

QUESTION

A patient following a crush injury is passing red color urine due to myoglobinuria. Which of the following will most likely be seen in this patient?

A Hypercalcemia

B Hypomagnesemia

C Hypophosphatemia

D **Hyperkalemia**

CORRECT

RIGHT ANSWER

OK D. Hyperkalemia

WHY THIS IS RIGHT

Crush injury

↓

Muscle cell breakdown

↓

Release of intracellular contents

↓

Myoglobin + K⁺ + phosphate

↓

Electrolyte imbalance + renal damage

Correct answer is D because crush injury causes rhabdomyolysis with release of intracellular potassium from damaged muscle cells, leading to hyperkalemia.

Cell lysis

↓

K⁺ released into blood

↓

Hyperkalemia

↓

Risk of arrhythmias ☐☐

Myoglobinuria is associated with acute kidney injury and electrolyte disturbances, especially life-threatening hyperkalemia.

Early phase typically shows hyperkalemia, hyperphosphatemia, and hypocalcemia, not hypercalcemia or hypophosphatemia.

| Electrolyte | Change |

| ----- | ----- |

| K⁺ | ↑ |

| Phosphate | ↑ |

| Calcium | ↓ (early), ↑ (late) |

QUESTION

A 7-year-old child is brought to the clinic with complaints of fatigue and poor concentration. The mother reports that the child has been eating non-food items such as soil and paint chips for the past few months. A peripheral blood smear image shows microcytic, hypochromatic red blood cells. Which of the following is the most likely diagnosis? (insert image)

A Vitamin B12 deficiency

B Thalassemia Major

C Lead Poisoning

D Iron deficiency anemia

CORRECT

RIGHT ANSWER

OK

D. Iron deficiency anemia

WHY THIS IS RIGHT

The source quiz contains the placeholder "\$19" here and does not include a written explanation for this item.

QUESTION

A 17-year-old male presents with recurrent episodes of severe limb pain and generalized fatigue since childhood. He has been hospitalized multiple times for similar painful episodes. On examination, he is pale and mildly icteric. Laboratory investigations show hemoglobin of 8.2 g/dL and MCV of 91 fL. Hemoglobin electrophoresis shows predominantly HbS. What is the most appropriate treatment to reduce the frequency of these painful episodes?

A Hydroxyurea

CORRECT

B Vitamin B12

C Oral Iron

D Blood transfusions

RIGHT ANSWER

OK A. Hydroxyurea

WHY THIS IS RIGHT

The source quiz contains the placeholder "\$1a" here and does not include a written explanation for this item.

QUESTION

A 58-year-old male undergoing chemotherapy for lymphoma, who also has chronic kidney disease (CKD), presents with fatigue, pallor and exertional breathlessness. Laboratory tests show normocytic normochromic anemia with low hemoglobin and low reticulocyte count. What is the drug of choice for treating his condition?

A Darbepoetin alfa

CORRECT

B Filgrastim

C Oprelvekin

D Parenteral iron

RIGHT ANSWER

OK

A. Darbepoetin alfa

WHY THIS IS RIGHT

Solution- Normocytic anemia + low reticulocytes + CKD -> EPO deficiency -> treat with EPO analog (Darbepoetin alfa)
Correct answer is A because CKD causes decreased erythropoietin production leading to normocytic normochromic anemia with low reticulocyte count, and darbepoetin alfa (long-acting EPO analog) corrects this deficiency.

Drug	Target Cell Line	Use
Darbepoetin	RBC	CKD anemia
Filgrastim	Neutrophils	Neutropenia
Oprelvekin	Platelets	Thrombocytopenia
Iron	RBC (substrate)	Iron deficiency

Filgrastim increases neutrophils. Oprelvekin increases platelets. Parenteral iron is useful only if iron deficiency coexists, not primary CKD anemia.

QUESTION

A school going child is being evaluated for underperformance in school and reduced hemoglobin levels. He has history of eating wall paint for past few weeks. Which of the following is the likely cause of anemia observed in him?

A Megaloblastic anemia

B Thalassemia minor

C Sideroblastic anemia

CORRECT

D Iron deficiency anemia

RIGHT ANSWER

OK

C. Sideroblastic anemia

WHY THIS IS RIGHT

• Correct answer is C because pica with paint ingestion suggests lead exposure, which inhibits heme synthesis enzymes (ALA dehydratase and ferrochelatase) leading to acquired sideroblastic anemia. This results in defective heme formation despite adequate iron availability. Iron deficiency anemia is due to low iron stores. Megaloblastic anemia is due to B12/folate deficiency. Thalassemia minor is a globin chain synthesis defect.

Feature	IDA	Sideroblastic
Iron	↓	↑
Ferritin	↓	↑
Cause	Deficiency	Defective utilization
Smear	Hypochromic	Stippling

QUESTION

A female patient presents with iron deficiency anemia, dysphagia, and glossitis. Which of the following is the most likely diagnosis?

- A Achalasia cardia
- B Dysphagia lusoria
- C Plummer Vinson syndrome**
- D Carcinoma of the esophagus

CORRECT

RIGHT ANSWER

- OK C. Plummer Vinson syndrome**

WHY THIS IS RIGHT

Correct answer is C because Plummer-Vinson syndrome is characterized by the triad of iron deficiency anemia, dysphagia due to esophageal webs, and glossitis.

Feature	Explanation
Iron deficiency anemia	↓ Hb
Dysphagia	Esophageal web
Glossitis	Mucosal atrophy
• Premalignant condition	

Risk of: Squamous cell carcinoma

It is classically seen in middle-aged females and is associated with increased risk of upper esophageal squamous cell carcinoma.

Achalasia causes dysphagia without iron deficiency anemia. Dysphagia lusoria is due to vascular compression.

Esophageal carcinoma presents with progressive dysphagia and weight loss.

Feature	PVS	Carcinoma
Dysphagia	Intermittent	Progressive
Iron deficiency	□	□
Glossitis	□	□
Cancer risk	Increased	-

QUESTION

A female patient presented with fatigue. Routine complete blood count analysis showed hemoglobin of 9 g/dL, MCV 60fL, and RBC count of 5.2 million. A peripheral smear showed microcytic hypochromic anemia. Which of the following is the next best investigation for this patient?

A Serum ferritin levels

B HbA2 levels

CORRECT

C Serum folate levels

D Serum homocysteine levels

RIGHT ANSWER

OK

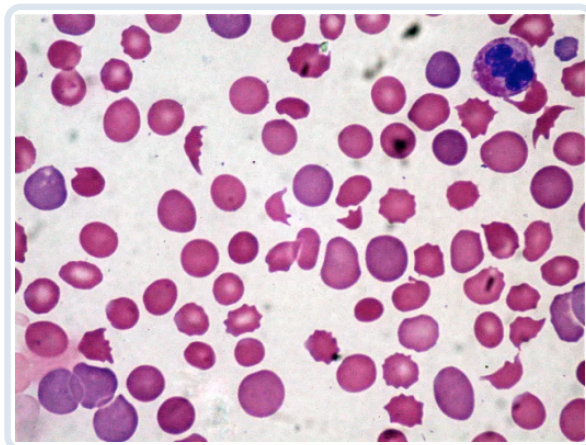
B. HbA2 levels

WHY THIS IS RIGHT

The source quiz contains the placeholder “\$1b” here and does not include a written explanation for this item.

QUESTION

An elderly patient presents with anemia and hemoglobinuria. Investigations reveal increased lactate dehydrogenase (LDH). The peripheral smear image is given below. Which of the following physical examination findings can support the likely diagnosis?



A Splenomegaly

B Frontal bossing

C Mechanical second heart sound

CORRECT

D Goitre

RIGHT ANSWER

OK

C. Mechanical second heart sound

WHY THIS IS RIGHT

The source quiz contains the placeholder "\$1c" here and does not include a written explanation for this item.

QUESTION

A child presents with recurrent chest infections and abdominal pain. There is a history of 1 blood transfusion in the past. On examination, he had icterus and mild splenomegaly. Electrophoresis shows increased HbA₂, HbF, and S spike. What is the likely diagnosis?

A. Beta thalassemia

B. HbC disease

C. Sickle cell disease

CORRECT

D. Acute coronary disease

RIGHT ANSWER

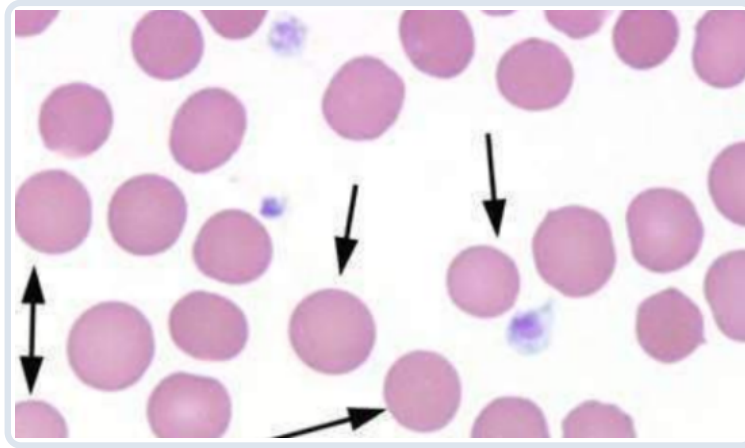
OK C. Sickle cell disease

WHY THIS IS RIGHT

The source quiz contains the placeholder “\$1d” here and does not include a written explanation for this item.

QUESTION

A 10-year-old child was brought with pallor and jaundice. On examination he had a hemoglobin of 9g/dl and mild splenomegaly. He has a history of similar episodes from birth. The peripheral smear had red cells without central pallor. Which of the following is useful for making the diagnosis of the patient?



A Autoimmune hemolytic anemia, direct Coombs test

B Hereditary spherocytosis, osmotic fragility test

CORRECT

C Hemolytic uremic syndrome

D PNH

RIGHT ANSWER

OK B. Hereditary spherocytosis, osmotic fragility test

WHY THIS IS RIGHT

The source quiz contains the placeholder "\$1e" here and does not include a written explanation for this item.

QUESTION

A patient had a blunt injury to the abdomen after an RTA and underwent ileal resection. He recovered well post-surgery but months later presents with fatigue and exercise intolerance. Which of the following will not be seen?

A Cytonuclear dyssynchrony

B Microcytic hypochromic anemia

CORRECT

C Romberg's sign positive

D Subacute combined degeneration

RIGHT ANSWER

OK B. Microcytic hypochromic anemia

WHY THIS IS RIGHT

The source quiz contains the placeholder “\$1f” here and does not include a written explanation for this item.

QUESTION

A 50-year-old patient who was being treated for hypertriglyceridemia developed flushing, gout, hyperglycemia, and raised liver enzymes. Which drug is the most likely cause?

A Atorvastatin

B Fenofibrate

C Nicotinamide

CORRECT

D Ezetimibe

RIGHT ANSWER

OK

C. Nicotinamide

WHY THIS IS RIGHT

Niacin (nicotinic acid) causes flushing, hyperuricemia (gout), hyperglycemia, and hepatotoxicity. Correct answer is C because nicotinic acid (niacin) used for hypertriglyceridemia causes flushing (prostaglandin mediated), hyperuricemia leading to gout, hyperglycemia, and hepatotoxicity with raised liver enzymes.

Statins mainly cause myopathy and mild liver enzyme elevation. Fibrates cause myopathy and gallstones. Ezetimibe mainly reduces cholesterol absorption and is usually well tolerated.

| Drug | Key Side Effect |

| ---- | ----- |

| Niacin | ☐ Flushing + gout + hyperglycemia |

| Statins | Myopathy |

| Fibrates | Gallstones |

| Ezetimibe | Minimal systemic side effects |

QUESTION

A 28-year-old woman presents with complaints of weakness and generalized fatigue. The peripheral smear shows microcytic hypochromic RBCs. Her serum iron is decreased and has increased RDW. Her MCV and MCH were also low, and TIBC was high. What would her serum transferrin saturation be?

A Increased

B Reduced

CORRECT

C Equivocal

D Cannot be determined

RIGHT ANSWER

OK

B. Reduced

WHY THIS IS RIGHT

Correct answer is B because iron deficiency anemia causes low serum iron with increased TIBC, resulting in reduced transferrin saturation.

Microcytic hypochromic RBCs with high RDW further support iron deficiency anemia.

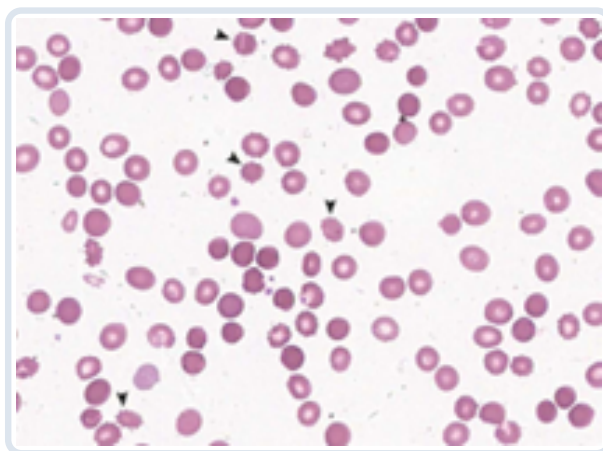
In iron deficiency, transferrin is increased but iron availability is low, so percentage saturation decreases.

Parameter	Finding in IDA
Serum iron	↓
Ferritin	↓
TIBC	↑
Transferrin saturation	↓↓
RDW	↑

$$\text{Transferrin saturation} = \frac{\text{Serum iron}}{\text{TIBC}} \times 100$$

QUESTION

A patient with gastrointestinal symptoms and neurological symptoms underwent a blood examination whose peripheral smear image is provided here. What is the likely diagnosis in this patient?



A Uremia

B Burns

C Abetalipoproteinemia

CORRECT

D Hereditary spherocytosis

RIGHT ANSWER

OK

C. Abetalipoproteinemia

WHY THIS IS RIGHT

The source quiz contains the placeholder "\$20" here and does not include a written explanation for this item.

QUESTION

Which of the following is a true/correct statement about paroxysmal nocturnal hemoglobinuria?

A It is an inherited red blood cell disorder causing intravascular hemolysis

B The diagnosis of the disorder is confirmed by sucrose lysis test

C Flow cytometry is the gold standard for diagnosing this condition

CORRECT

D The commonest cause of mortality is cardiac failure

RIGHT ANSWER

OK C. Flow cytometry is the gold standard for diagnosing this condition

WHY THIS IS RIGHT

Correct answer is C because paroxysmal nocturnal hemoglobinuria is diagnosed by flow cytometry demonstrating deficiency of GPI-anchored proteins (CD55 and CD59) on blood cells, which is the gold standard test.

PIGA gene mutation

↓

Defective GPI anchor

↓

Loss of CD55 & CD59

↓

No protection from complement

↓

Intravascular hemolysis

| Feature | Mechanism |

| ----- | ----- |

| Hemoglobinuria (morning) | Night-time acidosis -> complement activation |

| Pancytopenia | Stem cell disorder |

| Thrombosis | Platelet activation |

| Dark urine | Hemolysis |

Treatment:

• Eculizumab (C5 inhibitor)

Prevents complement-mediated destruction

PNH is an acquired clonal stem cell disorder, not inherited. Sucrose lysis test is an older screening test, not confirmatory. Major causes of mortality are thrombosis and complications of hemolysis, not cardiac failure.

QUESTION

Which of the following is the likely diagnosis in a patient having a ↓ MCV, ↓ MCH, ↓ transferrin saturation, ↓ serum ferritin, and ↑ Total iron binding capacity?

- A Thalassemia
- B Anemia of chronic disease
- C Iron deficiency anemia
- D Sideroblastic anemia

CORRECT

RIGHT ANSWER

- OK
- C. Iron deficiency anemia

WHY THIS IS RIGHT

The source quiz contains the placeholder “\$21” here and does not include a written explanation for this item.

QUESTION

A patient with anemia and a regular history of blood transfusions since an early age was carrying his daily activities normally. He experiences a mild respiratory infection following which he developed fatigue, severe pallor, and shortness of breath. Which of the following is the likely organism involved?

- A Cytomegalovirus
- B Parvovirus**
- C Epstein-Barr virus infection
- D HSV

CORRECT

RIGHT ANSWER

OK **B. Parvovirus**

WHY THIS IS RIGHT

Solution- Key clues:

- Chronic transfusions since childhood -> chronic hemolytic anemia (e.g., thalassemia, sickle cell)
- Sudden worsening after mild infection
- Severe pallor + fatigue

Diagnosis: Aplastic crisis due to Parvovirus B19

Correct answer is B because parvovirus B19 infects erythroid precursor cells in bone marrow causing transient aplastic crisis, especially in patients with chronic hemolytic anemia who depend on high erythropoiesis.

Parvovirus B19

↓
Infects erythroblasts

↓
Stops erythropoiesis

↓
Reticulocytopenia

↓
Sudden severe anemia

It presents with sudden severe anemia, pallor, and fatigue following mild viral illness.

Parameter	Finding
Hb	↓↓↓
Reticulocyte count	↓↓↓ (very important)
WBC/Platelets	Normal or mildly ↓
Bone marrow	↓ erythroid precursors

CMV, EBV, and HSV do not typically cause pure red cell aplasia or aplastic crisis.

QUESTION

| Which of the following is not seen in an elderly patient with ileal resection?

- A Reversible dementia
- B Nuclear cytoplasmic asynchrony
- C Microcytic hypochromic anemia**
- D Romberg sign positive

CORRECT

RIGHT ANSWER

- OK **C. Microcytic hypochromic anemia**

WHY THIS IS RIGHT

Terminal ileum -> absorbs B12 (with intrinsic factor)

Correct answer is C because ileal resection causes vitamin B12 deficiency leading to megaloblastic macrocytic anemia with nuclear-cytoplasmic asynchrony and neurological features such as posterior column involvement causing positive Romberg sign and possible reversible cognitive impairment.

Microcytic hypochromic anemia is seen in iron deficiency, not B12 deficiency.

Feature	B12 Deficiency	Iron Deficiency
MCV	↑ (macrocytic)	↓ (microcytic)
Neurological signs	Present	Absent
Smear	Macrocytes	Hypochromic
Cause	Ileal issue	Iron lack

QUESTION

| Which one of the following is correct about iron transport?

A Free iron is toxic for the cells

CORRECT

B Iron will be stored in the form of transferrin

C Iron is transported via Apoferritin in the blood

D Hepcidin enhances iron transport through Ferroportin

RIGHT ANSWER

OK

A. Free iron is toxic for the cells

WHY THIS IS RIGHT

Correct answer is A because free iron catalyzes formation of reactive oxygen species via Fenton reaction, causing cellular toxicity, so iron is normally bound to proteins.

Iron is transported in blood via transferrin, not apoferritin. Apoferritin is involved in intracellular storage as ferritin. Hepcidin decreases iron export by degrading ferroportin, not enhancing transport.

↑ Hepcidin

↓

↓ Ferroportin activity

↓

↓ Iron release into blood

Seen in: Anemia of chronic disease

| Protein | Function |

| ----- | ----- |

| Transferrin | Transport |

| Ferritin | Storage |

| Apoferritin | Empty storage protein |

| Ferroportin | Iron export |

| Hepcidin | Blocks ferroportin |

QUESTION

Which one of the following is incorrect about iron transport?

CORRECT

A Iron is converted from ferrous to ferric form before absorption through apical membrane.

B Apoferritin is the storage form.

C Iron is transported via transferrin in the blood.

D Ascorbic acid helps in iron reabsorption.

RIGHT ANSWER

OK

A. Iron is converted from ferrous to ferric form before absorption through apical membrane.

WHY THIS IS RIGHT

Solution- Iron must be in *ferrous (Fe^{2+})* form for absorption - not ferric (Fe^{3+}).

Correct answer is A because dietary iron is absorbed in the ferrous (Fe^{2+}) form at the apical membrane of enterocytes; ferric (Fe^{3+}) iron is first reduced to ferrous form before absorption.

Iron is transported in blood bound to transferrin. Apoferritin binds iron for storage as ferritin. Ascorbic acid enhances iron absorption by maintaining iron in ferrous form.

Dietary iron (Fe^{3+})

↓
Reduced to Fe^{2+} (Vitamin C)

↓
Absorbed via DMT1 (duodenum)

↓
Converted back to Fe^{3+}

↓
Bound to transferrin

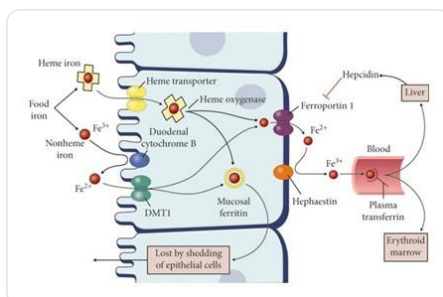
| Step | Form of Iron | Key Protein |

| --- | ----- | ----- |

| Absorption | Fe^{2+} | DMT1 |

| Transport | Fe^{3+} | Transferrin |

| Storage | Fe^{3+} | Ferritin |



QUESTION

A 60-year-old man with chronic kidney disease presents to the OPD with paleness, progressive dyspnea and signs of congestive cardiac failure. His lab results show a normocytic normochromic anemia. What is the most appropriate management?

A Darbepoetin alfa

CORRECT

B Parenteral iron

C Oral iron supplements

D Blood transfusion

RIGHT ANSWER

OK
A. Darbepoetin alfa

WHY THIS IS RIGHT

The source quiz contains the placeholder "\$22" here and does not include a written explanation for this item.

QUESTION

A child presented with fatigue, jaundice, and splenomegaly. His father also has had a similar history. On peripheral smear, MCHC was found to be elevated. Which of the following is the most likely diagnosis?

- A** Thalassemia
- B** Sickle cell disease
- C** Hereditary spherocytosis
- D** Autoimmune hemolytic anemia

CORRECT

RIGHT ANSWER

- OK** **C. Hereditary spherocytosis**

WHY THIS IS RIGHT

The source quiz contains the placeholder “\$23” here and does not include a written explanation for this item.

QUESTION

In a patient, ileal resection led to fatigue with Hb = 8 g/dL, MCV = 110 fL. Peripheral smear showed macrocytic anemia. Which vitamin deficiency is most likely?

A Iron deficiency

B B12 deficiency

CORRECT

C B1 deficiency

D Folate deficiency

RIGHT ANSWER

OK B. B12 deficiency

WHY THIS IS RIGHT

Ileal resection -> loss of B12 absorption -> macrocytic anemia (MCV 110)

Vitamin	Site
Vitamin B12	Terminal ileum
Folate	Jejunum

Correct answer is B because ileum is the site of vitamin B12 absorption (via intrinsic factor-B12 complex), so ileal resection leads to B12 deficiency causing megaloblastic macrocytic anemia. The high MCV (110 fL) supports macrocytic anemia. Iron deficiency causes microcytic anemia. Folate is absorbed in proximal jejunum, not ileum. Vitamin B1 deficiency causes neurological and cardiac manifestations, not macrocytic anemia.

Feature	B12 deficiency	Folate deficiency
Absorption	Ileum	Jejunum
Cause	Ileal disease, vegetarian	Poor diet
Neurological signs	Present	Absent
MCV	↑↑↑	↑↑

QUESTION

Which of the following drugs is used to prevent painful vaso-occlusive crises and decrease long-term complications in sickle cell anemia?

A A. Hydroxyurea

CORRECT

B B. Methotrexate plus leucovorin

C C. Methionine

D D. Eltrombopag

RIGHT ANSWER

OK A. A. Hydroxyurea

WHY THIS IS RIGHT

The source quiz contains the placeholder "\$24" here and does not include a written explanation for this item.

QUESTION

| Which of the following is true about red blood cells in Sickle cell anemia:

- A** Low mechanical fragility, high osmotic fragility
- B** High mechanical fragility, high osmotic fragility
- C** Low mechanical fragility, low osmotic fragility
- D** High mechanical fragility, low osmotic fragility

CORRECT

RIGHT ANSWER

- OK** D. High mechanical fragility, low osmotic fragility

WHY THIS IS RIGHT

The source quiz contains the placeholder "\$25" here and does not include a written explanation for this item.

QUESTION

A 60-year-old vegetarian patient presented with weakness and reduced work capacity. He had a Hb of 10gm/dl and MCV-110. What is the most likely diagnosis?

A Iron deficiency anemia

B Aplastic Anaemia

C Megaloblastic anaemia

CORRECT

D Thalassemia

RIGHT ANSWER

OK C. Megaloblastic anaemia

WHY THIS IS RIGHT

The source quiz contains the placeholder "\$26" here and does not include a written explanation for this item.

QUESTION

Decreased transferrin saturation is seen in:

A Hemochromatosis

B Iron deficiency anemia

CORRECT

C Macrocytic anemia

D Hemosiderosis

RIGHT ANSWER

OK

B. Iron deficiency anemia

WHY THIS IS RIGHT

Correct answer is B because iron deficiency anemia causes low serum iron with increased transferrin (TIBC), leading to decreased transferrin saturation.

↓ Body iron stores

↓

↓ Serum iron

↓

↑ TIBC (more empty transferrin)

↓

↓↓ Transferrin saturation

Hemochromatosis and hemosiderosis are iron overload states with increased transferrin saturation. Macrocytic anemia is usually due to B12 or folate deficiency and does not typically cause low transferrin saturation.

| Parameter | Iron Deficiency | Hemochromatosis |

| ----- | ----- | ----- |

| Serum iron | ↓ | ↑ |

| TIBC | ↑ | ↓ |

| Transferrin saturation | ↓↓ | ↑↑ |

| Ferritin | ↓ | ↑ |

$$\text{Transferrin saturation} = \frac{\text{Serum iron}}{\text{TIBC}} \times 100$$

QUESTION

Which of the following is not useful for hemoglobin estimation by the calorimetric test?



A RBC pipette

CORRECT

B Sahli graduated hemoglobin tube

C Comparator with brown glass standard

D Hemoglobin pipette

RIGHT ANSWER

OK
A. RBC pipette

WHY THIS IS RIGHT

The source quiz contains the placeholder "\$27" here and does not include a written explanation for this item.

QUESTION

Erythropoietin is secreted by which of the following?

- a. Liver
- b. Kidney
- c. Spleen
- d. Heart

A a, b

CORRECT

B b, c

C a, b, c

D Only b

RIGHT ANSWER

OK A. a, b

WHY THIS IS RIGHT

Erythropoietin (EPO) is produced mainly by the kidney in adults, and by both liver and kidney (especially liver in fetus).
Source of EPO

Correct answer is A because erythropoietin is mainly produced by peritubular interstitial cells of the kidney in adults, while the liver is a significant source during fetal life and contributes minimally in adults.

Hypoxia (↓ O₂)

↓

Kidney (peritubular cells)

↓

EPO secretion

↓

Bone marrow stimulation

↓

↑ RBC production

Spleen and heart do not produce erythropoietin.

Thus, kidney is the primary source and liver is a secondary source.

QUESTION

| Which of the following is not a feature of G6PD deficiency?

A Males and females are equally affected

CORRECT

B Oxidative stress

C Due to deficiency of NADPH

D Characterized by presence of Heinz bodies

RIGHT ANSWER

OK A. Males and females are equally affected

WHY THIS IS RIGHT

The source quiz contains the placeholder "\$28" here and does not include a written explanation for this item.

QUESTION

In haemolytic anaemia, which of the following is correct?

1. Urobilinogen is high
2. Serum conjugated bilirubin is elevated
3. Serum transaminases are increased
4. Indirect van den Bergh reaction is positive

A 1, 3

B 1, 4

CORRECT

C 2, 3

D 1, 2

RIGHT ANSWER

OK

B. 1, 4

WHY THIS IS RIGHT

The source quiz contains the placeholder "\$29" here and does not include a written explanation for this item.

