

Pathophysiology I  
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120 min.

**Pathophysiology I**  
**Final Exam**  
**(A)**

**Student name (in Arabic):** \_\_\_\_\_

**Mark:** \_\_\_\_\_

Note: for questions 1 & 2; please answer in the answer sheet below.

**MCQs**

1-	11.	21.	31.	41
2-	12.	22.	32	42
3-	13.	23.	33	43
4-	14.	24.	34	44
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**T&F**

1-	7-	13-	19-	25-
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6-	12-	18-	24-	30-

**Question 1 (70 marks): Please encircle the most appropriate answer.**

- 1- The most important prognostic determinant of malignant hypertension is
- a- Renal failure.
  - b- Retinopathy.
  - c- Papilledema.
  - d- Headache.
- 2- Which one of the following pairs is mismatched:
- a- Variant angina: unstable atherosclerotic plaque.
  - b- Stable angina: stable fixed atherosclerotic plaque.
  - c- Unstable angina: plaque disruption and platelet aggregation.
  - d- ST-segment elevation MI: plaque disruption with thrombus formation.
- 3- All of the following are positive risk factors for CHD EXCEPT:
- a- Low HDL cholesterol.
  - b- High LDL cholesterol.
  - c- Hypertension.
  - d- Women age > 45yrs.
- 4- All the following factors can increase the metabolic demands of the heart precipitate an anginal attack EXCEPT:
- a- Aortic stenosis.
  - b- Thyrotoxicosis.
  - c- Exercise.
  - d- Mental stress.
- 5- Rapid heart rate can precipitate anginal attacks through:
- a- Increasing the metabolic demands of the heart.
  - b- Decreasing blood flow through the subendothelial vessels as a result of decreased time spent in diastole.
  - c- Decreasing diastolic pressure.
  - d- A,b.
- 6- Macrophages are key players in all of the following EXCEPT:
- a- Chronic inflammatory response.
  - b- Wound healing.
  - c- Atherogenesis.
  - d- Type I hypersensitivity reactions.
- 7- Comparing stable angina to unstable angina:
- a- The pain in stable angina is located in the substernal area of the chest without radiating to other parts of the body while that in unstable angina radiates to the left shoulder.
  - b- The pain in stable angina is usually provoked by exercise while that in unstable angina usually occurs at rest.
  - c- The cause of stable angina is mainly atherosclerosis in the coronary arteries or their branches while the cause of unstable angina is spasm in the coronary arteries or their branches.
  - d- The ECG in stable angina is normal while in unstable angina the ECG is characterized by ST segment elevation.

- 8- **Comparing ST segment elevation MI with non-ST segment elevation MI:**
- a- Serum cardiac markers are elevated in ST segment elevation MI but not in non ST segment elevation MI.
  - b- ST segment elevation MI is caused by complete coronary occlusion, while in non ST segment elevation MI the coronary occlusion is subtotal.
  - c- The pain in ST segment elevation MI is increasing in severity and lasts more than 20 minutes while that in non ST segment elevation MI lasts less than 20 minutes.
  - d- All of the above statements are true.
- 9- **Cardiac markers used in the diagnosis of MI include:**
- a- Myoglobin.
  - b- CK-MB.
  - c- Cardiac troponin I.
  - d- B,c.
  - e- All of the above.
- 10- **Acute coronary syndromes includes all the following conditions EXCEPT:**
- a- Prinzmetal's angina.
  - b- Unstable angina.
  - c- ST segment elevation MI
  - d- Non ST segment elevation MI.
- 11- **The extent of the infraction in case of MI depends on:**
- a- Location and degree of occlusion
  - b- Amount of heart tissue supplied by the vessel.
  - c- Extent of collateral circulation.
  - d- A,b.
  - e- All of the above.
- 12- **Constrictive pericarditis:**
- a- Is characterized by the accumulation of exudates in the pericardial space that may be serous or purulent.
  - b- Is characterized by intense scarring of the pericardium.
  - c- Can caused diastolic dysfunction.
  - d- A,b.
  - e- B,c.
- 13- **Viral infections may cause all of the following conditions EXCEPT:**
- a- Acute pericarditis.
  - b- Myocarditis.
  - c- Rheumatic heart disease.
  - d- A,b.
- 14- **Mural thrombi are common with:**
- a- Dilated cardiomyopathy.
  - b- Hypertrophic cardiomyopathy.
  - c- Restrictive cardiomyopathy.
  - d- All of the above.

