

Blood and lymphoreticular system

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***PAST PAPERS
Mid***

Histology

Lecture 1

1) Which one of the following about the HCT is NOT true:

- A) The value of HCT is usually 45%.
- B) The HCT expresses the (%) of red blood cells in a volume of whole blood.
- C) The values of HCT closely paralleled the values of hemoglobin & red cell count.
- D) The space occupied by the packed red blood cells is termed the hematocrit.
- E) The value of HCT does not vary with age & sex of the individual.

Answer: E

2) Correct sequence of blood cells producing sites:

- A) yolk sac / liver / bone marrow
- B) liver / yolk sac / bone marrow
- C) yolk sac / liver / spleen

Answer: A

3) Erythrocytes, Choose the WRONG statement:

- A) Eosinophilia of erythrocytes is due to hemoglobin.
- B) About one week is needed for the formation of erythrocytes from proerythroblasts.
- C) Erythrocytes appear electron dense and homogenous under TEM.
- D) Rouleaux formation is a reversible condition due to surface tension caused by erythrocytes biconcave surface in slow circulation.
- E) Mature erythrocytes are still capable of producing a little amount of hemoglobin

Answer: E

4) Choose the wrong statement:

- A) Unlike platelets, RBCs never stack together
- B) Internum of the crystalloid granules contains major basic proteins

Answer: A

5) Which of the following statements most describe why RBC's are efficient in carrying oxygen:

- 1. Contains hemoglobin
- 2. Have no nucleus
- 3. Have many mitochondria needed to produce ATP
- 4. Biconcave shape
- 5. 4 oxygen molecules are carried by hemoglobin

- A) 1, 3, 4
- B) 2, 4, 5
- C) 1, 2, 4, 5
- D) 1, 2, 3, 5
- E) 1, 2, 3, 4, 5

Answer: C

6) The right arrangement of hemoglobin chains synthesis in human

- A) it starts is liver then yolk sac and finally in bone marrow
- B) it starts in yolk sac then liver and finally in bone marrow
- C) yolk sac and liver synthesize hemoglobin for almost the same period in gestation liver and yolk sac then bone marrow after birth

Answer: B

7) The right arrangement of hemoglobin chains synthesis in humans:

- A) it starts in liver then yolk sac and finally in bone marrow
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- C) yolk sac and liver synthesize hemoglobin for almost the same period in gestation
- D) liver and yolk sac then bone marrow after birth

Answer: B

8) Which biochemical component of the erythrocyte cell surface is primarily responsible for determining blood group (ABO)?

- A) Fatty acid
- B) carbohydrate
- C) protein
- D) Cholesterol

Answer: B

9) What is the approximate life span of circulating erythrocyte?

- A) 4 months
- B) 120 weeks
- C) 20 day
- D) 14-28 days

Answer: A

10) Eosinophils are cells with bilobed nuclei and many cytoplasmic granules:

- A) True
- B) False

Answer: A

11) Erythrocytes are very small, a cell-like element with no nuclei but many granules:

- A) True
- B) False

Answer: B

12) Erythrocytes consume some of the oxygen they transport for ATP production:

- A) True
- B) False

Answer: B

13) Correct sequence of blood cells producing sites:

Answer: Yolk sac -> Liver -> Bone marrow

14) Wrong about blood

special type of CT that originates from endoderm

15) Choose the wrong statement:

Answer: Erythrocyte contains granules

Lecture 2

16) Which of the following cells express receptors for IgE on their cell surface ?

- A) Cells with spherical nuclei and scant cytoplasm.
- B) Biconcave cells with no nuclei.
- C) Multinucleated cells with irregular S-shaped nuclei and large basophilic cytoplasmic granules.
- D) Highly phagocytic cells with many basophilic cytoplasmic granules.
- E) Single nucleated cells with many basophilic cytoplasmic granules.

Answer: E

17) Blood formed elements, choose the wrong statement:

- A) Erythrocytes lack class 1 MHC molecules.
- B) Both basophil and mast cell are granulated but basophil nucleus is lobulated while the mast cell nucleus is round.
- C) Human thrombocytes have, in contrast to erythrocytes, never been individual nucleated cells.
- D) The internum of eosinophilic granules contains major basic protein.
- E) Most neutrophils in female peripheral blood normally show barr bodies.

Answer: E

18) The cell that contains bi-lobed nucleus and large granules that obscure its nucleus

- A) monocyte
- B) eosinophil
- C) basophil
- D) neutrophil

Answer: C

19) Which of the following is wrong about WBCs?

- A) Neutrophils are the most prominent cells in blood
- B) eosinophils are more phagocytic and bactericidal than neutrophils
- C) B cells can act as APCs

Answer: B

20) Which of the following cells increase in level during parasitic infections ?

- A) Neutrophils
- B) Basophils
- C) Eosinophils
- D) Lymphocytes
- E) Monocytes

Answer: C

21) Which of the following cells have granules containing peroxidase and histaminase?

- A) neutrophils
- B) basophils
- C) eosinophils

Answer: C

22) Which of the following is false :

- A) neutrophils phagocytic activity is enhanced by the presence of complement
- B) absence of barr body in neutrophils and other body cells indicate true male (XY)
- C) Neutrophils are called cells of chronic inflammation

Answer: C

23) Which of the following statements regarding leukocytes are correct

1. They move out to the tissues by a process called emigration
2. Neutrophils and microphages are required in phagocytosis
3. Inflammatory cells are attracted by bacterial molecules and inflamed tissue by a process called chemotaxis
4. Leukopenia is an increase in the number of WBC's in the circulation

- A) 1 and 2 only
- B) 2, 3, 4
- C) 1, 2, 3
- D) 1, 2, 3, 4
- E) 3 and 4 only

Answer: C

24) Which cell type has cytoplasmic granules that contain heparin & histamine?

- A) Eosinophil
- B) Basophil
- C) Neutrophil
- D) Lymphocyte

Answer: B

25) A differential cell count of a blood smear from a patient with a parasitic infection is likely to reveal an increase in:

- A) Eosinophil
- B) Basophil
- C) Neutrophil
- D) T Lymphocyte

Answer: A

26) Neutrophils are multi-nucleated cell with polymorphic nuclei:

- A) True
- B) False

Answer: B

27) Which of the following cells function in the formation of pus at wound site:

- A) Cells with spherical nuclei
- B) Cell-like elements with no nuclei
- C) Biconcave cells with no nuclei
- D) Cells with polymorphic nuclei

Answer: D

28) The main different between basophils and mast cells is:

- A) The shape of the nucleus
- B) The density of their granules
- C) The content of their granules
- D) The staining reaction of their granules

Answer: A

29) Which one of the following is a correct pair?