QUESTION

| Which of the following is the correct statement regarding iron isomaltoside?

- A** It should not be given with erythropoietin
- B** It is given by intravenous route CORRECT
- C** It is more immunogenic than iron dextran
- D** A single bolus dose is enough for treatment of iron deficiency anemia

RIGHT ANSWER

- OK** **B. It is given by intravenous route**

WHY THIS IS RIGHT

The source quiz contains the placeholder "\$2a" here and does not include a written explanation for this item.

QUESTION

| Which mutation is seen in sickle cell anemia?

- A** Substitution of glutamic acid by valine at position 6 of the α -globin chain
- B** Substitution of glutamic acid by leucine at position 6 of the β -globin chain
- C** **Substitution of glutamic acid by valine at position 6 of the β -globin chain**
- D** Substitution of glutamic acid by leucine at position 6 of the α -globin chain

CORRECT

RIGHT ANSWER

- OK** **C. Substitution of glutamic acid by valine at position 6 of the β -globin chain**

WHY THIS IS RIGHT

The source quiz contains the placeholder “\$2b” here and does not include a written explanation for this item.

QUESTION

Erythropoietin is primarily used in the treatment of which type of anemia?

1. Nutritional anemia
2. Chronic kidney disease (CKD)-related anemia
3. Myelodysplastic syndrome (MDS)-related anemia
4. Aplastic anemia

A 1 & 4

B 2 & 3

CORRECT

C 1 & 3

D 1, 2 & 4

RIGHT ANSWER

OK

B. 2 & 3

WHY THIS IS RIGHT

The source quiz contains the placeholder “\$2c” here and does not include a written explanation for this item.

QUESTION

A 42-year-old female has Hb 9.2 g/dL and MCV 72 fL. Which of the following conditions can be the cause of this presentation?

1. Iron deficiency
2. Thalassemia
3. Lead poisoning
4. Vitamin B12 deficiency

A 1, 2, and 3

CORRECT

B 1, 3, and 4

C 1, and 2

D 2, 3, and 4

RIGHT ANSWER

OK
A. 1, 2, and 3

WHY THIS IS RIGHT

The source quiz contains the placeholder “\$2d” here and does not include a written explanation for this item.

QUESTION

Which of the following is true for hemolytic anemia?

- a. Indirect van den bergh test positive
- b. Direct van den bergh test positive
- c. Increased urine urobilinogen

A a only

B a and c

CORRECT

C b only

D c only

RIGHT ANSWER

OK

B. a and c

WHY THIS IS RIGHT

In hemolytic anemia, there is increased destruction of red blood cells, leading to excessive breakdown of hemoglobin and increased production of bilirubin.

Bilirubin metabolism changes in hemolytic anemia

1\ Increase in unconjugated (indirect) bilirubin

Hemoglobin breakdown produces unconjugated bilirubin. The liver may not conjugate all of the excess bilirubin produced. Therefore, indirect Van den Bergh test becomes positive.

2\ Increased urobilinogen in urine

More bilirubin reaches the intestine. Intestinal bacteria convert bilirubin to urobilinogen. Part of this urobilinogen is reabsorbed and excreted in urine, so urinary urobilinogen increases.

3. Direct (conjugated) bilirubin

Usually not elevated in pure hemolytic anemia, so direct Van den Bergh test is not positive.

QUESTION

In glucose-6-phosphate dehydrogenase (G6PD) deficiency, which of the following statements is correct?

A Normal Direct bilirubin, Increased Indirect Bilirubin, Increased Urine urobilinogen

CORRECT

B Increased Direct bilirubin, Normal Indirect Bilirubin, Absent Urine urobilinogen

C Normal Direct bilirubin, Normal Indirect Bilirubin, Normal Urine urobilinogen

D Decreased Direct bilirubin, Decreased Indirect Bilirubin, Increased Urine urobilinogen

RIGHT ANSWER

OK A. Normal Direct bilirubin, Increased Indirect Bilirubin, Increased Urine urobilinogen

WHY THIS IS RIGHT

Glucose-6-phosphate dehydrogenase (G6PD) deficiency causes episodic hemolytic anemia due to increased oxidative damage to RBCs.

- G6PD is a key enzyme of the Hexose Monophosphate (HMP) shunt that generates NADPH.
- NADPH maintains glutathione in the reduced form, which protects RBCs from oxidative stress.
- In G6PD deficiency, oxidant drugs, infections, or fava beans lead to RBC hemolysis.

Biochemical consequences of hemolysis:

1. Increased indirect (unconjugated) bilirubin
 - o Hemoglobin breakdown -> heme -> bilirubin -> overload of liver conjugation.
2. Normal direct (conjugated) bilirubin
 - o Liver function is normal; the problem is excessive hemolysis.
3. Increased urine urobilinogen
 - o More bilirubin reaches the intestine -> more urobilinogen formation -> increased reabsorption and urinary excretion.

QUESTION

Which of the following are reduced in Iron Deficiency Anemia ?

1. Ferritin
2. TIBC
3. Transferrin saturation
4. RDW
5. Hepcidin
6. Soluble transferrin receptor

A 1, 3, 5

CORRECT

B 1, 3, 4, 6

C 2, 4, 5

D 1, 3, 5, 6

RIGHT ANSWER

OK A. 1, 3, 5

WHY THIS IS RIGHT

(Iron deficiency anemia (IDA) results from depleted iron stores and adaptive changes to increase iron absorption.

Parameters that reduce in IDA:

- Ferritin ↓ -> reflects depleted iron stores (most specific)
- Transferrin saturation ↓ -> less iron bound to transferrin
- Hepcidin ↓ -> body increases iron absorption and release (normal hepcidin function is to inhibit ferroportin and reduce iron uptake into blood stream.) So a decrease in hepcidin- allows more iron uptake into blood stream

Parameters that increase in IDA:

- TIBC ↑ (more transferrin produced)
- RDW ↑ (anisocytosis)
- Soluble transferrin receptor ↑ (increased iron demand)

QUESTION

A 21-year-old man comes to the physician because of a 3-day history of yellowing of his eyes. He has also noticed a decrease in his exercise capacity and gets quickly exhausted after minor physical activity. Examination shows scleral icterus and pale mucous membranes. He has splenomegaly. His hemoglobin concentration is 7.9 mg/dL, leukocyte count 8500/mm³ and platelet count is 1.8 lakhs/mm³. Direct antiglobulin and heterophile antibody tests are positive. Which of the following additional laboratory findings are most likely present in this patient?

A Decreased reticulocyte count

B Decreased haptoglobin levels

CORRECT

C Decreased mean corpuscular volume

D Increased direct to total bilirubin ratio

RIGHT ANSWER

OK

B. Decreased haptoglobin levels

WHY THIS IS RIGHT

21-year-old
Jaundice
Pallor
Splenomegaly
Hb 7.9 (low)
Direct antiglobulin test (Coombs) positive , Heterophile antibody positive

Autoimmune hemolytic anemia (AIHA) *,likely triggered by infectious mononucleosis.*

Pathophysiology in hemolysis :

RBCs are destroyed -> body tries to compensate. So:

- ↑ Reticulocyte count (NOT decreased ☐)
- ↑ LDH
- ↑ Indirect bilirubin
- ↓ Haptoglobin (binds free hemoglobin)

☐ A: Decreased reticulocyte count

In hemolysis, retics go UP because marrow compensates.

☐ B: Decreased haptoglobin levels

Correct.

Free hemoglobin binds haptoglobin -> gets used up -> levels drop.

☐ C: Decreased MCV

Hemolytic anemia is usually normocytic or slightly increased MCV (due to reticulocytosis).

☐ D: Increased direct/total bilirubin ratio

Hemolysis increases indirect (unconjugated) bilirubin, not direct.

QUESTION

An investigator is studying the changes that occur in the oxygen-hemoglobin dissociation curve of different types of hemoglobin under various conditions. The blood obtained from a male infant shows decreased affinity for 2,3-bisphosphoglyceric acid. Which of the following is the most likely composition of the hemoglobin molecule in this sample?

A a₂b₂

B a₂y₂

CORRECT

C B₄

D a₂d₂

RIGHT ANSWER

OK

B. a₂y₂

WHY THIS IS RIGHT

Fetal hemoglobin (HbF: α₂γ₂) has a higher affinity for oxygen than adult hemoglobin (HbA: α₂β₂) because its γ chains bind 2,3-BPG poorly.

Mechanism:

- 2,3-BPG normally binds β chains of adult HbA -> stabilizes deoxygenated state -> promotes O₂ release
- In HbF, γ chains replace β chains -> reduced 2,3-BPG binding
- Result -> hemoglobin holds oxygen more tightly -> left shift of O₂ dissociation curve

Hemoglobin variants:

- HbA (adult): α₂β₂
- HbF (fetal): α₂γ₂ -> ↓2,3-BPG binding
- HbA_{1c}: α₂δ₂ (minor adult Hb)

QUESTION

A 2-week-old girl is brought to her primary care provider for a routine visit. Newborn screening results from hemoglobin electrophoresis are as follows:

Hemoglobin F: 70%

Hemoglobin A: 20%

Hemoglobin S: 10%

Examination shows a well-appearing infant with no pallor or splenomegaly. Which of the following is most likely true about this patient?

- A** Life expectancy will be shorter than average
- B** Mean corpuscular volume will be decreased
- C** Reticulocyte count will be elevated
- D** She has relative protection from *Plasmodium falciparum*

CORRECT

RIGHT ANSWER

- OK** **D. She has relative protection from *Plasmodium falciparum***

WHY THIS IS RIGHT

The source quiz contains the placeholder “\$2e” here and does not include a written explanation for this item.

QUESTION

35-year-old woman comes to the physician complaining of weakness, fatigue, and pallor. Physical examination is unremarkable except for conjunctival pallor.

Laboratory results are as follows:

Haemoglobin: 7.2 g/dL

Mean corpuscular volume: 90 fL

Reticulocytes: 0.1%

Platelets: 280,000 /uL

Leukocyte count: 6,700 cells/uL

Iron studies and serum B12 and folic acid levels are within normal limits. Bone marrow biopsy shows absence of erythroid precursors but preserved myeloid and megakaryocytic elements. Further workup would most likely show which of the following?

A Hepatocellular carcinoma

B Renal cell carcinoma

C Thymic tumor

CORRECT

D Cerebellar hemangioblastoma

RIGHT ANSWER

OK C. Thymic tumor

WHY THIS IS RIGHT

Pure red cell aplasia (PRCA) presents with severe normocytic anemia, very low reticulocyte count, and absence of erythroid precursors in bone marrow with normal leukocytes and platelets. Key association:

- Thymoma (thymic tumor) is strongly associated with acquired PRCA due to autoimmune destruction of erythroid precursors.

Other causes of PRCA include:

- Parvovirus B19 infection
- Autoimmune disorders
- Lymphoproliferative malignancies
- Drugs

Thus, patients with isolated erythroid aplasia should be evaluated for thymoma (CT chest).

QUESTION

A 5-year-old boy is brought to the clinic for a routine health maintenance examination. He underwent a splenectomy a year ago for persistent anemia and jaundice. He has received the pneumococcal and meningococcal vaccinations and takes penicillin prophylaxis. Physical examination reveals a well-appearing child. The sclerae are anicteric. The abdomen is soft and nontender; no masses are palpable. Several well-healed laparoscopy scars are noted. Complete blood count is as follows:

Hemoglobin: 11.3 g/dL

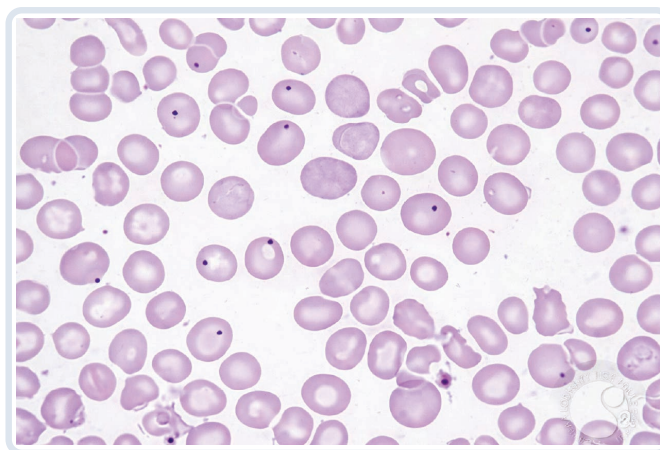
Reticulocytes: 3%

Platelets: 160,000/mm³

Leukocytes: 8,200/mm³

Peripheral blood smear with Wright stain is shown.

This patient's findings are most likely related to which of the following?



- A** Chronic Hb oxidation and precipitation
- B** Inability to produce beta globin chains
- C** Mechanical red-blood-cell membrane damage
- D** Persistence of red blood cell precursor nuclei

CORRECT

RIGHT ANSWER

OK

D. Persistence of red blood cell precursor nuclei

WHY THIS IS RIGHT

Howell-Jolly bodies (basophilic nuclear remnants in RBCs) occur due to persistence of red blood cell precursor nuclei and are normally removed by the spleen.

They are seen in:

- Post-splenectomy states
- Functional asplenia (e.g., sickle cell disease)

Severe hemolytic anemia

QUESTION

| True statement about Iron Isomaltoside 1000 is:

CORRECT

- A** Iron requirement can be fulfilled in single dose
- B** More immunogenic than iron dextran
- C** Given intravenously and gets deposited in adipose tissue therefore less toxic
- D** Best when given with erythropoietin

RIGHT ANSWER

- OK** **A. Iron requirement can be fulfilled in single dose**

WHY THIS IS RIGHT

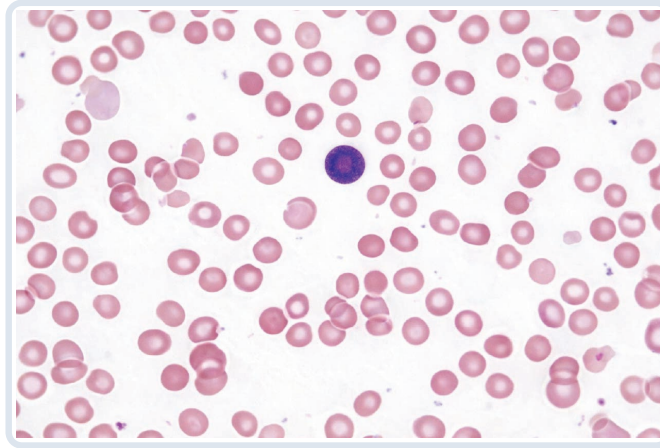
Iron isomaltoside 1000 (ferric derisomaltose) is a modern intravenous iron preparation that allows total iron replacement in a single high-dose infusion due to its stable iron-carbohydrate complex.

Key features:

- Can deliver full iron requirement in one sitting (single total-dose infusion)
- Low risk of free iron release -> fewer infusion reactions
- Less immunogenic than older preparations like high-molecular-weight iron dextran
- Used in iron deficiency anemia when rapid repletion is required or oral iron is not tolerated

QUESTION

A 3-year-old boy is brought to the physician with jaundice and pallor. He was adopted and his family history is unknown. Laboratory studies show anemia, reticulocytosis, and increased indirect bilirubin. A peripheral blood smear is shown. This patient is most likely to have which of the following additional findings?



A Decreased lactate dehydrogenase

B Increased haptoglobin

C Increased MCHC

CORRECT

D Positive Coombs test

RIGHT ANSWER

OK C. Increased MCHC

WHY THIS IS RIGHT

Hereditary spherocytosis is a hemolytic anemia due to defects in RBC membrane proteins (spectrin, ankyrin, band 3), causing formation of spherocytes that are trapped and destroyed in the spleen.

Key laboratory features:

- Increased MCHC (hallmark finding)
- Reticulocytosis
- ↑ Indirect bilirubin
- ↑ LDH
- ↓ Haptoglobin
- Negative Coombs test

Peripheral smear: spherocytes without central pallor.

QUESTION

A 41-year-old woman with a long history of menorrhagia comes to the physician due to a low hemoglobin level identified on routine laboratory evaluation. She is diagnosed with iron deficiency anemia and started on oral ferrous sulfate. Which of the following cells secrete a substance that controls iron storage and release by other cells involved in iron homeostasis?

- A** Biliary lining cells
- B** Bone marrow macrophages
- C** Enterocytes
- D** Hepatic parenchymal cells

CORRECT

RIGHT ANSWER

- OK** **D. Hepatic parenchymal cells**

WHY THIS IS RIGHT

Hepcidin, the master regulator of iron homeostasis, is produced by hepatic parenchymal cells (hepatocytes) and controls iron storage and release. Key actions of hepcidin:

- Inhibits ferroportin -> decreases iron export
- ↓ Iron release from macrophages
- ↓ Iron absorption from enterocytes
- ↓ Iron release from liver stores

Clinical relevance:

- ↑ Hepcidin -> anemia of chronic disease (iron trapped in stores)
- ↓ Hepcidin -> iron overload (e.g., hemochromatosis)
- In iron deficiency -> hepcidin levels fall to increase absorption

QUESTION

A 12-year-old boy was brought to OPD with complaint of fatigue. Serum investigations revealed findings as given below. What is the likely diagnosis?

Hemoglobin - 9 g/dl

Mean cell volume (MCV) - 60 fL

Mean cell Hb (MCH) - 20 pg

Serum Ferritin - 185 mcg/L

Total leukocyte count - Elevated lymphocyte and Neutrophils

[Normal values: Serum Ferritin: 50-200 mcg/L; Mean cell volume (MCV) - 80-100 fL;

Mean cell Hb (MCH) - 27-31 pg]

A Anemia of chronic disorder

B **Thalassemia**

CORRECT

C Iron-deficiency anemia

D Sickle cell anemia

RIGHT ANSWER

OK **B. Thalassemia**

WHY THIS IS RIGHT

Thalassemia should be suspected in a patient with microcytic hypochromic anemia (low MCV, low MCH) but normal or increased serum ferritin, indicating adequate iron stores.

- Low MCV and MCH (microcytic hypochromic anemia)
- Normal/high ferritin -> rules out iron deficiency anemia
- Often normal or elevated RBC count relative to Hb
- Peripheral smear may show target cells
- Confirmed by hemoglobin electrophoresis

Differentiation:

- Iron deficiency anemia: low ferritin
- Anemia of chronic disease: usually normocytic or mild microcytic with low iron/TIBC
- Sickle cell anemia: normocytic with sickled RBCs

QUESTION

| Which of the following statements are true about hereditary spherocytosis?

- A** It takes 4-5 years for gall stones to develop
- B** Splenectomy is not protective against developing gall stones
- C** At least 25 % cases have a family history of hereditary spherocytosis **CORRECT**
- D** Increase in MCH is pathognomonic of HS

RIGHT ANSWER

OK

C. At least 25 % cases have a family history of hereditary spherocytosis

WHY THIS IS RIGHT

Hereditary spherocytosis is a congenital hemolytic anemia due to defects in RBC membrane proteins (spectrin, ankyrin, band 3, protein 4.2) leading to extravascular hemolysis in the spleen.

- Most cases are autosomal dominant, and ~75% have positive family history (≥25% must have family history).
- Chronic hemolysis predisposes to pigment gallstones, often in childhood/adolescence.
- Splenectomy reduces hemolysis and decreases risk of pigment gallstones, so it is protective.
- Increased MCHC (not MCH) is characteristic; increased MCH is not pathognomonic.

Thus, presence of a family history supports hereditary spherocytosis diagnosis.

QUESTION

| All of the following parameters are true for anemia of chronic disease except:

A Increase in serum hepcidin

B Increased ferroportin

CORRECT

C TIBC decreased

D Normal iron stores

RIGHT ANSWER

OK **B. Increased ferroportin**

WHY THIS IS RIGHT

Anemia of chronic disease (anemia of inflammation) is mediated by increased hepcidin production from the liver in response to inflammatory cytokines (especially IL-6). Hepcidin inhibits ferroportin, reducing iron release from macrophages and intestinal absorption, leading to decreased serum iron despite normal or increased iron stores.

Typical findings include:

- ↑ Hepcidin
- ↓ Ferroportin activity
- ↓ TIBC
- Normal or ↑ ferritin (iron stores)

Thus, increased ferroportin is incorrect, as ferroportin is suppressed in anemia of chronic disease.

QUESTION

A young boy from high altitude came with fever and weakness and had the following lab reports:

Hemoglobin 17 gm%

TLC is 21,000 with neutrophils 25, lymphocytes 30, eosinophils 5, myelocytes and metamyelocytes 40 percent

Next step in the investigation should be:

A Philadelphia chromosome

B JAK mutation

C Erythropoietin levels

CORRECT

D Bone Marrow biopsy with reticulin stain

RIGHT ANSWER

OK

C. Erythropoietin levels

WHY THIS IS RIGHT

An elevated hemoglobin level in a patient from high altitude is most likely due to secondary polycythemia caused by chronic hypoxia.

Why EPO level is the next investigation:

- Helps differentiate secondary polycythemia from polycythemia vera
- Polycythemia vera -> low EPO, JAK2 mutation
- Secondary polycythemia -> high EPO

Other findings:

- Leukocytosis with left shift may be reactive due to infection or stress
- Not necessarily suggestive of myeloproliferative neoplasm initially

QUESTION

A 65-year-old male patient comes to the clinic with unbearable itching while taking a shower which has been present for many months. Physical examination shows the presence of facial plethora. Laboratory examination shows a hemoglobin of 20 g/dL. What would be the best match for this patient?

A RBC mass increased, O2 saturation increased, EPO decreased

B RBC mass increased, O2 saturation normal, EPO decreased

CORRECT

C RBC mass increased, O2 saturation increased, EPO normal

D RBC mass normal, O2 saturation normal, EPO increased

RIGHT ANSWER

OK B. RBC mass increased, O2 saturation normal, EPO decreased

WHY THIS IS RIGHT

The patient's aquagenic pruritus, facial plethora, and markedly elevated hemoglobin suggest polycythemia vera (PV), a primary myeloproliferative neoplasm. It has a risk of thrombosis, splenomegaly and shows hyperviscosity symptoms. Characteristic laboratory findings in polycythemia vera:

- Increased RBC mass (true polycythemia)
- Normal oxygen saturation (not due to hypoxia)
- Decreased erythropoietin (EPO) due to negative feedback from autonomous RBC production
- JAK2 mutation positive in most cases

Distinguishing from secondary polycythemia:

- Secondary -> increased RBC mass with high EPO and often low O₂ saturation
- PV -> low EPO with normal O₂ saturation

QUESTION

| Which of the following statements about polycythemia vera is true?

- A** Risk of thrombosis strongly correlates with the degree of thrombocytosis
- B** It is protective against H. pylori infection
- C** Generalized pruritus is a consequence of mast cell activation by JAK 2 mutation CORRECT
- D** Acute myeloid leukemia is the most common cause of mortality

RIGHT ANSWER

OK

C. Generalized pruritus is a consequence of mast cell activation by JAK 2 mutation

WHY THIS IS RIGHT

Polycythemia vera (PV) is a myeloproliferative neoplasm caused by a JAK2 mutation leading to uncontrolled proliferation of erythroid, myeloid, and megakaryocytic lineages.

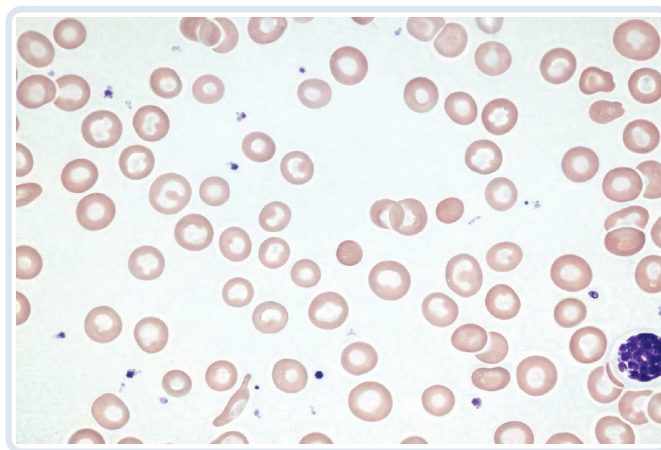
- Increased RBC mass -> hyperviscosity
- Thrombosis risk (most common cause of death)
- Splenomegaly
- Aquagenic pruritus (itching after hot bath) due to Release of histamine and other mediators

Distinguishing points:

- Thrombosis risk correlates with hematocrit and leukocytosis, not platelet count alone
- AML transformation can occur but is not most common cause of mortality
- No protective role against H. pylori

QUESTION

A 57-year-old woman comes to the physician because of a 3-month history of easy fatigability and dyspnea on exertion. Menopause occurred 5 years ago. Her pulse is 105/min and blood pressure is 100/70 mm Hg. Physical examination shows pallor of the nail beds and conjunctivae. A peripheral blood smear is shown. Further evaluation is most likely to show which of the following findings?



- A** Dry bone marrow tap
- B** Decreased serum haptoglobin concentration
- C** Positive stool guaiac test
- D** Decreased serum vitamin B9 concentration

CORRECT

RIGHT ANSWER

- OK** C. Positive stool guaiac test

WHY THIS IS RIGHT

A peripheral smear showing microcytic hypochromic anemia with marked anisopoikilocytosis and pencil cells is most consistent with iron deficiency anemia, especially in a postmenopausal woman.

- Iron deficiency in adults is commonly due to chronic blood loss, most often from the gastrointestinal tract
- Postmenopausal women with iron deficiency anemia should be evaluated for occult GI bleeding
- Positive stool guaiac test supports chronic GI blood loss as the underlying cause

QUESTION

Gaisböck syndrome includes all except?

- A** Obesity
- B** Normal leukocyte count
- C** Erythrocytosis
- D** Hypotension

CORRECT

RIGHT ANSWER

OK

D. Hypotension

WHY THIS IS RIGHT

Gaisböck syndrome (stress polycythemia or relative polycythemia) is characterized by relative erythrocytosis due to reduced plasma volume rather than true increase in RBC mass.

- Middle-aged obese men
- Hypertension (not hypotension)
- Smoking and stress association
- Increased hematocrit with normal RBC mass
- Normal leukocyte and platelet counts
- No splenomegaly

Distinguishing from polycythemia vera:

- Polycythemia vera -> increased RBC mass, leukocytosis, thrombocytosis, splenomegaly
- Gaisböck syndrome -> relative polycythemia with normal cell counts

QUESTION

A 9-month-old infant presents with severe pallor, failure to thrive, and hepatosplenomegaly. He has been receiving repeated blood transfusions since early infancy. Peripheral smear shows microcytic hypochromic anemia with target cells. Which of the following hemoglobin patterns best supports the diagnosis in this child?

A Predominant HbA with mildly increased HbA₂

B Markedly increased HbF with absent HbA

CORRECT

C Increased HbA₂ with normal HbF

D Normal HbA with mildly reduced HbF

RIGHT ANSWER

OK B. Markedly increased HbF with absent HbA

WHY THIS IS RIGHT

A transfusion-dependent infant with severe microcytic hypochromic anemia, failure to thrive, hepatosplenomegaly, and target cells is most consistent with β -thalassemia major. It is caused due to defective β -globin chain synthesis causing ineffective erythropoiesis and hemolysis.

- Markedly increased HbF (fetal hemoglobin)
- Absent or very low HbA
- Variable increase in HbA₂

Clinical features:

- Severe anemia beginning in infancy (after 6 months when HbF declines)
- Transfusion dependence
- Hepatosplenomegaly
- Growth failure
- Bone marrow expansion -> skeletal changes

QUESTION

A 58-year-old man presents with fatigue, acrocyanosis, and dark-colored urine that worsens on exposure to cold. Laboratory evaluation reveals anemia with elevated LDH, indirect hyperbilirubinemia, and reduced haptoglobin. A direct Coombs test is positive. Red blood cells show agglutination when the blood sample is cooled to 0-4 °C, which reverses on warming. The hemolysis in this condition is primarily due to binding of which of the following antibodies?

