Unit 6.3. MCQs Set 1

Results

#1. Q1. Red Blood Cells (RBCs) are most noted for

☐
(A). Direct phagocytic activity
☐
(B). Carrying oxygen via hemoglobin and sometimes binding immune complexes
☐
(C). Maturing into plasma cells
☐
(D). No role at all in immunity

While RBCs primarily transport oxygen, they can bind immune complexes via complement receptors, aiding in their clearance by the spleen.

#2. Q2. White Blood Cells (WBCs) in general are key to immunity because they

☐
(A). Only carry oxygen
☐
(B). Include diverse cell types (e.g., neutrophils, lymphocytes, monocytes) that perform phagocytosis, antibody production, etc.
☐
(C). Disappear after puberty
☐
(D). All are identical in function

WBCs (leukocytes) encompass several immune cell types essential for the body's defense.

#3. Q3. Platelets in immune mechanisms can

☐
(A). Form immunoglobulins
☐
(B). Release factors that modulate inflammation and help in wound repair
☐
(C). Attack pathogens directly
☐
(D). Have no immune function

Besides their role in clotting, platelets release cytokines and chemokines that modulate inflammation and promote tissue repair.

#4. Q4. Plasma proteins in immunity include

☐
(A). Collagen
☐
(B). Complement proteins, acute-phase reactants, immunoglobulins
☐
(C). Only hormones
☐
(D). None of the above

Plasma carries critical immune proteins such as complement, CRP, and antibodies.

#5. Q5. Biophysics of the immune system might analyze

☐
(A). The mechanical role of RBC shape in immunity
☐
(B). Molecular structures of antigens and antibody interactions (e.g., binding kinetics, affinity)
☐
(C). None
☐
(D). Strictly morphological data

Biophysical analysis focuses on molecular interactions between antigens and antibodies, including binding kinetics and affinity.

#6. Q6. An antigen is typically

☐
(A). Always beneficial
☐
(B). A foreign or self molecule capable of eliciting an immune response
☐
(C). A carbohydrate alone
☐
(D). None

Antigens are any molecules—protein, polysaccharide, or otherwise—that elicit an immune response.

#7. Q7. Basic structure of an antibody (immunoglobulin) includes

☐
(A). Single polypeptide chain
☐
(B). Two heavy chains and two light chains forming a Y-shaped molecule
☐
(C). 3 subunits of hemoglobin
☐
(D). None

An antibody is composed of two heavy chains and two light chains that together form a Y-shaped structure.

#8. Q8. T cells recognize antigen when

☐
(A). Antigen is dissolved in blood plasma

☐
(B). Antigenic peptides are presented on MHC molecules by antigen-presenting cells (APCs)
☐
(C). None
☐
(D). The B cell antibody binds T cell directly

T cells recognize antigenic peptides only when they are presented by MHC molecules on APCs.

#9. Q9. B-cell receptor (BCR) gene rearrangement is analogous to

☐
(A). None
☐
(B). TCR gene rearrangement, producing unique specificity via V(D)J recombination
☐
(C). RBC anabolism
☐
(D). MHC linking

Both B cells and T cells generate diverse receptors through V(D)J recombination.

#10. Q10. Antigen presentation involves MHC/HLA complex, meaning

☐
(A). None
☐
(B). MHC molecules bind peptides inside cells and display them on cell surfaces for T cell recognition
☐
(C). RBC clotting
☐
(D). No role for immune regulation

MHC molecules bind peptides internally and present them on the cell surface for T cell recognition.

#11. Q11. Antigen-antibody reactions can be tested by

☐
(A). Precipitation, agglutination, neutralization, complement fixation, ELISA
☐
(B). None
☐
(C). RBC doping
☐
(D). Genetic doping

These assays are classical methods for detecting and quantifying antigen-antibody interactions.

#12. Q12. Innate immune cells include

☐
(A). B and T lymphocytes
☐
(B). Neutrophils, macrophages, dendritic cells, and natural killer (NK) cells
☐
(C). None
☐
(D). RBC only

The innate immune response is mediated by cells such as neutrophils, macrophages, dendritic cells, and NK cells.