- A) Basophil / histaminasease
- B) Eosinophil / heparin
- C) Basophil / basic protein
- D) Basophil / histamine

Answer: D

30) In parasitic infection which of the following increases:

- A) Cells with a basophilic granular s-shaped nucleus
- B) Cells with acidophilic granular bilobular nucleus
- C) Cells without specific granules
- D) Cells having multilobed nucleus

Answer: B

31) Which statement is wrong about granulopoiesis?

- A) It takes around 2 weeks
- B) Precursors have lobulated nucleus
- C) Some of the Precursors have indented nucleus
- D) All choices are true

Answer: B

32) Wrong statement:

- A) Neutrophils circulate for hours in blood after maturation
- B) Neutrophils circulate for days in blood after maturation

Answer: B

34) Choose the wrong statement:

- A) Granulocytes have irregular shape in blood & spherical shape in connective tissue
- B) Granulocytes have spherical shape in blood & irregular shape in connective tissue

Answer: A

35) Which one of the following is a correct pair?

Basophil / Histamine

36) which of the following cells their granules contain peroxidase and histaminase:

eosinophile

37) Wrong about WBCs

eosinophils are more phagocytic and bactericidal than neutrophils

Lecture 3

38) Examination of a normal peripheral blood smear reveals a cell more than twice the diameter of an erythrocyte with a C-shaped nucleus and a frosted glassy cytoplasm; Which of the following cell types is being described ?

- A) Basophil.
- B) Eosinophil.
- C) Lymphocyte.
- D) Neutrophil.
- E) Monocyte

Answer: D

39) A cell with c shaped single non lobulated nucleus:

- A) mast cell
- B) eosinophil
- C) neutrophil
- D) monocyte

Answer: D

40) Cytotoxic T lymphocytes' marker:

- A) CD45 +
- B) CD34 –
- C) CD3 +
- D) CD19 –
- E) CD8 +

Answer: E

41) Which of the following is wrong about HLA class II?

- A) it is presented in all nucleated cells
- B) it is recognized by T helper
- C) it is coupled to peptide product of proteins the cells had ingested

Answer: A

42) Which of the following is the correct statement?

- A) Cytotoxic cells recognize MCH 1 and the Ag presented on it
- B) cytotoxic T-Cells bind to MHC 2
- C) cytotoxic T-Cells express MHC 2 on their surface

Answer: A

43) Which of the following is correct about monocytes?

- A) They are phagocytic cells
- B) They increase dramatically in parasitic infections
- C) They are responsible for allergic reactions

Answer: A

44) Which of the following cells can give rise to an APC ?

- A) myeloblast
- B) basophil
- C) monocyte

Answer: C

45) True about monocytes

- A) multinucleated cell
- B) frosted glass appearance
- C) nucleus is masked by granules

Answer: B

46) Lymphocytes, choose the CORRECT statement?

- A) Are produced only in the bone marrow.
- B) Are the most abundant type of leucocytes.
- C) Are produced only in the lymphoid tissues.
- D) Are granular leucocytes.
- E) Are produced in the bone marrow & in the lymphoid tissues.

Answer: E

47) Which of the following is false?

- A) monocytes have C-shaped nucleus
- B) 5-lobed-nucleus neutrophils are less mature than 4-lobed ones
- C) B and T lymphocytes cannot be distinguished under LM

Answer: B

48) Lymphocytes, choose the CORRECT statement?

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Answer: E

49) Thrombocytes, choose the WRONG statement:

- A) Microtubules and microfilaments are found in the outer marginal bundle.
- B) Have thick glycocalyx.
- C) Originate from bone marrow cells with many dynamic cell projections.
- D) Often form basophilic clumps in histological preparations.
- E) Formation of germinal centers for B-cell proliferation in each node's cortex

Answer: E

50) The wrong statement:

Macrophages secretes IL-2 that stimulates T-cells

51) AIDS progression

CD4+ count decreases and viral load increases

52) Wrong about HLA class II

it is presented in all cells

53) Cell with the same size of erythrocyte and blue cytoplasm with large nucleus?

Lymphocyte

Lecture 4

54) Reticulocytes, choose the CORRECT statement:

- A) Their percentage in peripheral blood is not changed in hemorrhage.
- B) Contain remnants of DNA.
- C) Contain acidophilic reticulum of polyribosomes.
- D) Have the same size as mature erythrocytes.
- E) They are stained with Brilliant cresyl blue.

Answer: E

55) Which of the following is wrong about reticulocytes?

- A) Contain DNA not RNA
- B) increases in hemolytic anemia
- C) can synthesize heme

Answer: A

56) What can be found inside the red bone marrow?

- A) Hematopoietic stem cells along with numerous fat tissue
- B) Hematopoietic stem cells + sinusoidal capillaries + reticular tissue
- C) Hematopoietic stem cells + fenestrated capillaries + reticular tissue

Answer: B

57) Hematopoiesis starts in liver, moves to yolk sac and then to the bone marrow

- A) True
- B) False

Answer: B

58) Choose the correct statement regarding the changes occurring during Erythropoiesis

- A) Specific granules appear in cytoplasm
- B) Nucleus disappears
- C) Cytoplasm changes to basophilic
- D) Cells maintain their capacity for mitosis
- E) Size of cells increases

Answer: B

59) Choose the wrong statements:

Lowest erythropoiesis occurs in the pelvis and vertebrae

Lecture 5

60) 25-The precursor cells of granulocytes are destroyed by radiotherapy. To reestablish the granulocytic lineage, which of the following cells should be transplanted?

- A) Promyelocytes.
- B) Metamyelocytes.
- C) Promonocytes.
- D) Band cells.
- E) Myelocytes.

Answer: A

61) Regarding granulopoiesis, choose the WRONG statement

- A) Azurophilic granules first appear at the promyelocyte stage.
- B) Secondary granules first appear at the myelocyte stage.
- C) Metamyelocytes have kidney shaped nuclei and cannot divide.
- D) Both types of granules in granulopoietic cells are synthesized by the free ribosomes.
- E) Band cells are almost mature granulocytes but without segmented nuclei

Answer: D

62) Which of the following is wrong about neutrophils?