A IgG active at 37 °C causing splenic macrophage-mediated hemolysis

B IgM binding to RBCs at 0-4 °C with complement fixation

CORRECT

C IgA causing intravascular hemolysis

D IgG with maximal activity at alkaline pH

RIGHT ANSWER

OK

B. IgM binding to RBCs at 0-4 °C with complement fixation

WHY THIS IS RIGHT

Cold agglutinin disease is a type of autoimmune hemolytic anemia caused by IgM antibodies that bind to red blood cells at low temperatures (0-4 °C) and activate the complement system, leading to extravascular hemolysis in liver (and sometimes intravascular).

On warming, IgM dissociates but complement remains

- Dark urine
- Elevated LDH and indirect bilirubin
- Reduced haptoglobin
- Direct Coombs positive (C3 complement)

Distinguishing from warm AIHA:

- Warm AIHA -> IgG antibodies active at 37 °C
- Cold agglutinin disease -> IgM complement-mediated hemolysis

QUESTION

A 22-year-old patient with β -thalassemia major is on regular packed RBC transfusions every 3-4 weeks. Despite adequate chelation therapy, the patient remains transfusion dependent. A newer drug is started that reduces transfusion requirement by enhancing late-stage erythroid maturation via TGF- β superfamily inhibition. Which of the following drugs was most likely prescribed?

A Deferasirox

B Erythropoietin

C Hydroxyurea

D Luspatercept

CORRECT

RIGHT ANSWER

OK D. Luspatercept

WHY THIS IS RIGHT

Luspatercept is a novel erythroid maturation agent used in transfusion-dependent β -thalassemia to reduce transfusion requirements. It works by enhancing late-stage erythroid maturation.

Clinical use:

- Transfusion-dependent β -thalassemia
- Some cases of myelodysplastic syndrome with ring sideroblasts
- Reduces need for repeated RBC transfusions

Why not others:

- Deferasirox -> iron chelator
- Erythropoietin -> stimulates early erythropoiesis (less effective in thalassemia major)
- Hydroxyurea -> increases HbF in sickle cell disease

QUESTION

Which of the following factors increases sickling of red blood cells in patients with sickle cell disease?

- A Increased HbF
- B Alkaline blood pH
- C Presence of HbC**
- D Increased red cell hydration

CORRECT

RIGHT ANSWER

- OK
- C. Presence of HbC**

WHY THIS IS RIGHT

Sickling of red blood cells in sickle cell disease (SCD) occurs due to polymerization of deoxygenated HbS, which distorts RBCs into a sickle shape.

Factors that increase sickling:

- Presence of HbC -> promotes RBC dehydration and HbS polymerization
- Low oxygen tension (hypoxia)
- Acidosis (low pH)
- Dehydration
- Infection or stress

Factors that decrease sickling:

- Increased HbF (fetal hemoglobin inhibits HbS polymerization)
- Adequate hydration
- Alkaline pH
- Oxygenation

QUESTION

A 6-year-old child presents with recurrent infections, easy bruising, and failure to thrive. Examination reveals short stature, café-au-lait spots, absent thumbs, and microcephaly. Laboratory investigations show pancytopenia with macrocytosis. Bone marrow examination reveals a hypocellular marrow. The disorder described above most commonly follows which pattern of inheritance?

A Autosomal dominant

B Autosomal recessive

CORRECT

C X-linked recessive

D Mitochondrial

RIGHT ANSWER

OK

B. Autosomal recessive

WHY THIS IS RIGHT

The clinical picture describes Fanconi anemia, an inherited bone marrow failure syndrome characterized by congenital anomalies, pancytopenia, and hypocellular marrow. It is a defect in

DNA repair.

- Pancytopenia with macrocytosis
- Short stature and failure to thrive
- Skeletal anomalies (eg, absent or hypoplastic thumbs)
- Café-au-lait spots and skin pigmentation
- Microcephaly
- Increased risk of AML and solid tumors

Inheritance pattern:

- Most commonly autosomal recessive
- Rare X-linked forms exist but are uncommon

QUESTION

A 30-year-old woman presents with easy fatigability and exertional dyspnea for the past 6 months. She has been treated with iron and vitamin supplements without significant improvement. There is no history of bleeding. Peripheral blood smear shows numerous spherocytes. Reticulocyte count is increased. Which of the following investigations would be most useful to confirm the diagnosis?

A Osmotic fragility test

B Flow cytometry

C Hemoglobin HPLC

D Coombs test

CORRECT

RIGHT ANSWER

OK

D. Coombs test

WHY THIS IS RIGHT

The presence of spherocytes with increased reticulocyte count suggests hemolytic anemia, most commonly autoimmune hemolytic anemia (AIHA) or hereditary spherocytosis. The most useful confirmatory test for AIHA is the Direct Coombs (direct antiglobulin) test, which detects antibodies or complement bound to RBC surfaces.

- Findings: anemia, reticulocytosis, spherocytes, elevated LDH, indirect bilirubin
- Caused by IgG or complement-mediated RBC destruction

Distinguishing from other options:

- Osmotic fragility test: confirms hereditary spherocytosis
- Flow cytometry: used for PNH (CD55/CD59 deficiency)
- Hemoglobin HPLC: evaluates hemoglobinopathies

QUESTION

An elderly patient presents with back pain and recurrent infections. Serum protein electrophoresis reveals an M spike. Which of the following factors are used to determine the prognosis in this patient?

- A** Serum IgG level and LDH levels
- B** Serum beta 2 microglobulin and hemoglobin levels
- C** Serum albumin levels and hemoglobin levels
- D** Serum beta 2 microglobulin levels and albumin levels

CORRECT

RIGHT ANSWER

- OK** D. Serum beta 2 microglobulin levels and albumin levels

WHY THIS IS RIGHT

Correct answer is D because prognosis in multiple myeloma is classically determined by International Staging System, which uses serum beta-2 microglobulin (tumor burden and renal function marker) and serum albumin (overall disease severity marker).

ISS (International Staging System)

Higher beta-2 microglobulin and lower albumin indicate worse prognosis.

IgG, LDH, and hemoglobin may reflect disease status but are not the primary staging parameters.

Stage	β2-microglobulin	Albumin	Prognosis
I	Low	High	Good
II	Intermediate	-	Moderate
III	High	Low	Poor

Marker	Role
β2-microglobulin	□ Tumor burden
Albumin	Disease severity
M protein	Diagnosis
Calcium	CRAB feature

QUESTION

An elderly patient presents with low-grade fever and long-standing lymphadenopathy. Flow cytometry reveals CD19+, CD5+, and CD23+ cells. What is the most likely diagnosis?

A Burkitt lymphoma

B Small lymphocytic lymphoma

CORRECT

C Follicular lymphoma

D Mantle cell lymphoma

RIGHT ANSWER

OK

B. Small lymphocytic lymphoma

WHY THIS IS RIGHT

The source quiz contains the placeholder “\$19” here and does not include a written explanation for this item.

QUESTION

Which of the following chromosomal translocations is characteristic of Anaplastic Large Cell Lymphoma (ALCL)?

A t(8;14)

B t(2;8)

C t(2;5)

CORRECT

D t(8;22)

RIGHT ANSWER

OK C. t(2;5)

WHY THIS IS RIGHT

ALCL = t(2;5) → NPM-ALK fusion → ALK-positive lymphoma

Correct answer is C because anaplastic large cell lymphoma is classically associated with t(2;5) translocation causing NPM-ALK fusion protein leading to constitutive ALK tyrosine kinase activation.

t(2;5)

↓

NPM-ALK fusion

↓

Tyrosine kinase activation

↓

Uncontrolled growth

↓

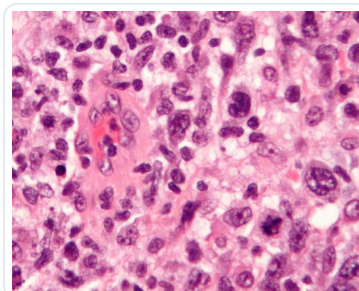
ALCL

anaplastic large-cell lymphoma

- Hallmark cells with horseshoe/kidney-shaped nucleus
- CD30 positive
- Often ALK positive

t(8;14), t(2;8), and t(8;22) are associated with Burkitt lymphoma involving MYC gene translocations.

Disease	Translocation	Gene
ALCL	t(2;5)	ALK
Burkitt	t(8;14)	MYC
Follicular	t(14;18)	BCL2
CML	t(9;22)	BCR-ABL



QUESTION

A 56-year-old man presents with dragging pain in the abdomen. On examination, there is massive splenomegaly. Peripheral smear shows leukocytosis with increased myelocytes, metamyelocytes and basophils. Which of the following translocation is seen in this condition?

A t (9:22)

CORRECT

B t (8;22)

C t (15;17)

D t (8;14)

RIGHT ANSWER

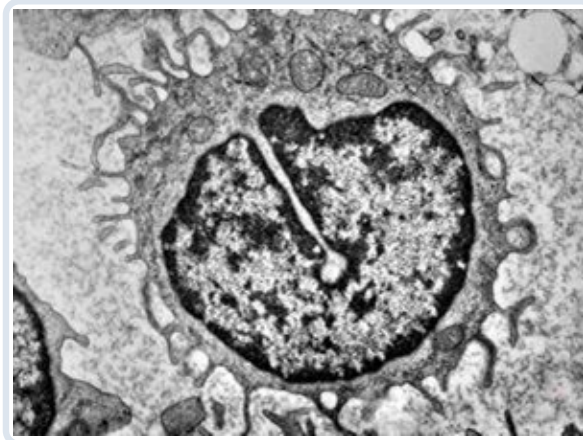
OK
A. t (9:22)

WHY THIS IS RIGHT

The source quiz contains the placeholder "\$1a" here and does not include a written explanation for this item.

QUESTION

Below is an electron microscopy depiction of a cellular structure. Determine the type of cell being depicted.



A Target cell

B Hairy cell

CORRECT

C Gaucher cell

D Sickle cell

RIGHT ANSWER

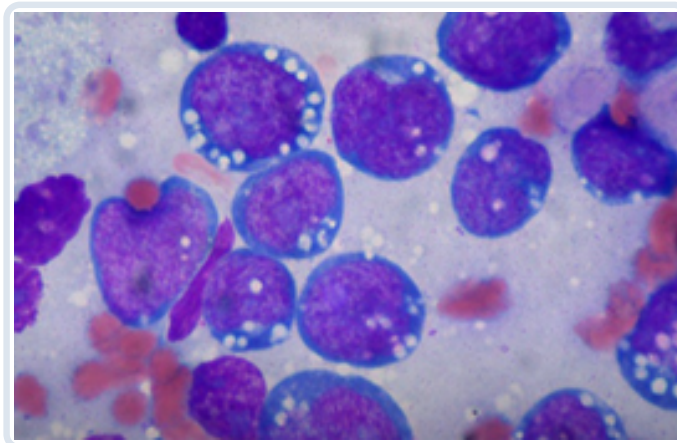
OK B. Hairy cell

WHY THIS IS RIGHT

The source quiz contains the placeholder "\$1b" here and does not include a written explanation for this item.

QUESTION

A patient presented with complaint of a jaw swelling. His tissue was found to have the presence of t (8;14). The histopathological appearance of the bone marrow aspirate tissue is given in the image. Which of the following is a likely diagnosis for this patient?



A Follicular lymphoma

B Burkitt lymphoma

CORRECT

C Acute myeloid leukemia

D Multiple myeloma

RIGHT ANSWER

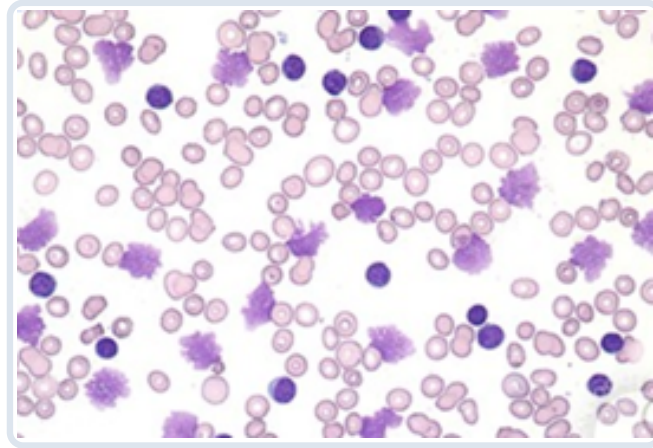
OK B. Burkitt lymphoma

WHY THIS IS RIGHT

The source quiz contains the placeholder "\$1c" here and does not include a written explanation for this item.

QUESTION

A 62-year-old elderly male presented with persistent fatigue and lymph total leucocyte count of 50,000/ul. His peripheral smear was done and had the findings as shown. Which of the following is the next best step in the management of this patient?



- A** Bone marrow aspirate.
- B** Fluorescent in situ hybridization (FISH)
- C** Flow cytometry
- D** Polymerase chain reaction

CORRECT

RIGHT ANSWER

C. Flow cytometry

WHY THIS IS RIGHT

The source quiz contains the placeholder “\$1d” here and does not include a written explanation for this item.

QUESTION

A patient with reduced hemoglobin and gum bleeding presented to you. He has thrombocytopenia (platelet count 25,000/ul) elevated PT, and aPTT. Which of the following can be the probable cause of his finding?

A AML t (8;21)

B AML t (15;17)

CORRECT

C AML t (16;16)

D AML with NMP

RIGHT ANSWER

OK

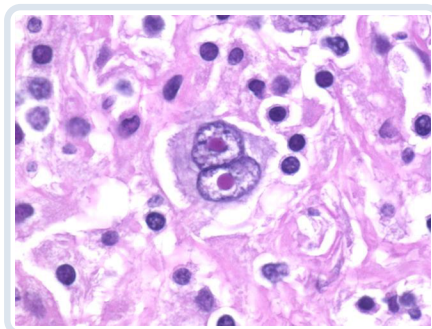
B. AML t (15;17)

WHY THIS IS RIGHT

The source quiz contains the placeholder “\$1e” here and does not include a written explanation for this item.

QUESTION

A 45-year-old woman came with complaints of fever, night sweats, generalized itching, and unintentional weight loss of 10% in the last 3 months. On examination, she has enlarged cervical and axillary lymph nodes. The lymph node examination and biopsy showed the following picture. What would the likely diagnosis and treatment option be?



CORRECT

- A** Hodgkin's Lymphoma - ABVD regimen
- B** NHL - Rituximab monotherapy
- C** NHL - advanced stage - treated with radiotherapy
- D** Sarcoidosis - Started on Prednisolone 40 mg/day

RIGHT ANSWER

OK

A. Hodgkin's Lymphoma - ABVD regimen

WHY THIS IS RIGHT

Correct answer is A because the biopsy shows Reed-Sternberg cells (large binucleate "owl eye" nuclei), characteristic of Hodgkin lymphoma, and the clinical features include B symptoms (fever, night sweats, weight loss, pruritus).

Lymphadenopathy

↓

B symptoms present

↓

Pruritus

↓

Biopsy: Reed-Sternberg cells

↓

Hodgkin lymphoma

Standard first-line treatment is ABVD regimen (Adriamycin, Bleomycin, Vinblastine, Dacarbazine).

| Feature | Hodgkin | NHL |

| ----- | ----- | --- |

| Spread | Contiguous | Non-contiguous |

| RS cells | Present | Absent |

| B symptoms | Common | Variable |

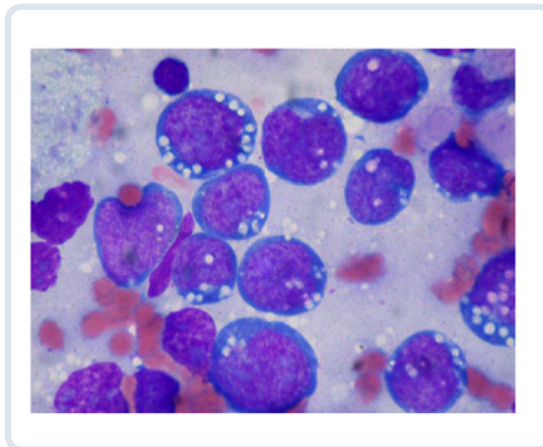
| Treatment | ABVD | R-CHOP etc. |

NHL usually lacks Reed-Sternberg cells. Radiotherapy alone is not used for advanced disease. Sarcoidosis shows non-caseating granulomas, not RS cells. Most common subtype:

- Nodular sclerosis HL
- Mediastinal involvement common

QUESTION

A 12-year-old child presented with cervical lymphadenopathy. A biopsy is obtained and it is as shown below. Flow cytometry showed the following findings: Tdt - negative, CD5/CD23 - negative, CD10/CD19/CD20, and SIg are positive. What is the likely diagnosis?



A Burkitt's lymphoma

CORRECT

B DLBCL (Diffuse Large B-Cell Lymphoma)

C ALCL (Anaplastic Large Cell Lymphoma)

D ALL (Acute Lymphoblastic Leukemia)

RIGHT ANSWER

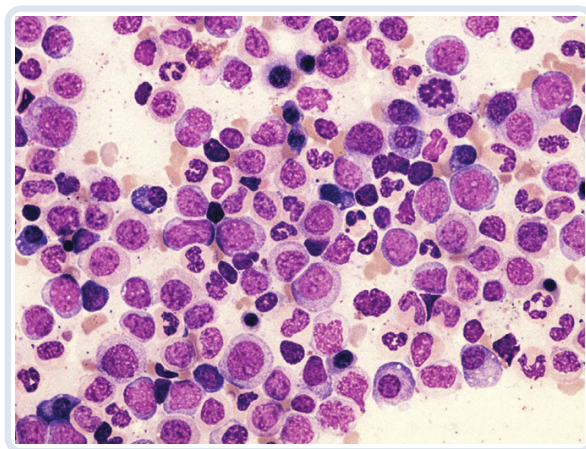
OK A. Burkitt's lymphoma

WHY THIS IS RIGHT

The source quiz contains the placeholder "\$1f" here and does not include a written explanation for this item.

QUESTION

A 30-year-old patient presented with fatigue. Labs are as follows - Hb 8 g/dL, WBC 150,000, and platelets 50,000. Examination is significant for hepatosplenomegaly. Bone marrow biopsy is shown. What is the most common karyotypic abnormality?



A 46XY t(9;22)

CORRECT

B 47 XY +21

C 45XY t(14;21)

D 46XY SRY gene deletion

RIGHT ANSWER

OK

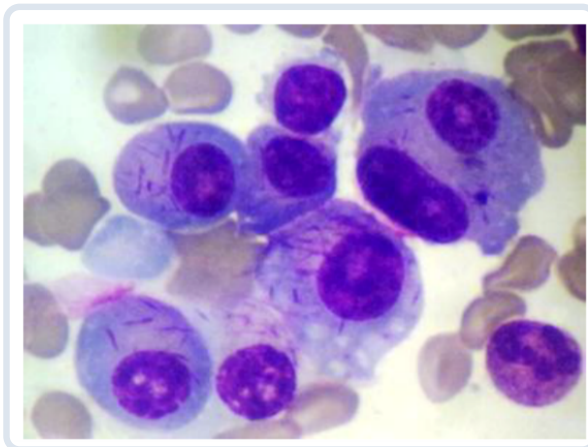
A. 46XY t(9;22)

WHY THIS IS RIGHT

The source quiz contains the placeholder "\$20" here and does not include a written explanation for this item.

QUESTION

A child presented with recurrent nasal bleeding. On examination, there was hepatosplenomegaly and WBC count is 40,000. Her peripheral smear is shown. On further evaluation, her PT, aPTT, and D-dimer were elevated. Which of the following cytogenetic changes is likely to be seen?



A PML-RARA

CORRECT

B BCR-ABL

C MYC-IgH

D DEK-MUP4

RIGHT ANSWER

OK A. PML-RARA

WHY THIS IS RIGHT

The source quiz contains the placeholder “\$21” here and does not include a written explanation for this item.

QUESTION

A 7-year-old child presented with fatigue. On examination, there were scattered purpuric rashes, and abdominal examination was notable for cervical lymphadenopathy and hepato-splenomegaly. Lab parameters are shown - Hb 7 g/dL, WBC 50,000, platelets 60,000. What is the treatment?

- A IVIg
- B Doxorubicin + epirubicin
- C Radiotherapy to the lymph node
- D Prednisolone + Vincristine**

CORRECT

RIGHT ANSWER

- OK
- D. Prednisolone + Vincristine**

WHY THIS IS RIGHT

Correct answer is D because the presentation suggests acute lymphoblastic leukemia with anemia, thrombocytopenia (purpura), leukocytosis, lymphadenopathy, and hepatosplenomegaly.

Prednisolone

↓

Lymphoblast apoptosis

Vincristine

↓

Inhibits mitosis (microtubules)

↓

Kills leukemic cells

Initial induction therapy for ALL commonly includes combination chemotherapy with steroids (prednisolone) and vincristine to induce remission.

IVIg is used in immune thrombocytopenia. Doxorubicin/epirubicin are used in other malignancies. Radiotherapy is not first-line for systemic leukemia.

| Phase | Treatment |

| ---- | ----- |

| Induction | □ Steroid + Vincristine |

| Consolidation | Chemo |

| Maintenance | Methotrexate, etc. |

ALL markers:

- TdT positive
- CD10 (CALLA)

QUESTION

A 65-year-old patient presents with symptoms of bone pain, anemia, hypercalcemia, and renal impairment. A bone marrow biopsy confirms the diagnosis of multiple myeloma. The patient is started on a treatment regimen. Which of the following treatments is most likely associated with the reactivation of herpes zoster?

A Bortezomib

CORRECT

B Lenalidomide

C Daratumumab

D Melphalan

RIGHT ANSWER

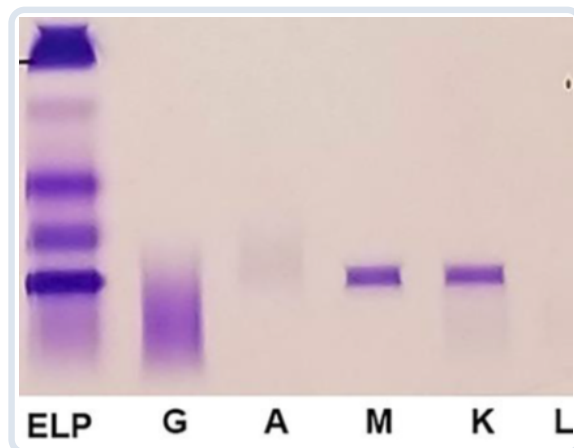
OK A. Bortezomib

WHY THIS IS RIGHT

The source quiz contains the placeholder “\$22” here and does not include a written explanation for this item.

QUESTION

An elderly male presented to the clinic with fatigue, headache, backache, and renal dysfunction. He had elevated calcium levels also. His serum electrophoresis had an M spike and the immunofixation pattern has been presented alongside. What is the likely diagnosis in the patient?



- A** Severe systemic infection
- B** MGUS (Monoclonal gammopathy of undetermined significance)
- C** Multiple myeloma with elevated IgG

D Multiple myeloma with elevated IgM

CORRECT

RIGHT ANSWER

OK D. Multiple myeloma with elevated IgM

WHY THIS IS RIGHT

The source quiz contains the placeholder “\$23” here and does not include a written explanation for this item.

QUESTION

A 4-year-old child presented with sudden onset of fatigue due to severe anemia, multiple bruises on his limbs, and WBC count of $40,000/\text{cm}^3$. What is the likely karyotype of the child?

A 46XY t(9;22)

B 45X0

C 47XX (+21)

CORRECT

D 46XY

RIGHT ANSWER

OK

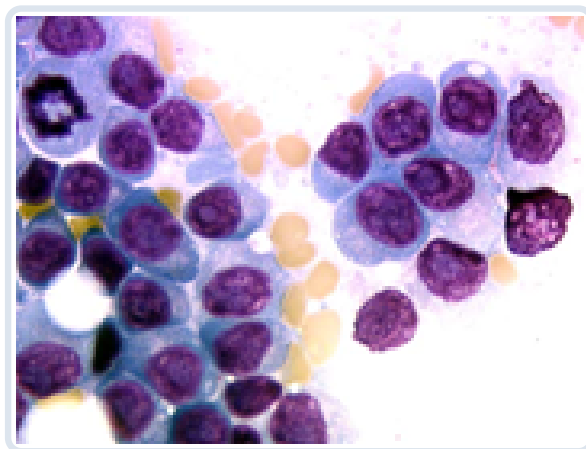
C. 47XX (+21)

WHY THIS IS RIGHT

The source quiz contains the placeholder “\$24” here and does not include a written explanation for this item.

QUESTION

A patient presented with tingling and numbness in the legs, polyuria, and weight loss. He underwent a bone marrow aspirate (image as shown). Which of the following is the likely diagnosis?



- A** SACD due to diabetes
- B** SACD with B12 deficiency
- C** Multiple myeloma with renal involvement
- D** Metastasis

CORRECT

RIGHT ANSWER

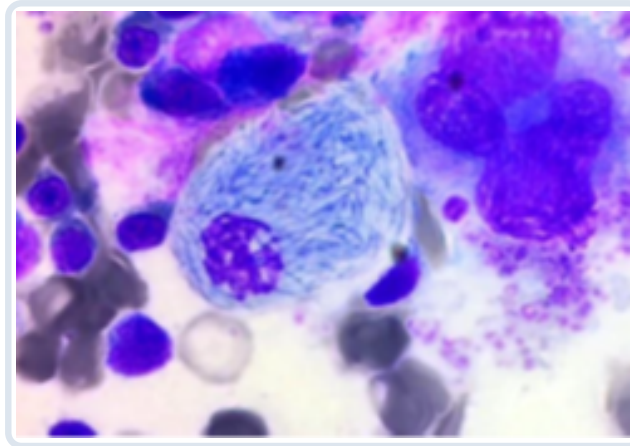
- OK** C. Multiple myeloma with renal involvement

WHY THIS IS RIGHT

The source quiz contains the placeholder "\$25" here and does not include a written explanation for this item.

QUESTION

Which of the following is associated with a bone marrow aspirate having the finding as shown in the image?



- A** Acute myeloid leukemia
- B** Acute lymphoblastic leukemia
- C** Chronic myeloid leukemia
- D** Chronic lymphocytic leukemia

CORRECT

RIGHT ANSWER

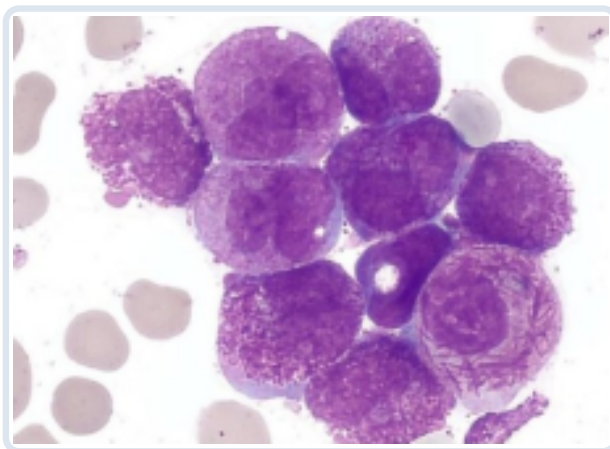
- OK** **C. Chronic myeloid leukemia**

WHY THIS IS RIGHT

The source quiz contains the placeholder "\$26" here and does not include a written explanation for this item.

QUESTION

A 60-year-old man presents with weakness, fatigue, and bleeding tendencies. His peripheral smear showed 25% blast-like cells, as shown in the image. What is the most common type of genetic abnormality seen in this hematological malignancy?



