

b. C4bC2a3a

c. C4bC2aC3b

d. C4aC2bC3b

e. C4aC2bCa

1. **What is the structure of alternately activated C3 convertase?**

a. C3bBb

b. C3aBb

c. C2aBb

d. C3bBa

e. C3aBa

1. **What is the role of C 1 inhibitor in the process of complement activation?**

a. inhibition of C 3 convertase through the classical pathway

b. inhibition of C 5 convertase through the classical pathway

c. inhibition of C 3 convertase through the alternative pathway

d. inhibition of C 5 convertase through the alternative pathway

e. inhibition of the C5b-C9 complex

1. **What is the role of C3a and C5a in the immune response?**

a. degranulation of eosinophils

b. degranulation of basophils

c. chemotaxis of eosinophils

d. opsonization of gram-negative bacteria

e. degradation of non-self antigen

1. **Which cells express receptors for C3b (CD21, CD35)?**

a. macrophages

b. dendritic cells

c. erythrocytes

d. NK (natural killer)

e. mast cells

1. **Which immunoglobulins are able to activate complement through the classical pathway?**

a. Ig G 1

b. IgG 4

c. Ig M

d. IgA

e. IgD

1. **What is the role of CD 59 expressed on different cells in complement activation?**

a. inhibits convertase 3

b. inhibits convertase 5

c. inhibits the insertion of C9 into the MAC complex (C5b, C6, C7, C8)

d. inhibits factor B

e. inhibits factor D

1. **What is the role of MCP (membrane cofactor protein) in complement activation?**

a. inhibits C3b

b. inhibits C3a

c. inhibits C4b

d. inhibits C5a

e. inhibits C5b

1. **What is the role of properdin in complement activation?**

a. it is an activator of the classical pathway

b. it is an inhibitor of the classical pathway

c. it is an activator of the alternative pathway

d. it is an inhibitor of the alternative pathway

e. inhibits lectin

1. **Which one segment of the HLA gene controls the expression of complement components?**

a. MHC-I-A

b. MHC-I-B

c. MHC-I-C

d. MHC-II

e. MHC-III

1. **Characterize the D factor involved in the alternative pathway of complement activation?**

a. it is inactive

b. it is always active

c. it cleaves factor B

d. it cleaves factor H

e. ensures the formation of convertase 5

1. **Characterize the D factor involved in the alternative pathway of complement activation?**

a. it is inactive

b. it is always active

c. it is activated by properdin

d. it is activated by factor H

e. ensures the formation of convertase 3

1. **Characterize the D factor involved in the alternative pathway of complement activation?**

a. stimulates complement activation through the classical pathway through the connection with Ag

b. inhibits classical complement activation by blocking C1q

c. activates the metabolism of convertase 3

d. activates the metabolism of convertase 5

e. increases lectin affinity for mannose

1. 1**Characterize the D factor involved in the alternative pathway of complement activation?**

a. activates the alternative pathway of complement activation by facilitating B-D protein binding

b. inhibits the alternative pathway of complement activation by B-D facilitating protein binding

c. activates the alternative complement pathway of complement activation by inhibiting

convertase 3 metabolism

d. inhibits the alternative pathway of complement activation by inactivating convertase 5

e. inhibits the alternative pathway of complement by activating the B-D protein binding

1. **Which one convertase 3 is formed in the result of the alternative pathway of complement**

**activation?**

a. C4b2a

b. C4b2b

c. C3bBb

d. C3bBa

e. C3aBb

1. **What are the protective systems of own cells in case of uncontrolled complement**

**activation through alternative pathway?**

a. plasmatic factor H

b. factor H expressed on the cell membrane

c. CD55 factor expressed on the cell membrane

d. Factor I expressed on the cell membrane

e. Plasmatic DAF of convertase 3 (degradation acceleration factor of convertase 3)

1. **Characterize anaphylatoxin C5a?**

a. It has a weaker activity than C3a

b. It is more active than C3a

c. Stimulates the expression of the R1 receptor on the macrophage to C3b

d. Stimulates the expression of the R1 receptor on the pathogen to C3b

e. Plasmatic DAF of convertase 3 (degradation acceleration factor of convertase 3)

1. **Indicate the extrahepatic sources of C1q?**

a. endotheliocytes

b. mast cells

c. monocytes

d. plasma cells derived from the action of T-independent antigen

e. plasma cells derived from the action of T-dependent antigen

1. **Which one convertase 5 is formed in the classical pathway of complement activation?**

a. C4b2aC3a

b. C4b2bC3b

c. C4aC2aC3b

d. C4bC2aC5a

e. C4bC2aC3b

1. **What are characteristic functions of C1q?**

a. stimulation of dendritic cell migration in lymphoid tissue

b. activation of macrophage phagocytosis

c. increased expression of CMH-II molecules on the dendritic cells surface

d. inhibition of CMH-II expression

e. activation of memory B lymphocyte clone formation

1. **What is low expression of the C1 receptor (CD35) to C3b?**

a. disorder of the convertase 3 formation through alternative pathway of complement activation

b. disorder of convertase 5 formation through classical pathway of complement activation

c. disorder of phagocytosis and removal of the Ag-Ab complex

d. autoimmune inflammation

e. decreases the action of properdin from the alternative pathway of complement activation