- A) it has its own specific granules
- B) it lives for several hours only and stores glycogen
- C) it has polymorphic nucleus throughout its life
- D) measuring neutrophils from blood represents all neutrophils in our body

Answer: D

63) We recognize myelocytes from:

- A) specific granules
- B) Primary granules
- C) size

Answer: A

64) Which of the following is wrong about neutrophil?

- A) peripheral blood count of neutrophils is an absolute measure of their total count
- B) Barr body appears in females
- C) Its primary granules contain myeloperoxidase

Answer: A

65) Choose the correct statement.

- A) The first morphologically distinguishable stage of development of red blood cells is basophilic erythroblast.
- B) The first morphologically distinguishable stage of development of granulocytes is promyelocyte.
- C) The type of tissue serves as a supportive structure for hematopoiesis in the bone marrow is a jelly- like connective tissue.
- D) Myeloid progenitor cell can be a precursor for all leukocytes except lymphocytes.

Answer: D

66) Which statement is wrong about granulopoiesis?

Precursors have lobulated nucleus

67) Wrong statement: Answer:

Neutrophils circulate for days in blood after maturation

Lecture 6

68) Which of the following isn't true about lymph nodes:

- A) post capillary venules are located in the outer cortex
- B) most of lymphocytes enter lymph nodes via blood vessels
- C) The cords are separated by spaces called medullary sinuses

Answer: A

69) True about all secondary lymph organs

- A) contain lymph follicles
- B) contain epithelial reticular cells as stroma
- C) contain afferent vessels
- D) contain capsule

Answer: A

70) Lymphocytes in the circulation enter lymph nodes from

- A) afferent vessels
- B) marginal zone
- C) postcapillary venule

Answer: C

71) Which description is true of all primary lymphoid organs?

- A) Contain crypts.
- B) Contain epithelial-reticular cells.
- C) Lack of connective tissue capsules.
- D) Are sites for antigen exposure.
- E) Are capable of antigen-independent lymphopoiesis.

Answer: E

72) Which of the following is the correct pathway when one lymph node sends a lymphocyte to educate another lymph node about antigenic stimulation?

- A) Post-capillary venules --> thoracic duct --> Systemic Circulation --> Efferent lymphatic vessel
- B) Afferent lymphatic vessel --> Post-capillary venules --> Efferent lymphatic vessel
- C) Afferent lymphatic vessel --> Thoracic duct --> Systemic Circulation --> Efferent lymphatic vessel
- D) Afferent lymphatic vessel --> Thoracic duct --> Efferent lymphatic vessel
- E) Efferent lymphatic vessel --> Thoracic duct --> Systemic Circulation --> Post-capillary venules

Answer: E

Lecture 7

73) T cells in spleen are mostly presented in

- A) lymphoid follicles
- B) splenic cords
- C) splenic sinuses
- D) PALS

Answer: D

74) In the spleen, the plasma cells are found mainly in?

- A) Splenic sinuses of the splenic red pulp.
- B) Periarterial lymphoid sheaths of splenic white pulp.
- C) Primary follicles of splenic white pulp.
- D) Germinal centers of Malpighian corpuscles.
- E) Cords of Billroth of the splenic red pulp.

Answer: E

75) Lymphatic organs, choose the WRONG statement:

- A) Blood lymphocytes enter the spleen through marginal zone sinuses and enter the lymph nodes through postcapillary venules.
- B) Aggregations of lymphocytes occupy the majority of splenic parenchyma.
- C) The variation in color intensity of thymic lobules (cortex and medulla) is attributed to the density of thymocytes.
- D) Cells with TCR proteins that bind to MHC-1 will express CD8 proteins at the end of thymic education.
- E) PALS area in spleen and paracortex in lymph nodes are considered thymus dependent zones.

Answer: B

76) Which one of these statements is NOT true regarding the blood circulation in the spleen?

- A) The spleen has a unique 'open' circulation in which blood is not enclosed by endothelium
- B) Each central arteriole eventually loses its sheath of lymphocytes and enters the red pulp forming penicillar arterioles
- C) The central arteriole terminates in the marginal zone as marginal zone sinuses and forms penicillar arterioles in the red pulp
- D) In closed circulation, blood empties from sheathed capillaries into splenic cords and then enters the sinuses through slits in the wall

Answer: D

77) Which cells of the spleen degrade hemoglobin to its constituents and collect the remaining iron?

- A) Lymphocytes
- B) Follicular dendritic cells
- C) Macrophages
- D) Myofibroblasts
- E) Stave cells

Answer: C

78) Which type of connective tissue comprises the capsule of the spleen?

- A) Dense irregular connective tissue
- B) Loose connective tissue
- C) Dense regular connective tissue
- D) Elastic connective tissue
- E) Reticular connective tissue

Answer: A

79) Which cells synthesize and secrete the majority of stromal tissue in the spleen?

- A) Reticular cells
- B) Myofibroblasts
- C) Macrophages
- D) Follicular dendritic cells
- E) Plasma cells

Answer: A

80) Which of the following structures emerges from the splenic capsule and penetrates the parenchyma of the spleen?

- A) Red pulp
- B) White pulp
- C) Splenic cords
- D) Splenic trabeculae
- E) Splenic sinusoids

Answer: D

81) Which of the following cells line the splenic sinusoids?

- A) Reticular cells
- B) Dendritic cells
- C) Stave cells
- D) Fibroblasts
- E) Macrophages

Answer: C

82) Which part of the lymphoid nodule of the spleen is mostly composed of inactive lymphocytes and encircles the germinal center?

- A) Hilum of spleen
- B) Mantle zone
- C) Splenic sinusoids
- D) Splenic trabeculae
- E) Marginal zone

Answer: B

83) Which part of the lymphoid nodule of the spleen is formed by the proliferation of B lymphocytes in response to antigen stimulation?

- A) Marginal zone
- B) Splenic trabeculae
- C) Paracortex
- D) Germinal center
- E) Mantle zone

Answer: D

84) Which of the following structures are found in the red pulp of the spleen?

- A) Paracortex
- B) Periarterial lymphatic sheath
- C) Splenic cords
- D) Lymphatic follicles
- E) Splenic sinusoids

Answer: C+E

85) Which of the following structures are found in the white pulp of the spleen?