- 15- All the following conditions can cause diastolic dysfunction EXCEPT:
- Mitral valve stenosis.
  - Dilated cardiomyopathy.
  - Restrictive cardiomyopathy.
  - Hypertrophic cardiomyopathy.
- 16- Aschoff bodies is the pathognomic feature of:
- Infective endocarditis.
  - Rheumatic fever.
  - Congestive cardiac failure.
  - Mitral valve stenosis.
- 17- Infective endocarditis is associated with all of the following EXCEPT:
- Heart murmurs.
  - Glomerulonephritis.
  - Pericarditis.
  - Small petechial hemorrhages.
- 18- Ischemic heart disease is associated with:
- Systolic dysfunction.
  - Diastolic dysfunction.
  - High out-put failure.
  - A,b.
- 19- Increased systemic venous pressure is associated with:
- Right – sided heart failure.
  - Left-sided heart failure.
  - A,b.
  - None of the above.
- 20- All the following are manifestations of left heart failure EXCEPT:
- Cyanosis.
  - Dyspnea.
  - Anorexia.
  - Cough.
- 21- Which one of the following statements about heart failure is true:
- Thyrotoxicosis is a common cause of heart failure.
  - Cardiac cachexia occurs in persons with end-stage heart failure and it is related to left and right failure.
  - Pulmonary edema is decreased while sleeping.
  - Dyspnea related to an increase in activity is called paroxysmal nocturnal dyspnea.
- 22- Which one of the following statements regarding Food allergies is NOT true:
- Can occur at any age but tend to manifest during childhood.
  - allergens can be food proteins, partially digested food products or food additives.
  - Clinical manifestations are always gastrointestinal ones.
  - The foods most commonly causing these reactions are milk and eggs in children, peanuts and fish in adults.

**23- Regarding Immune-complex mediated injury:**

- a- It is type II hypersensitivity reaction.
- b- It is induced by exogenous antigens only such as viral and bacterial proteins.
- c- The resultant damage is indirect; secondary to the inflammatory response induced by complement proteins that are activated by the antigen-antibody complexes.
- d- An example of which is mismatched blood transfusions.

**24- Regarding latex allergy:**

- a- It can be triggered by the latex proteins or by the additives used in the manufacturing process such as cornstarch powder.
- b- The most common type of latex allergy is contact dermatitis caused by a type IV delayed hypersensitivity reaction to latex proteins.
- c- May be caused by type I hypersensitivity reactions that occur in response to rubber additives.
- d- All of the above.

**25- Conditions associated with increased platelet function include all of the following EXCEPT:**

- a- Atherosclerosis.
- b- Diabetes mellitus.
- c- Elevated cholesterol levels.
- d- Postsurgical immobility.

**26- The main cells involved in hypersensitivity reactions causing allergic rhinitis are:**

- a- Macrophages.
- b- Mast cells.
- c- Cytotoxic T cells.
- d- Neutrophils.

**27- Regarding von Willebrand factor (vWF):**

- a- It is produced by the endothelial cells of the blood vessels.
- b- It is important in platelet adhesion to the exposed collagen.
- c- Its deficiency is associated with bleeding disorders due to both thrombocytopathia as well as coagulation defects.
- d- All of the above.

**28- Which one of the following statements is NOT true:**

- a- Thrombocytopathia may be caused by some drugs such as aspirin.
- b- Liver cirrhosis can lead to decrease production of both platelets and clotting factors.
- c- Hemophilia A is a hereditary disorder caused by deficiency of factor VIII.
- d- Hemophilia B is a hereditary disorder caused by deficiency of factor IX.

**29- Smoking may be associated with:**

- a- Increased platelet adhesion and aggregation.
- b- Activation of the clotting system.
- c- Coronary heart disease.
- d- A,c.
- e- All of the above.

- 30- **Plasminogen activators:**
- a- Are synthesized by the liver and vascular endothelium.
  - b- Convert plasminogen into plasmin that digest fibrin and some clotting factors.
  - c- Are unstable and rapidly inactivated by inhibitors synthesized by the endothelium and the liver.
  - d- All of the above.

31- Which one of the following terms is not matched with the corresponding description:

- a- Platelet adhesion: adherence of the platelets to the subendothelial layer where platelet receptor binds to vWF at the injury site
- b- Platelet aggregation: adherence of platelets to each other under the influence of TXA2 to form the platelet plug.
- c- Coagulation: the formation of the fibrin clot through the activation of clotting factors. It is inhibited by some factors such as protein C.
- d- Fibrinolysis: dissolution of the fibrin clot that is promoted by some natural substances such as heparin.

32- **Hypercoagulability state is associated with all of the following EXCEPT:**

- a- Increased levels of estrogen.
- b- Stasis of blood flow.
- c- Increased levels of protein S.
- d- Increased levels of the inhibitors of tissue plasminogen activators.