A inv(16)

B t(8;21)

C AML with NPM1

D t (15;17)

CORRECT

RIGHT ANSWER

OK

D. t (15;17)

WHY THIS IS RIGHT

The source quiz contains the placeholder “\$27” here and does not include a written explanation for this item.

QUESTION

A 28-year-old female presents with multiple cervical lymphadenopathies. IHC markers were positive for CD10 and BCL-2. Peripheral smear shows a large number of small cells (centrocytes) and occasional large cells (centroblasts). What is the most common genetic defect in this condition?

A t (14;18) BCL2-IGH

CORRECT

B t (2;5) ALK

C t (11;18) MALT1

D t (11;14) Cyclin D1-IGH

RIGHT ANSWER

OK A. t (14;18) BCL2-IGH

WHY THIS IS RIGHT

The source quiz contains the placeholder “\$28” here and does not include a written explanation for this item.

QUESTION

| Which of the following statements is/are incorrect about Hodgkin's lymphoma?

A Nodular sclerosis is the most common and involves the mediastinum

B Waldeyer's ring is commonly involved

CORRECT

C CD15 & CD30 positivity in Reed Sternberg cells

D Reed Sternberg cells are derived from B cells

RIGHT ANSWER

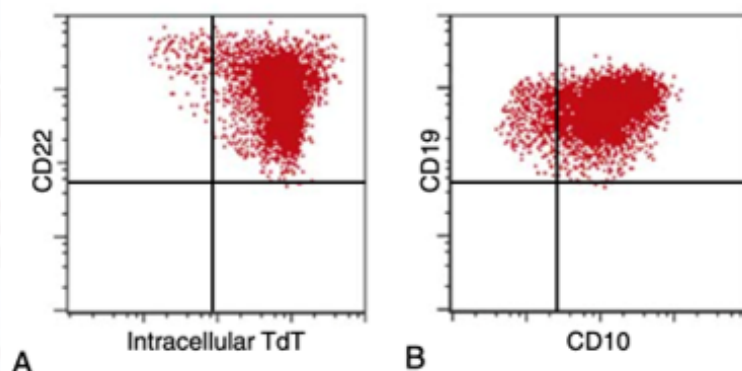
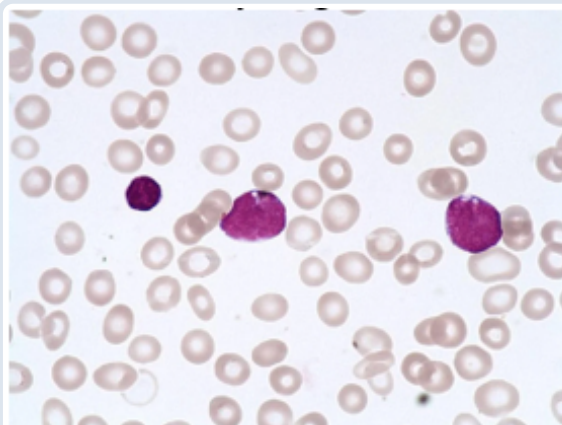
OK B. Waldeyer's ring is commonly involved

WHY THIS IS RIGHT

The source quiz contains the placeholder "\$29" here and does not include a written explanation for this item.

QUESTION

A 5-year-old child presents with gums bleeding, hepatosplenomegaly has a peripheral smear finding shown in the image. Flow cytometry was ordered for patient and shown below. What is the likely diagnosis?



A ALL B Lymphocyte Type

CORRECT

B ALL T Lymphocyte Type

C AML

D CML

RIGHT ANSWER

OK A. ALL B Lymphocyte Type

WHY THIS IS RIGHT

The source quiz contains the placeholder "\$2a" here and does not include a written explanation for this item.

QUESTION

6 Month-old girls has developed seborrheic skin eruptions over the past 3 months. She has had recurrent upper respiratory and middle ear infections with streptococcus pneumoniae for the past year. Physical examination indicates that she also has hepatosplenomegaly and generalized lymphadenopathy. Her hearing is reduced in the right ear. A skull radiograph shows an expansile, 2 cm lytic lesion involving the right temporal bone. Laboratory studies show no anemia, thrombocytopenia, or leukopenia. The mass is curetted. Which of the following is most likely to be seen on microscopic examination of this mass?

A Histocytes with Birbeck granules

CORRECT

B Lymphoblasts marking with CD3

C Plasma cells with Russell bodies

D Reed-Sternberg cells and variants

RIGHT ANSWER

OK

A. Histocytes with Birbeck granules

WHY THIS IS RIGHT

- Seborrheic dermatitis-like rash + Lytic skull lesions ("punched-out")
These are CLASSIC LCH features. (letterer siewe disease)

What is seen microscopically?

Langerhans cells:

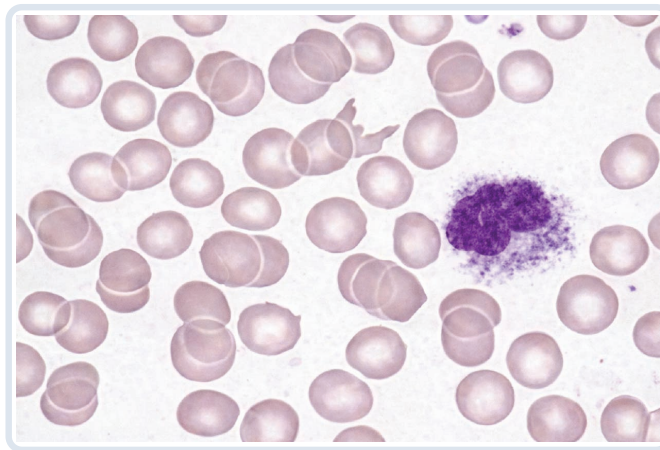
- Histiocytes
- Positive for : CD1a, S100, CD 207 (langerin), HLA DR +

- ☐ Option B: Lymphoblasts marking with CD3 -> T-ALL
- ☐ Option C: Plasma cells with Russell bodies -> chronic inflammation
- ☐ Option D :Reed-Sternberg cells -> Hodgkin lymphoma

QUESTION

A 62-year-old man comes to the physician because of easy bruising and recurrent nosebleeds over the past 4 months. During the same time period, the patient has felt weak and has had a 10-kg weight loss. Physical examination shows mucosal pallor and bruising on the upper and lower extremities in various stages of healing. The spleen is palpated 4 cm below the left costal margin. Laboratory studies show anemia and thrombocytopenia. A photomicrograph of a peripheral blood smear is shown.

Histologic examination of a bone marrow biopsy in this patient is most likely to show which of the following findings?



- A** Neoplastic granulocytes with low leukocyte alkaline phosphatase score
- B** Neoplastic lymphocytes that stain positive for tartrate-resistant acid phosphatase CORRECT
- C** Neoplastic myeloid cells that stain positive for myeloperoxidase
- D** Dysplastic erythroid cells that stain positive for iron

RIGHT ANSWER

- OK** **B. Neoplastic lymphocytes that stain positive for tartrate-resistant acid phosphatase**

WHY THIS IS RIGHT

Hairy cell leukemia is a B-cell lymphoproliferative disorder characterized by splenomegaly, pancytopenia, and circulating lymphocytes with cytoplasmic “hairy” projections; diagnosis is confirmed by tartrate-resistant acid phosphatase (TRAP) positivity and bone marrow fibrosis causing a dry tap.

Why not others:

- A. CML: Low LAP with ↑granulocytes, not TRAP+ lymphocytes
- C. AML: Myeloperoxidase+ myeloblasts, acute leukemia
- D. MDS: Ring sideroblasts in erythroid cells

QUESTION

A 55-year-old man comes to the physician because of worsening fatigue and recurrent bleeding from his gums for 2 weeks. Physical examination shows marked pallor. There are scattered red, nonblanching pinpoint spots on his trunk and extremities. Laboratory studies show a hemoglobin of 8.0 g/dL, a leukocyte count of 80,000/mm³, and a platelet count of 104,000/mm³. Genetic analysis of a bone marrow aspirate shows leukemic cells with a balanced translocation between the long arms of chromosome 15 and 17. These cells are most likely to stain positive for which of the following?

A Myeloperoxidase

CORRECT

B Tartrate resistant acid phosphatase

C Periodic acid- Schiff

D Cluster of differentiation 1a

RIGHT ANSWER

OK A. Myeloperoxidase

WHY THIS IS RIGHT

A balanced translocation t(15;17) is characteristic of acute promyelocytic leukemia (APL), a subtype of AML.

- Fusion gene: PML-RAR α
- Blocks myeloid differentiation at promyelocyte stage
- Promyelocytes accumulate with Auer rods
- High risk of DIC and bleeding
- Myeloid lineage cells -> myeloperoxidase (MPO) positive

Why not others:

- TRAP -> hairy cell leukemia
- PAS -> lymphoblasts (ALL)
- CD1a -> Langerhans cells/T-cell lineage

QUESTION

A 64-year-old man comes to the OPD due to persistent back pain, constipation, and easy fatigability for the last several months. Blood pressure is 115/75 mm Hg and pulse is 88/ min. The patient has dry mucous membranes. Laboratory results are as follows:

Hemoglobin 8.6 g/dL

Mean corpuscular volume: 92 fL

Blood urea nitrogen: 68 mg/dL

Creatinine: 1.9mg/dl

Renal biopsy is performed, and light microscopy shows atrophic tubules, many of which contain large, obstructing, waxy casts that stain intensely with eosin. Which of the following is the most likely diagnosis in this patient?

- A Acute pyelonephritis
- B Aminoglycoside toxicity
- C Allergic interstitial nephritis

D Multiple myeloma

CORRECT

RIGHT ANSWER

D. Multiple myeloma

WHY THIS IS RIGHT

Multiple myeloma commonly causes renal failure due to light-chain cast nephropathy (myeloma kidney). Key clinical features (CRAB criteria):

- Calcium elevation -> constipation, dehydration
- Renal failure -> ↑ BUN, creatinine
- Anemia -> normocytic anemia
- Bone pain -> lytic lesions/back pain

Renal pathology:

- Filtered monoclonal light chains (Bence Jones proteins)
- Form waxy eosinophilic casts in renal tubules
- Cause tubular obstruction and atrophy
- Leads to chronic kidney injury

This patient has:

- ☐ Back pain
- ☐ Constipation + dehydration (hypercalcemia)
- ☐ Fatigue (likely anemia)

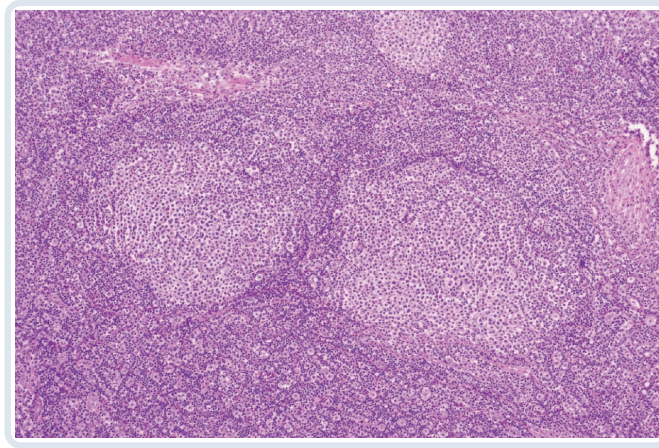
This fits Multiple Myeloma perfectly.

Other options:

- Acute pyelonephritis -> Fever, flank pain, urinary symptoms.
- Aminoglycoside toxicity -> Acute kidney injury after drug exposure.
- Allergic interstitial nephritis -> Rash, fever, eosinophilia.

QUESTION

A 35-year-old man is being evaluated for nontender cervical lymphadenopathy that he first noticed while shaving. A biopsy is performed and is shown below. Cytogenetic analysis would most likely demonstrate which of the following patterns?



A BCL-2 overexpression

CORRECT

B BCR-ABL rearrangement

C C-MYC overexpression

D Constitutive tyrosine kinase activation

RIGHT ANSWER

OK

A. BCL-2 overexpression

WHY THIS IS RIGHT

Follicular lymphoma is characterized by painless lymphadenopathy and is associated with t(14;18) translocation, leading to BCL-2 overexpression.

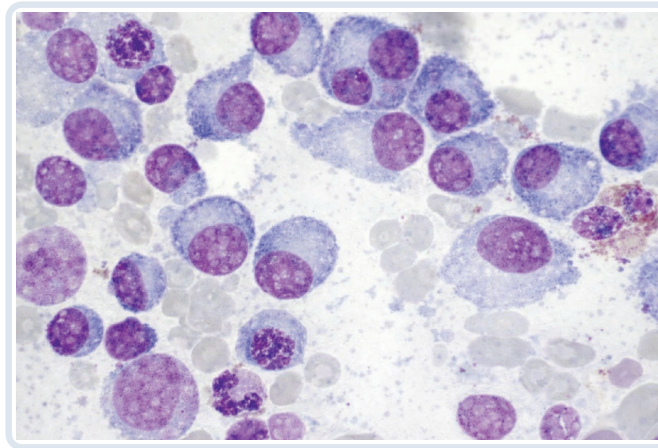
- BCL-2 gene moves next to Ig heavy-chain promoter
- Leads to inhibition of apoptosis -> accumulation of B-cells
- Produces nodular/follicular pattern on histology

Why other options are wrong:

- BCR-ABL -> CML
- c-MYC -> Burkitt lymphoma
- Constitutive tyrosine kinase -> various leukemias

QUESTION

A 59-year-old man comes to the OPD due to 3 months of progressive fatigue and back pain. The back pain occurs mainly with movement or positional changes. Physical examination reveals midline tenderness over the middle and lower back. Laboratory evaluation shows a hemoglobin level of 10.2 g/dL and serum calcium level of 12 mg/dL. A bone marrow aspirate is performed, and the histopathologic findings are shown below. This patient is at greatest risk for developing which of the following conditions?



A Amyloidosis

CORRECT

B Cardiac tamponade

C Hepatic failure

D Hyperthyroidism

RIGHT ANSWER

OK A. Amyloidosis

WHY THIS IS RIGHT

Multiple myeloma (anemia, hypercalcemia, bone pain, plasma cells in marrow) is associated with AL (light-chain) amyloidosis due to deposition of monoclonal immunoglobulin light chains produced by malignant plasma cells.

Key points:

- Excess κ or λ light chains $\rightarrow$ misfold $\rightarrow$ deposit as amyloid in tissues
- Organs affected: kidney (nephrotic syndrome), heart (restrictive cardiomyopathy), nerves, GI
- Congo red stain shows apple-green birefringence
- Amyloidosis is a major systemic complication of plasma cell dyscrasias.

QUESTION

A 20-year-old woman comes to the emergency department due to bloody stools. For the past month, she has also had decreased energy. Skin examination shows pallor and scattered bruises in various stages of healing throughout the trunk. The abdomen is soft without organomegaly. Complete blood count results are as follows:

Hemoglobin: 7.2 g/dL

Mean corpuscular volume 90 μm^3

Platelets: 10,000/ mm^3

Leukocytes: 1050/ mm^3

Neutrophils 5%

Lymphocytes 95%

Which of the following is the most likely cause of this patient's condition?

A Autoimmune-induced loss of self-renewing hematopoietic stem cells

CORRECT

B Bone marrow replacement by constitutively active tyrosine kinase-stimulated cells

C Splenic hyperactivity with cell trapping by the reticuloendothelial system

D Ineffective hematopoiesis secondary to micronutrient deficiency

RIGHT ANSWER

OK

A. Autoimmune-induced loss of self-renewing hematopoietic stem cells

WHY THIS IS RIGHT

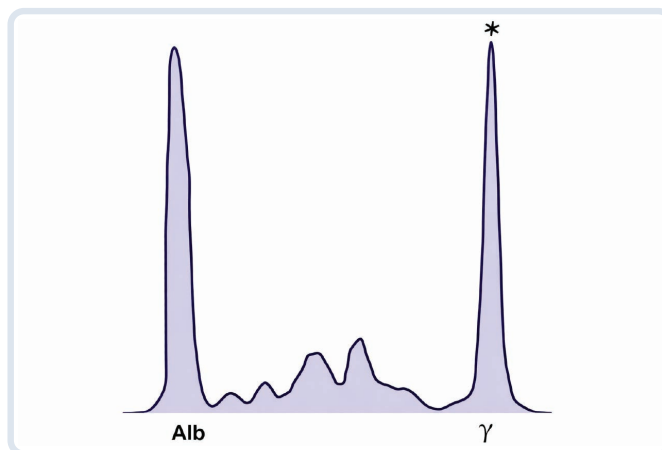
Aplastic anemia is caused by autoimmune destruction of hematopoietic stem cells, leading to pancytopenia with hypocellular bone marrow and absence of organomegaly.

- Pancytopenia: anemia + thrombocytopenia + leukopenia
- Normocytic anemia with low reticulocyte count
- No splenomegaly or lymphadenopathy
- Bone marrow: markedly hypocellular with fatty replacement
- Pathogenesis: autoreactive T-cell-mediated stem cell destruction

Common triggers include drugs, radiation, viral infections, and idiopathic autoimmune mechanisms.

QUESTION

A 67-year-old man is evaluated for persistent lower back pain and fatigue. Laboratory testing shows anemia and renal dysfunction. Serum electrophoresis of the serum proteins is shown below. A medication that blocks cellular proteasome action is administered. This treatment is most likely to cause which of the following effects on the abnormal cells?



A Augmented cytotoxic T-cell response

B Decreased DNA methylation

C Impaired RNA splicing

D Increased apoptosis

CORRECT

RIGHT ANSWER

OK D. Increased apoptosis

WHY THIS IS RIGHT

Proteasome inhibitors (e.g., bortezomib) used in multiple myeloma block degradation of misfolded and regulatory proteins within plasma cells, leading to accumulation of pro-apoptotic factors and inhibition of NF- κ B signaling, ultimately causing increased apoptosis of malignant plasma cells.

Key points:

- Multiple myeloma shows monoclonal M-spike on SPEP
- Plasma cells produce large amounts of immunoglobulin -> highly dependent on proteasome function
- Proteasome inhibition -> protein buildup -> ER stress -> apoptosis
- Therapeutic effect: selective killing of malignant plasma cells

QUESTION

A 5-year-old girl is brought to the OPD by her mother due to leg pain. One week ago mother saw the patient fall onto the living room floor after climbing on a couch. Since the incident, she has had persistent leg pain that appears to be worse at night, and for the last 2 days she has been refusing to walk asking her mother to carry her. The patient has no chronic medical conditions but has had a mild, non-productive cough for the past month. Temperature is 38.3 C (100.9 F); all other vital signs are normal. Examination shows a pale child. The abdomen is nontender and moderate hepatosplenomegaly is noted. Palpation of the bilateral anterior proximal tibias elicits pain. There are a few scattered bruises across the chest and back. Complete blood count results are as follows:

Hemoglobin-8g/dL

Platelets-30,000/mm³

Leukocytes-3,000/mm³

Which of the following is the most likely cause of this patient's symptoms?

A Acute lymphoblastic leukemia

CORRECT

B Aplastic anemia

C Immune thrombocytopenia

D Infectious mononucleosis

RIGHT ANSWER

OK **A. Acute lymphoblastic leukemia**

WHY THIS IS RIGHT

Acute lymphoblastic leukemia (ALL) in children commonly presents with bone pain, pallor, fever, bruising, and hepatosplenomegaly due to bone marrow infiltration by malignant lymphoblasts.

- Marrow infiltration -> pancytopenia (anemia, thrombocytopenia, leukopenia)
- Bone expansion and periosteal irritation -> bone pain, refusal to walk
- Extramedullary infiltration -> hepatosplenomegaly, lymphadenopathy
- Often mistaken for trauma or infection initially

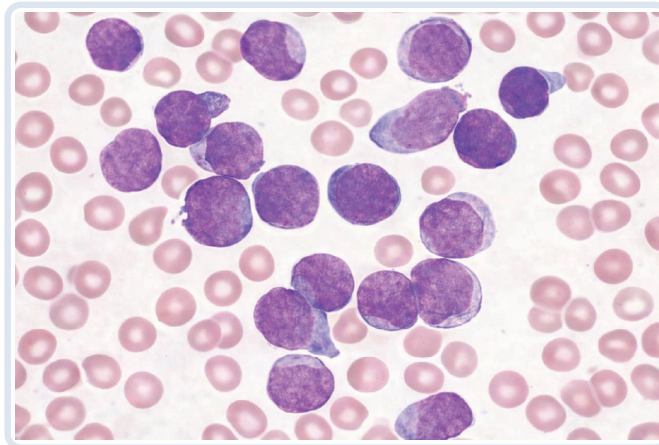
Diagnosis:

- Peripheral smear/bone marrow: lymphoblasts
- Immunophenotype: TdT+, CD10+, CD19+ (B-ALL)

Thus, leukemia should be suspected in any child with bone pain + pancytopenia + organomegaly.

QUESTION

A 5-year-old child was brought to OPD with abrupt onset of fever, weakness and hepatosplenomegaly. Peripheral blood smear showed cells as given below. Immunophenotyping revealed the presence of CD79a+, CD19+, and CD20+. The cells of origin for these neoplastic cells are?



A Precursor B lymphoblasts

CORRECT

B Marginal zone cells

C Germinal center cells

D Thymic origin T cells

RIGHT ANSWER

OK A. Precursor B lymphoblasts

WHY THIS IS RIGHT

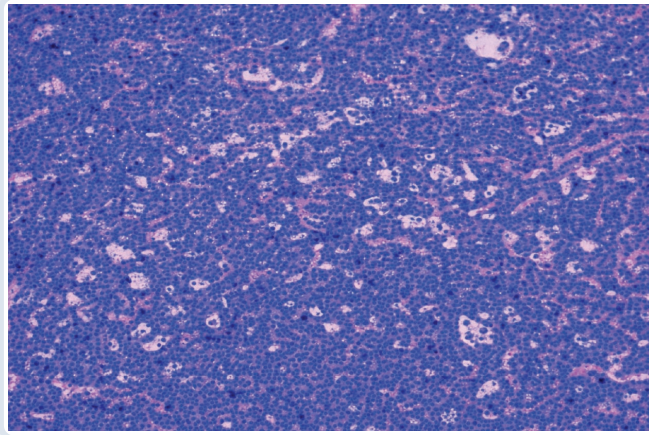
Blasts expressing CD19, CD20, and CD79a are of B-cell lineage, indicating B-cell acute lymphoblastic leukemia (B-ALL). Key immunophenotypic markers:

- CD19, CD79a: pan B-cell markers
- CD10 (CALLA): common in precursor B-ALL
- TdT positive: lymphoblast marker
- May express CD20 in some cases

B-ALL arises from precursor B lymphoblasts in bone marrow and is the most common childhood leukemia, presenting with fever, weakness, hepatosplenomegaly, and circulating blasts.

QUESTION

A 18-year-old boy is brought to the hospital with a 2-week history of rapidly increasing swelling on his jaw, recurrent nosebleeds, weight loss, and generalized fatigue. Physical examination of the neck reveals firm, nontender lymph nodes. The mass is biopsied, the image is shown below. Which of the following best describes the genomic structure of the most likely causative virus?



A Double-stranded circular DNA

B Double-stranded linear DNA

CORRECT

C Double-stranded linear RNA

D Single-stranded linear RNA

RIGHT ANSWER

OK B. Double-stranded linear DNA

WHY THIS IS RIGHT

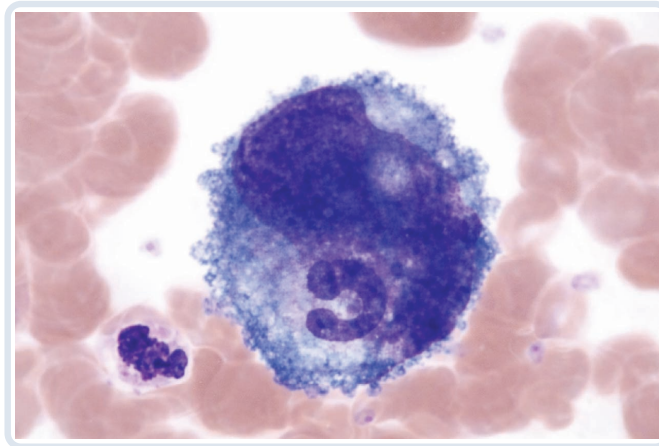
Jaw swelling in an adolescent with “starry-sky” histology suggests Burkitt lymphoma, which is strongly associated with Epstein-Barr virus (EBV) infection.

EBV characteristics:

- Member of herpesvirus family
- Enveloped, double-stranded linear DNA virus
- Infects B lymphocytes via CD21 receptor
- Associated with Burkitt lymphoma, Hodgkin lymphoma, nasopharyngeal carcinoma, and infectious mononucleosis

QUESTION

The following phenomenon is seen in all diseases except



A Autoimmune hepatitis

B Rosai-Dorfman disease

C Burkitt lymphoma

CORRECT

D Hodgkin lymphoma

RIGHT ANSWER

OK

C. Burkitt lymphoma

WHY THIS IS RIGHT

The image shows emperipolesis - presence of intact lymphocytes or other cells within the cytoplasm of histiocytes/plasma cells without destruction.

Emperipolesis is classically seen in:

- Rosai-Dorfman disease (hallmark feature)
- Autoimmune hepatitis (plasma cells with emperipolesis)
- Hodgkin lymphoma (can be seen in Reed-Sternberg cells)

It is not a feature of Burkitt lymphoma, which instead shows a “starry sky” appearance due to macrophages phagocytosing apoptotic tumor cells (true phagocytosis, not emperipolesis).

QUESTION

Which of the following is a histone deacetylase inhibitor that can be used in the treatment of cutaneous T - cell lymphoma?

- A Lonafarnib
- B Alemtuzumab
- C Vemurafenib

D Vorinostat

CORRECT

RIGHT ANSWER

D. Vorinostat

WHY THIS IS RIGHT

Vorinostat is a histone deacetylase (HDAC) inhibitor used in the treatment of cutaneous T-cell lymphoma (CTCL), including mycosis fungoides and Sézary syndrome.

Mechanism of action:

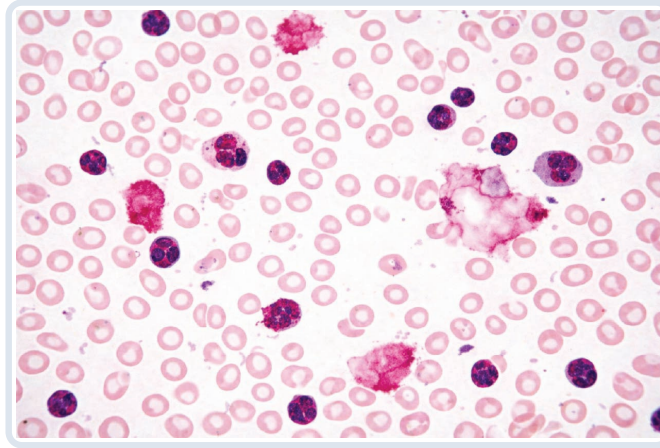
- Inhibits histone deacetylase -> increases histone acetylation
- Leads to altered gene expression
- Promotes tumor cell differentiation, cell cycle arrest, and apoptosis

Why not others:

- Lonafarnib -> farnesyl transferase inhibitor
- Alemtuzumab -> anti-CD52 monoclonal antibody
- Vemurafenib -> BRAF inhibitor (melanoma)

QUESTION

A 65-year-old male patient with chronic fatigue and lymphadenopathy presents to the outpatient department. His peripheral smear is shown below. Which of the following additional investigations will you do to arrive at a diagnosis?