- A) Periarterial lymphatic sheath
- B) Splenic cords
- C) Lymphatic follicles
- D) Splenic sinusoids
- E) Paracortex

Answer: A+C

86) Activated B lymphocytes in spleen are located in:

Malpighian corpuscles

87) Wrong about the spleen

like HEC of the lymph node, marginal sinuses only allow lymphocytes to go to the spleen

Lecture 8

88) All of the following cells can be seen in the cortex of the thymus except:

- A) Macrophages
- B) Dendritic cells
- C) Reticular epithelial cells
- D) Double positive T cells
- E) Double negative T cells

Answer: B

89) Which of the following is covered by stratified squamous non-keratinized epithelium

- A) palatine tonsils
- B) appendix
- C) payers patch

Answer: A

90) Choose the right statement about the thymus gland

- A) it has afferent lymph vessels
- B) Thymic epithelial cells form a blood thymic barrier in the medulla
- C) thymic epithelial cells form the stroma of the gland

Answer: C

91) Diffuse lymphatic tissue, choose the WRONG statement:

- A) Peyer's patches are composed of Lymphatic nodules with a thin underlying connective tissue capsule.
- B) M cells are intestinal epithelial cells overlying the diffuse lymphatic tissues.
- C) The basement membrane overlying lymphatic nodules of Peyer's patches is highly porous.
- D) Pharyngeal tonsils are covered by respiratory epithelium.
- E) Palatine tonsils are partly encapsulated and covered by nonkeratinized stratified squamous epithelium.

Answer: A

92) Removal of the old and aged erythrocytes from the circulation:

- A) Is due to the dilated endothelium and large pores in the lining of the sinusoids of the spleen
- B) Takes place in the marginal zone sinuses
- C) Occurs in the lymph node
- D) Is the function of splenic cords
- E) A + B

Answer: A

93) The lymphatic nodules of the mucosa-associated lymphatic tissue predominantly contain the B-Lymphocytes, whereas the diffuse area has T-Lymphocytes.

- A) True
- B) False

Answer: A

94) Which of the following structures build the blood-thymus barrier, together with the reticular epithelial cells?

- A) Thymocytes
- B) Dendritic cells
- C) Macrophages of perivascular connective tissue
- D) Endothelium of capillaries
- E) Hassall's corpuscle

Answer: C+D

95) Which of the following granules are found in Hassall's corpuscles?

- A) Keratohyaline granules
- B) Zymogen granules
- C) Lipofuscin granules
- D) Mucinogen granules
- E) Melanin granules

Answer: A

96) Which portion of the thymus is markedly basophilic on light microscopy with hematoxylin and eosin (H&E) stain?

- A) Cortex
- B) Medulla
- C) Medullary cords
- D) Paracortex
- E) Capsule

Answer: A

97) Which of the following structures represent the established domains between the trabeculae in the thymus?

- A) Medullary cords
- B) Cell cords
- C) Red pulp
- D) PALS
- E) Thymic lobule

Answer: E

98) Which cells are responsible for phagocytizing T lymphocytes that have not met the requirements of the education process?

- A) Follicular dendritic cells
- B) Macrophages
- C) Reticular cells
- D) Plasma cells
- E) Thymocytes

Answer: B

99) In which part of the thymus is the blood-thymus barrier located?

- A) Medulla
- B) Marginal zone of white pulp
- C) Corticomedullary junction
- D) Cortex
- E) Medullary cords

Answer: D

100) Which of the following structures protects the developing T lymphocytes in the thymus from early antigen exposure?

- A) Keratohyaline granules
- B) Trabeculae
- C) Hassall's corpuscles
- D) Blood thymic barrier

Answer: D

101) Which of the following structures make up the majority of the palatine tonsil parenchyma?

- A) White pulp
- B) Lymphatic nodules
- C) Cords of Billroth
- D) Red pulp
- E) Lymphatic sinuses

Answer: B

102) Which type of epithelium lines the palatine and lingual tonsillar crypts?

- A) Simple squamous epithelium
- B) Respiratory epithelium
- C) Non keratinized stratified squamous epithelium
- D) Keratinized stratified squamous epithelium

Answer: C

103) True about blood-thymus barrier

antigens that cross is cause immunological tolerance

Pathology

Lecture 1

104) Absolute polycythemia can be caused by:

- A) Diarrhea
- B) Diuretic drugs
- C) Vomiting
- D) Carcinoma in renal cells

Answer: D

ما لقيت غيره على هاي المحاضرة 😊😊

Lecture 2

105) A patient has hemorrhage, he loses 1.5 L of blood, when his blood is tested:

- A) Normochromic, normocytic.
- B) Macrocytic, normochromic.
- C) Microcytic, normochromic.
- D) Microcytic, hypochromic.

Answer: A

106) A guy with Chest Stab came to the hospital, his lab findings regarding his RBS's are:

- A) Normocytic, normochromic
- B) Macrocytic, normochromic.
- C) Microcytic, normochromic.
- D) Microcytic, hypochromic

Answer: A

107) A 62-year-old male, presented with microcytic hypochromic anemia, which of the following is the most common cause of the condition:

- A) GI bleeding
- B) Malabsorption
- C) Acute trauma
- D) CKD

Answer: A

108) When do we have no reticulocytosis?

- A) Chronic blood loss
- B) G6PD deficiency
- C) Autoimmune hemolytic anemia
- D) Thalassemia

Answer: A

109) Reticulocyte count is used to differentiate between:

- A) Microcytic and macrocytic.
- B) Hemolysis anemia and normocytic anemia
- C) Anemia of hemorrhage and anemia of bone marrow failure.
- D) Iron deficiency anemia and thalassemia.

Answer: C

110) Very easy description of iron deficiency anemia, what is your next step?

- A) Iron studies
- B) hepcidin level
- C) Electrophoresis
- D) bone marrow biopsy

Answer: C

111) Which of the following statements about iron is NOT TRUE:

- A) More than 65% in haemoglobin
- B) The iron daily intake is usually equal to daily iron requirement
- C) Women have less store of iron than man
- D) Iron absorption mostly at upper part of jejunum
- E) There is more iron absorption from meat and meat products than that from vegetables

Answer: B

112) Not a color change in anemia

Green

Lecture 3

113) Which of the following is a rare cause of anemia:

- A) Vit B 12 deficiency
- B) Folate deficiency
- C) Iron absorption defect.

Answer: A

114) Which of the following causes pancytopenia:

- A) Immune hemolytic anemia
- B) Thalassemia
- C) Iron deficiency anemia
- D) Hereditary spherocytosis
- E) B12 deficiency

Answer: E

115) Which one of the following is NOT a cause of vitamin B12 deficiency?