#13. Q13. PAMP (Pathogen-associated molecular pattern) is recognized by

☐
(A). RBC doping
☐
(B). Pattern recognition receptors (PRRs) on innate immune cells
☐
(C). None
☐
(D). BCR gene rearrangement

PRRs, such as toll-like receptors (TLRs), recognize PAMPs on pathogens.

#14. Q14. Complement system can

☐
(A). Always cause RBC doping
☐
(B). Lyse pathogens, opsonize them, and enhance inflammation
☐
(C). None
☐
(D). Only degrade immunoglobulins

The complement system is crucial for lysing pathogens, opsonization, and enhancing inflammatory responses.

#15. Q15. Natural (innate) immunity is

☐
(A). Highly specific memory
☐
(B). Nonspecific defense present from birth via skin, mucosa, phagocytes, and NK cells
☐
(C). None
☐
(D). Only T cell-based

Innate immunity provides a rapid, nonspecific first line of defense.

#16. Q16. Acquired immunity can be subdivided into

☐
(A). None
☐
(B). Humoral (B-cell/antibody-mediated) and cell-mediated (T-cell mediated) immunity
☐
(C). RBC doping only
☐
(D). Infectious illusions

Acquired immunity includes the humoral and cell-mediated arms of the adaptive immune response.

#17. Q17. Cell-mediated immunity specifically involves

☐
(A). RBC doping
☐
(B). T lymphocytes (CD4+ helper and CD8+ cytotoxic cells) targeting infected or abnormal cells
☐
(C). None
☐
(D). Complementing RBC shape

Cell-mediated immunity primarily involves T cells, which can eliminate infected or abnormal cells.

#18. Q18. T cell-mediated toxicity means

☐
(A). None
☐
(B). CD8+ T cells induce apoptosis in target cells presenting foreign peptides on MHC-I molecules
☐
(C). RBC doping
☐
(D). Pure illusions

CD8+ cytotoxic T cells kill target cells by inducing apoptosis when foreign peptides are presented via MHC-I.

#19. Q19. Cytokines are

☐
(A). None
☐
(B). Signaling proteins (e.g., interleukins, interferons, tumor necrosis factor) that orchestrate immune cell communication
☐
(C). RBC-bound proteins
☐
(D). Bacterial toxins only

Cytokines are essential signaling molecules that regulate the immune response.

#20. Q20. Immunopathology includes

☐
(A). None
☐
(B). The study of diseases caused by immune dysfunction such as autoimmunity, hypersensitivities, immune deficiencies, and transplant rejections
☐
(C). RBC doping
☐
(D). Infectious illusions

Immunopathology focuses on disorders resulting from improper or overactive immune responses.

#21. Q21. Autoimmune disease example

☐
(A). Influenza
☐
(B). Rheumatoid arthritis
☐
(C). None
☐
(D). Common cold

Rheumatoid arthritis is a well-known autoimmune disorder affecting the joints.

#22. Q22. Transplant rejection typically stems from

☐
(A). None
☐
(B). Host T cells recognizing donor MHC antigens as foreign

☐
(C). RBC doping
☐
(D). Infectious illusions

Host T cells recognize and respond to foreign MHC antigens on a transplanted organ, leading to rejection.

#23. Q23. Allergy is associated with

☐
(A). RBC doping
☐
(B). IgE-mediated hypersensitivity causing mast cell degranulation and histamine release
☐
(C). None
☐
(D). Complement fixation only

Allergic reactions are typically mediated by IgE antibodies, which trigger mast cell degranulation and release histamine.

#24. Q24. Immunomodulators can

☐
(A). Only suppress immunity
☐
(B). Either enhance or suppress immune function (e.g., cytokines, herbal extracts, synthetic drugs)
☐
(C). None
☐
(D). RBC doping

Immunomodulators have the capacity to either boost or dampen the immune response depending on their nature and application.

#25. Q25. Antibody isolation and purification often uses

☐
(A). None
☐
(B). Techniques such as Protein A/G affinity chromatography and salt precipitation
☐
(C). RBC doping
☐
(D). Infectious illusions

Antibodies are often isolated using Protein A or Protein G affinity chromatography, in addition to precipitation methods.

