LEC 3 PATHO INFLAMMATIONS Q:

1. **What is the primary function of chemotaxis in the context of white blood cells (WBCs)?**
   A) Enhancing phagocytosis
   B) Movement towards injured tissue
   C) Initiating vascular changes
   D) Engulfing pathogens
2. **Which of the following is considered a potent chemoattractant derived from bacterial products?**
   A) LTB4
   B) C5a
   C) N-terminal peptides
   D) Interferon gamma
3. **What characterizes neutrophils in the context of inflammation?**
   A) They are long-lived cells present in chronic inflammation.
   B) Their presence indicates acute inflammation.
   C) They are responsible for the repair of damaged tissues.
   D) They are primarily involved in allergic reactions.
4. **In the sequence of events during inflammation, which phase occurs first?**
   A) Neutrophilic infiltration
   B) Chronic inflammatory cell appearance
   C) Edema
   D) Phagocytosis
5. **What role does nitric oxide (NO) play in the immune response?**
   A) Acts as a cytokine amplifier
   B) Involved in the formation of reactive oxygen species
   C) Directly kills pathogens through phagocytosis
   D) Stimulates T-lymphocyte activation
6. **Which type of granule in neutrophils contains myeloperoxidase (MPO)?**
   A) Secondary Granules
   B) Tertiary Granules
   C) Azurophil Granules
   D) Exocytotic Granules
7. **How do neutrophil extracellular traps (NETs) contribute to the immune response?**
   A) They degrade pathogens within the phagolysosome.
   B) They form a barrier to contain pathogens.
   C) They amplify the inflammatory response.
   D) They facilitate the repair of tissue damage.
8. **Which condition is associated with prolonged inflammation leading to tissue injury?**
   A) Allergic reactions
   B) Chronic Hepatitis
   C) Acute respiratory infections
   D) Simple skin irritations
9. **What is the role of Th17 cells in the inflammatory process?**
   A) They suppress the immune response.

B) They produce interleukin-17 (IL-17) to promote inflammation.
C) They primarily mediate allergic responses.
D) They enhance phagocytosis in macrophages.

10. **Which of the following best describes the function of cytokines in inflammation?**
    A) They solely amplify the immune response.
    B) They serve to limit and contain the immune response once pathogens are cleared.
    C) They are only produced by neutrophils.
    D) They are not involved in the inflammatory process.

Answers

1. B
2. C
3. B
4. C
5. B
6. C
7. B
8. B
9. B
10. B

11. **What type of cells are primarily responsible for phagocytosis during the initial phase of inflammation?**
    A) Eosinophils
    B) Lymphocytes
    C) Neutrophils and macrophages
    D) Plasma cells
12. **Which cytokine is primarily responsible for stimulating iNOS (inducible Nitric Oxide Synthase)?**
    A) IL-6
    B) TNF-α
    C) Interferon gamma (IFN-γ)
    D) IL-10
13. **What is the main characteristic of eosinophils in the inflammatory response?**
    A) They indicate chronic inflammation.
    B) They play a key role in allergic reactions.
    C) They are responsible for the acute phase response.
    D) They are involved in pathogen clearance in the early stages.
14. **In which phase of inflammation do chronic inflammatory cells typically appear?**
    A) Edema
    B) Neutrophilic infiltration
    C) After the initial vascular phase
    D) During the acute inflammatory phase
15. **What is the primary function of leukocyte extracellular traps (NETs)?**
    A) To enhance phagocytosis
    B) To trap bacteria and prevent their spread

C) To secrete cytokines
D) To promote tissue repair

16. **Which of the following best describes the action of C5a in the complement system?**
    A) It inhibits leukocyte migration.
    B) It serves as a potent chemoattractant.
    C) It directly kills pathogens.
    D) It stimulates the production of antibodies.
17. **What is a key characteristic of macrophages in relation to their lifespan and role in inflammation?**
    A) They are short-lived and indicate recent inflammation.
    B) They are long-lived and are involved in chronic inflammation.
    C) They only appear during the initial phase of inflammation.
    D) They are primarily responsible for acute allergic reactions.
18. **Which process occurs when neutrophils die and form extracellular traps?**
    A) Apoptosis
    B) Necrosis
    C) NETosis
    D) Phagocytosis
19. **What role do growth factors released by WBCs play during the later phases of inflammation?**
    A) They enhance the immune response.
    B) They facilitate the repair of damaged tissues.
    C) They promote leukocyte apoptosis.
    D) They trigger the production of more cytokines.
20. **What condition is associated with a deficiency in antiproteases like α-1 antitrypsin?**
    A) Acute respiratory distress syndrome
    B) Chronic liver disease
    C) Systemic Lupus Erythematosus
    D) Alpha-1 antitrypsin deficiency

Answers

11. C
12. C
13. B
14. C
15. B
16. B
17. B
18. C
19. B
20. D

21. **Which of the following describes the initial vascular phase of inflammation?**
    A) It leads to tissue repair and regeneration.
    B) It is triggered by recognition of microbes or injury.