- A) Jejunal resection.
- B) Gastrectomy.
- C) Malabsorption.
- D) Veganism.
- E) Lack of gastric intrinsic factor.

Answer: A

116) Not a definite effect of vitamin b12 deficiency?

- A) Pernicious anemia
- B) Megaloblastic anemia
- C) Sterility
- D) Neuropathy
- E) Macrocytic hypochromic

Answer: E

117) Which of the following are NOT characteristic of iron deficiency anemia?

- A) Low reticulocyte hemoglobin content
- B) Low mean cell volume
- C) Absent Perl's staining pattern
- D) Low total iron binding capacity
- E) Can be caused by liver disease

Answer: D

118) What happens in patients with IDA?

- A) Platelets ↑ + TIBC ↑
- B) Platelets ↓ + TIBC ↓
- C) Platelets ↑ + TIBC ↓

Answer: A

119) Wrong about Iron:

- A) 20% of heme and 1% of non-heme iron are absorbed.
- B) Is mostly absorbed in the jejunum.
- C) Hepcidin inhibits iron absorption.

Answer: B

120) Which of the following is NOT characteristic of megaloblastic anemia?

- A) Macroovalocytes
- B) Chronic course of disease
- C) Can be caused by strict vegan diet
- D) Loss of proprioception
- E) Severely high bilirubin level

Answer: E

121) A patient present with headache, dizziness, and nail spooning, what is your next step?

- A) Iron studies
- B) Hepcidin level
- C) Electrophoresis
- D) Bone marrow biopsy

Answer: A

122) Which of the following is NOT an expected finding in a patient with iron deficiency anemia?

- A) Koilonychia (spoon nails)
- B) Angular stomatitis
- C) Hypochromic microcytic red blood cells
- D) Pallor
- E) Symmetric paresthesia in lower limbs.

Answer: E

123) Recent research showed that patients with marked obesity have increased levels of IL-6 in blood that is mainly secreted from adipose tissue which results in anemia. Which of the following is an expected finding?

- A) Absent haptoglobin level
- B) High erythropoietin level
- C) High reticulocyte count
- D) Low total iron binding capacity
- E) The presence of gall bladder stones.

Answer: D

124) Which of the following is MOST likely to be required by a 5-year-old boy with CKD?

- A) Oprelvekin (IL-11)
- B) Cyanocobalamin
- C) Erythropoietin
- D) Deferoxamine
- E) Filgrastim (G-CSF).

Answer: C

125) Chronic alcoholism is a risk factor for:

- A) Megaloblastic anemia
- B) Iron deficiency anemia
- C) Aplastic anemia
- D) Immune hemolytic anemia
- E) Myelodysplastic syndrome.

Answer: A

126) Which of the following is wrong about hepcidin?

- A) It is increased in iron overload.
- B) It decreases with inflammation.
- C) It decreases iron absorption.

Answer: B

127) Chronic disease anemia caused by elevated:

- A) Hepcidin
- B) Iron

Answer: A

128) Which of the following can't be seen in a patient of pure red cell aplasia:

- A) Skin rash and Arthralgia.
- B) Normocytic anemia.
- C) Reticulocytopenia

Answer: A

Lecture 4

129) Hb Bart means that you have:

- A) 4 chains of gamma
- B) 4 chains of beta
- C) 3 chains of beta and 1 chain of alpha.

Answer: A

130) Which of the following can't be present in beta thalassemia:

- A) HbH
- B) HbA
- C) HbF

Answer: A

131) HbH is caused by:

- A) Deletion of 3 genes
- B) Deletion of 4 genes
- C) Mutation in 3 genes
- D) Mutation in 4 genes

Answer: A

132) Hb Barts is caused by:

- A) Deletion of 3 genes
- B) Deletion of 4 genes
- C) Mutation in 3 genes
- D) Mutation in 4 genes

Answer: B

133) Doesn't worsen sickle cell trait:

- A) Malarial infection
- B) Hypoxia
- C) Dehydration
- D) Acidosis

Answer: A

134) About the thalassemia major which of this is not true:

- A) HbA2 increases in B thalassemia.
- B) HbF increase in B thalassemia.
- C) Hb Bart's increase in A-thalassemia.
- D) In A-thalassemia major 3 or 4 copies are mutated but in B thalassemia major 2 copies are mutated.

Answer: D

Lecture 5

135) G6PD Mediterranean is characterized by:

- A) Reduced stability of the enzyme.
- B) Reduced expression, stability, and activity of the enzyme.
- C) Reduced activity of the enzyme.
- D) Reduced expression of the enzyme.
- E) Reduced stability and activity of the enzyme.

Answer: C

136) G6PD deficiency class 2 (Mediterranean) produce enzyme with:

- A) More activity
- B) Less stability
- C) Less activity
- D) B+C

Answer: C

137) Which of the following is wrong about G6PD deficiency?

- A) GSH is normally maintained in the reduced form by Glutathione reductase.
- B) G6PD gene is located on the X chromosome.
- C) G6PD deficiency is mainly caused by large deletions.

Answer: C

138) Wrong about PNH:

- A) Thrombosis is common.
- B) Splenomegaly
- C) Mutation in PIGA gene.
- D) CD55 and CD59 are deficient

Answer: B

139) Correct pair:

Methyldopa – spherocytosis

Biochemistry

Lecture 1

140) A medical student is reviewing the structure of hemoglobin. Which of the following statements best describes the relationship between the heme molecule and the globin protein in hemoglobin?

- A) The heme molecule is non-covalently attached to the globin protein.
- B) The heme molecule is covalently attached to the globin protein.
- C) The heme molecule is loosely associated with the globin protein without any specific bonds.
- D) The globin protein wraps around the heme molecule without direct attachment.

Answer: B

141) Which one of the following statements concerning hemoglobin is correct?

- A) HbA is the most abundant hemoglobin in normal adults.
- B) Fetal blood has a lower affinity for oxygen than adult blood because HbF has an increased affinity for 2,3- bisphosphoglycerate.
- C) The globin chain composition of HbF is $\alpha_2\delta_2$.
- D) HbA1c differs from HbA by a single, genetically determined amino acid substitution.
- E) HbA2 appears early in fetal life.

Answer: A

142) Which of the following best describes the role of the heme group in hemoproteins?

