BASIC HEMATOLOGY OVERVIEW

Name_____

1. Mean cell volume (MCV) is calculated using the following formulas:
   a) hgb/rbc x 10
   b) hct/rbc x 10
   c) hct/hgb x 100
   d) hgb/rbc x 100

2. Calculate the mean cell hemoglobin concentration (MCHC) using the following values: Hgb: 15 g/dl (150g/L); RBC: 4.50 x 10^6/ul (4.50 x 10^12/L) Hct: 47% (0.47)
   a) 9.5% (0.95)
   b) 10.4% (.104)
   c) 31.9% (.319)
   d) 33.3% (.333)

3. A manual white blood cell (WBC) count was performed. A total of 36 cells were counted in all 9 mm^2 squares of a Neubauer-ruled hematocytometer. A dilution 1:10 dilution was used. What is the Wbc count?
   a) 0.4 x 10^9/L
   b) 2.5 x 10^9/L
   c) 4.0 x 10^9/L
   D) 8.0 x 10^9/L

BASIC HEMATOLOGY OVERVIEW

Name_____

4. A 7.0 ml etheylenediaminetetraacetic acid (EDTA) tube is received in the laboratory containing only 2.0 ml of blood. If the laboratory is using manual techniques, which of the following tests will most likely be erroneous?

   a) RBC count

   b) Hgb

   c) Hematocrit

   d) Wbc count

5. A decreased osmotic fragility test would be associated with which of the following conditions?

   a) Sickle cell anemia

   b) Hereditary spherocytosis

   c) Hemolytic disease of the newborn

   d) Acquired hemolytic anemia

6. A falsely elevated hematocrit is obtained using a defective centrifuge. Which of the following calculated values will not be affected?

   a) MCV

   b) MCH

   c) MCHC

   d) Red cell distribution width (RDW)

BASIC HEMATOLOGY OVERVIEW

Name_____

7. Cell indices obtained on a patient are as follows: MCV=88 um^3(fl), MCH=30 pg; MCHC=34 % (.340). The RBC on the peripheral smear would appear:

   a) Hypochromic, microcytic

   b) Normochromic, microcytic

   c) Normochromic, normocytic

   d) Hypochromic, normocytic

8. A correction is necessary for WBC counts when nucleated RBCs are seen on the peripheral smear because:

   a) the WBC count should be higher

   b) the RBC count is too low

   c) NRBCs are counted as leukocytes

   d) NRBCs are confused with giant platelets

9. All of the following factors may influence the erythrocyte sedimentation rate (ESR) except:

   a) blood drawn in a sodium citrate tube

   b) anisocytosis, poikilocytosis

   c) plasma proteins

   d) caliber of the tube

BASIC HEMATOLOGY OVERVIEW

Name_____

10. What staining method is used most frequently to stain and count reticulocytes?
    a) immunofluorescence
    b) supravital staining
    c) Romanowsky staining
    d) Cytochemical staining

11. Using a Coulter counter analyzer, an increased RDW should correlate with:
    a) spherocytosis
    b) anisocytosis
    c) leukocytosis
    d) presence of NRBCs

12. Which condition will shift the oxyhemoglobin dissociation curve to the right?
    a) acidosis
    b) alkalosis
    c) multiple blood transfusions
    d) Hgb Kansas

13. In which age group would 60% lymphocytes be a normal finding?
    a) 40-60 years
    b) 11-15 years
    c) 6 months-2 years
    d) 4-6 years

BASIC HEMATOLOGY OVERVIEW

Name_____

14. In which stage of erythrocyte maturation does Hgb formation begin?
    a) reticulocyte
    b) pronormoblast
    c) basophilic normoblast
    d) polychromatic normoblast

15. Which of the following Hgb configurations is characteristic of Hgb H?
    a) 4 gamma
    b) alpha 2-gamma 2
    c) beta 4
    d) alpha – beta 2

16. What is the most likely explanation of the following results from an EDTA sample?
    WBC= 4.0 x 10^3 /ul MCV= 113 um^3
    RbC= 2.80 x 10^6/ul MCH=43.6 pg
    Hct= 31.5% MCHC= 38.7%
    Hgb=12.2 g/dl

BASIC HEMATOLOGY OVERVIEW

Name_____

17. If a patient has a reticulocyte count of 8% with a hematocrit of 18%, what is the corrected reticulocyte count?

a) 20%

b) 2.3%

c) 3.2%

d) 8%

18. Which of the following factors affect(s) the ESR?

a) increased fibrinogen

b) extreme poikilocytosis

c) use of heparin as an anticoagulant

d) all of the above

19. What type of hemoglobin electrophoresis would be best to separate hemoglobin S and D?

a) cellulose acetate at alkaline ph

b) citrate agar at acid ph

c) either cellulose acetate or citrate agar may be used

20.The mean value of a reticulocyte count on specimens of cord blood from healthy full-term newborns is?