C) It is the final phase of the inflammatory response.
D) It primarily involves chronic inflammatory cells.

22. **What is the main role of cytokines during the early phases of inflammation?**
    A) To initiate apoptosis in neutrophils
    B) To enhance the recruitment of white blood cells
    C) To suppress the immune response
    D) To facilitate tissue repair
23. **Which pathway is involved in the production of LTB4 as a chemoattractant?**
    A) Complement system
    B) Lipoxygenase pathway
    C) Cyclooxygenase pathway
    D) Phospholipase pathway
24. **Which of the following is true about macrophages?**
    A) They primarily mediate acute inflammation.
    B) They are derived from neutrophils.
    C) They can persist for days or weeks in tissue.
    D) They are responsible for the formation of NETs.
25. **What condition is associated with an inappropriate inflammatory response leading to tissue damage?**
    A) Tuberculosis
    B) Systemic Lupus Erythematosus (SLE)
    C) Acute appendicitis
    D) Simple allergic reactions
26. **What is the significance of peroxynitrite ($ONOO^-$) in the immune response?**
    A) It enhances the recruitment of leukocytes.
    B) It serves as a potent bactericidal agent.
    C) It inhibits cytokine production.
    D) It promotes the repair of damaged tissues.
27. **Which type of immune response involves exaggerated reactions to minor stimuli, such as allergies?**
    A) Chronic inflammation
    B) Acute inflammation
    C) Autoimmune response
    D) Exaggerated response
28. **What is the role of T-helper 17 (Th17) cells in inflammation?**
    A) They inhibit the production of pro-inflammatory cytokines.
    B) They produce IL-17 to promote acute inflammation.
    C) They are responsible for chronic immune responses.
    D) They enhance phagocytosis in macrophages.
29. **How do primary granules in neutrophils differ from secondary granules?**
    A) Primary granules contain lysozyme, while secondary granules contain MPO.
    B) Secondary granules are involved in the initial phase of phagocytosis.
    C) Primary granules contain myeloperoxidase and enzymes for intracellular killing.
    D) Secondary granules are released first during inflammation.
30. **What is the potential consequence of a deficiency in cytokine regulation during inflammation?**
    A) Decreased phagocytosis
    B) Enhanced tissue repair

C) Prolonged inflammation and tissue damage
D) Reduced leukocyte activation

Answers

21. B
22. B
23. B
24. C
25. B
26. B
27. D
28. B
29. C
30. C

31. **What is the primary mechanism by which leukocyte extracellular traps (NETs) function in pathogen defense?**
    A) They directly phagocytize pathogens.
    B) They trap pathogens in a meshwork to prevent their spread.
    C) They release cytokines to attract more leukocytes.
    D) They degrade pathogens using proteolytic enzymes.
32. **Which of the following statements accurately describes the relationship between reactive oxygen species (ROS) and neutrophil function?**
    A) ROS are solely responsible for cytokine production.
    B) ROS enhance the efficiency of pathogen clearance during phagocytosis.
    C) ROS are released by macrophages only, not neutrophils.
    D) ROS inhibit the inflammatory response by damaging leukocytes.
33. **What is the significance of the age of the inflammatory response in terms of WBC infiltration?**
    A) It affects the types of cytokines released by the cells.
    B) It determines the overall severity of the inflammation.
    C) It influences the specific types of WBCs that migrate to the site of injury.
    D) It dictates the rate of tissue repair following inflammation.
34. **Which characteristic distinguishes chronic inflammation from acute inflammation?**
    A) Presence of neutrophils only
    B) The speed of the inflammatory response
    C) The types of inflammatory cells present, such as macrophages and lymphocytes
    D) The duration of the inflammatory process
35. **In the context of leukocyte-mediated tissue injury, what role do cytokines play during an inappropriate immune response?**
    A) They solely amplify the immune reaction.
    B) They facilitate tissue repair while preventing inflammation.
    C) They may lead to tissue damage by exaggerating the inflammatory response.
    D) They are irrelevant in autoimmune diseases.
36. **What is the primary role of C5a in the complement system, and how does it relate to leukocyte function?**

A) C5a promotes the synthesis of antibodies.
B) C5a acts as a potent chemoattractant for neutrophils and other leukocytes.
C) C5a is involved in inhibiting leukocyte apoptosis.
D) C5a enhances the formation of T-lymphocytes.