- A) It is an amino acid chain essential for the protein's structure.
- B) It is a non-peptide unit required for the biological function of the protein.
- C) It is a sugar molecule that assists in energy storage.
- D) It is a lipid molecule that aids in the solubility of the protein.

Answer: B

143) Which of the following is wrong about HbA1c

- A) measurement of glucose bound to valine on Beta hemoglobin chains.
- B) patient should be fasting
- C) according to IFCC 100mmol/mol is acceptable.
- D) B and C is correct.

Answer: D

144) Which of the following is wrong about the structure of heme?

- A) iron is coplanar with the heme in deoxy form Hb
- B) Iron can form six bonds
- C) porphyrin consists of four rings (designated A-D) called pyrrole rings.

Answer: A

145) A 45-year-old male with a history of diabetes presents to the clinic for a routine check-up. Laboratory findings reveal elevated levels of glycosylated hemoglobin (HbA1c). What is the primary significance of this finding?

- A) The patient has been compliant with his insulin regimen.
- B) The patient's blood glucose levels have been well-controlled over the past 2-3 months.
- C) The patient's blood glucose levels have been consistently elevated over the past 2-3 months.
- D) The patient likely has an unrelated hemoglobinopathy.

Answer: C

146) A 30-year-old female is suspected of having a hemoglobinopathy. Genetic testing reveals a mutation in a gene encoding one of the amino acids involved in the electrostatic interactions that stabilize the T-form of hemoglobin. This mutation would most likely result in which of the following?

- A) Decreased oxygen affinity of hemoglobin.
- B) Increased oxygen delivery to tissues.
- C) A shift in the oxygen dissociation curve to the left.
- D) Stabilization of hemoglobin in the R-state.

Answer: D

147) In the context of hemoglobin's ability to bind oxygen, which of the following best describes the T-state and R-state of hemoglobin?

- A) The T-state has a high affinity for oxygen, while the R-state has a low affinity.
- B) The T-state has more hydrogen bonds and electrostatic interactions than the R-state.
- C) The R-state is stabilized by the presence of more hydrogen bonds and electrostatic interactions.
- D) Transition from the R-state to the T-state is associated with oxygen release.

Answer: B

148) which of the following regarding heme structure and abnormalities is correct?

- A) heme consists of a tetrapyrrole ring with 4 methyl, 2 propionate and 2 vinyl groups.
- B) structural changes in the heme are the most common cause in abnormal hemoglobin.
- C) heme iron is found in aqueous solution will be present in the ferrous state
- D) the distal histidine of heme is involved in the binding to ferrous iron.

Answer: A

149) Which of the following is true about R and T forms of Hb?

- A) R releases protons.
- B) R has less affinity for oxygen than T

Answer: A

150) The R form of hemoglobin is stabilized by:

- A) Electrostatic interaction between Asp of beta chain with His within the same chain.
- B) Electrostatic interaction between carboxylate of His146 with Lys of alpha chain.
- C) Electrostatic interaction between His146 of beta chain with Asp of the alpha chain.
- D) Hydrogen bond between Asn of beta chain with Asp within the same chain.
- E) Hydrogen bond between Asn of beta chain with Asp of alpha chain

Answer: E

151) Prediabetes is characterized by having these lab results of glucose:

- A) 155 mg/dL or 7%
- B) 212 mg/dL or 11.8 mmol/L.
- C) 120 mg/dL or 40mmol/mol.
- D) 9% or 11.8 mmol/L.
- E) 8% glycosylated glucose or 64 mmol/mol.

Answer: A

Lecture 2

152) 2,3-bisphosphoglycerate binds weakly to fetal hemoglobin than adult hemoglobin because:

- A) The heme pocket is less hydrophobic.
- B) Fetal hemoglobin has a serine instead of a histidine 143 residue.
- C) Fetal hemoglobin has a narrower core.
- D) The lysine residue within the core of hemoglobin is replaced by a tyrosine.
- E) The N-termini of the alpha chains of fetal hemoglobin are acetylated.

Answer: B

153) pregnant woman is found to have a higher affinity of her fetal hemoglobin (HbF) for oxygen compared to her adult hemoglobin(HbA). Which of the following changes in the fetal hemoglobin is responsible for this increased affinity?

- A) Histidine is replaced by Serine
- B) Increase in 2,3-BPG binding
- C) Histidine is replaced by Valine
- D) Presence of Chloride ions
- E) Increase in CO₂ concentration

Answer: A

154) All of the following regarding to 2,3BPG are correct except?

- A) decrease the oxygen binding capacity of hemoglobin.
- B) decrease some effects of sickle cell anemia.
- C) Binds to the pocket situated between the two beta globin chains.
- D) raises the P₅₀ of hemoglobin.
- E) all of the above are correct.

Answer: B

155) A 27 years old firefighter is brought to the emergency room after being exposed to smoke during a training exercise. He looks ill and has labored breathing. He is clutching his head and exhibits an altered mental status. On examination, you note that he appears red, and his pulse oximetry reads 100%. You suspect carbon monoxide toxicity. What is true of the oxygen saturation curve during carbon monoxide toxicity?

- A) The oxygen saturation curve is shifted to the left.
- B) The oxygen saturation curve is shifted to the right.
- C) The effect of carbon monoxide on hemoglobin is similar to that of having increased levels of 2,3 bisphosphoglycerate.
- D) The effect of carbon monoxide on hemoglobin is similar to that of a low pH state.
- E) The effect of carbon monoxide on hemoglobin is similar to that of an increased temperature state

Answer: A

156) A medical student is studying the binding of various molecules to hemoglobin. She learns that one molecule binds to hemoglobin with an affinity that is 20,000-40,000 times greater than that of oxygen. Which of the following molecules is she studying?

- A) CO₂
- B) 2,3-BPG
- C) O₂
- D) CO
- E) Cl⁻

Answer: D

157) Which of the following is wrong about allosteric regulation?

- A) low Ph decreases the affinity of hemoglobin towards oxygen.
- B) the major effect of CO₂ is form of carbamate.
- C) 2,3-BPG does its action by increasing electrostatic interactions.
- D) Bohr effect works by electrostatic interaction between His with negatively charged amino acid on the same chain.

Answer: B

158) Which one of the following statements concerning the binding of oxygen by hemoglobin is correct?