33- **Liver disease may be associated with:**

- a- Decreased synthesis of vitamin K - dependent clotting factors.
- b- Decreased synthesis of tissue plasminogen activators.
- c- Decreased synthesis of inhibitors of the tissue plasminogen activators.
- d- Thrombocytopenia.
- e- All of the above.

34- **Compared to acute inflammation, chronic inflammation:**

- a- Is characterized by plasma exudation with neutrophil accumulation.
- b- May be associated with fibrosis.
- c- Is nonspecific and may be caused by any injury.
- d- Is self-limiting and rapidly controlled by the host defenses.

35- **Regarding granulomatous lesions:**

- a- It is caused by pathogens that usually are not controlled by other inflammatory mechanisms such as *Mycobacterium tuberculosis*.
- b- It is characterized by the presence of epithelioid cells surrounded by lymphocytes.
- c- A dense membrane of connective tissue eventually encapsulates the lesion and isolates it.
- d- A, c
- e- All of the above.

- 42- Which one of the following types of hypersensitivity reactions is NOT matched well with its description:
- a- Type I: IgE mediated, present always as severe anaphylactic reaction and threatening circulatory shock.
  - b- Type II: formation of IgG or IgM against cell surface antigens with subsequent activation of complement proteins.
  - c- Type III: formation of IgM or IgG against endogenous or exogenous antigens with subsequent antigen-antibody complex precipitation.
  - d- Type IV: cell mediated cytotoxicity.
- 43- Which one of the following types of hypersensitivity reactions is NOT matched well with the corresponding example:
- a- Type I: asthma.
  - b- Type II: Autoimmune hemolytic anemia.
  - c- Type III: rheumatic fever.
  - d- Type IV: transplant rejection.
- 44- Uncontrolled hypertension increases the risks of:
- a- Left ventricular hypertrophy and heart failure.
  - b- Atherosclerosis.
  - c- Obesity.
  - d- A, b.
  - e- All of the above.
- 45- A blood pressure measurement of 150 mm Hg systolic and 102 mm diastolic is considered:
- a- High-normal blood pressure.
  - b- Stage 1 hypertension.
  - c- Stage 2 hypertension.
  - d- Stage 3 hypertension.
- 46- Which one of the following is not a risk factor for hypertension:
- a- Increased levels of LDL.
  - b- Obesity.
  - c- Age-related increases in blood pressure.
  - d- Race.
  - e- Family history.
- 47- The most common cause of secondary hypertension is:
- a- Nephrosclerosis.
  - b- Renovascular hypertension.
  - c- Pheochromocytoma.
  - d- Cushing's syndrome.
- 48- Hypertension, hypokalemia, and the presence of abdominal bruit are manifestations of:
- a- Renovascular hypertension.
  - b- Primary hyperaldosteronism.
  - c- Cushing's syndrome.
  - d- Pheochromocytoma.

- 36- Which one of the following stages or signs of inflammatory response is not well-matched with the corresponding chemical mediator:
- a- Chemotaxis – complement fragment.
  - b- Leukocytosis - TNF.
  - c- Fever- histamine..
  - d- Pain- prostaglandins.
  - e- Swelling- leukotrienes..
- 37- Which one of the following statements regarding phagocytosis is FALSE:
- a- It is the final stage of the cellular response of acute inflammation.
  - b- Opsonization usually enhances phagocytosis through the stimulation of intracellular killing by oxygen free radicals.
  - c- Phagosome formation usually follows the engulfment step.
  - d- The phagosome fuses with a lysosome containing antibacterial molecules and enzymes that can digest the microbe
- 38- Which one of the following statements regarding inflammatory exudates is FALSE:
- a- Serous exudates are watery fluids rich in red blood cells.
  - b- Fibrinous exudates are dense due to their large content of fibrinogen.
  - c- Purulent exudate is the main type present in the abscess.
  - d- Hemorrhagic exudates occur when there is severe tissue injury that causes damage to blood vessels.
- 39- The following term is NOT well matched with the appropriate description:
- a- Ulcer: a necrotic epithelial surface as a result of inflammation.
  - b- Tubercle: granulomatous inflammatory response with a caseous (cheesy) necrotic center.
  - c- Pavementing: process by which leukocytes move to and along the periphery of the blood vessels.
  - d- Chemotaxis: process by which the leukocytes pass through the capillary walls by ameboid movement, and move into tissue spaces.
- 40- The systemic manifestations of inflammation include all of the following EXCEPT:
- a- Increased ESR.
  - b- Elevation in the levels of C-reactive proteins.
  - c- Fever.
  - d- Hotness at the site of inflammation.
- 41- Which one of the following statements about wound healing is FALSE:
- a- Skeletal muscle injury is repaired by connective tissue replacement.
  - b- A sutured surgical incision is an example of healing by primary intention while large surface wounds heal by secondary intention.
  - c- Angiogenesis takes place during the inflammatory phase of wound healing.
  - d- The granulation tissue is a soft, pink tissue rich of fibroblasts and serves as the foundation for scar tissue development.
  - e- Wounds never heal in the absence of macrophages.