a) 0.50%

b) 2.00%

c) 5.00%

d) 8.00%

BASIC HEMATOLOGY OVERVIEW

Name_____

21. A 20 ys old black man has peripheral blood changes suggesting thalassemia minor. The quantitative hemoglobin A2 level is normal but the hemoglobin F level is 5% (normal is less than 2%). This is most consistent with:

a) Alpha thalassemia minor

b) Beta thalassemia minor

c) delta-beta thalassemia minor

d) Hereditary persistence of fetal hemoglobin

22. A native of Thailand has a normal hgb level. Hemoglobin electrophoresis on cellulose acetate shows 45% Hgb A and approximately 40% of hemoglobin with the mobility of Hgb A2. This is most consistent with:

a) Hgb C trait

b) Hgb D trait

c) Hgb E trait

d) Hgb O trait

23. A 20 ys old woman with sickle cell anemia whose usual hemoglobin concentration is 8 g/dl develops fever, increased weakness and malaise. The hemoglobin concentration is 4 g/dl and the reticulocyte count is 0.1%. The most likely explanation for this clinical picture is:

a) increased hemolysis due to hypersplenism

b) aplastic crisis

c) thrombotic crisis

d) occult blood loss

BASIC HEMATOLOGY OVERVIEW

Name_____

24. When using an electronic cell counter, which results can occur in the presence of a cold agglutinin?

a) Increased MCV, decreased RBC

b) Increased MCV, normal RBC

c) Decreased MCV, increased MCHC

d) Decreased MCV and RBC

25. Blood collected in EDTA undergoes which changes of kept at room temperature for 6-24 hours?

a) increased HCT and MCV

b) increased ESR and MCV

c) increased MCHC and MCV

d) decreased reticulocyte count and hematocrit

26. On setting up the electronic particle counter in the morning, one of the controls is slightly below the range for the MCV. What should the technologist do first?

a) call for service

b) adjust the MCV up slightly

c) shutdown in the instrument

d) repeat the control

BASIC HEMATOLOGY OVERVIEW

Name_____

27. Which is seen most often in thalassemia?

a) chronic blood loss
b) target cells
c) basophilic stippling
d) ringed sideroblast

28.The anemia found in sickle cell disease is usually:

a) microcytic; normochromic
b) microcytic; hypochromic
c) normocytic; normochromic
d) normocytic; hypochromic

29. Which is the major Hgb found in the Rbc of patients with sickle cell trait?

a) Hgb S
b) Hgb F
c) Hgb A2
d) Hgb A

30.Select the aminoacid substitution that is responsible for sickle cell anemia:

a) lysine is substitued for glutamic acid at the sixth position at the alpha chain
b) valine is substitued for glutamic acid at the six position of the beta chain
c) valine is substitued for glutamic acid at the six position of the alpha chain
d) glutamine is substitued for glutamic acid at the sixth position of the beta chain

BASIC HEMATOLOGY OVERVIEW

Name_____

31. All of the following are usually found in Hgb C disease except:

a) Hgb C crystals

b) target cells

c) lysine substituted for glutamic acid at the sixth position of the beta chain

d) fast mobility of Hgb C at ph 8.6

32. Which of the following hemoglobin migrates to the same position as Hgb A2 at ph 8.6?

a) Hgb H
b) Hgb F
c) Hgb E
d) Hgb S

33. Which of the following electrophoretic results is consistent with a diagnosis of sickle cell trait?

a) Hgb A: 40% Hgb S: 35% Hgb F: 5%
b) Hgb A: 60% Hgb S: 38% Hgb A2: 2%
c) Hgb A: 0% Hgb A2: 5% Hgb F: 95%
d) Hgb A: 80% Hgb S: 10% Hgb A2: 10%

BASIC HEMATOLOGY OVERVIEW

Name_____

34. Sickle cell disorders are:
    a) hereditary, intracorpuscular Rbc defects
    b) hereditary, extracorpuscular Rbc defects
    c) acquired, intracorpusuclar Rbc defects
    d) acquired, extracorpuscular Rbc defects

35. What is the basic hematologic defect seen in patients with thalassemia major:
    a) DNA synthetic defect
    b) Hgb structure
    c) beta chain synthesis
    d) hgb phosphorylation