- A) The Bohr effect results in a lower oxygen affinity at higher pH values.
- B) Carbon dioxide increases the oxygen affinity of hemoglobin by binding to the C terminal groups of the polypeptide chains.
- C) The oxygen affinity of hemoglobin increases as the saturation percentage increases.
- D) The hemoglobin tetramer binds four molecules of 2,3-bisphosphoglycerate
- E) Oxyhemoglobin and deoxyhemoglobin have the same affinity for protons

Answer: C

159) A 28-year-old man recently moved to a city at a high altitude. He is not acclimatized to the altitude, and as a result, the oxygen dissociation curve of his hemoglobin has shifted. Which of the following conditions most likely represents the initial compensatory mechanism that shifts the curve, indicating a decreased affinity of hemoglobin for oxygen in response to the altitude change?

- A) Decrease in temperature
- B) Presence of fetal hemoglobin
- C) Decreased 2,3-BPG concentration
- D) Decreased CO₂ concentration
- E) Increased 2,3-BPG concentration

Answer: E

160) β -Lysine 82 in HbA is important for the binding of 2,3-isphosphoglycerate. In Hb Helsinki, this amino acid has been replaced by methionine. Which of the following should be true concerning Hb Helsinki?

- A) It should be stabilized in the taut, rather than the relaxed form
- B) It should have increased oxygen affinity and consequently decreased oxygen delivery to tissues.
- C) Its oxygen-dissociation curve should be shifted to the right relative to HbA.
- D) It results in anemia

Answer: B

161) A 25-year-old male patient presents to the emergency room with dizziness, confusion, and headache. He mentions that he was working in his garage for several hours with the door closed. On examination, his oxygen saturation is 94%, but his arterial blood has a cherry-red appearance. Which of the following is most likely responsible for his symptoms?

- A) High levels of 2,3-BPG
- B) Hyperventilation
- C) Carbon monoxide exposure
- D) Allosteric regulation
- E) Chloride shift

Answer: C

162) A 60-year-old chronic smoker is found to have an elevated red blood cell count during a routine check-up. This adaptation to chronic smoking is primarily due to:

- A) Direct stimulation of the bone marrow by nicotine
- B) Increased erythropoietin secretion in response to chronic hypoxia
- C) Suppression of the immune system by smoking
- D) Increased levels of CO₂ in the blood
- E) Accelerated erythropoiesis due to increased levels of 2,3-BPG

Answer: B

163) Which of the following statement is false?

- A) BPG forms salt bridges with lysine, a histidine and in both beta chains.
- B) BPG increases the energy needed to transform hemoglobin from T to R state.
- C) Both Mb & Hb are affected by 2,3-BPG.
- D) none of the above

Answer: C

164) All of the following favor the transformation from the T form to the R form of hemoglobin except:

- A) decreased PH.
- B) decreased 2,3-BPG.
- C) decreased temperature.
- D) all of the above is correct.

Answer: A

165) Which of the following increases p50 of the curve of O₂ binding to Hb?

- A) Decreased temperature.
- B) Increased pH.
- C) Living in high altitude.
- D) Mutation at His146 of β -chain

Answer: C

166) Regarding the binding of 2,3 BPG, it makes a cross-linking by which subunits?

- A) B1, A1 subunits.
- B) B1 , B2 subunits.
- C) B1 , A2 subunits.
- D) A1 , A2 subunits.

Answer: B

167) One of the following about hemoglobin is NOT true:

- A) In one hemoglobin molecule there are four hemes and four globins subunits.
- B) The term oxygenation is used for hemoglobin binding to oxygen not oxidation.
- C) One hemoglobin molecule can bind four oxygen molecules.
- D) Binding of four heme in the hemoglobin with oxygen doesn't occur at the same time, and the affinity of the fourth heme to oxygen is many times that of the first.
- E) Globins can't bind oxygen but they bind CO, CO₂ and hydrogen.

Answer: E

168) A carbamate is formed between CO₂ and?

- A) Arg141 of the alpha chain.
- B) His146 of the beta chain Iron of heme.
- C) The N-terminus of the alpha chain.
- D) The carboxylate end of the beta group.

Answer: C

169) Chloride ions move through the membrane of red blood cells in association with the movement of:

- A) Bicarbonate ion in the opposite direction.
- B) Oxygen.
- C) Protons in the same direction.
- D) Bicarbonate ion in the same direction.
- E) Protons in the opposite direction.

Answer: A

In blood transfusion, some components are "rejuvenated" because ?

- A) hemoglobin affinity towards oxygen decreased.
- B) hemoglobin loses its ability to carry oxygen.
- C) to repair the PH
- D) the hemoglobin can't release oxygen because 2,3BPG is broken

Answer: D

170) Which of the following is wrong about HbF (Fetal hemoglobin)?

- A) It can bind 8 oxygen atoms.
- B) It has similar affinity to myoglobin.
- C) It is only found in adults.
- D) It has higher affinity than adult hemoglobin.

Answer: C

171) Which of the following shifts HB saturation curve to the left?

- A) 2,3 BPG ↑
- B) CO₂ ↑
- C) 2,3 BPG ↓
- D) Temperature ↑

Answer: C

172) Why 2,3 BPG is low in fetal tissues?

Accelerate conversion to subsequent products

Lecture 3

173) This hemoglobin variant is both a quantitative and a qualitative hemoglobinopathy:

- A) Hb Hammersmith.
- B) Hb Kansas.
- C) HbS.
- D) HbE.
- E) HbC.

Answer: D

174) Which of the following is wrong about HbE?

- A) It is caused by mutation that affects B chain
- B) It is common in Africans
- C) It results in defected proteins
- D) A truncated (short) beta-chain is produced

Answer: B

175) Hb Cowtown where His 146 is replaced by Leucine, choose the correct statement:

- A) it stabilizes R state and increases affinity for oxygen
- B) it stabilizes T state and increases affinity for oxygen
- C) it stabilizes R state and decreases affinity for oxygen
- D) it causes degradation of protein

Answer: A

176) Which of the following is not true about thalassemia major?