A Polymerase chain reaction

B Fluorescent in situ hybridization

C Flow cytometry

CORRECT

D Cytogenetics

RIGHT ANSWER

OK

C. Flow cytometry

WHY THIS IS RIGHT

Peripheral smear showing absolute lymphocytosis with smudge cells in an elderly patient suggests chronic lymphocytic leukemia (CLL). Flow cytometry is the investigation of choice to confirm diagnosis by demonstrating a monoclonal B-cell population with characteristic immunophenotype:

- CD19 $\square$, CD20 $\square$
- CD5 $\square$
- CD23 $\square$

Why not others?

- PCR: Detects mutations -> used later, not for initial diagnosis
- FISH: For prognosis (del 13q, 17p) -> after diagnosis
- Cytogenetics: Low sensitivity in CLL -> prognostic use

QUESTION

A 60-year-old patient presented with scrotal swelling and ataxia. Which among the following could likely be a cause?

- A Glioblastoma multiforme
- B Hodgkin lymphoma
- C Non-Hodgkin lymphoma**
- D Non seminomatous germ cell tumor

CORRECT

RIGHT ANSWER

- OK
- C. Non-Hodgkin lymphoma**

WHY THIS IS RIGHT

Non-Hodgkin lymphoma (especially testicular lymphoma) in elderly men can present with painless scrotal/testicular swelling and may be associated with paraneoplastic cerebellar degeneration, causing ataxia. Testicular lymphoma is the most common testicular tumor in men >60 years and often shows extranodal spread, particularly to:

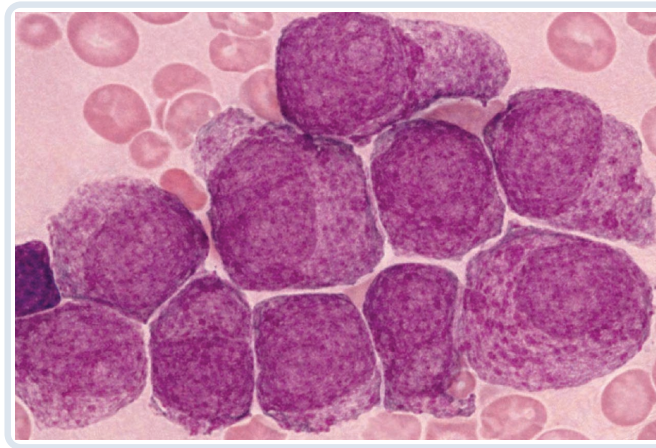
- CNS
- Skin
- Waldeyer ring

Why not others:

- Glioblastoma: CNS only, no testicular swelling
- Hodgkin lymphoma: Rare testicular involvement
- Non-seminomatous GCT: Occurs in young men, not 60 yrs

QUESTION

42-year-old man is hospitalized with fever and persistent sore throat. On physical examination, his temperature is 38.3°C (101 F), blood pressure is 120/80 mm Hg, pulse is 94/min, and respirations are 16/min. There are several bruises on his trunk, and blood is oozing from his intravenous catheter venipuncture sites. His blood fibrinogen level is 110 mg/dL (normal 150-400 mg/dL). Bone marrow biopsy is shown here. Chromosomal analysis of these immature cells is most likely to show which of the following abnormalities?



A t (8;14)

B t (9;22)

C t (14;18)

D t (15;17)

CORRECT

RIGHT ANSWER

OK

D. t (15;17)

WHY THIS IS RIGHT

Acute promyelocytic leukemia (APL, AML-M3) presents with bleeding, DIC, and low fibrinogen due to release of procoagulant granules from abnormal promyelocytes. It is strongly associated with the t(15;17) translocation, producing the PML-RAR α fusion gene.

This fusion blocks differentiation at the promyelocyte stage and is uniquely responsive to all-trans retinoic acid (ATRA) $\pm$ arsenic trioxide, which induces maturation of malignant cells and rapidly improves coagulopathy.

QUESTION

Identify the causes of dry tap on bone marrow aspiration

1. Hairy cell leukemia
2. Follicular lymphoma
3. AML M7
4. Myelodysplastic syndrome

A 1, 3

B 2, 4

C 1, 3, 4

CORRECT

D 1, 2, 3, 4

RIGHT ANSWER

OK C. 1, 3, 4

WHY THIS IS RIGHT

A dry tap on bone marrow aspiration occurs when marrow cannot be aspirated due to marrow fibrosis, hypercellularity, or infiltration, and is often followed by a trephine biopsy for diagnosis.

Common causes of dry tap:

- Hairy cell leukemia: marrow fibrosis due to leukemic infiltration
- AML M7 (acute megakaryoblastic leukemia): associated with marked marrow fibrosis
- Myelodysplastic syndrome (especially fibrotic variant): may produce fibrosis and ineffective hematopoiesis
- Primary myelofibrosis (classic cause, though not listed)

Follicular lymphoma is less common cause it Usually causes marrow infiltration but not significant fibrosis leading to dry tap.

QUESTION

A patient with cervical lymphadenopathy has (11;14) positive. Which of the following markers would be positive?

1. CD10;
2. CD 200;
3. CD5
4. Cyclin D1
5. CD23

A 1, 2

B 2, 3, 4, 5

C 1, 3

D 3, 4

CORRECT

RIGHT ANSWER

OK

D. 3, 4

WHY THIS IS RIGHT

A t(11;14)(q13;q32) translocation is characteristic of mantle cell lymphoma (MCL). This translocation causes overexpression of cyclin D1, leading to uncontrolled cell cycle progression. Immunophenotype of mantle cell lymphoma:

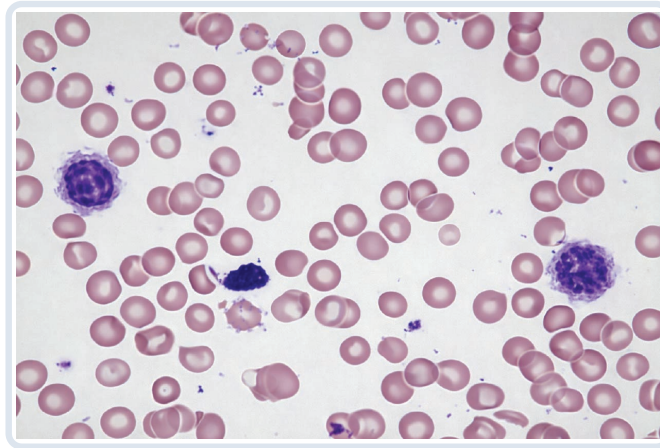
- CD5 positive (T-cell marker aberrantly expressed on B cells)
- Cyclin D1 positive (hallmark finding)
- CD20 positive
- CD23 negative (helps differentiate from CLL)
- CD10 negative (distinguishes from follicular lymphoma)

Genetic basis:

- t(11;14) -> cyclin D1 gene (CCND1) overexpression
- Promotes G1->S phase cell cycle transition

QUESTION

Which of the following markers will be positive in the following patient?



A CD 103

CORRECT

B CD 1a

C BCL-2

D CD5

RIGHT ANSWER

OK A. CD 103

WHY THIS IS RIGHT

The peripheral smear image shows hairy cells - lymphoid cells with irregular cytoplasmic projections - characteristic of hairy cell leukemia, a chronic B-cell lymphoproliferative disorder. Immunophenotypic markers of hairy cell leukemia:

- CD103 positive (highly characteristic)
- CD11c positive
- CD25 positive
- TRAP positive (tartrate-resistant acid phosphatase)
- Annexin A1 positive

Clinical features:

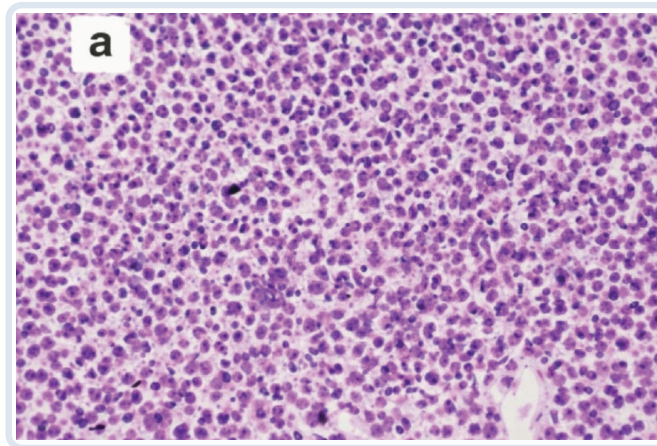
- Pancytopenia
- Splenomegaly
- Recurrent infections
- "Dry tap" on bone marrow aspiration due to fibrosis

Distinguishing from other options:

- CD1a -> Langerhans cell histiocytosis
- BCL-2 -> many lymphomas but not specific
- CD5 -> CLL, mantle cell lymphoma

QUESTION

A 37-year-old presented with fever. On examination, he had enlarged and ulcerated tonsils. His peripheral blood smear showed lymphocytosis. Monospot test was negative. Tonsillectomy was done and it showed large cells mixed with lymphocytes. The cells were positive for CD20, EB LMP1, MUM1, BCL-6. The cells are negative for CD15. Your most probable diagnosis is?



A Hodgkin lymphoma

B DLBCL

CORRECT

C CLL

D EBV positive mucocutaneous ulcer

RIGHT ANSWER

OK B. DLBCL

WHY THIS IS RIGHT

Diffuse large B-cell lymphoma (DLBCL) is an aggressive non-Hodgkin lymphoma composed of large atypical B cells and commonly presents with rapidly enlarging extranodal masses such as tonsillar enlargement.

- CD20 positive -> B-cell lineage
- MUM1 positive -> activated B-cell phenotype
- EBV LMP1 positive -> EBV association in some cases
- BCL-6 variable
- CD15 negative -> helps exclude classical Hodgkin lymphoma

Distinguishing features:

- Hodgkin lymphoma -> CD15+, CD30+, Reed-Sternberg cells
- CLL -> small mature lymphocytes, CD5+, CD23+
- EBV mucocutaneous ulcer -> localized ulcer in immunosuppressed/elderly, self-limited

QUESTION

A child presented with bilateral proptosis. From the peripheral smear, he was suspected to have chloroma. What is the next investigation of choice?

A Platelet count

B WBC count

C Flow cytometry

D Bone marrow examination

CORRECT

RIGHT ANSWER

OK D. Bone marrow examination

WHY THIS IS RIGHT

Chloroma (granulocytic sarcoma) is an extramedullary tumor composed of immature myeloid cells and is strongly associated with acute myeloid leukemia (AML). It may present with bilateral proptosis due to orbital infiltration in children. Next investigation of choice: Bone marrow examination

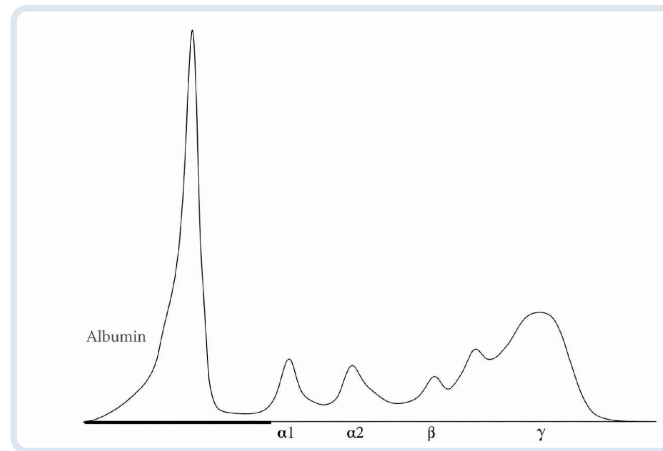
- Confirms diagnosis of AML
- Assesses blast percentage
- Enables cytogenetic and molecular studies

Other options:

- Platelet/WBC count -> supportive but not diagnostic
- Flow cytometry -> done on marrow sample after confirmation

QUESTION

The following serum protein electrophoresis (SPEP) pattern is shown. This electrophoretic pattern is most consistent with which of the following?



A Monoclonal IgG gammopathy

B Monoclonal IgM gammopathy

C Polyclonal IgG gammopathy

CORRECT

D Light-chain (Bence Jones) proteinemia

RIGHT ANSWER

OK C. Polyclonal IgG gammopathy

WHY THIS IS RIGHT

In serum protein electrophoresis (SPEP), a polyclonal gammopathy is characterized by a broad-based increase in the gamma (γ) region, reflecting increased production of multiple immunoglobulin types from many plasma cell clones.

Key SPEP patterns:

- Polyclonal gammopathy: broad, diffuse γ-region elevation
- Seen in chronic infections, autoimmune diseases, chronic liver disease, inflammation
- Monoclonal gammopathy (M-spike): sharp narrow spike in γ or β regio
- Seen in multiple myeloma, MGUS, Waldenström macroglobulinemia
- Bence Jones/light-chain disease: may show minimal serum spike; detected in urine electrophoresis

QUESTION

A 24-year-old man presents with progressive fatigue, recurrent infections, and spontaneous gum bleeding for the past 3 months. There is no hepatosplenomegaly or lymphadenopathy. Complete blood count shows pancytopenia with normal red cell indices. Reticulocyte count is markedly reduced. Which of the following bone marrow findings is most consistent with the underlying condition in this patient?

A

Markedly hypocellular marrow with extensive fatty replacement and reduced hematopoietic cells

CORRECT

B

Increased neutrophils with distorted architecture giving a “crumpled tissue paper” appearance

C

Hypercellular marrow with erythroid hyperplasia and reduced myeloid lineage

D

Hypercellular marrow with dysplastic changes in all three cell lineages

RIGHT ANSWER

OK

A. Markedly hypocellular marrow with extensive fatty replacement and reduced hematopoietic cells

WHY THIS IS RIGHT

The patient's pancytopenia with low reticulocyte count, absence of organomegaly, and bleeding/infections is characteristic of aplastic anemia, a bone marrow failure disorder causing Immune-mediated destruction of hematopoietic stem cells. It Can be idiopathic or due to drugs, toxins, radiation, viral infections.

Bone marrow findings in aplastic anemia:

- Markedly hypocellular marrow
- Extensive fatty replacement
- Severe reduction of hematopoietic stem cells
- No malignant infiltration or fibrosis

Distinguishing from other options:

- Myelofibrosis -> “dry tap,” fibrotic marrow
- Pure red cell aplasia -> only erythroid suppression
- Myelodysplastic syndrome -> hypercellular marrow with dysplasia

QUESTION

A 58-year-old man with newly diagnosed multiple myeloma presents with confusion, nausea, constipation, and bone pain. Investigations reveal:

Serum calcium: 14.8 mg/dL

Serum creatinine: 2.1 mg/dL

Hemoglobin: 8.2 g/dL

Skeletal survey shows multiple lytic lesions.

Which of the following is the most appropriate initial management?

A Lenalidomide + Bortezomib + Dexamethasone + Daratumumab

B Rituximab + Cyclophosphamide + Vincristine

C Intravenous normal saline infusion

CORRECT

D Autologous stem cell transplantation

RIGHT ANSWER

OK

C. Intravenous normal saline infusion

WHY THIS IS RIGHT

Severe hypercalcemia is a medical emergency commonly seen in multiple myeloma due to osteolytic bone resorption. Initial management focuses on rapid reduction of serum calcium and stabilization. First-line initial treatment: Aggressive intravenous normal saline infusion.

Subsequent treatments (after hydration):

- IV bisphosphonates (zoledronic acid, pamidronate)
- Calcitonin for rapid temporary reduction
- Treat underlying malignancy (chemotherapy)

Why other options are incorrect initially:

- Myeloma chemotherapy -> started after stabilization
- Stem cell transplant -> long-term management
- Rituximab regimens -> not used in myeloma

QUESTION

A 46-year-old man presents with severe fatigue, bone pain, recurrent infections, and bleeding manifestations for 2 months. Examination reveals pallor and hepatosplenomegaly. Laboratory investigations show:

Hemoglobin: 6.8 g/dL

Serum calcium: 12.2 mg/dL

Serum creatinine: 2.4 mg/dL

Peripheral blood smear reveals >25% circulating plasma cells. There is no prior history of multiple myeloma.

Which of the following is the most likely diagnosis?

- A** Multiple myeloma
- B** Secondary plasma cell leukemia
- C** Primary plasma cell leukemia
- D** Waldenström macroglobulinemia

CORRECT

RIGHT ANSWER

OK C. Primary plasma cell leukemia

WHY THIS IS RIGHT

Primary plasma cell leukemia (PCL) is a rare, aggressive plasma cell dyscrasia defined by >20% circulating plasma cells (or absolute count >2,000/ μ L) in peripheral blood without prior history of multiple myeloma.

- Severe anemia
- Hypercalcemia
- Renal dysfunction
- Bone pain
- Hepatosplenomegaly
- Recurrent infections and bleeding

Types:

- Primary PCL: arises de novo without prior multiple myeloma
- Secondary PCL: occurs as leukemic transformation of known multiple myeloma

Distinguishing from other disorders:

- Multiple myeloma -> plasma cells mainly in bone marrow, not high circulating levels
- Waldenström macroglobulinemia -> lymphoplasmacytic lymphoma with IgM excess

QUESTION

Which of the following drugs is approved for the treatment of chronic myeloid leukemia (CML) in patients who have failed two or more tyrosine kinase inhibitors (TKIs)?

A Bosutinib

B Ponatinib

C Omacetaxine

CORRECT

D Nilotinib

RIGHT ANSWER

OK C. Omacetaxine

WHY THIS IS RIGHT

Omacetaxine mepesuccinate is a protein synthesis inhibitor approved for treatment of chronic myeloid leukemia (CML) by blocking ribosomal elongation in patients who have failed or are resistant to two or more tyrosine kinase inhibitors (TKIs). Reduces levels of BCR-ABL oncoprotein.

Other drugs:

- Imatinib, dasatinib, nilotinib, bosutinib -> TKIs (first/second-line)
- Ponatinib -> used for T315I mutation or resistant disease but still a TKI

QUESTION

A 66-year-old woman presents with progressive fatigue. CBC shows Hb 7.6 g/dL, MCV 112 fL, TLC 4,800/ μ L, and platelet count $4.9 \times 10^5/\mu$ L. Bone marrow examination reveals hypolobated megakaryocytes. Cytogenetic analysis shows an isolated deletion of the long arm of chromosome 5. Which of the following is the treatment of choice?

- A Azacitidine
- B Lenalidomide**
- C Allogeneic stem cell transplantation
- D Erythropoietin therapy

CORRECT

RIGHT ANSWER

OK **B. Lenalidomide**

WHY THIS IS RIGHT

An isolated deletion of the long arm of chromosome 5 (del(5q)) in a patient with macrocytic anemia and dysplastic megakaryocytes indicates myelodysplastic syndrome (MDS) with isolated del(5q), a distinct subtype with relatively good prognosis.

Treatment of choice: Lenalidomide

- Improves anemia
- Reduces transfusion dependence
- Can induce cytogenetic remission

Other options:

- Azacitidine -> for higher-risk MDS
- Stem cell transplant -> for younger/high-risk patients
- Erythropoietin -> less effective in del(5q) subtype

QUESTION

The Philadelphia chromosome seen in chronic myeloid leukemia is best described as which of the following chromosomal abnormalities?

- A Balanced translocation between the short arms of chromosomes 9 and 22
- B Balanced translocation between the long arms of chromosomes 9 and 22**
- C Unbalanced translocation between the long arms of chromosomes 9 and 22
- D Unbalanced translocation between the short arms of chromosomes 9 and 22

CORRECT

RIGHT ANSWER

- B. Balanced translocation between the long arms of chromosomes 9 and 22**

WHY THIS IS RIGHT

The Philadelphia chromosome in chronic myeloid leukemia (CML) results from a balanced reciprocal translocation between the long arms (q arms) of chromosomes 9 and 22, designated t(9;22)(q34;q11).

- Translocation forms the BCR-ABL fusion gene
- Produces a constitutively active tyrosine kinase
- Leads to uncontrolled myeloid cell proliferation

Clinical relevance:

- Diagnostic hallmark of CML
- Also seen in some cases of ALL
- Targeted therapy: tyrosine kinase inhibitors (eg, imatinib, dasatinib)

QUESTION

Which of the following peripheral blood smear findings is NOT typically seen in chronic lymphocytic leukemia (CLL)?

A Small mature lymphocytes

B Smudge cells

C Prolymphocytes

D Lymphoblasts

CORRECT

RIGHT ANSWER

OK

D. Lymphoblasts

WHY THIS IS RIGHT

Chronic lymphocytic leukemia (CLL) is a malignancy of mature B lymphocytes and typically shows characteristic findings on peripheral blood smear. Typical smear findings in CLL:

- Small mature lymphocytes with clumped chromatin
- Smudge cells (fragile lymphocytes disrupted during slide preparation)
- Occasional prolymphocytes may be present in small numbers

Not seen in CLL:

- Lymphoblasts -> seen in acute leukemias (eg, ALL), not in CLL
- Presence of numerous blasts suggests transformation or acute leukemia rather than CLL

QUESTION

A 62-year-old man presents with progressive fatigue and painless cervical and axillary lymphadenopathy for the past 4 months. There is no history of fever or weight loss. Examination reveals mild splenomegaly. Complete blood count shows Hb 11 g/dL, total leukocyte count 58,000/ μ L with absolute lymphocytosis. Peripheral blood smear reveals numerous small mature-appearing lymphocytes with smudge cells. Which of the following investigations is most appropriate to confirm the diagnosis?

- A** Bone marrow aspiration and biopsy
- B** Flow cytometry of peripheral blood
- C** Fluorescence in situ hybridization (FISH)
- D** Lymph node excisional biopsy

CORRECT

RIGHT ANSWER

- OK** **B. Flow cytometry of peripheral blood**

WHY THIS IS RIGHT

Chronic lymphocytic leukemia (CLL) is characterized by persistent absolute lymphocytosis with small mature-appearing lymphocytes and smudge cells on peripheral smear. The most appropriate test to confirm the diagnosis is flow cytometry of peripheral blood.

- Monoclonal B cells expressing CD19, CD20, CD23
- Aberrant CD5 expression on B cells (key feature)
- Light chain restriction (kappa or lambda)

Other tests:

- Bone marrow biopsy -> staging/prognosis, not initial confirmation
- FISH -> detects prognostic cytogenetic abnormalities (eg, del17p)
- Lymph node biopsy -> used if transformation suspected (Richter syndrome)

QUESTION

Which of the following represent the primary defect in patients with Bernard-Soulier syndrome?

- A** Defect in fibrinogen
- B** Defect in von Willebrand factor
- C** Defect in GpIIb
- D** Defect in Gplb

CORRECT

RIGHT ANSWER

OK D. Defect in Gplb

WHY THIS IS RIGHT

Solution- Normal:
Vessel injury

↓
vWF binds exposed collagen

↓
Platelet GpIIb binds vWF

↓
Platelet adhesion

Correct answer is D because Bernard-Soulier syndrome is caused by deficiency or dysfunction of platelet Gplb receptor, leading to defective platelet adhesion to subendothelial vWF.

Gplb defect

↓
No binding to vWF

↓
No platelet adhesion

↓
Bleeding

It presents with thrombocytopenia, giant platelets, and prolonged bleeding time.

GpIIb/IIIa defect is seen in Glanzmann thrombasthenia. vWF defect is seen in von Willebrand disease. Fibrinogen defects cause coagulation abnormalities, not platelet adhesion defects.

Disorder	Defect	Problem	Key Feature
Bernard-Soulier	Gplb	Adhesion	Giant platelets
Glanzmann	GpIIb/IIIa	Aggregation	Normal size platelets
vWD	vWF	Adhesion + Factor VIII	↑ aPTT

QUESTION

A male patient sustained a fall after which he developed swelling of the knee. Laboratory investigations show increased APTT, with normal bleeding time and normal PT. Which of the following is the most likely diagnosis?

A Von Willebrand disease

B Hemophilia A

CORRECT

C ITP

D DIC

RIGHT ANSWER

OK B. Hemophilia A

WHY THIS IS RIGHT

The source quiz contains the placeholder “\$19” here and does not include a written explanation for this item.

QUESTION

A young patient began taking a weight loss medication that works by preventing fat absorption from food. She developed easy bruising and increased menstrual bleeding after a few weeks. Which of the following vitamins deficiency is likely to be responsible for her condition?

A Vitamin E

B Vitamin K

CORRECT

C Vitamin B6

D Vitamin D

RIGHT ANSWER

OK

B. Vitamin K

WHY THIS IS RIGHT

Correct answer is B because fat absorption inhibitors reduce absorption of fat-soluble vitamins, and vitamin K deficiency leads to impaired synthesis of clotting factors II, VII, IX, and X, causing bleeding tendency.

Fat absorption blocked

↓

↓ Fat-soluble vitamins (A, D, E, K)

↓

↓ Vitamin K

↓

↓ Clotting factors (II, VII, IX, X)

↓

Bleeding

This explains easy bruising and menorrhagia.

Vitamin E deficiency causes neuropathy. Vitamin D deficiency causes bone disease. Vitamin B6 is water soluble and not affected by fat malabsorption.

QUESTION

A patient with deep vein thrombosis was started on a new drug. After 2 days, he presented with the given finding. Which of the following drugs is implicated in causing the above condition?



A Warfarin

CORRECT

B Heparin

C Dabigatran

D Rivaroxaban

RIGHT ANSWER

OK

A. Warfarin

WHY THIS IS RIGHT

Correct answer is A because warfarin can cause early skin necrosis (purple toe/dermal vascular necrosis) due to rapid fall in protein C levels before full anticoagulation, creating a transient hypercoagulable state.

Warfarin started

↓

↓ Protein C (short half-life)

↓

Temporary hypercoagulable state

↓

Microthrombosis in skin

↓

Skin necrosis

It is more common in patients with underlying protein C deficiency and typically occurs within the first few days of therapy.
Mechanism:

BUT ALSO:

Result: Initial hypercoagulable state

Heparin causes HIT-related thrombosis. Dabigatran and rivaroxaban are not associated with warfarin skin necrosis.

Time after starting warfarin	Event
1-3 days	□ Skin necrosis
Later	Anticoagulation effect

QUESTION

The mechanism of action of tissue plasminogen activator is:

- A** Inhibit extrinsic pathway
- B** Inhibits platelet aggregation
- C** Enhance fibrin degradation
- D** Inhibit clot formation

CORRECT

RIGHT ANSWER

- OK** C. Enhance fibrin degradation

WHY THIS IS RIGHT

Fibrin clot

↓

tPA activates plasminogen

↓

Plasmin formed

↓

Fibrin degraded

↓

Clot dissolved

Correct answer is C because tissue plasminogen activator converts plasminogen to plasmin, which breaks down fibrin clots and enhances fibrin degradation (fibrinolysis).

It does not inhibit clotting pathways directly or platelet aggregation; instead, it dissolves already formed fibrin thrombi.

| Drug Type | Mechanism |

| ----- | ----- |

| tPA | ☒ Breaks clot (fibrinolysis) |

| Heparin | Prevents clot formation |

| Warfarin | Inhibits vitamin K factors |

| Aspirin | Inhibits platelets |

QUESTION

A patient with a malignancy is undergoing chemotherapy. The platelet counts were reduced after the previous cycle of chemotherapy. Which of the following drugs can be used in the treatment of this patient?

A Oprelvekin (IL-11)

CORRECT

B Filgrastim

C Erythropoietin

D Amifostine

RIGHT ANSWER

OK

A. Oprelvekin (IL-11)

WHY THIS IS RIGHT

Correct answer is A because oprelvekin (IL-11) stimulates megakaryocyte proliferation and platelet production and is used for chemotherapy-induced thrombocytopenia.

Filgrastim stimulates neutrophil production. Erythropoietin stimulates RBC production. Amifostine is a cytoprotective agent used to reduce chemotherapy toxicity, not to increase platelets.