36. Which of the following is the primary Hgb in patients with thalassemia major:
    a) Hgb D
    b) Hgb A
    c) Hgb C
    d) Hgb F

37. In which of the following conditions is Hgb A2 elevated?
    a) Hgb H
    b) Hgb SC disease
    c) beta Thalassemia minor
    d) Hgb S trait

BASIC HEMATOLOGY OVERVIEW

Name_____

38. In alpha type thalassemia, with three inactive alpha genes, which of the following is characteristic?

a) Hgb A2

b) Hgb A

c) Hgb H

d) Hgb F and A2

39. The characteristic hemoglobin concentration in a patient silent state with heterozygous Beta-thalassemia is:

a) hemoglobin A level normal

b) hemoglobin A2 increased

c) hemoglobin A2 level decreased

d) hemoglobin F level increased

40.Which of the following is most true of paroxysmal nocturnal hemoglobinuria?

a) it is an acquired hemolytic anemia

b) it is an inherited as a sex-linked trait

c)it is an inherited as an autosomal dominant trait

d) it is inherited as an autosomal recessive trait

BASIC HEMATOLOGY OVERVIEW

Name_____

41.Hemolytic uremic syndrome (HUS) is characterized by all of the following except:

a) hemorrhage
b) thrombocytopenia
c) hemoglobinuria
d) reticulocytopenia

42. Which antibody is associated with paroxysmal cold hemoglobinuria (PCH)?

a) anti I antibody
b) anti i antibody
c) anti M antibody
d) anti P antibody

43.Reticulocytes usually indicates:

a) response to inflammation
b) neoplastic process
c) aplastic anemia
d) red cell regeneration

BASIC HEMATOLOGY OVERVIEW

Name_____

44.All of the following are characteristic findings in a patient with iron deficiency anemia except:

a) microcytic, hypochromic red cell morphology
b) elevated platelet counts along with small platelets
c) decreased total iron binding capacity (TIBC)
d) increased Rbc protoporphyrin

45. Iron deficiency anemia may be distinguished from anemia of chronic infection by:

a) serum iron level
b) red cell morphology
c) red cell indices
d) total iron binding capacity

46. Which anemia has red cell morphology similar to that seen in iron deficiency anemia:

a) sickle cell anemia
b) thalassemia syndrome
c) pernicious anemia
d) hereditary spherocytosis

BASIC HEMATOLOGY OVERVIEW

Name_____

47. Iron deficiency anemia is characterized by:
    a) decreased plasma iron, decreased % saturation, increased Tibc
    b) decreased plasma iron, decreased plasma ferritin, normal Rbc porphyrin
    c) decreased plasma iron, decreased % saturation, decreased Tibc
    d) decreased plasma iron, increased % saturation, decreased Tibc

48. Storage iron is usually best determined by:
    a) serum transferrin levels
    b) Hgb values
    c) myoglobin values
    d) serum ferritin levels

49. All of the following are associated with sideroblastic anemia except:
    a) increased serum iron
    b) ringed sideroblast
    c) dimorphic blood picture
    d) increased Rbc protoporphyrin

BASIC HEMATOLOGY OVERVIEW

Name_____

50. A Schilling test gives the following results: part I: 2% excretion of radioactive vitamin B12 (normal=5-35%) Part II: 8% excretion of radioactive B12 after intrinsic factor was given with vitamin B12(normal=7-10%). These results indicate:

a) tropical sprue
b) transcobalamin deficiency
c) blind loop syndrome
d) pernicious anemia

51. All of the following are characteristics of megaloblastic anemia except:

a) pancytopenia
b) elevated reticulocyte count
c) hyper segmented neutrophils
d) macrocytic erythrocyte indices

52. Which of the following are most characteristic of the red cell indices associated with megaloblastic anemias?

a) mcv 99 fl, mch 28 pg, mchc 31%
b) mcv 62 fl, mch 27 pg, mchc 30%
c) mcv 125 fl, mch 36 pg, mchc 34%
d) mcv 78 fl, mch 23 pg, mchc 30%