- A) HbA2 increases in B thalassemia
- B) HbF increase in B thalassemia
- C) Hb Bart's increase in a thalassemia
- D) in a thalassemia major 3 or 4 copies are mutated but in B thalassemia major 2 copies are mutated

Answer: D

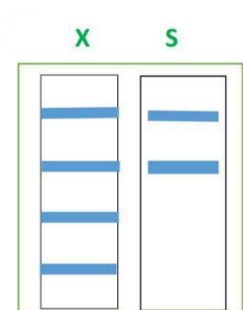
177) Hb Bart means that you have:

- A) 4 chains of gamma
- B) 4 chains of beta
- C) 3 chains of beta and 1 chain of alpha

Answer: A

178) You have sample X and S in heme electrophoresis, what can you conclude about sample S? (in X you have HbA, HbC, HbS, HbF, NOT ORDERED)

- A) HbS homozygous
- B) HbS heterozygous
- C) HbSC
- D) A neonate 4 weeks before birth



Answer: D

179) Which of the following can't be present in beta thalassemia:

- A) HbH
- B) HbA
- C) HbF

Answer: A

180) Hb H is caused by:
deletion of 3 genes

Lecture 4

181) The reason why liver is not affected by deficiency of pyruvate kinase is:

- A) ATP and NADH are compensated by other metabolic pathways.
- B) The enzyme is not regulated.
- C) Reduced activity is compensated by increased expression.
- D) Reduced activity is compensated by alternative expression of pyruvate kinase M1.
- E) Reduced pyruvate level is compensated by increase uptake of pyruvate.

Answer: C

182) Which of the following doesn't happen in RBC?

- A) PPP
- B) Heme Synthesis
- C) glycolysis

Answer: B

183) G6PD Mediterranean is characterized by:

- A) Reduced stability of the enzyme.
- B) Reduced expression, stability, and activity of the enzyme.
- C) Reduced activity of the enzyme.
- D) Reduced expression of the enzyme.
- E) Reduced stability and activity of the enzyme.

Answer: C

184) Which of the following regarding glutathione and G6PD deficiency is NOT CORRECT?

- A) Glutathione is a tri-peptide that consists of (gly-cys-glu)
- B) G6PD production of NADPH is required to maintain glutathione in a reduced state
- C) G6PD A variant (class III) is associated with 80% enzyme activity in reticulocyte cells
- D) In cells such as the liver, G6PD is not the only way for the production of NADPH
- E) G6PD deficiency is associated with non-sense and frameshift mutations

Answer: E

185) Mutation of distal histidine into tyrosine results in:

- A) Inability to bind to methemoglobin reductase.
- B) Inability to release oxygen.
- C) Oxidation of iron.
- D) Attraction of carbon monoxide.
- E) Stabilization of the R form of hemoglobin.

Answer: C

186) An amino acid substitution in one of chains of hemoglobin could lead to hemoglobinopathy (hemoglobin with abnormal function) for any of the following reasons EXCEPT:

- A) An increase in the 2,3-BPG binding affinity
- B) A change in the affinity of subunits contact
- C) A change in the solubility properties of reduced hemoglobin
- D) An increase in the hydrophilic property of heme-pocket
- E) An increase tendency of the heme iron to exist in the reduced state

Answer: E

187) Fetal pyruvate kinase influence to have hemoglobin with more affinity is by:

- A) producing more ATP
- B) producing more 2,3-BPG
- C) producing less 2,3-BPG

Answer: C

188) Choose the correct statement:

- A) Pyruvate kinase has 2 isozymes and 2 isoforms.
- B) Pyruvate kinase is activated by phosphorylation.
- C) Fetal pyruvate kinase is PKM1.
- D) The difference between PKL and PKR is the transcription termination site.
- E) The difference between PKM1 and PKM2 is the alternative splicing.

Answer: E

189) G6PD deficiency class 2 (Mediterranean) produce an enzyme with

- A) more activity
- B) less stability
- C) less activity d. B+C

Answer: C

190) Which of the following is wrong about G6PD deficiency?

- A) GSH is normally maintained in the reduced form by Glutathione reductase
- B) G6PD gene is located on the X chromosome
- C) G6PD deficiency is mainly caused by large deletions

Answer: C

191) A compensatory mechanism to allow adequate oxygen delivery to the tissue at the high altitudes with oxygen concentrations are low is which one of the following:

- A) An increase in 2,3-BPG synthesis by the red cell
- B) A decrease in 2,3-BPG synthesis by the red cell
- C) An increase in hemoglobin synthesis by the red cell
- D) A decrease in hemoglobin synthesis by the red cell
- E) Decreasing the blood pH

Answer: A

192) Four of the following statements describe a metabolic pathway in the erythrocytes. One statement does not describe this pathway, choose it.

- A) The rate-limiting step produces fructose 1,6-bisphosphate.
- B) The last step is regulated by alanine and Protein Kinase A.
- C) If an infection occurs whenever this pathway is defected, Heinz bodies would be seen in blood smears.
- D) If the last step's enzyme is defected, liver won't be affected.
- E) It produces coenzymes that are essential for preventing methemoglobinemia.

Answer: C

193) Which of the following is true?

- A) most cells, unlike RBCs, have another pathway to synthesize NADPH
- B) NADH is required for the activity of cytochrome b5 reductase
- C) G6PD deficient Mediterranean variant shows severe enzyme deficiency of young cells
- D) all of the above are true

Answer: D

194) Which of the following doesn't cause a hemoglobinopathy?

- A) increasing the tendency of iron to stay in the ferrous form
- B) decreasing numbers of hemoglobin
- C) changing hemoglobin structure

Answer: A

195) A patient with chronic moderate anemia with high 2,3-BPG and low ATP

pyruvate kinase deficiency

196) Wrong about G6PD deficiency

GSH is normally maintained in the reduced form by GSH-peroxidase

197) The reason why liver is not affected by deficiency of pyruvate kinase is:
Reduced activity is compensated by increased expression

198) Choose the correct statement:

The difference between PKM1 and PKM2 is the alternative splicing

199) Mutation of distal histidine into tyrosine results in:

Oxidation of iron.

200) Which of the following is wrong about G6PD deficiency?

G6PD deficiency is mainly caused by large deletions

اللهم احفظ أرواح المجاهدين في فلسطين، وردهم إلى أهلهم مردًا كريمًا آمنًا.

اللهم إنا نبرأ من حولنا وقوتنا وتدييرنا إلى حولك وقوتك وتدييرك لا إله إلا أنت لا يعجزك شيء وأنت على كل شيء قدير.

اللهم إنا لا نملك لأهلنا في فلسطين إلا الدعاء .

اللهم احفظهم بحفظك وانصرهم واخذل كل من خذلهم.

اللهم سلم غزة وأهلها من كل سوء وشر , اللهم انصرهم وثبت أقدامهم وكن لهم ناصرًا ومعينًا

The End

Good Luck シ