37. **Which of the following best describes the process of opsonization in the context of phagocytosis?**
A) The direct destruction of pathogens by neutrophils.
B) The coating of pathogens with antibodies or complement proteins to enhance phagocytosis.
C) The formation of NETs to trap pathogens.
D) The release of cytokines to attract additional immune cells.
38. **How does the presence of antiproteases like α-1 antitrypsin affect the inflammatory response?**
A) They enhance the activity of inflammatory mediators.
B) They regulate and neutralize harmful granule enzymes, preventing tissue damage.
C) They are involved in the recruitment of WBCs to the site of injury.
D) They inhibit the production of reactive oxygen species.
39. **What role does interleukin-17 (IL-17) play in the immune system?**
A) It inhibits the activity of macrophages.
B) It promotes the recruitment and activation of neutrophils and other inflammatory cells.
C) It serves as an anti-inflammatory cytokine.
D) It directly kills pathogens through its cytotoxic effects.
40. **Which pathological condition is primarily associated with the formation of neutrophil extracellular traps (NETs) and their contribution to disease processes?**
A) Chronic Hepatitis
B) Systemic Lupus Erythematosus (SLE)
C) Tuberculosis
D) Allergic Rhinitis

Answers

31. B
32. B
33. C
34. C
35. C
36. B
37. B
38. B
39. B
40. B

41. **Which mechanism allows neutrophils to generate reactive oxygen species (ROS) during phagocytosis?**
A) The classical pathway of complement activation
B) The respiratory burst phenomenon

C) The formation of cytokine networks
D) The synthesis of leukotrienes

42. **What distinguishes the activity of macrophages from that of neutrophils in the inflammatory response?**
A) Macrophages are more effective at producing cytokines.
B) Neutrophils have a longer lifespan in tissues.
C) Macrophages primarily function in the initial phase of inflammation.
D) Neutrophils are the main producers of reactive nitrogen species.
43. **Which of the following best explains the clinical significance of excessive neutrophil activity in inflammation?**
A) It leads to increased tissue repair and regeneration.
B) It can result in chronic tissue damage and the exacerbation of inflammatory diseases.
C) It has no effect on the outcome of the inflammatory response.
D) It promotes a switch from acute to chronic inflammation.
44. **What is the function of the lipoxygenase pathway in the context of chemotaxis?**
A) To produce anti-inflammatory mediators that inhibit WBC recruitment.
B) To generate leukotrienes that act as potent chemoattractants.
C) To promote the clearance of apoptotic cells.
D) To facilitate the adhesion of leukocytes to endothelial cells.
45. **How does the complement component C5a influence the behavior of leukocytes during inflammation?**
A) It induces apoptosis in neutrophils.
B) It inhibits the migration of macrophages to the site of injury.
C) It enhances chemotaxis and increases the adherence of leukocytes to the endothelium.
D) It solely promotes the generation of antibodies.
46. **In what way does the process of NETosis differ from apoptosis and necrosis?**
A) NETosis leads to the complete destruction of the cell.
B) NETosis is a mechanism specifically for trapping and killing pathogens without cell death.
C) NETosis does not involve chromatin degradation.
D) NETosis only occurs in response to viral infections.
47. **What impact does the presence of eosinophils have on the inflammatory response, particularly in allergic conditions?**
A) Eosinophils exacerbate inflammation by promoting tissue repair.
B) Eosinophils contribute to the elimination of pathogens through phagocytosis.
C) Eosinophils release mediators that can lead to tissue damage and exacerbate allergic responses.
D) Eosinophils play a minor role compared to neutrophils in acute inflammation.
48. **Which cytokine is most commonly associated with the activation of Th17 cells and subsequent inflammation?**
A) IL-10
B) IL-6
C) TNF-α
D) IL-17
49. **What are the potential consequences of a deficiency in granule enzymes in neutrophils?**

A) Enhanced immune response to infections
B) Increased susceptibility to chronic inflammation and tissue damage
C) Decreased ability to produce reactive oxygen species
D) Reduced apoptosis of immune cells

50. **Which of the following best describes the role of cytokines in the later phases of inflammation?**
A) They primarily function to initiate the inflammatory response.
B) They limit the inflammatory response and promote tissue healing.
C) They enhance the acute phase response and increase neutrophil activation.
D) They serve no significant role after the initial inflammatory response.