BASIC HEMATOLOGY OVERVIEW

Name_____

53. In iron deficiency anemia:

a) serum iron is severely decreased and the total iron binding capacity (TIBC) is increased

b) serum iron is decreased and the Tibc is normal

c) serum iron is normal and the Tibc is normal

d) serum iron is increased and the Tibc is normal

54. Which of the following is the preferable site for the bone marrow aspiration and biopsy in an adult?

a) iliac crest

b) sternum

c) tibia

d) spinous processes of a vertebra

55. Given the following values, which set of red blood cell indices suggests spherocytosis?

a) MCV 76 MCH 19.9pg MCHC 28.5%

b) MCV 90 MCH 30.5pg MCHC 32.5%

c) MCV 80 MCH 36.5pg MCHC 39.0%

d) MCV 81 MCH 29.0pg MCHC 34.8%

BASIC HEMATOLOGY OVERVIEW

Name_____

56. Auer rods may be seen in all of the following **except**:
    a) acute myelomonocytic leukemia (M4)
    b) acute lymphoblastic leukemia (L1,L2,L3)
    c) acute myeloblastic leukemia (M1, M2)
    d) acute promyelocytic leukemia (M3)

57. Which type of anemia is usually present in a patient with acute leukemia?
    a) microcytic; hyperchromic
    b) microcytic; hypochromic
    c) normocytic; normochromic
    d) macrocytic; normochromic

58. An M:E ratio of 10:1 is most often seen in:
    a) talasemia
    b) leukemia
    c) polycythemia vera
    d) myelofibrosis

BASIC HEMATOLOGY OVERVIEW

Name_____

59. The following laboratory values are seen:

Wbc=6.0 x 10^9/L	hgb=6.0 g/dl
Rbc=1.90 x10^12/L	Hct=18.5%
Plats+ 130 x 10^9/L	B12 & folic acid= Normal
Wbc differential	**Bone Marrow**
6% PMNs	40% myeloblasts
40% lymphocytes	60% promegaloblasts
4% monocytes	40% megaloblastoid NRBC
50% blasts	

These results are most characteristic of:

a) pernicious anemia
b) acute myeloblastic leukemia (M1)
c) Erythroleukemia (M6)
d) myelomonocytic leukemia (M4)

60. A 20-year-old man with Down syndrome presents with a fever, pallor, lymphadenopathy, and hepatosplenomegaly. His Cbc results as follows:

Wbc=10.8 x 10^9/L	**Wbc differential**
Rbc= 1.56 x 10^12/L	8% Pmn's
Hgb= 3.3g/dl	25% lymphocytes
Hct= 11%	67% PAS positive blasts
Plats= 2.5 x10^9/L	

BASIC HEMATOLOGY OVERVIEW

Name_____

60. These findings are suggestive of:
    a) Hodgkin's lymphoma
    b) Myeloproliferative disorder
    c) Leukemoid reaction
    d) acute lymphocytic leukemia

61. A peripheral smear shows 75% blasts. These stains positive for both Sudan Black B (SBB), and peroxidase (PX). Given these values, which of the following disorders is most likely?
    a) AML
    b) CML
    c) acute undifferentiated leukemia
    d) ALL

62. A patient's peripheral blood smear and bone marrow both show 70% blasts. These cells are negative for SBB. Given these data, which of the following is the most likely diagnosis?
    a) AML
    b) CLL
    c) Acute promyelocytic leukemia
    d) ALL

BASIC HEMATOLOGY OVERVIEW

Name_____

63. An 89-year-old white female was transferred to the hospital from a nursery facility for treatment of chronic urinary tract infection with proteinuria.

The patient presented with the following data:

Rbc= 10.0 x 10^6/ml Wbc= 3.1 x 10^3/ml

hgb= 7.2 g/dl hct= 24% Mcv= 78 fl

Mch=23 pg Mchc=31%

Iron= 29mg/dl Tibc= 160 mg/dl

ferritin=100 mg/dl

Examining of the bone marrow revealed a slightly fatty marrow with increased storage iron as detected by the Prussian blue technique.

These data are most consistent with which condition:

a) iron deficiency anemia

b) anemia of chronic disease

c) hemochromatosis

d) acute blood loss

64. Franklin's disease is also known as:

a) mu heavy chain disease

b) gamma heavy chain disease

c) alpha heavy chain disease

d) light alpha chain disease

BASIC HEMATOLOGY OVERVIEW

Name_____

65. Waldestrom's macroglobulinemia is a malignancy of the:

a) lymphoplasmacytoid cells
b) adrenal cortex
c) myeloblastic cell lines
d) erythroid cell precursors

66. Cells that exhibit a positive stain with acid phosphatase and are not inhibited with tartaric acid are characteristically seen in:

a) infectious mononucleosis
b) infectious lymphocytosis
c) Hairy cell leukemia
d) T-cell acute lymphoblastic leukemia

67. Choose the incorrect statement regarding storage granules related to hemostasis in the mature platelet:

a) alpha granules contain platelet factor 4, beta thromboglobulin, and platelet derived growth factor
b) alpha granules contain platelet fibrinogen and von Willebrand factor
c) dense bodies contain serotonin and ADP
d) lysosomes contain actomyosin, myosin, and filamin