Drug	Target Cell Line	Use
---	-----	---
Oprelvekin (IL-11)	□ Platelets	Thrombocytopenia
Filgrastim (G-CSF)	Neutrophils	Neutropenia
Erythropoietin	RBCs	Anemia
Amifostine	Cytoprotective	Prevent toxicity

Oprelvekin side effects:

- Fluid retention
- Edema
- Cardiac issues

QUESTION

A 10-year-old boy presented with complaints of recurrent bleeding. He has a retroperitoneal hematoma and develops joint pain with swelling on slight exercise. There is no mucosal bleeding in the patient. Which of the following coagulation factor can be responsible for the patient?

A Von willebrand factor deficiency

B Factor 8/9 deficiency

CORRECT

C Lupus anticoagulant

D Factor 9/12 deficiency

RIGHT ANSWER

OK

B. Factor 8/9 deficiency

WHY THIS IS RIGHT

Correct answer is B because recurrent deep tissue bleeding, hemarthrosis, and retroperitoneal hematoma without mucosal bleeding is typical of hemophilia due to factor VIII (Hemophilia A) or factor IX (Hemophilia B) deficiency.

Test Finding
--- -----
Bleeding time Normal
PT Normal
aPTT ↑
Platelets Normal

Von Willebrand disease causes mucocutaneous bleeding. Lupus anticoagulant causes thrombosis rather than bleeding. Factor XII deficiency prolongs aPTT but does not cause clinical bleeding.

Feature Hemophilia vWD
----- ----- ---
Bleeding type Deep Mucosal
Platelets Normal Normal
Bleeding time Normal ↑
aPTT ↑ Mild ↑

QUESTION

A woman at 30 weeks of gestation is diagnosed with deep vein thrombosis (DVT). Which of the following is the most appropriate for this patient for prophylaxis?

A Warfarin

B Low Molecular Weight Heparin (LMWH)

CORRECT

C Apixaban

D Fondaparinux

RIGHT ANSWER

OK

B. Low Molecular Weight Heparin (LMWH)

WHY THIS IS RIGHT

Mechanism:

Advantages:

- Does NOT cross placenta
- Predictable action
- Less bleeding risk
- No monitoring needed (usually)
- Correct answer is B because low molecular weight heparin is the anticoagulant of choice in pregnancy as it does not cross the placenta and has predictable anticoagulant effect with good safety profile.

Warfarin is teratogenic and contraindicated in pregnancy. Direct oral anticoagulants like apixaban and fondaparinux are generally avoided due to limited safety data in pregnancy.

Drug Placental Transfer Use
--- ----- ---
LMWH No Drug of choice
Unfractionated heparin No Alternative
Warfarin Yes Contraindicated
DOACs ? ☐ Avoid

LMWH → Activates antithrombin → ↓ Factor Xa

QUESTION

| Which of the following is false about von Willebrand disease?

CORRECT

A Type I vWD presents with severe bleeding since birth

B Type II vWD has reduced activity of von Willebrand factor

C Type III vWD has very low levels of von Willebrand factor

D Type III vWD presents clinically as a severe disease

RIGHT ANSWER

OK

A. Type I vWD presents with severe bleeding since birth

WHY THIS IS RIGHT

Correct answer is A because Type I von Willebrand disease is a partial quantitative deficiency and usually causes mild bleeding, often presenting later in life rather than severe bleeding since birth. Type II vWD is a qualitative defect with reduced functional activity of vWF. Type III vWD has near absence of vWF and presents with severe bleeding resembling hemophilia.

Type	Defect	Severity	Key Feature
Type I	Partial quantitative ↓	□ Mild	Most common
Type II	Qualitative defect	Moderate	Dysfunctional vWF
Type III	Severe deficiency	□ Severe	Almost absent vWF

Feature	vWD	Hemophilia
Bleeding type	Mucosal	Deep (joints)
Platelet function	Abnormal	Normal
Bleeding time	↑	Normal
aPTT	Mild ↑	↑

QUESTION

A patient presents with bleeding due to factor IX deficiency. In which of the following conditions will you find an improvement after administering Vitamin K parenterally?

A Pernicious anemia

B Bile duct obstruction

CORRECT

C Hepatitis A

D Classical hemophilia

RIGHT ANSWER

OK B. Bile duct obstruction

WHY THIS IS RIGHT

Vitamin K-dependent factors

Without Vitamin K -> these factors are produced but non-functional

Correct answer is B because vitamin K is required for hepatic synthesis of vitamin K-dependent clotting factors (II, VII, IX, X), and in bile duct obstruction fat-soluble vitamin absorption is impaired, leading to deficiency that improves with parenteral vitamin K.

Pernicious anemia is due to vitamin B12 deficiency. Hepatitis A causes hepatocellular injury where vitamin K response may be limited. Classical hemophilia (factor VIII deficiency) does not respond to vitamin K.

Condition	Problem	Vitamin K effect
-----	-----	-----
Bile duct obstruction	↓ absorption	☐ Improves
Vitamin K deficiency	↓ activation	☐ Improves
Hemophilia	Factor absent	☐ No effect
Liver disease	↓ synthesis	☐ Limited

QUESTION

A 45-year-old patient presents with widespread purpura and easy bruising. Laboratory tests reveal a significantly low platelet count with normal hemoglobin and white blood cell count, indicating a diagnosis of isolated thrombocytopenia. The patient has no prior history of autoimmune disorders or recent viral infections. Considering these symptoms and diagnosis, which tyrosine kinase inhibitor would be appropriate for this patient

A Oprelvekin

B Fostamatinib

CORRECT

C Eltrombopag

D Bosutinib

RIGHT ANSWER

OK

B. Fostamatinib

WHY THIS IS RIGHT

The source quiz contains the placeholder "\$1a" here and does not include a written explanation for this item.

QUESTION

A 26-year-old female with bleeding disorder, gives family history of her father and sister suffering from the same bleeding disorders. Which is the most likely disorder?

A Von Willebrand disease

CORRECT

B Hemophilia A

C Christmas disease

D Factor 12 Deficiency

RIGHT ANSWER

OK A. Von Willebrand disease

WHY THIS IS RIGHT

Mechanism:

- ↓ vWF → ↓ platelet adhesion + ↓ Factor VIII stability

Dual defect:

- Platelet function
- Coagulation pathway

Correct answer is A because von Willebrand disease is usually autosomal inherited and affects both males and females, commonly presenting with mucocutaneous bleeding such as menorrhagia and positive family history across genders. Hemophilia A and Christmas disease (Hemophilia B) are X-linked recessive and mainly affect males. Factor XII deficiency usually does not cause clinical bleeding despite abnormal coagulation tests.

Feature	vWD	Hemophilia A/B
-----	---	-----
Inheritance	AD	X-linked
Gender	Both	Males
Bleeding type	Mucosal	Deep (joints)
Bleeding time	↑	Normal
aPTT	Mild ↑	↑

QUESTION

| Which of the following STD is transmitted by all components of the blood?

A Hepatitis

B Filariasis

C Malaria

CORRECT

D Syphilis

RIGHT ANSWER

OK C. Malaria

WHY THIS IS RIGHT

Malaria

- The parasite (Plasmodium) lives inside RBCs
- During component preparation, no component is 100% RBC-free:
- Platelets -> contain residual RBCs
- Plasma -> may have minimal RBC contamination
- Even very small numbers of infected RBCs can transmit malaria

Therefore, malaria can be transmitted via:

- Packed RBCs
- Platelets
- Plasma

Hence, effectively transmitted by all components

Why other options are wrong

A) Hepatitis B / Hepatitis C ☐

- Virus is mainly plasma-borne
- Conceptually linked to plasma transmission, not the “all components via contamination” principle tested here

B) Filariasis ☐

- Not a routine transfusion-transmitted infection
- Not relevant to component-based transmission

D) Syphilis ☐

- Organism is fragile
- Killed by storage at 4°C
- Transmission mainly via fresh blood only

QUESTION

Which of the following is used in the treatment of hemophilia B?

- a) Fresh Frozen Plasma (FFP)
- b) Cryoprecipitate
- c) Factor VIII concentrates
- d) Cryo-poor Plasma

A a & c

B a & d

CORRECT

C a, b, c

D All of above

RIGHT ANSWER

OK B. a & d

WHY THIS IS RIGHT

The source quiz contains the placeholder “\$1b” here and does not include a written explanation for this item.

QUESTION

| Which of the following anticoagulants requires coagulation profile monitoring?

A Enoxaparin

B Lepirudin

CORRECT

C Fondaparinux

D Dabigatran

RIGHT ANSWER

OK B. Lepirudin

WHY THIS IS RIGHT

The source quiz contains the placeholder "\$1c" here and does not include a written explanation for this item.

QUESTION

A 26-year-old female presents to the ER with menorrhagia. She mentions that her father and sister also suffer from bleeding disorders. Which of the following is likely?

A Factor X deficiency

B Factor VIII deficiency

C Factor IX deficiency

D Von Willebrand Disease

CORRECT

RIGHT ANSWER

OK

D. Von Willebrand Disease

WHY THIS IS RIGHT

The source quiz contains the placeholder “\$1d” here and does not include a written explanation for this item.

QUESTION

| Which of the following is not a component of TTP?

A Thrombocytopenia

B Renal failure

C **Thrombosis**

CORRECT

D Haemolytic anemia

RIGHT ANSWER

OK **C. Thrombosis**

WHY THIS IS RIGHT

Thrombotic Thrombocytopenic Purpura (TTP)

Caused by deficiency of:

ADAMTS13 deficiency

↓

Large vWF multimers persist

↓

Platelet aggregation in microvasculature

↓

Microthrombi formation

↓

↓ Platelets + RBC fragmentation

Thrombotic thrombocytopenic purpura is classically characterized by a pentad:

1. Thrombocytopenia ☐

2. Microangiopathic hemolytic anemia (MAHA) ☐

3. Neurological symptoms (confusion, seizures)

4. Renal dysfunction ☐

5. Fever

• Although microvascular platelet-rich thrombi are central to the pathophysiology, “thrombosis” (as a clinical feature like DVT/PE) is not part of the classical pentad.

QUESTION

A newborn presents with umbilical cord stump bleeding and a history of recurrent bleeding episodes. Laboratory results reveal normal PT, APTT, and platelet count, but a positive urea clot solubility test. What coagulation factor deficiency is most likely responsible for these symptoms?

A Factor XII

B Factor XI

C Factor VIII

D Factor XIII

CORRECT

RIGHT ANSWER

OK

D. Factor XIII

WHY THIS IS RIGHT

The source quiz contains the placeholder “\$1e” here and does not include a written explanation for this item.

QUESTION

| Which of the following is not an inherited cause of thrombosis?

- A** Protein S deficiency
- B** Homocystinuria
- C** PNH (Paroxysmal Nocturnal Haemoglobinuria) CORRECT
- D** Antithrombin III deficiency

RIGHT ANSWER

- OK** **C. PNH (Paroxysmal Nocturnal Haemoglobinuria)**

WHY THIS IS RIGHT

The source quiz contains the placeholder “\$1f” here and does not include a written explanation for this item.

QUESTION

A patient presents with a history of petechiae, ecchymosis, thrombocytopenia, and large platelets on peripheral smear. What is the most appropriate treatment?

A Intravenous immunoglobulin (IVIG)

CORRECT

B Methotrexate

C Aspirin

D Bone Marrow Transplant

RIGHT ANSWER

OK A. Intravenous immunoglobulin (IVIG)

WHY THIS IS RIGHT

The source quiz contains the placeholder "\$20" here and does not include a written explanation for this item.

QUESTION

| Which of the following is the most common inherited bleeding disorder?

A

Von Willebrand Disease

CORRECT

B

Disseminated Intravascular Coagulation

C

Factor V Deficiency

D

Hemophilia

RIGHT ANSWER

OK

A. Von Willebrand Disease

WHY THIS IS RIGHT

The source quiz contains the placeholder "\$21" here and does not include a written explanation for this item.

QUESTION

A 45-year-old woman presents to the emergency department with fever, abdominal pain, and persistent fatigue for 2 days. On examination, her blood pressure is 130/90 mm Hg, and she is pale with scattered petechiae on the extremities. Laboratory evaluation reveals low hemoglobin, elevated serum lactate dehydrogenase, thrombocytopenia, and normal prothrombin time/partial thromboplastin time. Peripheral blood smear shows schistocytes. Urinalysis shows proteinuria and hematuria. What is the most likely diagnosis?

- A** Focal segmental glomerulosclerosis
- B** Post-streptococcal glomerulonephritis
- C** Thrombotic thrombocytopenic purpura (TTP) CORRECT
- D** HUS

RIGHT ANSWER

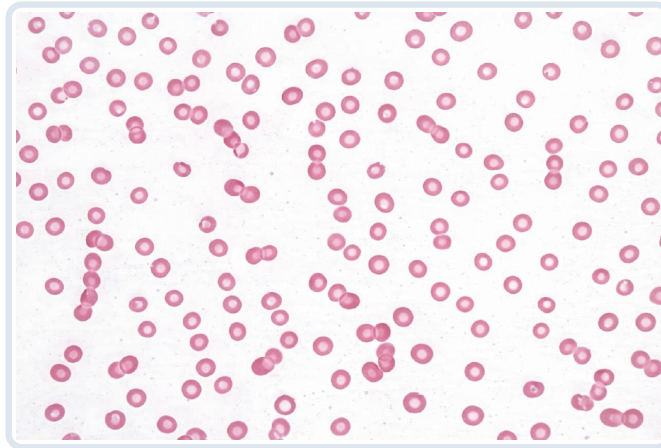
- OK** **C. Thrombotic thrombocytopenic purpura (TTP)**

WHY THIS IS RIGHT

The source quiz contains the placeholder “\$22” here and does not include a written explanation for this item.

QUESTION

A 69-year-old woman comes to the physician because of a 3-week history of headache and worsening vision. Ophthalmologic examination shows a visual acuity of 20/120 in the right eye and 20/80 in the left eye. Physical examination shows no other abnormalities. Laboratory studies show a hemoglobin of 14.2 g/dL and total serum calcium of 9.9 mg/dL. A photomicrograph of a peripheral blood smear is shown. Serum electrophoresis shows increased concentration of a pentameric immunoglobulin. Which of the following is the most likely diagnosis?



- A Hyper IgM syndrome
- B Essential thrombocythemia
- C Waldenstrom macroglobulinemia**
- D Multiple Myeloma

CORRECT

RIGHT ANSWER

- OK
- C. Waldenstrom macroglobulinemia**

WHY THIS IS RIGHT

Waldenström macroglobulinemia is a lymphoplasmacytic malignancy characterized by excess monoclonal IgM (pentameric immunoglobulin) leading to hyperviscosity syndrome.

Key diagnostic clues:

- ↑ IgM on serum electrophoresis
- Hyperviscosity symptoms: headache, visual disturbances, neurologic deficits
- Peripheral smear: rouleaux formation (stacked RBCs)
- Normal calcium (unlike multiple myeloma)

Why not others?

- Hyper-IgM syndrome: Pediatric immunodeficiency; no monoclonal IgM spike or hyperviscosity.
- Essential thrombocythemia: ↑ Platelets with thrombosis/bleeding; no IgM excess.
- Multiple myeloma: Usually IgG/IgA with bone lesions, hypercalcemia, renal failure.

QUESTION

Four days after admission to the hospital for acute pancreatitis, a 41-year-old man develops hypotension and fever. His temperature is 39.1°C (102.3°F), pulse is 115/min, and blood pressure is 80/60 mm Hg. Physical examination shows warm extremities, asymmetric calf size, and blood oozing around his IV sites. There are numerous small, red, non blanching macules and patches covering the extremities, as well as several large ecchymoses. His hemoglobin concentration is 9.0 g/dl. A PBS shows schistocytes and decreased platelets. Which of the following sets of serum findings are most likely in this patient?

A PT increased, aPTT increased, Fibrinogen decreased, D-dimer normal

B PT normal, aPTT increased, Fibrinogen decreased, D-dimer increased

C PT increased, aPTT normal, Fibrinogen normal, D-dimer normal

D PT increased, aPTT increased, Fibrinogen decreased, D-dimer increased

CORRECT

RIGHT ANSWER

OK

D. PT increased, aPTT increased, Fibrinogen decreased, D-dimer increased

WHY THIS IS RIGHT

This patient has disseminated intravascular coagulation (DIC), a consumptive coagulopathy triggered by severe illness such as acute pancreatitis, sepsis, trauma, or malignancy.

Key clinical clues:

- Hypotension, fever (sepsis/pancreatitis trigger)
- Bleeding from IV sites
- Petechiae, ecchymoses
- Schistocytes on smear (microangiopathic hemolysis)
- Thrombocytopenia

Characteristic lab findings in DIC:

- PT ↑ (extrinsic pathway consumption)
- aPTT ↑ (intrinsic pathway consumption)
- Fibrinogen ↓ (consumed)
- D-dimer ↑ (fibrin degradation products)

QUESTION

9-year-old girl is brought to the emergency department due to prolonged epistaxis. The girl says that she picked her nose immediately before the bleeding started. Her parents decided to take her to the emergency department after the epistaxis persisted for 20 minutes despite constant compression. The patient has had frequent nosebleeds that often last >10 minutes. Laboratory tests are ordered, and results are as follows:

Hematocrit: 43%

Bleeding time: prolonged

Partial thromboplastin time (PTT): prolonged

Prothrombin time (PT): normal

Thrombin time (TT): normal

D-dimer: normal

Which of the following is the most likely diagnosis?

A Factor XIII deficiency

B Hemophilia A

C Vitamin K deficiency

D von Willebrand disease

CORRECT

RIGHT ANSWER

OK

D. von Willebrand disease

WHY THIS IS RIGHT

Von Willebrand disease (vWD) is the most common inherited bleeding disorder and presents with mucocutaneous bleeding such as recurrent epistaxis. Lab pattern in vWD:

- Bleeding time ↑ -> platelet adhesion defect
- PTT ↑ -> decreased factor VIII stabilization
- PT normal
- Platelet count normal
- Thrombin time normal

Why not others (short):

- Factor XIII deficiency: PT, PTT, bleeding time all normal; delayed bleeding after trauma.
- Hemophilia A: ↑PTT only; bleeding time normal (deep tissue/joint bleeds, not epistaxis).
- Vitamin K deficiency: ↑PT first (±↑PTT); bleeding time normal.

QUESTION

A 59-year-old woman comes to the emergency department due to right leg swelling and pain for 2 days. The patient was started on hemodialysis 2 months ago for end-stage renal disease from diabetes mellitus. Duplex ultrasound shows a right popliteal vein thrombosis. The patient is started intravenous heparin infusion. On the third day of hospitalization, the right leg is more swollen and painful. Repeat ultrasound shows an extension of thrombus to the right femoral vein.

Laboratory results are as follows:

Hemoglobin-14.0 g/dL

Platelets-50,000/mm³

Leukocytes-7,500/mm³

Which of the following is the most likely cause of this patient's worsening condition?

- A** Antibody-mediated platelet activation
- B** Decreased bone marrow platelet production
- C** Disseminated intravascular coagulation.
- D** Platelet sequestration and redistribution

CORRECT

RIGHT ANSWER

- OK** **A. Antibody-mediated platelet activation**

WHY THIS IS RIGHT

Heparin-induced thrombocytopenia (HIT) is caused by IgG antibodies against heparin-platelet factor 4 (PF4) complexes, leading to platelet activation, thrombocytopenia, and paradoxical thrombosis.

- Occurs 5-10 days after starting heparin (earlier if prior exposure)
- Platelet count falls >50% from baseline
- New or worsening thrombosis despite heparin therapy
- Mechanism: Antibody-mediated platelet activation -> prothrombotic state

Management:

- Stop all heparin immediately
- Start non-heparin anticoagulant (argatroban, bivalirudin, fondaparinux)
- Avoid platelet transfusion unless severe bleeding

QUESTION

A 28-year-old woman, gravida 1, para 0, at 32 weeks' gestation is evaluated for vaginal bleeding. Five days ago, she was admitted to the hospital and started on treatment for a deep vein thrombosis in the right leg. Her pulse is 125/min and blood pressure is 95/67 mm Hg. Physical examination shows large hematomas on the upper limbs and swelling in the right calf. There is a large amount of bright red blood in the vaginal vault. Laboratory studies show a hemoglobin of 8.9 mg/dL, platelet count of 185,000/mm³, and activated partial thromboplastin time of 160 seconds (N-30s). Which of the following is the most appropriate pharmacotherapy to rapidly reverse this patient's coagulopathy?

A Protamine sulfate

CORRECT

B Prothrombin complex concentrate

C Vitamin K

D Alteplase

RIGHT ANSWER

OK A. Protamine sulfate

WHY THIS IS RIGHT

Protamine sulfate is the antidote for heparin overdose and is used to rapidly reverse anticoagulation when severe bleeding occurs.

- Pregnant patient treated for DVT -> most likely on unfractionated heparin (safe in pregnancy).
- Findings: severe bleeding + markedly prolonged aPTT (160 sec) with normal platelets -> indicates heparin toxicity.
- Protamine sulfate binds and neutralizes heparin -> rapid reversal of anticoagulant effect.

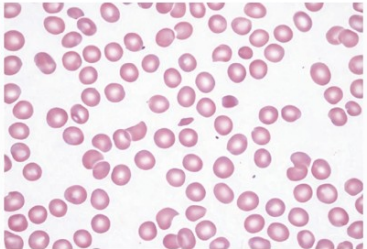
Why not others:

- Vitamin K: reverses warfarin, not heparin
- PCC: used for warfarin reversal
- Alteplase: thrombolytic, would worsen bleeding

QUESTION

A 40-year-old female is brought to the emergency department with a 24-hour history of confusion. Her temperature is 38.9°C, and examination reveals scleral icterus. Peripheral blood smear is shown below. Which of the following additional laboratory findings is most likely in this patient?

Parameter	Value
Hemoglobin (Hb)	9.1 g/dL
Platelet Count	50,000 /mm ³
Total Bilirubin	3.7 mg/dL
Direct Bilirubin	0.2 mg/dL
Lactate Dehydrogenase (LDH)	655 U/L



A Decreased serum phosphorus

B Decreased serum potassium

C Elevated serum bicarbonate

D Elevated serum creatinine

CORRECT

RIGHT ANSWER

OK

D. Elevated serum creatinine

WHY THIS IS RIGHT

Confusion, fever, thrombocytopenia, anemia with schistocytes, ↑LDH, and indirect hyperbilirubinemia indicate thrombotic thrombocytopenic purpura (TTP) - a form of thrombotic microangiopathy.

- ADAMTS13 deficiency -> large vWF multimers
- Platelet microthrombi in small vessels
- Microangiopathic hemolytic anemia (schistocytes)
- Organ ischemia (brain, kidney)

Clinical pentad:

- Fever
- Neurologic symptoms
- Microangiopathic hemolytic anemia
- Thrombocytopenia
- Renal dysfunction

Thus, elevated serum creatinine is expected due to renal ischemia and microthrombi.

QUESTION

A 7-year-old boy presents with left knee swelling following a trivial injury. His platelet count and bleeding time are normal. His aPTT is prolonged and factor VIII levels are decreased. Which of the following can be used in the management of his condition?

A Emicizumab

CORRECT

B Voxelektor

C Eculizumab

D Ravulizumab

RIGHT ANSWER

OK A. Emicizumab

WHY THIS IS RIGHT

A child with hemarthrosis, normal platelet count/bleeding time, prolonged aPTT, and low factor VIII has Hemophilia A (factor VIII deficiency). Emicizumab is a newer therapy used in hemophilia A:

- Bispecific monoclonal antibody
- Bridges factor IXa and factor X, mimicking factor VIII function
- Used for prophylaxis in patients with or without inhibitors
- Reduces frequency of bleeding episodes

Why not others:

- Voxelotor -> sickle cell disease
- Eculizumab & Ravulizumab -> complement inhibitors for PNH/aHUS

QUESTION

All of the following are true regarding the management of Immune Thrombocytopenic Purpura (ITP) except:

A Splenectomy is considered after glucocorticoid therapy failure

B IVIG is a treatment option in life-threatening bleeding

C Romiplostim and eltrombopag are avoided post-splenectomy

CORRECT

D Rh(D) immune globulin is used in Rh-positive patients

RIGHT ANSWER

OK

C. Romiplostim and eltrombopag are avoided post-splenectomy

WHY THIS IS RIGHT

Management of immune thrombocytopenic purpura (ITP) aims to reduce bleeding risk by increasing platelet count.

Standard treatment approach:

- First line: corticosteroids
- Severe/life-threatening bleeding: IVIG or platelet transfusion
- Rh(D) immune globulin: option in Rh-positive, nonsplenectomized patients
- Second line: splenectomy if steroid failure
- Thrombopoietin receptor agonists (romiplostim, eltrombopag) stimulate platelet production and are used in refractory ITP, including post-splenectomy patients

Thus, the false statement is that romiplostim and eltrombopag are avoided after splenectomy; they are actually effective second-line therapies

QUESTION

Which of the following is used in the treatment of hemophilia B?

- a) Fresh Frozen Plasma (FFP)
- b) Cryoprecipitate
- c) PCC
- d) Cryo poor Plasma

A a & c

B a & c

CORRECT

C a, b, c

D All of above

RIGHT ANSWER

OK B. a & c

WHY THIS IS RIGHT

Hemophilia B (Christmas disease) is caused by factor IX deficiency. Treatment focuses on replacing factor IX or providing factor IX-containing products. Treatment options for hemophilia B:

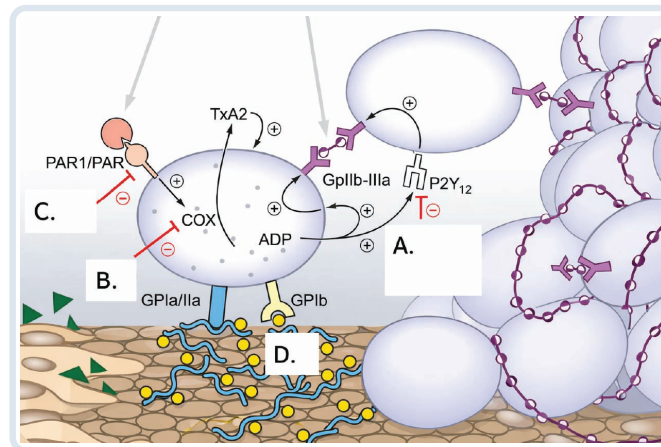
- Fresh frozen plasma (FFP): contains factor IX and can be used when specific concentrates are unavailable
- Cryo-poor plasma (cryosupernatant): contains factor IX and can be used as replacement therapy
- Recombinant or plasma-derived factor IX concentrates: preferred treatment (if available)

Not useful:

- Cryoprecipitate: rich in fibrinogen, factor VIII, vWF -> used in hemophilia A, not B
- PCC (prothrombin complex concentrate): contains factor IX but mainly used for warfarin reversal; not routine first-line for hemophilia B in many settings

QUESTION

Which of the following drugs irreversibly binds the site A?



A Aspirin

B Prasugrel

CORRECT

C Ticagrelor

D Tirofiban

RIGHT ANSWER

OK B. Prasugrel

WHY THIS IS RIGHT

Prasugrel is an antiplatelet drug that irreversibly inhibits the P2Y₁₂ ADP receptor on platelets, preventing ADP-mediated activation of the GPIIb/IIIa receptor and thereby inhibiting platelet aggregation.

Comparison with other drugs:

- Aspirin -> irreversible COX inhibition
- Ticagrelor -> reversible P2Y₁₂ inhibitor
- Tirofiban -> GPIIb/IIIa inhibitor

QUESTION

Which of the following conditions has the same underlying pathophysiology as the mechanism of action of Eptifibatide?