Answers

41. B
42. A
43. B
44. B
45. C
46. B
47. C
48. D
49. B
50. B

51. **Which of the following best describes the action of myeloperoxidase (MPO) in neutrophils?**
A) It enhances the production of cytokines.
B) It is involved in the generation of reactive oxygen species.
C) It directly kills pathogens by converting hydrogen peroxide into hypochlorous acid.
D) It aids in the formation of neutrophil extracellular traps (NETs).
52. **In the context of inflammation, what is the significance of the chemokine family?**
A) They suppress the immune response during chronic inflammation.
B) They are primarily responsible for the synthesis of antibodies.
C) They act as potent chemoattractants to recruit leukocytes to sites of injury.
D) They facilitate apoptosis in neutrophils.
53. **Which condition exemplifies prolonged inflammation leading to tissue damage?**
A) Acute bronchitis
B) Chronic hepatitis C infection
C) Allergic rhinitis
D) Acute appendicitis
54. **What cellular changes occur during the initial vascular phase of inflammation?**
A) Vasodilation and increased permeability of blood vessels
B) Decreased blood flow to the affected area
C) Apoptosis of endothelial cells
D) Recruitment of eosinophils to the site
55. **How does interleukin-17 (IL-17) contribute to the immune response?**
A) It inhibits the function of neutrophils.

B) It enhances the recruitment of neutrophils and other inflammatory cells.
C) It promotes T-cell apoptosis.
D) It suppresses the production of other pro-inflammatory cytokines.

56. **Which type of inflammation is characterized by the presence of eosinophils and is often associated with allergic reactions?**
    A) Acute inflammation
    B) Chronic inflammation
    C) Eosinophilic inflammation
    D) Granulomatous inflammation
57. **What is the main pathway through which LTB4 is produced?**
    A) Cyclooxygenase pathway
    B) Lipoxygenase pathway
    C) Phospholipase pathway
    D) Complement pathway
58. **Which of the following best describes the process of opsonization?**
    A) The trapping of pathogens in extracellular traps.
    B) The tagging of pathogens with antibodies or complement proteins to enhance phagocytosis.
    C) The production of cytokines that attract leukocytes.
    D) The direct killing of pathogens by reactive oxygen species.
59. **How does the complement system contribute to the inflammatory response?**
    A) By inhibiting the migration of leukocytes
    B) By facilitating the formation of antibodies
    C) By producing cytokines that regulate inflammation
    D) By generating potent chemoattractants like C5a
60. **Which of the following factors is most likely to influence the specific types of leukocytes recruited during an inflammatory response?**
    A) The duration of the inflammatory response
    B) The type of pathogen or injury
    C) The age of the individual
    D) The presence of circulating antibodies

Answers

51. C
52. C
53. B
54. A
55. B
56. C
57. B
58. B
59. D
60. B

61. **What is the primary role of interferons in the context of inflammation and immune response?**
    A) They promote leukocyte apoptosis.

B) They enhance the activity of macrophages and neutrophils.
C) They regulate the adaptive immune response and have antiviral effects.
D) They serve as direct bactericidal agents.

62. **Which of the following best explains the function of neutrophil extracellular traps (NETs) during an immune response?**
A) They enhance the phagocytosis of pathogens.
B) They trap and immobilize pathogens while allowing viable neutrophils to continue fighting infection.
C) They are primarily involved in the activation of the complement system.
D) They produce cytokines that regulate inflammation.

63. **What key process is disrupted in conditions associated with a deficiency in antiproteases such as α-1 antitrypsin?**
A) Phagocytosis of pathogens
B) Regulation of proteolytic enzymes that can damage tissues
C) Chemotaxis of leukocytes
D) Production of reactive oxygen species

64. **How does the presence of bacterial products as chemoattractants influence the inflammatory response?**
A) They decrease the activity of leukocytes.
B) They promote the early recruitment of neutrophils to the site of infection.
C) They inhibit the production of pro-inflammatory cytokines.
D) They lead to the apoptosis of macrophages.

65. **Which of the following accurately describes the process of phagocytosis in neutrophils?**
A) Phagocytosis is solely dependent on opsonization.
B) Neutrophils can engulf pathogens without recognizing them first.
C) The process involves recognition, engulfment, and the formation of a phagolysosome for degradation.
D) Phagocytosis does not involve reactive oxygen species.