BASIC HEMATOLOGY OVERVIEW

Name_____

68. The bleeding time measures:

a) the ability of platelets to stick together

b) platelet adhesion and aggregation on locally injured vascular subendothelium

c) the quantity and quality of platelets

d) antibodies against platelets

69. If a pediatric preoperative patient has a family history of bleeding but has never had a bleeding episode herself, what test should be included in a coagulation profile in addition to the PT, APTT and platelet count?

a) Lee-White clotting time

b) Clot retraction

c) bleeding time

d) fibrin split products

70. If a child ingested rat poison which of the following tests should be performed to test the effect of the poison on the child's coagulation mechanism?

a) APTT

b) PT

c) fibrinogen assay

d) thrombin time

BASIC HEMATOLOGY OVERVIEW

Name_____

71. A patient has a prolonged APTT and a normal PT. The APTT is not corrected by factor VIII-deficient plasma, but is corrected by factor IX-deficient plasma. In which factor does the patient appear to be deficient?

a) Factor II b) Factor V c) Factor VIII

d) Factor XI

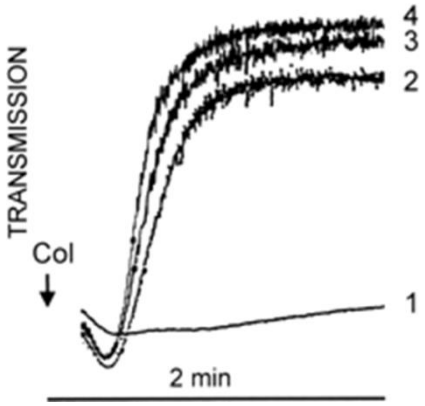
72. The platelet aggregation pattern drawn below is characteristic of what aggregating agent?

a) ADP

b) collagen

c) ristocetin

d) thrombin



73. A 4 ys old child is seen in the emergency room with petechiae and a platelet count of 15 x 10^9/L. She has no previous history of bleeding problems. Three weeks earlier she had chicken pox. The physician advises the parents to keep the child off the playground to avoid injury, and the child will recover within several weeks to a month with no further treatment. What condition does this child most likely have?

a) essential thrombocythemia

b) idiopathic thrombocytopenic purpura

c) thrombotic thrombocytopenic purpura

d) Wiskott-Aldrich syndrome

BASIC HEMATOLOGY OVERVIEW

Name_____

74.An APTT on a 46-year-old male patient admitted for minor surgery is markedly abnormal whereas the PT is within the normal range. The patient has no clinical manifestations of bleeding problem and has no personal or family history of bleeding problems, even following dental extraction. Several family members have been treated for thrombotic episodes. The prolonged APTT is corrected with a 1:1 mixing study using normal plasma. Based on these laboratory results and the clinical history, what factor deficiency would be expected?

a) II b) VIII c) XII d) XIII

75. A 25-year-old obstetrical patient at 35 weeks of gestation is admitted through the emergency room She has bleeding in the genitourinary tract, and there are visible petechiae and ecchymoses. The following laboratory results are obtained:

platelet count: decreased PT: prolonged
APTT: prolonged Fibrinogen: decreased
TT: prolonged D-dimer: positive
FDP: positive ATIII: decreased
Rbc morphology: schistocytes present

These laboratory results are consistent with

a) primary fibrinolysis
b) DIC with secondary fibrinolysis
c) factor II deficiency
d) heparin therapy

BASIC HEMATOLOGY OVERVIEW

Name_____

76. A 57-year-old man with prostate cancer is admitted to the intensive care unit with severe bleeding problems. The following laboratory results are obtained:

platelet count: normal PT: prolonged

APTT: prolonged fibrinogen: decreased

TT: prolonged D-dimer: negative

FDP: positive ATIII: normal

Rbc morphology: schistocytes absent

These laboratory results are consistent with:

a) primary fibrinolysis

b) DIC with secondary fibrinolysis

c) Factor II deficiency

d) Coumadin therapy

77. A transudate can be described as:

a) sg=>1.016, low to moderate number of WBC, Ldh<200 Iu/L

b) sg=<1.016, ph 7.4-7.5, Ldh <200 IU/L

c) ph 7.35-7.45 and protein concentration >3.0 g/dl

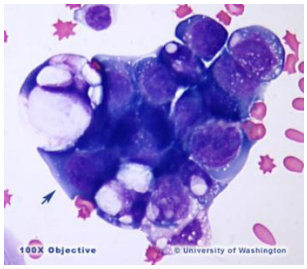
d)Ldh <200 IU/L and protein concentration>3.0g/dl