#26. Q26. ELISA (Enzyme-Linked Immunosorbent Assay) is used to

☐
(A). None
☐
(B). Detect or quantify antigens or antibodies in a sample via enzyme-labeled detection
☐
(C). RBC doping
☐
(D). Infectious illusions

ELISA is a common immunoassay technique used to detect and measure antigens or antibodies in a sample through a colorimetric or chemiluminescent reaction.

#27. Q27. Immunoblotting (Western blot) checks

☐
(A). None
☐
(B). The presence of specific proteins that have been separated by electrophoresis and probed with antibodies
☐
(C). RBC doping
☐
(D). Indirect illusions

Western blotting is used to detect particular proteins after separation by SDS-PAGE and transfer onto a membrane.

#28. Q28. Immunohistochemistry uses

☐
(A). None
☐
(B). Antibodies conjugated to enzymes or fluorophores to visualize antigens in tissue sections
☐
(C). RBC doping
☐
(D). Culture expansions

Immunohistochemistry employs labeled antibodies to detect specific antigens within tissue sections, visualized via colorimetric or fluorescent methods.

#29. Q29. Immunoprecipitation helps

☐
(A). None
☐
(B). Isolate a specific antigen from a mixture by using an antibody to form an insoluble complex
☐
(C). RBC doping
☐
(D). Infectious illusions

Immunoprecipitation uses antibodies to pull down a particular antigen from solution, facilitating further analysis.

#30. Q30. Immune cell isolation might use

☐
(A). RBC doping
☐
(B). Techniques like density gradient centrifugation (e.g., Ficoll) or flow cytometry-based cell sorting
☐
(C). None
☐
(D). Only mechanical pressing

Techniques such as Ficoll density gradients and FACS are standard methods for isolating immune cell subpopulations.

#31. Q31. Flow cytometry can evaluate

☐
(A). None
☐
(B). Cell surface markers, cell size, and granularity to distinguish various immune subsets
☐
(C). RBC doping
☐

(D). Infectious illusions

Flow cytometry uses fluorescent antibodies to evaluate cell-surface markers, size, and granularity, enabling detailed immunophenotyping.

#32. Q32. Immunotherapy example might be

☐
(A). RBC doping
☐
(B). Monoclonal antibody therapy or immune checkpoint inhibitors targeting tumor antigens
☐
(C). None
☐
(D). Antibiotic usage

Immunotherapy includes strategies such as monoclonal antibody treatments and checkpoint inhibitors to enhance the immune response against tumors.

#33. Q33. The first successful vaccine in history was

☐
(A). Louis Pasteur’s rabies vaccine
☐
(B). Edward Jenner’s smallpox vaccine
☐
(C). None
☐
(D). Jonas Salk’s polio injection

Edward Jenner’s smallpox vaccine using cowpox material is regarded as the first successful vaccine.

#34. Q34. Attenuated vaccine means

☐
(A). Using a non-infectious agent
☐
(B). Using a live pathogen that has been weakened so it does not cause severe disease but still stimulates immunity
☐
(C). None
☐
(D). A heat-killed approach

Attenuated vaccines use live but weakened pathogens to elicit a strong immune response without causing serious illness.

#35. Q35. Heat-killed vaccine uses

☐
(A). Live bacteria
☐
(B). Pathogens killed by heat or chemical treatment so they cannot replicate
☐
(C). None
☐
(D). RBC doping

Heat-killed or inactivated vaccines use pathogens that have been rendered non-infectious by heat or chemicals.

#36. Q36. Subunit vaccine example

☐
(A). Complete virus
☐
(B). Only the essential antigens (proteins or polysaccharides) from the pathogen, not the entire organism
☐
(C). None
☐
(D). RBC doping

Subunit vaccines contain only the key antigenic components of a pathogen, reducing side effects.

#37. Q37. Recombinant vaccine:

☐
(A). None
☐
(B). Involves cloning genes encoding antigenic proteins in expression systems (e.g., yeast, bacteria) to produce safe, pure antigens
☐
(C). A weakened virus
☐
(D). RBC doping

Recombinant vaccines use genetic engineering to produce antigenic proteins in controlled systems for safe vaccination.

#38. Q38. DNA vaccine concept:

☐
(A). None
☐
(B). A plasmid carrying the gene for an antigen is injected, leading to in situ antigen production by host cells
☐
(C). Must be a live virus
☐
(D). RBC doping

DNA vaccines deliver plasmids with antigen-coding genes, leading host cells to produce the antigen and stimulate immunity.