66. **What is the consequence of a prolonged inflammatory response in the context of chronic diseases?**
A) It leads to complete resolution of tissue injury.
B) It may result in fibrosis and permanent tissue damage.
C) It reduces the likelihood of acute infections.
D) It has no impact on tissue integrity.

67. **Which cells are primarily responsible for the early stages of phagocytosis in response to bacterial infections?**
A) Eosinophils
B) T-lymphocytes
C) Neutrophils
D) Plasma cells

68. **What effect does nitric oxide (NO) have in the context of inflammation?**
A) It primarily serves as a signaling molecule that reduces inflammation.
B) It promotes the apoptosis of neutrophils.
C) It has antimicrobial properties and is produced during the killing of pathogens.
D) It inhibits the function of macrophages.

69. **In the context of allergic reactions, what role do eosinophils play?**
A) They primarily induce apoptosis in other immune cells.

B) They release mediators that can lead to tissue damage and inflammation.
C) They facilitate the clearance of bacterial pathogens.
D) They are responsible for the formation of NETs.

70. **What is the significance of C5a in the complement cascade, particularly regarding leukocyte behavior?**
A) C5a inhibits leukocyte chemotaxis.
B) C5a enhances the recruitment and activation of leukocytes to the site of injury.
C) C5a is involved in the production of antibodies.
D) C5a promotes the apoptosis of neutrophils.

Answers

61. C
62. B
63. B
64. B
65. C
66. B
67. C
68. C
69. B
70. B

71. **All of these statements about chemotaxis are correct except:**
A) It is an active process involving movement of WBCs toward injured tissue.
B) Chemoattractants can be both endogenous and exogenous.
C) It exclusively involves the movement of neutrophils.
D) It plays a crucial role in the inflammatory response.
72. **All of these characteristics of neutrophils are accurate except:**
A) They are short-lived cells that indicate acute inflammation.
B) They are capable of phagocytosing a wide range of pathogens.
C) They persist for weeks at the site of injury.
D) They are the primary responders during the early stages of inflammation.
73. **All of the following statements regarding cytokines are true except:**
A) They can amplify or limit the inflammatory response.
B) They are solely produced by macrophages.
C) They play a role in recruiting leukocytes to the site of inflammation.
D) They can be involved in promoting tissue repair in later phases.
74. **All of these are recognized functions of reactive oxygen species (ROS) during phagocytosis except:**
A) They aid in the intracellular killing of pathogens.
B) They contribute to the formation of neutrophil extracellular traps (NETs).
C) They are exclusively produced by macrophages.
D) They help in degrading pathogens within the phagolysosome.
75. **All of the following statements about the role of eosinophils are correct except:**
A) They are primarily involved in allergic reactions.
B) They can contribute to tissue damage in allergic conditions.

C) They are key players in acute inflammation.
D) They are distinct from neutrophils in their functions.

76. **All of these statements regarding the complement system are accurate except:**
    A) C5a is the most powerful chemoattractant among complement proteins.
    B) The complement system is involved in opsonization of pathogens.
    C) The complement system exclusively activates T-lymphocytes.
    D) It enhances the inflammatory response through various pathways.
77. **All of the following about the process of phagocytosis are true except:**
    A) It involves recognition, engulfment, and degradation of pathogens.
    B) Neutrophils require opsonization for effective phagocytosis.
    C) Phagocytosis does not involve the formation of reactive oxygen species.
    D) It culminates in the formation of a phagolysosome.
78. **All of these characteristics of chronic inflammation are correct except:**
    A) It is marked by the presence of macrophages and lymphocytes.
    B) It typically follows acute inflammation.
    C) It is associated with short-lived inflammatory cells.
    D) It can result in tissue remodeling and fibrosis.
79. **All of the following are consequences of excessive immune responses except:**
    A) Tissue injury due to prolonged inflammation.
    B) Enhanced immune defense against pathogens.
    C) Autoimmune diseases where the body attacks its own tissues.
    D) Exaggerated allergic reactions leading to tissue damage.
80. **All of the following statements regarding nitric oxide (NO) are correct except:**
    A) It is produced from arginine by nitric oxide synthase.
    B) It has no role in the immune response.
    C) It can react with superoxide to form peroxynitrite.
    D) It contributes to the killing of pathogens by macrophages.

Answers

71. C
72. C
73. B
74. C
75. C
76. C
77. C
78. C
79. B
80. B

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