BASIC HEMATOLOGY OVERVIEW

Name_____

78.A thoracentesis was performed on a 64-year-old male with nephrotic syndrome. Identify the cell:

- A) Lymphocyte
- B) Malignant cell
- C) Mesothelial cell
- D) Monocyte



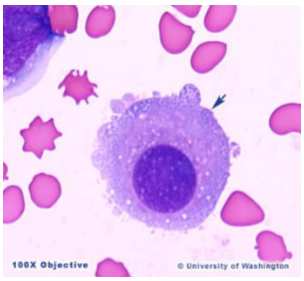
79.This is a pleural fluid, identify the cell type at the end of the arrow.

a) Lymphocyte

b) Malignant Cell

c)Mesothelial Cell

d)Monocyte



80.A sperm concentration of 5 million per mL semen is classified as:

a) Hypospermia

b) oligozoospermia

c) asthenozoospermia

d) paucispermia

BASIC HEMATOLOGY OVERVIEW

Name_____

81.The disease most closely associated with cytoplasmic granule fusion

a) Chediak Higashi syndrome

b) Pelguer Huet anomaly

c) May Haegglin anomaly

d) Alder Reilly anomaly

82.The leukocyte alkaline phosphatase (LAP) stain on a patient gives the following results: 10(0); 48(1+), 38(2+), 3(3+), 1(4+).

Calculate the lap score:

a) 100

b) 117

c) 137

d) 252

83.The disease most closely associated with mucopolysaccaridosis is:

a) Pelguer Huet anomaly

b) Chediak Higashi syndrome

c) Gaucher's disease

d) Alder Reilly anomaly

BASIC HEMATOLOGY OVERVIEW

Name_____

84. Platelet aggregation will occur with the end production of:

a) cyclo-oxygenase
b) arachidonic acid
c) prostacyclin
d) thromboxane A2

85. Infantile X-linked agammaglobulinemia is referred to as:

a) Bruton's agammaglobulinemia
b) Di George syndrome
c) Swiss-type agammaglobulinemia
d) axia telangiectasia

BASIC HEMATOLOGY OVERVIEW

Case studies

Name_____

1. A 70-year-old woman diabetes was admitted to the hospital because of bleeding caused by pancytopenia.

Laboratory Data:

Hgb 6.0 g/dl
Hct 20%
WBC=4.1X10^9/L
Differential: Plasma cells 26%, immature granulocyte 13%,
Lymphocytes (variant forms noted) 36%
other tests: urinalysis positive for blood and protein
blood culture negative
immunoelectrophoresis decreased IgG
Complement assay decreased
Diagnosis_____

2. A 75-year-old man was referred to a multispecialty group

practice for evaluation of chronic lymphoproliferative disorders (CLL, Follicular lymphoma, Mantle Cell lymphoma, Hairy Cell Leukaemia).

Laboratory data: Hgb=9.0 g/dl

Hct-32%

Rbc count=2.9X10^12/L

WBC=7.5x10^9/L

Platelets+ 150x10^12/L

BASIC HEMATOLOGY OVERVIEW

Name_____

(2.) Peripheral: lymphocytes with cytoplasmic projections, prominent nucleoli, and smaller cell size.
Trap stain: negative
Flow cytometry: Cd11c, and Cd25c negative

Diagnosis_____

3. A 10-month-old Central American child was referred to the laboratory for testing after being seen by a pediatrician. The phlebotomist noted the child was very pale and listless. The following tests were ordered: CBC, platelet count, reticulocyte count, total serum bilirubin, total serum iron and total iron binding capacity, and a stool examination for occult blood, ova and parasites.

Results:

Hgb=5.6 g/dl
Hct=0.24 L/L
RBC=3.5 x 10^12/L
WBC=10.5x 10^9/L
MCV=68.6 fl
MCH=16pg
MCHC=23%

BASIC HEMATOLOGY OVERVIEW

Name_____

(3.) Peripheral: anisocytosis, microcytosis, hypochromia, poikilocytosis

Platlelets: normal 200x 10^9/L

Retic: 0.5%

Total serum bilirubin: 0.9 mg/dl

Serum Iron: 40 ug/dl

TIBC: 465 ug/dl

Percent saturation of transferrin: 8.6%

Stool examination: negative for occult blood, ova and parasites.

Diagnosis_____

4. A 30-year-old white man saw his family physician because of increasing fatigue over the previous few months. Physical examination revealed a pale, but otherwise normal appearing adult, although the liver and spleen appeared to be very slightly enlarged. The patient reported that his **first urine of the morning** was occasionally dark brown. The physician ordered a CBC, urinalysis, and liver and spleen scan.