#39. Q39. RNA vaccine (like some COVID-19 vaccines) indicates

☐
(A). None
☐
(B). mRNA encoding the antigen is delivered into host cells, leading to in situ protein expression and immune stimulation
☐
(C). RBC doping
☐
(D). Attenuated virus approach

RNA vaccines use synthetic mRNA to direct host cells to produce the antigen, eliciting an immune response.

#40. Q40. Dendritic cell-based vaccine typically involves

☐
(A). None
☐
(B). Harvesting a patient's dendritic cells, loading them with tumor antigens, and re-infusing them to stimulate T-cell responses

☐
(C). RBC doping
☐
(D). Basic heat-killed approach

Dendritic cell-based vaccines involve the ex vivo loading of a patient’s dendritic cells with antigens, then re-infusing them to prompt a targeted immune response.

#41. Q41. Virus-Like Particles (VLPs) in vaccines are

☐
(A). Infectious viruses
☐
(B). Non-infectious structures resembling viruses but lacking genetic material, used to present antigens
☐
(C). None
☐
(D). RBC doping

VLPs mimic the structure of viruses to stimulate immunity without the risk of infection.

#42. Q42. Adjuvants in vaccines help by

☐
(A). None
☐
(B). Enhancing the immune response by prolonging antigen release and activating antigen-presenting cells
☐
(C). RBC doping
☐
(D). Only providing color

Adjuvants boost the immune response by increasing antigen retention and stimulating APC activity.

#43. Q43. “Toxoid vaccine” uses

☐
(A). None
☐
(B). Inactivated bacterial toxins that induce an immune response without causing disease
☐
(C). RBC doping
☐
(D). Subunit DNA

Toxoid vaccines use inactivated bacterial toxins to stimulate a protective immune response without the risk of toxin-mediated disease.

#44. Q44. The reason behind “booster doses” in vaccination is

☐
(A). None
☐
(B). To re-stimulate memory cells, maintaining high antibody titers or memory T-cell populations
☐
(C). RBC doping
☐
(D). Infectious illusions

Booster doses help to reinforce and sustain the immune memory generated by the primary vaccine series.

#45. Q45. “Herd immunity” arises when

☐
(A). None
☐
(B). A sufficient proportion of a population is immunized, reducing disease spread and protecting unvaccinated individuals
☐
(C). RBC doping
☐
(D). Infectious illusions

Herd immunity occurs when enough people are immune, thereby indirectly protecting those who are not immunized.

#46. Q46. Pathogen Recognition Receptors (PRRs) like TLRs detect

☐
(A). None
☐
(B). Pathogen-associated molecular patterns (PAMPs) on microbes, triggering innate immune responses
☐
(C). RBC doping
☐
(D). Unknown illusions

PRRs such as TLRs recognize conserved molecular motifs on pathogens to activate innate immunity.

#47. Q47. Flow cytometry in immunology can measure

☐
(A). None
☐
(B). Cell size, granularity, and fluorescence of labeled markers to distinguish different cell populations
☐
(C). RBC doping
☐
(D). Basic illusions

Flow cytometry evaluates cell size, granularity, and fluorescently labeled markers for detailed immunophenotyping.

#48. Q48. Immunoblotting (Western blot) steps typically are

☐
(A). None
☐
(B). Separating proteins by SDS-PAGE, transferring them to a membrane, and probing with labeled antibodies
☐
(C). RBC doping
☐
(D). Infectious illusions

Western blotting consists of protein separation by SDS-PAGE, membrane transfer, and antibody-based detection.

#49. Q49. “Neutralizing antibody” function is to

☐
(A). None
☐
(B). Bind to pathogens or toxins to prevent them from infecting or damaging host cells
☐
(C). RBC doping
☐
(D). Amplify T-cell exhaustion

Neutralizing antibodies block the key functional domains of pathogens or toxins to stop infection or tissue damage.

#50. Q50. An example of immunotherapy is

☐
(A). Antibiotic injection
☐
(B). CAR T-cell therapy or monoclonal antibody therapy
☐
(C). RBC doping
☐
(D). None

Examples of immunotherapy include CAR T-cell therapy and monoclonal antibody treatments used especially in cancer management.

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