A Bernard-Soulier syndrome

B Von Willebrand disease

C Glanzmann thrombasthenia

CORRECT

D Gray platelet syndrome

RIGHT ANSWER

OK C. Glanzmann thrombasthenia

WHY THIS IS RIGHT

Eptifibatide is a glycoprotein IIb/IIIa inhibitor that prevents platelet aggregation by blocking fibrinogen binding to the GPIIb/IIIa receptor on platelets. Glanzmann thrombasthenia has the same underlying pathophysiology:

- Inherited deficiency or dysfunction of GPIIb/IIIa receptor
- Platelets cannot bind fibrinogen
- Impaired platelet aggregation despite normal platelet count
- Presents with mucocutaneous bleeding

Comparison with other disorders:

- Bernard-Soulier syndrome: defect in GPIb -> impaired platelet adhesion
- Von Willebrand disease: vWF deficiency -> impaired adhesion
- Gray platelet syndrome: deficiency of alpha granules

QUESTION

| Which of the following is false about hemolytic uremic syndrome?

- A** Symptoms and signs of HUS develops as diarrhea begins to improve.
- B** Only supportive management of acute Renal Failure is done in typical HUS
- C** Eculizumab improves microangiopathic hemolytic anemia in atypical HUS
- D** Coomb's positive Hemolytic anemia is seen in HUS. CORRECT

RIGHT ANSWER

OK

D. Coomb's positive Hemolytic anemia is seen in HUS.

WHY THIS IS RIGHT

Hemolytic uremic syndrome (HUS) is a thrombotic microangiopathy characterized by the triad of:

- Microangiopathic hemolytic anemia (MAHA) with schistocytes on peripheral smear finding
- Thrombocytopenia
- Acute kidney injury

Key points:

- Typical HUS (Shiga toxin-associated) usually follows diarrheal illness; symptoms often begin as diarrhea improves
- Management is mainly supportive (fluids, dialysis, transfusions if needed)
- Atypical HUS involves complement dysregulation and is treated with eculizumab, a C5 inhibitor
- Hemolysis in HUS is Coombs negative because it is mechanical (microangiopathic), not immune-mediated

QUESTION

A 48-year-old male with small cell carcinoma of the lung presents with cyanosis of the neck and face, epistaxis, headache, dizziness, and swelling over the face, neck, and upper chest. He is currently undergoing chemotherapy sessions. A chest X-ray reveals widening of the superior mediastinum. What is the investigation of choice in this condition?

A Doppler ultrasonography

B MRI

C Ultrasound

D CT scan

CORRECT

RIGHT ANSWER

OK D. CT scan

WHY THIS IS RIGHT

The patient's symptoms (facial swelling, cyanosis of face/neck, epistaxis, headache, dilated chest veins) with mediastinal widening suggest superior vena cava (SVC) syndrome, most commonly caused by lung malignancy (especially small cell carcinoma).

Investigation of choice: Contrast-enhanced CT scan of the chest

- Confirms SVC obstruction
- Identifies cause (tumor, lymph nodes, thrombosis)
- Determines extent of compression
- Helps plan treatment (stenting, radiotherapy, chemotherapy)

QUESTION

A patient is started on unfractionated heparin (UFH) for acute venous thromboembolism. Which of the following is the most appropriate method for monitoring the anticoagulant effect of this drug?

A No monitoring is required

B Prothrombin time (PT)

C PT+ Anti factor Xa assay

D Anti-factor Xa assay

CORRECT

RIGHT ANSWER

OK D. Anti-factor Xa assay

WHY THIS IS RIGHT

Unfractionated heparin (UFH) exerts its anticoagulant effect by enhancing antithrombin activity, which inhibits factor Xa and thrombin (factor IIa). Monitoring is required due to variable pharmacokinetics and risk of bleeding.

Best monitoring test:

- Anti-factor Xa assay -> directly measures heparin activity and is the most accurate method
- Therapeutic range typically: 0.3-0.7 IU/mL (varies by protocol)

Other monitoring methods:

- aPTT traditionally used but less reliable due to variability
- PT -> used for warfarin monitoring, not UFH
- LMWH -> usually no routine monitoring except in special populations

QUESTION

A 30-year-old woman, G3P0L0, is being evaluated prior to an elective surgical procedure. She has no history of excessive bleeding during previous dental procedures or childbirth. General physical examination is unremarkable.

Laboratory investigations show:

Bleeding time: 5 minutes

PT: 15 seconds

APTT: 60 seconds

Which of the following is the most likely diagnosis?

A Acquired hemophilia

B Factor XII deficiency

C Vitamin K deficiency

D Antiphospholipid antibody syndrome

CORRECT

RIGHT ANSWER

OK

D. Antiphospholipid antibody syndrome

WHY THIS IS RIGHT

A prolonged activated partial thromboplastin time (aPTT) with normal bleeding history and normal or near-normal PT suggests the presence of a circulating anticoagulant rather than a true bleeding disorder. One important cause is antiphospholipid antibody syndrome (APS).

- Autoantibodies (eg, lupus anticoagulant, anticardiolipin)
- Paradoxically increased risk of thrombosis, not bleeding
- Recurrent pregnancy loss may occur
- Bleeding time normal

Distinguishing from other options:

- Vitamin K deficiency -> prolonged PT and aPTT with bleeding tendency
- Hemophilia/acquired factor inhibitors -> bleeding history present
- Factor XII deficiency -> prolonged aPTT but usually incidental finding without thrombosis history.

QUESTION

A patient involved in a road traffic accident was admitted to the emergency department. During the first 2-4 hours, he received 4 units of packed red blood cells. Which of the following complications is most likely to occur in this patient?

A Hyponatremia

B Hypocalcemia

CORRECT

C Hypocitratemia

D Hypernatremia

RIGHT ANSWER

OK B. Hypocalcemia

WHY THIS IS RIGHT

Stored blood contains citrate

↓

Citrate binds calcium

↓

↓ Ionized calcium

↓

Hypocalcemia

Answer is B because stored blood contains citrate as an anticoagulant, which binds ionized calcium during rapid or massive transfusion, leading to hypocalcemia.

Mechanism:

This can cause tetany, hypotension, and arrhythmias during transfusion.

Sodium abnormalities and hypocitratemia are not typical complications of blood transfusion.

Massive Transfusion Complications-

| Complication | Mechanism |

| ----- | ----- |

| Hypocalcemia | Citrate binding |

| Hyperkalemia | RBC lysis |

| Hypothermia | Cold blood |

| Acidosis | Poor perfusion |

Prevention:

- Monitor calcium
- Give IV calcium gluconate if needed

QUESTION

Match the blood product with the shelf life mentioned in the next column:

Blood Product	Shelf Life
A. Single donor platelet	1. 42 days
B. Packed red blood cells	2. 24 hours
C. Cryoprecipitate	3. 5 days
D. Granulocyte concentrate	4. 1 year

A A-3, B-1, C-4, D-2

CORRECT

B A-2, B-3, C-1, D-4

C A-3, B-4, C-2, D-1

D A-3, B-1, C-2, D-1

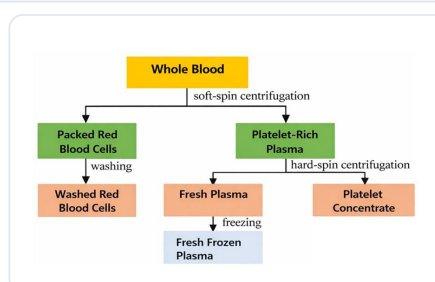
RIGHT ANSWER

OK A. A-3, B-1, C-4, D-2

WHY THIS IS RIGHT

Blood Component	Storage Duration
Single Donor Platelet	5 days
Packed Red Blood Cells	42 days
Cryoprecipitate	1 year
Granulocyte Concentrate	24 hours

Product	Storage Temp	Shelf Life	Key Reason
Packed RBCs	2-6°C	42 days	SAGM
Platelets	20-24°C	5 days	Risk of bacterial growth
Cryoprecipitate	-30°C	1 year	Frozen
Granulocytes	Room temp	24 hours	Very fragile



QUESTION

A patient with an unknown blood group experiences trauma and is unstable, requiring an urgent blood transfusion. Which types of blood should be transfused?

- a. A+
- b. AB+
- c. O+
- d. O-

A a & b

B c & d

CORRECT

C None of above

D All of above

RIGHT ANSWER

OK

B. c & d

WHY THIS IS RIGHT

Unknown blood group + unstable patient

↓

Need immediate transfusion

↓

Use O group blood

↓

If female / childbearing -> O negative

If adult male -> O positive acceptable

Correct answer is B because in emergency transfusion with unknown blood group, group O blood is safest as it lacks A and B antigens, minimizing risk of acute hemolytic reaction.

O negative is universal donor and preferred, especially in females of reproductive age to prevent Rh sensitization. O positive can be used in life-threatening emergencies, especially in males or when O negative is unavailable.

| Term | Meaning |

| --- | ----- |

| Universal donor (RBC) | O- |

| Universal recipient (RBC) | AB+ |

| Plasma donor (universal) | AB |

| Plasma recipient (universal) | O |

A+ and AB+ contain A and/or B antigens and can cause severe hemolytic transfusion reactions in incompatible recipients.

QUESTION

Regarding ABO blood grouping, which statement is false?

A IgM is the most common antibody in ABO

B ABO antibodies are natural and present since birth

CORRECT

C ABO antigens are carbohydrates

D Antibodies are present only if antigens are absent

RIGHT ANSWER

OK

B. ABO antibodies are natural and present since birth

WHY THIS IS RIGHT

Birth -> No ABO antibodies

↓

Exposure to gut bacteria / food antigens

↓

Immune system recognizes similar antigens

↓

Formation of IgM antibodies

Correct answer is B because ABO antibodies are naturally occurring but are not present at birth; they develop within the first few months of life due to exposure to environmental antigens (e.g., gut bacteria).

| Blood Group | Antigen | Antibody |

| ----- | ----- | ----- |

| A | A | Anti-B |

| B | B | Anti-A |

| AB | A & B | None |

| O | None | Anti-A & Anti-B |

ABO antibodies are predominantly IgM. ABO antigens are carbohydrate structures on RBC membrane. Antibodies develop against ABO antigens that are absent on an individual's RBCs.

QUESTION

Which of the following is a feature of delayed blood transfusion reaction?

1. Increased unconjugated bilirubin
2. Cola colored urine after 2 hours
3. Increased LDH
4. Failure of rise of hemoglobin after transfusion

A 1 and 2

B 1, 2 and 3

C 1, 3 and 4

CORRECT

D 1, 2, 3, 4

RIGHT ANSWER

OK C. 1, 3 and 4

WHY THIS IS RIGHT

The source quiz contains the placeholder “\$19” here and does not include a written explanation for this item.

QUESTION

I All blood products are separated by Centrifugation except:

- A** Platelet
- B** RBC
- C** Serum albumin CORRECT
- D** Cryoprecipitate

RIGHT ANSWER

- OK** C. Serum albumin

WHY THIS IS RIGHT

The source quiz contains the placeholder “\$1a” here and does not include a written explanation for this item.

QUESTION

A patient with a history of road traffic accident (RTA) presents with massive blood loss and has been transfused with 4 units of packed red blood cells within a few hours. Which of the following electrolyte abnormalities is most likely to occur?

A Hypernatremia

B Hypocalcemia

CORRECT

C Hyperkalemia

D Hyponatremia

RIGHT ANSWER

OK B. Hypocalcemia

WHY THIS IS RIGHT

Massive transfusion delivers citrate from stored blood, which chelates ionized calcium in the circulation. This reduces free Ca^{2+} and leads to transfusion-related hypocalcemia. Low calcium leads to:

- Neuromuscular irritability
- Tetany
- Cardiac arrhythmias

Rapid transfusion increases the risk because citrate metabolism is overwhelmed. The key electrolyte complication of massive transfusion is hypocalcemia.

Complication Mechanism
----- -----
Hypocalcemia Citrate binds Ca^{2+}
Hyperkalemia RBC lysis -> K^{+} release
Hypothermia Cold blood transfusion
Coagulopathy Dilution of clotting factors

QUESTION

A 25 yr old women G2P1L1 is brought to the emergency at 30 weeks gestation in active labor. The patient had severe anemia during pregnancy and received multiple blood transfusions during past months. An uncomplicated Vaginal delivery is performed and 2.5kg infant is delivered. Post operatively she continues to bleed and receives a transfusion of 1 unit of packed RBC. One hour later, the patient appears to have flank pain and in acute distress. Temperature is 101° F, pulse 115/min and BP is 92/66 mmHg. Foley catheter shows dark brown urine. Further evaluation is most likely to show:

A Serum antibodies against Class 1 HLA

B Positive Direct Coomb's

CORRECT

C B/L pulmonary infiltrates on CXR

D Low levels of serum IgA

RIGHT ANSWER

OK

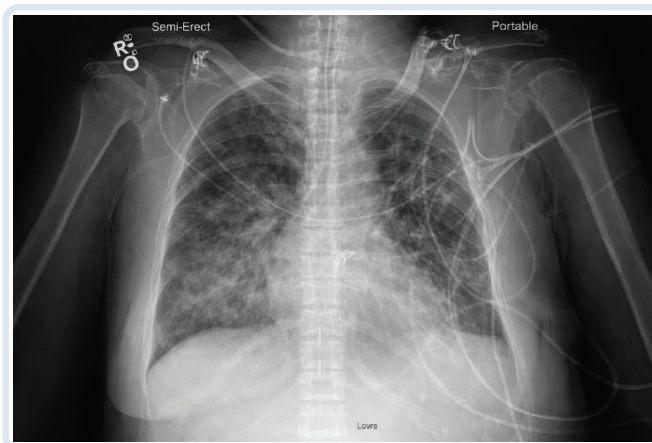
B. Positive Direct Coomb's

WHY THIS IS RIGHT

The source quiz contains the placeholder "\$1b" here and does not include a written explanation for this item.

QUESTION

A 66-year-old woman with warfarin induced bleeding receives IV vitamin K, 4 U PRBCs and 4U FFP. 4h later, she begins to complain of shortness of breath. Vitals T - 39°C, RR 35/min, SpO2 84% on RA, and BP 88/52 mm Hg. Exam revealed B/L crackles and the patient was intubated for respiratory failure. CXR is as shown in the picture. What is the likely diagnosis?



A Anaphylaxis

B TACO

C TRALI

CORRECT

D Aspiration

RIGHT ANSWER

OK C. TRALI

WHY THIS IS RIGHT

Transfusion-related acute lung injury (TRALI) is an acute, non-cardiogenic pulmonary edema occurring within 6 hours of blood transfusion, caused by donor anti-leukocyte antibodies activating recipient neutrophils in pulmonary capillaries.

- Acute hypoxemia and respiratory distress after transfusion
- Fever, hypotension (not hypertension)
- Bilateral pulmonary infiltrates on CXR
- Normal cardiac function (non-cardiogenic pulmonary edema)

Differentiate from TACO:

- TRALI: Hypotension, fever, normal BNP, no volume overload
- TACO: Hypertension, raised JVP/BNP, cardiogenic pulmonary edema

QUESTION

A 24-year-old man met with a road traffic accident and was brought to the casualty after 6 hours. His B.P. was 90/60 mm Hg, heart rate was 110/min, and SpO₂ was 92%. After a few hours of receiving damage control resuscitation, the patient is febrile, tachypneic, and starts bleeding from the IV and NG tube sites. His SpO₂ levels started falling. What could be the cause?

A Hemolytic Transfusion reaction

CORRECT

B Acute adrenal crisis

C TACO

D Consumption coagulopathy

RIGHT ANSWER

OK **A. Hemolytic Transfusion reaction**

WHY THIS IS RIGHT

A patient who develops fever, hypotension, tachycardia, respiratory distress, and bleeding from IV/NG sites soon after receiving blood during resuscitation most likely has an acute hemolytic transfusion reaction (AHTR), usually due to ABO incompatibility.

- Recipient antibodies (usually IgM anti-ABO) attack donor RBCs
- Complement-mediated intravascular hemolysis
- Release of free hemoglobin and inflammatory mediators
- Can trigger DIC (consumption coagulopathy) and shock

Immediate management:

- Stop transfusion immediately
- Maintain IV access with normal saline
- Send blood for crossmatch and hemolysis workup
- Supportive care (fluids, diuretics, treat DIC)

QUESTION

A 62-year-old male patient with heart failure is scheduled for a heart transplant. His renal function test is deranged, and hemoglobin is 6 g/dL. The physician ordered 2 units of whole blood. Four hours after transfusion, he developed severe respiratory distress. On examination, he is hypoxemic, has tachycardia, and his mean arterial pressure is elevated. Which of the following are the best investigations for the above scenario?

1. Chest X-ray
2. Brain natriuretic peptide (BNP) level
3. Absolute neutrophil count
4. Leukocyte
5. Platelets

A 4 and 5

B 3 and 5

C 1 and 2

CORRECT

D 2 only

RIGHT ANSWER

OK C. 1 and 2

WHY THIS IS RIGHT

Acute respiratory distress occurring within hours of blood transfusion in a patient with heart failure suggests transfusion-associated circulatory overload (TACO) rather than TRALI.

- Occurs within 6 hours of transfusion
- Dyspnea, hypoxemia
- Hypertension, tachycardia
- Pulmonary edema due to volume overload
- Elevated BNP
- Common in elderly or cardiac/renal failure patients
- Chest X-ray: shows pulmonary edema/cardiomegaly

Distinguishing from TRALI:

- TRALI -> hypotension, normal BNP, noncardiogenic pulmonary edema
- TACO -> hypertension, elevated BNP, cardiogenic pulmonary edema

QUESTION

| All of the following are the correct statements about Blood transfusion except:

- A** Blood received from blood bank should be completely transfused within 4 hours of receiving
- B** Calcium can be added to the blood product to prevent hypocalcemia CORRECT
- C** Pre-warmed blood products are preferred
- D** Acute hemolytic transfusion reaction may present in first 24hrs

RIGHT ANSWER

OK

B. Calcium can be added to the blood product to prevent hypocalcemia

WHY THIS IS RIGHT

Correct transfusion principles:

- Blood should be completely transfused within 4 hours of issue from blood bank to reduce risk of bacterial proliferation
- Pre-warmed blood may be required in massive transfusion or in patients at risk of hypothermia
- Acute hemolytic transfusion reactions usually occur during transfusion or within the first 24 hours

Important precaution: Calcium must NOT be added directly to blood products

- Stored blood contains citrate (anticoagulant)
- Calcium added to the blood bag can overcome anticoagulation -> clot formation
- If hypocalcemia occurs (eg, massive transfusion), calcium should be given separately via IV line, not mixed with blood

QUESTION

A first-year medical student performs a manual RBC count using a Neubauer chamber. After proper dilution and charging of the chamber, 210 red blood cells are counted in the appropriate counting area. What is the RBC count of this patient?

A 4.2 million / mm^3

B 2.1 million / mm^3

CORRECT

C 21 million / mm^3

D 42 million / mm^3

RIGHT ANSWER

OK B. 2.1 million / mm^3

WHY THIS IS RIGHT

The manual RBC count using a Neubauer hemocytometer is calculated based on the number of cells counted, dilution factor, and chamber volume.

$\text{RBC count (cells/mm}^3\text{)} = \text{Cells counted} \times \text{dilution factor} \times 10^4 \div \text{number of squares counted}$

For RBC counting:

- Dilution = 1:200
- Area counted = 5 small RBC squares
- Depth = 0.1 mm
- Conversion factor gives simplified formula:

$\text{RBC count} = \text{Cells counted} \times 10,000$

$210 \times 10,000 = 2,100,000/\text{mm}^3 = 2.1 \text{ million}/\text{mm}^3$

QUESTION

A patient following a crush injury is passing red color urine due to myoglobinuria. Which of the following will most likely be seen in this patient?

A Hypercalcemia

B Hypomagnesemia

C Hypophosphatemia

D **Hyperkalemia**

CORRECT

RIGHT ANSWER

OK D. Hyperkalemia

WHY THIS IS RIGHT

Crush injury

↓

Muscle cell breakdown

↓

Release of intracellular contents

↓

Myoglobin + K⁺ + phosphate

↓

Electrolyte imbalance + renal damage

Correct answer is D because crush injury causes rhabdomyolysis with release of intracellular potassium from damaged muscle cells, leading to hyperkalemia.

Cell lysis

↓

K⁺ released into blood

↓

Hyperkalemia

↓

Risk of arrhythmias ☐☐

Myoglobinuria is associated with acute kidney injury and electrolyte disturbances, especially life-threatening hyperkalemia.

Early phase typically shows hyperkalemia, hyperphosphatemia, and hypocalcemia, not hypercalcemia or hypophosphatemia.

| Electrolyte | Change |

| ----- | ----- |

| K⁺ | ↑ |

| Phosphate | ↑ |

| Calcium | ↓ (early), ↑ (late) |

QUESTION

A 7-year-old child is brought to the clinic with complaints of fatigue and poor concentration. The mother reports that the child has been eating non-food items such as soil and paint chips for the past few months. A peripheral blood smear image shows microcytic, hypochromatic red blood cells. Which of the following is the most likely diagnosis? (insert image)

A Vitamin B12 deficiency

B Thalassemia Major

C Lead Poisoning

D Iron deficiency anemia

CORRECT

RIGHT ANSWER

OK D. Iron deficiency anemia

WHY THIS IS RIGHT

The source quiz contains the placeholder “\$19” here and does not include a written explanation for this item.

QUESTION

A 17-year-old male presents with recurrent episodes of severe limb pain and generalized fatigue since childhood. He has been hospitalized multiple times for similar painful episodes. On examination, he is pale and mildly icteric. Laboratory investigations show hemoglobin of 8.2 g/dL and MCV of 91 fL. Hemoglobin electrophoresis shows predominantly HbS. What is the most appropriate treatment to reduce the frequency of these painful episodes?

A Hydroxyurea

CORRECT

B Vitamin B12

C Oral Iron

D Blood transfusions

RIGHT ANSWER

OK A. Hydroxyurea

WHY THIS IS RIGHT

The source quiz contains the placeholder "\$1a" here and does not include a written explanation for this item.

QUESTION

A 58-year-old male undergoing chemotherapy for lymphoma, who also has chronic kidney disease (CKD), presents with fatigue, pallor and exertional breathlessness. Laboratory tests show normocytic normochromic anemia with low hemoglobin and low reticulocyte count. What is the drug of choice for treating his condition?

A Darbepoetin alfa

CORRECT

B Filgrastim

C Oprelvekin

D Parenteral iron

RIGHT ANSWER

OK

A. Darbepoetin alfa

WHY THIS IS RIGHT

Solution- Normocytic anemia + low reticulocytes + CKD -> EPO deficiency -> treat with EPO analog (Darbepoetin alfa)
Correct answer is A because CKD causes decreased erythropoietin production leading to normocytic normochromic anemia with low reticulocyte count, and darbepoetin alfa (long-acting EPO analog) corrects this deficiency.

Drug	Target Cell Line	Use
---	-----	---
Darbepoetin	RBC	CKD anemia
Filgrastim	Neutrophils	Neutropenia
Oprelvekin	Platelets	Thrombocytopenia
Iron	RBC (substrate)	Iron deficiency

Filgrastim increases neutrophils. Oprelvekin increases platelets. Parenteral iron is useful only if iron deficiency coexists, not primary CKD anemia.

QUESTION

A school going child is being evaluated for underperformance in school and reduced hemoglobin levels. He has history of eating wall paint for past few weeks. Which of the following is the likely cause of anemia observed in him?

A Megaloblastic anemia

B Thalassemia minor

C Sideroblastic anemia

CORRECT

D Iron deficiency anemia

RIGHT ANSWER

OK C. Sideroblastic anemia

WHY THIS IS RIGHT

• Correct answer is C because pica with paint ingestion suggests lead exposure, which inhibits heme synthesis enzymes (ALA dehydratase and ferrochelatase) leading to acquired sideroblastic anemia. This results in defective heme formation despite adequate iron availability. Iron deficiency anemia is due to low iron stores. Megaloblastic anemia is due to B12/folate deficiency. Thalassemia minor is a globin chain synthesis defect.

Feature	IDA	Sideroblastic
Iron	↓	↑
Ferritin	↓	↑
Cause	Deficiency	Defective utilization
Smear	Hypochromic	Stippling

QUESTION

A female patient presents with iron deficiency anemia, dysphagia, and glossitis. Which of the following is the most likely diagnosis?

- A Achalasia cardia
- B Dysphagia lusoria
- C Plummer Vinson syndrome**
- D Carcinoma of the esophagus

CORRECT

RIGHT ANSWER

- OK C. Plummer Vinson syndrome**

WHY THIS IS RIGHT

Correct answer is C because Plummer-Vinson syndrome is characterized by the triad of iron deficiency anemia, dysphagia due to esophageal webs, and glossitis.

Feature	Explanation
Iron deficiency anemia	↓ Hb
Dysphagia	Esophageal web
Glossitis	Mucosal atrophy
• Premalignant condition	

Risk of: Squamous cell carcinoma

It is classically seen in middle-aged females and is associated with increased risk of upper esophageal squamous cell carcinoma.

Achalasia causes dysphagia without iron deficiency anemia. Dysphagia lusoria is due to vascular compression.

Esophageal carcinoma presents with progressive dysphagia and weight loss.

Feature	PVS	Carcinoma
Dysphagia	Intermittent	Progressive
Iron deficiency	□	□
Glossitis	□	□
Cancer risk	Increased	-

QUESTION

A female patient presented with fatigue. Routine complete blood count analysis showed hemoglobin of 9 g/dL, MCV 60fL, and RBC count of 5.2 million. A peripheral smear showed microcytic hypochromic anemia. Which of the following is the next best investigation for this patient?

A Serum ferritin levels

B HbA2 levels

CORRECT

C Serum folate levels

D Serum homocysteine levels

RIGHT ANSWER

OK

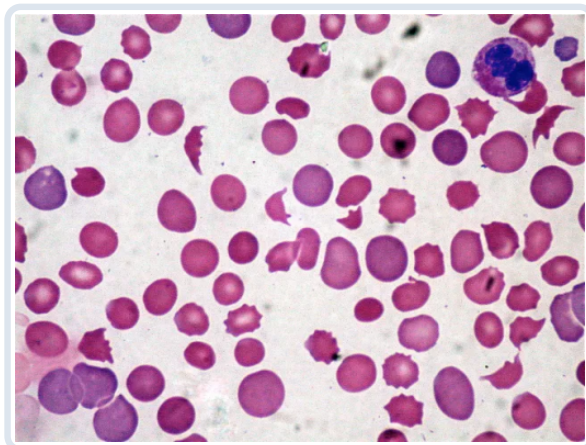
B. HbA2 levels

WHY THIS IS RIGHT

The source quiz contains the placeholder “\$1b” here and does not include a written explanation for this item.

QUESTION

An elderly patient presents with anemia and hemoglobinuria. Investigations reveal increased lactate dehydrogenase (LDH). The peripheral smear image is given below. Which of the following physical examination findings can support the likely diagnosis?



A Splenomegaly

B Frontal bossing

C Mechanical second heart sound

CORRECT

D Goitre

RIGHT ANSWER

OK

C. Mechanical second heart sound

WHY THIS IS RIGHT

The source quiz contains the placeholder "\$1c" here and does not include a written explanation for this item.

QUESTION

A child presents with recurrent chest infections and abdominal pain. There is a history of 1 blood transfusion in the past. On examination, he had icterus and mild splenomegaly. Electrophoresis shows increased HbA₂, HbF, and S spike. What is the likely diagnosis?