Lab data: Hgb: 8.5 g/dl

Hct: 0.25 L/L

RBC count: 2.6 x 10 ^12/L

Total WBC count: 4.4x 10^9/L

The differential leukocyte count revealed an increase the lymphocytes (60%), but the percentages of other leukocytes were within the normal range. The urine demonstrated the presence of hemosiderin. A serum iron level and reticulocyte count were additionally requested. The total Iron levels were decreased and the reticulocyte count was increased to 13%.

Diagnosis_____

BASIC HEMATOLOGY OVERVIEW

Name_____

5. A 55-year-old white male college professor had been experiencing fatigue and shortness of breath when walking over the past several months. Getting more sleep at night did not help. He reported eating a balanced diet of fruits, vegetables, meat and dairy products. Upon physical examination, he appeared slightly pale but had no other abnormalities. His primary care physician ordered a complete blood count, urinalysis and fecal occult blood(x3) tests.

Laboratory data:

Hgb=12.5 g/dl	WBC=normal limits
MCV=42.0 fl	Hct=0.32 L/L
RBC= 4.2 x 10^12/L	MCH=29.7 pg.

Urinalysis: normal

WBC=normal limits

Fecal occult blood: positive

Diagnosis_____

BASIC HEMATOLOGY OVERVIEW

Name_____

6. A 75-year-old woman started feeling a bit weak The patient respond limited red meat intake. A cholecystectomy was performed at age 60 and some bowel was removed. The patient has occasional diarrhea. The patient has experienced some bilateral loss of sensation in the feet and a tingling that was getting worse and more fre2quent over the past few months. She takes over the counter medications and her husband's pills for indigestion. The patient complains of arthritis; she has been taking nonsteroidal and anti-inflammatory drugs for 5 years and she has started low dose methotrexate for arthritis. The physician is certain she is anemic and request a CBC and differential, iron, TIBC, and % of saturation, ferritin. No malignancies or GI bleeding are noted. Blood loss from the GI tract has been ruled out. Profound atrophic gastritis with patches of inflammation is noted, as is Helicobacter pylori at stomach biopsy study.

Laboratory Data:

Hgb=10 g/dl Hct=33% MCV=83 fl RDW=17.5

Iron=25 ug/dl TIBC=250ug/dl %sat=10%

Ferritin=45ug/dl folate=100ng/ml Vitamin B12=100 pg./ml

Diagnosis_____

BASIC HEMATOLOGY OVERVIEW

Name_____

7. An 18-year-old **black** woman was admitted to the hospital for elective surgery. She had a routine preoperative CBC and urinalysis.

Laboratory Data:

Hgb=13.0 g/dl Hct=0.40 L/L RBC= 4.35 x 10^12/L

WBC= 7.3 x 10^9/L MCV=92 fl MCH=29.9 pg MCHC= 33%

The patient's peripheral blood smear revealed a normocytic; normochromic pattern, however a moderate number of **target** cells (codocytes) were noted. A repeat blood smear obtained from fingertip blood again had a moderate number of codocytes. The urinalysis revealed no abnormalities. On receipt of this results the anaesthetist postponed surgery and ordered a sickle cell preparation, sickle cell screening test and haemoglobin electrophoresis.

Results: Sickle cell preparation: positive

Hgb S screening positive

Hgb electrophoresis: Hgb A: 63% Hgb F: 3% Hgb S: 34%

Diagnosis_____

BASIC HEMATOLOGY OVERVIEW

Name_____

8. A 22-year-old white woman had recently graduated from college and relocated to accept her first professional job. She was being seen for the first time by a local gynecologist because of **prolonged menstrual bleeding**. Her medical history included several episodes of severe **nose bleeds** during childhood that required cauterization to arrest. She reported that her menses lasted from 8 to 12 days. When questioned about family illness or disorders, she reported that **her mother and two sisters** also had long menstrual periods, and that one of her **two brothers** needed several blood transfusions after an appendectomy. Physical examination revealed an essentially normal patient. However, she appeared pale and severe large **bruises** were noted on her extremities. The patient was referred to the outpatient laboratory for a hemoglobin, hematocrit, and coagulation profile.

Laboratory data:

Hgb=10.0 g/dl Hct=0.27 L/L Bleeding time=7 minutes

PT=11.5secs APTT=29 secs Clot retraction= decreased.