- 49- A 20 mm Hg or higher pressure in the arms than in the legs suggests:
- a- Aortic stenosis.
  - b- Coarctation of the aorta.
  - c- Mitral valve stenosis.
  - d- None of the above.

- 50- Nonpharmacological treatment of hypertension include:
- a- Daily salt intake shouldn't exceed 6g/day.
  - b- High dietary potassium intake.
  - c- Weight reduction for overweight.
  - d- All of the above.

## Q2 (30 marks):

### True and false:

- 1- ( ) Essential hypertension accounts for 90% to 95% of all hypertension.
- 2- ( ) Aortic stenosis can lead to congestive cardiac failure due to increased afterload.
- 3- ( ) Vegetations can cause valvular destruction.
- 4- ( ) Tuberculin test is an example of type IV hypersensitivity reactions mediated by CD4 cells.
- 5- ( ) Coronary artery spasm is observed in areas of plaque deposition and lead to stable anginal attacks.
- 6- ( ) Cerebrovascular complications of hypertension are more closely related to systolic than diastolic hypertension.
- 7- ( ) Proteins, are more likely to cause an immediate hypersensitivity response, whereas simple organic compounds and metals more commonly cause delayed hypersensitivity reactions.
- 8- ( ) Atherosclerotic plaque rupture is the most common cause of MI and sudden death.
- 9- ( ) Diastolic blood pressure is largely determined by the cardiac output while systolic blood pressure is determined mainly by the peripheral vascular resistance.
- 10- ( ) left ventricular hypertrophy is a major risk factor for ischemic heart disease, cardiac dysrhythmias
- 11- ( ) The allergenicity of a food may be changed by heating or cooking.
- 12- ( ) Anaphylaxis has a rapid onset, often within minutes a can lead to massive vasodilation with peripheral pooling of blood, a profound drop in blood pressure, and life-threatening circulatory shock.
- 13- ( ) Hypersensitivity pneumonitis is an example of type IV hypersensitivity reactions, associated with exposure to inhaled organic dusts with subsequent activation of pulmonary T cells.
- 14- ( ) Thromboxane A<sub>2</sub> (TXA<sub>2</sub>), a prostaglandin released from the vessel endothelium, contributes to the vessel spasm stage of hemostasis.
- 15- ( ) Arterial thrombi are associated with conditions that cause stasis of blood flow with increased concentrations of coagulation factors.
- 16- ( ) Stable angina frequently occurs during sleep and this is associated with a great risk of dysrhythmia and sudden death.
- 17- ( ) Patients with prosthetic valves are at higher risks of infective endocarditis as compared to persons with normal valves.
- 18- ( ) Severe anemia may be associated with high-output cardiac failure.
- 19- ( ) Orthopnea is shortness of breath that occurs when a person is supine.
- 20- ( ) Valvular regurgitation may lead to heart failure.

- 21- ( ) Ventricular wall tension is the main determinant of preload.
- 22- ( ) The hepatocytes of the liver are one form of stable cells while the surface cells of the skin are labile cells.
- 23- ( ) Clotting factor deficiency typically causes large bruises and hematomas, while platelet defects are more commonly associated with petechiae and purpura.
- 24- ( ) Bacterial infections produce a relatively selective increase in neutrophils, while viral infections tend to produce an increase in eosinophils.
- 25- ( ) Pyogens are microorganisms that are associated with suppurative inflammation.
- 26- ( ) Macrophages engulf larger and greater quantities of foreign material than neutrophils.
- 27- ( ) Exogenous pyrogens act directly and immediately on the hypothalamic thermoregulatory center to increase its set point.
- 28- ( ) Unstable atherosclerotic plaque is that with large lipid core and fibromuscular cap.
- 29- ( ) Fever can be produced by infectious as well as non-infectious disorders, such as myocardial infarction and neoplasms.
- 30- ( ) Group A ( $\beta$ -hemolytic) streptococcus is the causative pathogen of infective endocarditis.

**Q3 (20 marks):**

**Please answer the following questions:**

**1- Please write about orthostatic hypotension considering the following:**

- What is orthostatic hypotension and what are the criteria for diagnosis of it

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- What are the protective mechanisms against orthostatic hypotension in individuals?

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- What are the causes of orthostatic hypotension?

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**GOOD LUCK**  
Dr. HALA AL AGHA.