Platelet morphology= normal

Platelet function: deficiency in aggregation and adhesion

Diagnosis_____

BASIC HEMATOLOGY OVERVIEW

Name_____

9. A 63-year-old women experiences a burning sensation in her hands and feet. Two months ago, she had an episode of swelling with tenderness in the right leg, followed by dyspnea and then right sided chest pain. On physical examination, the spleen and liver now appear to be enlarged. CBC shows:

   Hgb: 13.3 g/dl Hct: 40.1^% WBC: 17,400/mm^3

   The peripheral blood smear shows **abnormally large platelets**

Diagnosis_____

a) Essential thrombocytopenia

b) Chronic Myelogeneous leukemia

c) Myelofibrosis with myeloid metaplasia

d) Polycythemia Vera

10. A 12-year-old boy is taken to the physician because he has had increasing abdominal distention and pain for the past 3 days. Physical examination shows lower abdominal tender and the abdomen is tympanitic with reduced bowel movement. An abdominal CT scan shows a 7cm **mass** involving the region of the ileocecal valve. Surgery is performed to remove the mass. Histologic examination of the mass shows sheets of intermediate sized lymphoid cells with nuclei having coarse chromatin, several nucleoli and many mitoses. A bone marrow biopsy sample is negative for this cell population. Cytogenetic analysis of the cells from the mass shows a t(8:14) karyotype. Flow cytometric analysis reveals 40% of the cells are in S-phase. The tumour shrinks dramatically in size following chemotherapy.

BASIC HEMATOLOGY OVERVIEW

Name_____

(10.) Diagnosis_____

a) Diffuse large B cell lymphoma

b) Follicular lymphoma

c) Acute lymphoblastic lymphoma

d) Plasmacytoma

e) Burkitt lymphoma

11. A 46-year-old man presented with back pain and progressive fatigue. The patient also had fluctuating chest pain several months before admission, but extensive investigation, including electrocardiogram, stress test and echocardiogram showed no heart disease. One month before the diagnosis, he began to notice increasing fatigue and occasional nosebleeds. Physical examination on admission showed the patient to be pale, with hematomas of the right flank and left thigh.
No petechiae or purpura were noted. He had no palpable lymphadenopathy or hepatosplenomegaly. Laboratory data showed a hemoglobin level of 11.1 g/dl, hct=31.5%, and platelets=41x10^9/L.

His leukocyte count was 3x10^9/L with 20% immature cells. Serum chemistry profiles were significant for elevated levels of LDH (266U/L) and iron (231 ug/dl) Coagulation studies suggested the existence of DIC. A bone marrow aspiration and bone marrow biopsy were done. Cytogenetic study on his peripheral blood and bone marrow revealed t (15:17).

BASIC HEMATOLOGY OVERVIEW

Name_____

(11) **Flow cytometry findings**:

Cd19=1% Cd3=1% Cd5=2% Cd7=2%

Cd13=38% Cd33=99% Cd14=11% Cd15=0%

HLADR=1% Cd34=0%

MPO=positive CAE (chloroacetate esterase) = pos

Cytochemical findings

NBE (alpha naphtyl butyrate) =neg

CAE shows Auer rods in leukemic cells

TDT= negative

Diagnosis_____

12. A 61ys old man who had a dental abscess 2years before was found to have a total WBC=15x10^9/L with 50% lymphocytes. The patient has been asymptomatic and thus no treatment was given. He was advised to consult a haematologist for evaluation of his leukemic status before being admitted for herniorrhaphy. Physical examination at the hematologist's office showed no lymphadenopathy and no hepatosplenomegaly. Peripheral blood examination revealed a total WBC count=19x10^9/L with polymorphs=40%, bands 1%, lymphocytes 54%, monocytes 4%, and eosinophils 1%. His hgb =13.3 g/dl, hct=43% and platelets=277x10^9/L. A bone marrow and biopsy were taken for evaluation.

Flow cytometry findings:

Dim and moderate patterns

Cd19=70% Cd20=71% HLA-DR=70% Cd23=70% FMC7= neg

Cd3=24% Cd5=93% Cd7=28% Cd14=5% kappa=62% lambda=2%

Diagnosis_____


The special people
that cross our path
in this life make
the journey
more beautiful
Thanks for making mine so beautiful!

Answers:

1.Myeloma Multiple

2.Hairy cell leukemia variant

3.Iron deficiency anemia

4.PNH

5.Chronic blood los

6.Fe deficiency anemia with VB12 anemia

7.Sickle cell trait

8.Glanzman Thrombasthenia

9.A

10.E

11.M3-acute promyelocytic leukemia

12. CLL-chronic lymphocytic leukemia