A. Beta thalassemia

B. HbC disease

C. Sickle cell disease

CORRECT

D. Acute coronary disease

RIGHT ANSWER

OK

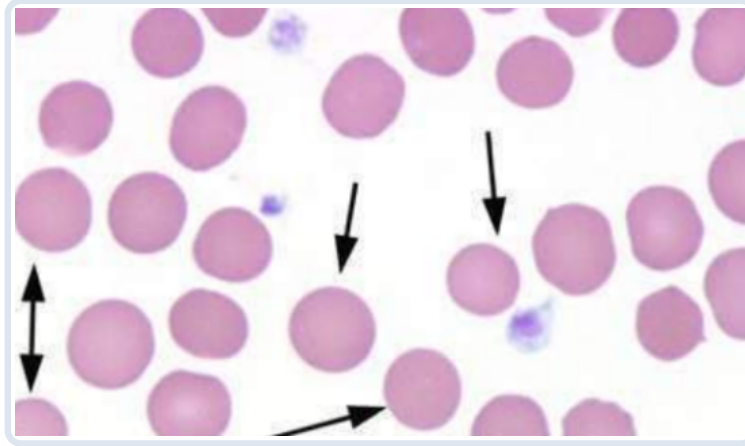
C. Sickle cell disease

WHY THIS IS RIGHT

The source quiz contains the placeholder “\$1d” here and does not include a written explanation for this item.

QUESTION

A 10-year-old child was brought with pallor and jaundice. On examination he had a hemoglobin of 9g/dl and mild splenomegaly. He has a history of similar episodes from birth. The peripheral smear had red cells without central pallor. Which of the following is useful for making the diagnosis of the patient?



A Autoimmune hemolytic anemia, direct Coombs test

B Hereditary spherocytosis, osmotic fragility test

CORRECT

C Hemolytic uremic syndrome

D PNH

RIGHT ANSWER

OK

B. Hereditary spherocytosis, osmotic fragility test

WHY THIS IS RIGHT

The source quiz contains the placeholder “\$1e” here and does not include a written explanation for this item.

QUESTION

A patient had a blunt injury to the abdomen after an RTA and underwent ileal resection. He recovered well post-surgery but months later presents with fatigue and exercise intolerance. Which of the following will not be seen?

A Cytonuclear dyssynchrony

B Microcytic hypochromic anemia

CORRECT

C Romberg's sign positive

D Subacute combined degeneration

RIGHT ANSWER

OK

B. Microcytic hypochromic anemia

WHY THIS IS RIGHT

The source quiz contains the placeholder “\$1f” here and does not include a written explanation for this item.

QUESTION

A 50-year-old patient who was being treated for hypertriglyceridemia developed flushing, gout, hyperglycemia, and raised liver enzymes. Which drug is the most likely cause?

A Atorvastatin

B Fenofibrate

C Nicotinamide

CORRECT

D Ezetimibe

RIGHT ANSWER

OK

C. Nicotinamide

WHY THIS IS RIGHT

Niacin (nicotinic acid) causes flushing, hyperuricemia (gout), hyperglycemia, and hepatotoxicity. Correct answer is C because nicotinic acid (niacin) used for hypertriglyceridemia causes flushing (prostaglandin mediated), hyperuricemia leading to gout, hyperglycemia, and hepatotoxicity with raised liver enzymes.

Statins mainly cause myopathy and mild liver enzyme elevation. Fibrates cause myopathy and gallstones. Ezetimibe mainly reduces cholesterol absorption and is usually well tolerated.

| Drug | Key Side Effect |

| ---- | ----- |

| Niacin | ☐ Flushing + gout + hyperglycemia |

| Statins | Myopathy |

| Fibrates | Gallstones |

| Ezetimibe | Minimal systemic side effects |

QUESTION

A 28-year-old woman presents with complaints of weakness and generalized fatigue. The peripheral smear shows microcytic hypochromic RBCs. Her serum iron is decreased and has increased RDW. Her MCV and MCH were also low, and TIBC was high. What would her serum transferrin saturation be?

A Increased

B Reduced

CORRECT

C Equivocal

D Cannot be determined

RIGHT ANSWER

OK

B. Reduced

WHY THIS IS RIGHT

Correct answer is B because iron deficiency anemia causes low serum iron with increased TIBC, resulting in reduced transferrin saturation.

Microcytic hypochromic RBCs with high RDW further support iron deficiency anemia.

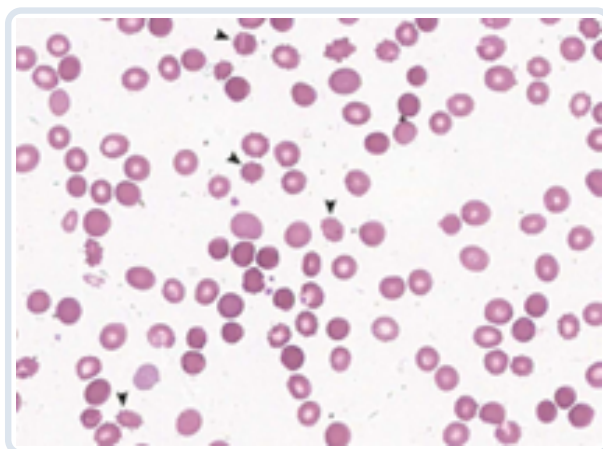
In iron deficiency, transferrin is increased but iron availability is low, so percentage saturation decreases.

Parameter	Finding in IDA
Serum iron	↓
Ferritin	↓
TIBC	↑
Transferrin saturation	↓↓
RDW	↑

$$\text{Transferrin saturation} = \frac{\text{Serum iron}}{\text{TIBC}} \times 100$$

QUESTION

A patient with gastrointestinal symptoms and neurological symptoms underwent a blood examination whose peripheral smear image is provided here. What is the likely diagnosis in this patient?



A Uremia

B Burns

C Abetalipoproteinemia

CORRECT

D Hereditary spherocytosis

RIGHT ANSWER

OK

C. Abetalipoproteinemia

WHY THIS IS RIGHT

The source quiz contains the placeholder "\$20" here and does not include a written explanation for this item.

QUESTION

Which of the following is a true/correct statement about paroxysmal nocturnal hemoglobinuria?

A It is an inherited red blood cell disorder causing intravascular hemolysis

B The diagnosis of the disorder is confirmed by sucrose lysis test

C Flow cytometry is the gold standard for diagnosing this condition

CORRECT

D The commonest cause of mortality is cardiac failure

RIGHT ANSWER

OK C. Flow cytometry is the gold standard for diagnosing this condition

WHY THIS IS RIGHT

Correct answer is C because paroxysmal nocturnal hemoglobinuria is diagnosed by flow cytometry demonstrating deficiency of GPI-anchored proteins (CD55 and CD59) on blood cells, which is the gold standard test.

PIGA gene mutation

↓

Defective GPI anchor

↓

Loss of CD55 & CD59

↓

No protection from complement

↓

Intravascular hemolysis

| Feature | Mechanism |

| ----- | ----- |

| Hemoglobinuria (morning) | Night-time acidosis -> complement activation |

| Pancytopenia | Stem cell disorder |

| Thrombosis | Platelet activation |

| Dark urine | Hemolysis |

Treatment:

• Eculizumab (C5 inhibitor)

Prevents complement-mediated destruction

PNH is an acquired clonal stem cell disorder, not inherited. Sucrose lysis test is an older screening test, not confirmatory. Major causes of mortality are thrombosis and complications of hemolysis, not cardiac failure.

QUESTION

Which of the following is the likely diagnosis in a patient having a ↓ MCV, ↓ MCH, ↓ transferrin saturation, ↓ serum ferritin, and ↑ Total iron binding capacity?

- A Thalassemia
- B Anemia of chronic disease
- C Iron deficiency anemia
- D Sideroblastic anemia

CORRECT

RIGHT ANSWER

- OK
- C. Iron deficiency anemia

WHY THIS IS RIGHT

The source quiz contains the placeholder “\$21” here and does not include a written explanation for this item.

QUESTION

A patient with anemia and a regular history of blood transfusions since an early age was carrying his daily activities normally. He experiences a mild respiratory infection following which he developed fatigue, severe pallor, and shortness of breath. Which of the following is the likely organism involved?

- A Cytomegalovirus
- B Parvovirus**
- C Epstein-Barr virus infection
- D HSV

CORRECT

RIGHT ANSWER

OK **B. Parvovirus**

WHY THIS IS RIGHT

Solution- Key clues:

- Chronic transfusions since childhood -> chronic hemolytic anemia (e.g., thalassemia, sickle cell)
- Sudden worsening after mild infection
- Severe pallor + fatigue

Diagnosis: Aplastic crisis due to Parvovirus B19

Correct answer is B because parvovirus B19 infects erythroid precursor cells in bone marrow causing transient aplastic crisis, especially in patients with chronic hemolytic anemia who depend on high erythropoiesis.

Parvovirus B19

↓
Infects erythroblasts

↓
Stops erythropoiesis

↓
Reticulocytopenia

↓
Sudden severe anemia

It presents with sudden severe anemia, pallor, and fatigue following mild viral illness.

Parameter	Finding
Hb	↓↓↓
Reticulocyte count	↓↓↓ (very important)
WBC/Platelets	Normal or mildly ↓
Bone marrow	↓ erythroid precursors

CMV, EBV, and HSV do not typically cause pure red cell aplasia or aplastic crisis.

QUESTION

| Which of the following is not seen in an elderly patient with ileal resection?

- A Reversible dementia
- B Nuclear cytoplasmic asynchrony
- C Microcytic hypochromic anemia**
- D Romberg sign positive

CORRECT

RIGHT ANSWER

- OK C. Microcytic hypochromic anemia**

WHY THIS IS RIGHT

Terminal ileum -> absorbs B12 (with intrinsic factor)

Correct answer is C because ileal resection causes vitamin B12 deficiency leading to megaloblastic macrocytic anemia with nuclear-cytoplasmic asynchrony and neurological features such as posterior column involvement causing positive Romberg sign and possible reversible cognitive impairment.

Microcytic hypochromic anemia is seen in iron deficiency, not B12 deficiency.

Feature	B12 Deficiency	Iron Deficiency
MCV	↑ (macrocytic)	↓ (microcytic)
Neurological signs	Present	Absent
Smear	Macrocytes	Hypochromic
Cause	Ileal issue	Iron lack

QUESTION

| Which one of the following is correct about iron transport?

A Free iron is toxic for the cells

CORRECT

B Iron will be stored in the form of transferrin

C Iron is transported via Apoferritin in the blood

D Hepcidin enhances iron transport through Ferroportin

RIGHT ANSWER

OK A. Free iron is toxic for the cells

WHY THIS IS RIGHT

Correct answer is A because free iron catalyzes formation of reactive oxygen species via Fenton reaction, causing cellular toxicity, so iron is normally bound to proteins.

Iron is transported in blood via transferrin, not apoferritin. Apoferritin is involved in intracellular storage as ferritin. Hepcidin decreases iron export by degrading ferroportin, not enhancing transport.

↑ Hepcidin

↓

↓ Ferroportin activity

↓

↓ Iron release into blood

Seen in: Anemia of chronic disease

| Protein | Function |

| ----- | ----- |

| Transferrin | Transport |

| Ferritin | Storage |

| Apoferritin | Empty storage protein |

| Ferroportin | Iron export |

| Hepcidin | Blocks ferroportin |

QUESTION

Which one of the following is incorrect about iron transport?

CORRECT

A Iron is converted from ferrous to ferric form before absorption through apical membrane.

B Apoferritin is the storage form.

C Iron is transported via transferrin in the blood.

D Ascorbic acid helps in iron reabsorption.

RIGHT ANSWER

OK

A. Iron is converted from ferrous to ferric form before absorption through apical membrane.

WHY THIS IS RIGHT

Solution- Iron must be in *ferrous (Fe^{2+})* form for absorption - not ferric (Fe^{3+}).

Correct answer is A because dietary iron is absorbed in the ferrous (Fe^{2+}) form at the apical membrane of enterocytes; ferric (Fe^{3+}) iron is first reduced to ferrous form before absorption.

Iron is transported in blood bound to transferrin. Apoferritin binds iron for storage as ferritin. Ascorbic acid enhances iron absorption by maintaining iron in ferrous form.

Dietary iron (Fe^{3+})

↓

Reduced to Fe^{2+} (Vitamin C)

↓

Absorbed via DMT1 (duodenum)

↓

Converted back to Fe^{3+}

↓

Bound to transferrin

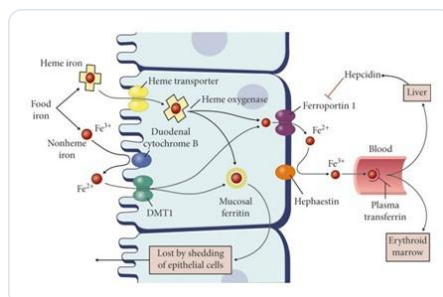
| Step | Form of Iron | Key Protein |

| --- | ----- | ----- |

| Absorption | Fe^{2+} | DMT1 |

| Transport | Fe^{3+} | Transferrin |

| Storage | Fe^{3+} | Ferritin |



QUESTION

A 60-year-old man with chronic kidney disease presents to the OPD with paleness, progressive dyspnea and signs of congestive cardiac failure. His lab results show a normocytic normochromic anemia. What is the most appropriate management?

A Darbepoetin alfa

CORRECT

B Parenteral iron

C Oral iron supplements

D Blood transfusion

RIGHT ANSWER

OK
A. Darbepoetin alfa

WHY THIS IS RIGHT

The source quiz contains the placeholder “\$22” here and does not include a written explanation for this item.

QUESTION

A child presented with fatigue, jaundice, and splenomegaly. His father also has had a similar history. On peripheral smear, MCHC was found to be elevated. Which of the following is the most likely diagnosis?

- A** Thalassemia
- B** Sickle cell disease
- C** Hereditary spherocytosis
- D** Autoimmune hemolytic anemia

CORRECT

RIGHT ANSWER

- OK** **C. Hereditary spherocytosis**

WHY THIS IS RIGHT

The source quiz contains the placeholder “\$23” here and does not include a written explanation for this item.

QUESTION

In a patient, ileal resection led to fatigue with Hb = 8 g/dL, MCV = 110 fL. Peripheral smear showed macrocytic anemia. Which vitamin deficiency is most likely?

A Iron deficiency

B B12 deficiency

CORRECT

C B1 deficiency

D Folate deficiency

RIGHT ANSWER

OK B. B12 deficiency

WHY THIS IS RIGHT

Ileal resection -> loss of B12 absorption -> macrocytic anemia (MCV 110)

Vitamin	Site
Vitamin B12	Terminal ileum
Folate	Jejunum

Correct answer is B because ileum is the site of vitamin B12 absorption (via intrinsic factor-B12 complex), so ileal resection leads to B12 deficiency causing megaloblastic macrocytic anemia.

The high MCV (110 fL) supports macrocytic anemia. Iron deficiency causes microcytic anemia. Folate is absorbed in proximal jejunum, not ileum. Vitamin B1 deficiency causes neurological and cardiac manifestations, not macrocytic anemia.

Feature	B12 deficiency	Folate deficiency
Absorption	Ileum	Jejunum
Cause	Ileal disease, vegetarian	Poor diet
Neurological signs	Present	Absent
MCV	↑↑↑	↑↑

QUESTION

Which of the following drugs is used to prevent painful vaso-occlusive crises and decrease long-term complications in sickle cell anemia?

A A. Hydroxyurea

CORRECT

B B. Methotrexate plus leucovorin

C C. Methionine

D D. Eltrombopag

RIGHT ANSWER

OK A. A. Hydroxyurea

WHY THIS IS RIGHT

The source quiz contains the placeholder "\$24" here and does not include a written explanation for this item.

QUESTION

| Which of the following is true about red blood cells in Sickle cell anemia:

- A** Low mechanical fragility, high osmotic fragility
- B** High mechanical fragility, high osmotic fragility
- C** Low mechanical fragility, low osmotic fragility
- D** High mechanical fragility, low osmotic fragility

CORRECT

RIGHT ANSWER

- OK** D. High mechanical fragility, low osmotic fragility

WHY THIS IS RIGHT

The source quiz contains the placeholder "\$25" here and does not include a written explanation for this item.

QUESTION

A 60-year-old vegetarian patient presented with weakness and reduced work capacity. He had a Hb of 10gm/dl and MCV-110. What is the most likely diagnosis?

A Iron deficiency anemia

B Aplastic Anaemia

C Megaloblastic anaemia

CORRECT

D Thalassemia

RIGHT ANSWER

OK C. Megaloblastic anaemia

WHY THIS IS RIGHT

The source quiz contains the placeholder "\$26" here and does not include a written explanation for this item.

QUESTION

Decreased transferrin saturation is seen in:

A Hemochromatosis

B Iron deficiency anemia

CORRECT

C Macrocytic anemia

D Hemosiderosis

RIGHT ANSWER

OK B. Iron deficiency anemia

WHY THIS IS RIGHT

Correct answer is B because iron deficiency anemia causes low serum iron with increased transferrin (TIBC), leading to decreased transferrin saturation.

↓ Body iron stores

↓

↓ Serum iron

↓

↑ TIBC (more empty transferrin)

↓

↓↓ Transferrin saturation

Hemochromatosis and hemosiderosis are iron overload states with increased transferrin saturation. Macrocytic anemia is usually due to B12 or folate deficiency and does not typically cause low transferrin saturation.

Parameter	Iron Deficiency	Hemochromatosis
Serum iron	↓	↑
TIBC	↑	↓
Transferrin saturation	↓↓	↑↑
Ferritin	↓	↑

$$\text{Transferrin saturation} = \frac{\text{Serum iron}}{\text{TIBC}} \times 100$$

QUESTION

Which of the following is not useful for hemoglobin estimation by the calorimetric test?



A RBC pipette

CORRECT

B Sahli graduated hemoglobin tube

C Comparator with brown glass standard

D Hemoglobin pipette

RIGHT ANSWER

OK A. RBC pipette

WHY THIS IS RIGHT

The source quiz contains the placeholder "\$27" here and does not include a written explanation for this item.

QUESTION

Erythropoietin is secreted by which of the following?

- a. Liver
- b. Kidney
- c. Spleen
- d. Heart

A a, b

CORRECT

B b, c

C a, b, c

D Only b

RIGHT ANSWER

OK

A. a, b

WHY THIS IS RIGHT

Erythropoietin (EPO) is produced mainly by the kidney in adults, and by both liver and kidney (especially liver in fetus).
Source of EPO

Correct answer is A because erythropoietin is mainly produced by peritubular interstitial cells of the kidney in adults, while the liver is a significant source during fetal life and contributes minimally in adults.

Hypoxia (↓ O₂)

↓

Kidney (peritubular cells)

↓

EPO secretion

↓

Bone marrow stimulation

↓

↑ RBC production

Spleen and heart do not produce erythropoietin.

Thus, kidney is the primary source and liver is a secondary source.

QUESTION

| Which of the following is not a feature of G6PD deficiency?

A Males and females are equally affected

CORRECT

B Oxidative stress

C Due to deficiency of NADPH

D Characterized by presence of Heinz bodies

RIGHT ANSWER

OK A. Males and females are equally affected

WHY THIS IS RIGHT

The source quiz contains the placeholder "\$28" here and does not include a written explanation for this item.

QUESTION

In haemolytic anaemia, which of the following is correct?

1. Urobilinogen is high
2. Serum conjugated bilirubin is elevated
3. Serum transaminases are increased
4. Indirect van den Bergh reaction is positive

A 1, 3

B 1, 4

CORRECT

C 2, 3

D 1, 2

RIGHT ANSWER

OK

B. 1, 4

WHY THIS IS RIGHT

The source quiz contains the placeholder "\$29" here and does not include a written explanation for this item.

QUESTION

| Which of the following is the correct statement regarding iron isomaltoside?

- A** It should not be given with erythropoietin
- B** It is given by intravenous route CORRECT
- C** It is more immunogenic than iron dextran
- D** A single bolus dose is enough for treatment of iron deficiency anemia

RIGHT ANSWER

- OK** **B. It is given by intravenous route**

WHY THIS IS RIGHT

The source quiz contains the placeholder "\$2a" here and does not include a written explanation for this item.

QUESTION

| Which mutation is seen in sickle cell anemia?

- A** Substitution of glutamic acid by valine at position 6 of the α -globin chain
- B** Substitution of glutamic acid by leucine at position 6 of the β -globin chain
- C** Substitution of glutamic acid by valine at position 6 of the β -globin chain CORRECT
- D** Substitution of glutamic acid by leucine at position 6 of the α -globin chain

RIGHT ANSWER

- OK** **C. Substitution of glutamic acid by valine at position 6 of the β -globin chain**

WHY THIS IS RIGHT

The source quiz contains the placeholder “\$2b” here and does not include a written explanation for this item.

QUESTION

Erythropoietin is primarily used in the treatment of which type of anemia?

1. Nutritional anemia
2. Chronic kidney disease (CKD)-related anemia
3. Myelodysplastic syndrome (MDS)-related anemia
4. Aplastic anemia

A 1 & 4

B 2 & 3

CORRECT

C 1 & 3

D 1, 2 & 4

RIGHT ANSWER

OK

B. 2 & 3

WHY THIS IS RIGHT

The source quiz contains the placeholder “\$2c” here and does not include a written explanation for this item.

QUESTION

A 42-year-old female has Hb 9.2 g/dL and MCV 72 fL. Which of the following conditions can be the cause of this presentation?

1. Iron deficiency
2. Thalassemia
3. Lead poisoning
4. Vitamin B12 deficiency

A 1, 2, and 3

CORRECT

B 1, 3, and 4

C 1, and 2

D 2, 3, and 4

RIGHT ANSWER

OK A. 1, 2, and 3

WHY THIS IS RIGHT

The source quiz contains the placeholder “\$2d” here and does not include a written explanation for this item.

QUESTION

Which of the following is true for hemolytic anemia?

- a. Indirect van den bergh test positive
- b. Direct van den bergh test positive
- c. Increased urine urobilinogen

A a only

B a and c

CORRECT

C b only

D c only

RIGHT ANSWER

OK

B. a and c

WHY THIS IS RIGHT

In hemolytic anemia, there is increased destruction of red blood cells, leading to excessive breakdown of hemoglobin and increased production of bilirubin.

Bilirubin metabolism changes in hemolytic anemia

1\ Increase in unconjugated (indirect) bilirubin

Hemoglobin breakdown produces unconjugated bilirubin. The liver may not conjugate all of the excess bilirubin produced. Therefore, indirect Van den Bergh test becomes positive.

2\ Increased urobilinogen in urine

More bilirubin reaches the intestine. Intestinal bacteria convert bilirubin to urobilinogen. Part of this urobilinogen is reabsorbed and excreted in urine, so urinary urobilinogen increases.

3. Direct (conjugated) bilirubin

Usually not elevated in pure hemolytic anemia, so direct Van den Bergh test is not positive.

QUESTION

In glucose-6-phosphate dehydrogenase (G6PD) deficiency, which of the following statements is correct?

A Normal Direct bilirubin, Increased Indirect Bilirubin, Increased Urine urobilinogen

CORRECT

B Increased Direct bilirubin, Normal Indirect Bilirubin, Absent Urine urobilinogen

C Normal Direct bilirubin, Normal Indirect Bilirubin, Normal Urine urobilinogen

D Decreased Direct bilirubin, Decreased Indirect Bilirubin, Increased Urine urobilinogen

RIGHT ANSWER

OK A. Normal Direct bilirubin, Increased Indirect Bilirubin, Increased Urine urobilinogen

WHY THIS IS RIGHT

Glucose-6-phosphate dehydrogenase (G6PD) deficiency causes episodic hemolytic anemia due to increased oxidative damage to RBCs.

- G6PD is a key enzyme of the Hexose Monophosphate (HMP) shunt that generates NADPH.
- NADPH maintains glutathione in the reduced form, which protects RBCs from oxidative stress.
- In G6PD deficiency, oxidant drugs, infections, or fava beans lead to RBC hemolysis.

Biochemical consequences of hemolysis:

1. Increased indirect (unconjugated) bilirubin
 - o Hemoglobin breakdown -> heme -> bilirubin -> overload of liver conjugation.
2. Normal direct (conjugated) bilirubin
 - o Liver function is normal; the problem is excessive hemolysis.
3. Increased urine urobilinogen
 - o More bilirubin reaches the intestine -> more urobilinogen formation -> increased reabsorption and urinary excretion.

QUESTION

An elderly patient presents with back pain and recurrent infections. Serum protein electrophoresis reveals an M spike. Which of the following factors are used to determine the prognosis in this patient?

- A** Serum IgG level and LDH levels
- B** Serum beta 2 microglobulin and hemoglobin levels
- C** Serum albumin levels and hemoglobin levels
- D** Serum beta 2 microglobulin levels and albumin levels

CORRECT

RIGHT ANSWER

- OK** **D. Serum beta 2 microglobulin levels and albumin levels**

WHY THIS IS RIGHT

Correct answer is D because prognosis in multiple myeloma is classically determined by International Staging System, which uses serum beta-2 microglobulin (tumor burden and renal function marker) and serum albumin (overall disease severity marker).

ISS (International Staging System)

Higher beta-2 microglobulin and lower albumin indicate worse prognosis.

IgG, LDH, and hemoglobin may reflect disease status but are not the primary staging parameters.

Stage	β2-microglobulin	Albumin	Prognosis
I	Low	High	Good
II	Intermediate	-	Moderate
III	High	Low	Poor

Marker	Role
β2-microglobulin	□ Tumor burden
Albumin	Disease severity
M protein	Diagnosis
Calcium	CRAB feature

QUESTION

An elderly patient presents with low-grade fever and long-standing lymphadenopathy. Flow cytometry reveals CD19+, CD5+, and CD23+ cells. What is the most likely diagnosis?

A Burkitt lymphoma

B Small lymphocytic lymphoma

CORRECT

C Follicular lymphoma

D Mantle cell lymphoma

RIGHT ANSWER

OK

B. Small lymphocytic lymphoma

WHY THIS IS RIGHT

The source quiz contains the placeholder “\$2e” here and does not include a written explanation for this item.

QUESTION

Which of the following chromosomal translocations is characteristic of Anaplastic Large Cell Lymphoma (ALCL)?

A t(8;14)

B t(2;8)

C t(2;5)

CORRECT

D t(8;22)

RIGHT ANSWER

OK C. t(2;5)

WHY THIS IS RIGHT

ALCL = t(2;5) → NPM-ALK fusion → ALK-positive lymphoma

Correct answer is C because anaplastic large cell lymphoma is classically associated with t(2;5) translocation causing NPM-ALK fusion protein leading to constitutive ALK tyrosine kinase activation.

t(2;5)

↓

NPM-ALK fusion

↓

Tyrosine kinase activation

↓

Uncontrolled growth

↓

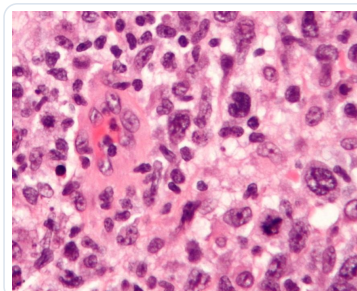
ALCL

anaplastic large-cell lymphoma

- Hallmark cells with horseshoe/kidney-shaped nucleus
- CD30 positive
- Often ALK positive

t(8;14), t(2;8), and t(8;22) are associated with Burkitt lymphoma involving MYC gene translocations.

Disease	Translocation	Gene
ALCL	t(2;5)	ALK
Burkitt	t(8;14)	MYC
Follicular	t(14;18)	BCL2
CML	t(9;22)	BCR-ABL



QUESTION

A 56-year-old man presents with dragging pain in the abdomen. On examination, there is massive splenomegaly. Peripheral smear shows leukocytosis with increased myelocytes, metamyelocytes and basophils. Which of the following translocation is seen in this condition?

A t (9:22)

CORRECT

B t (8;22)

C t (15;17)

D t (8;14)

RIGHT ANSWER

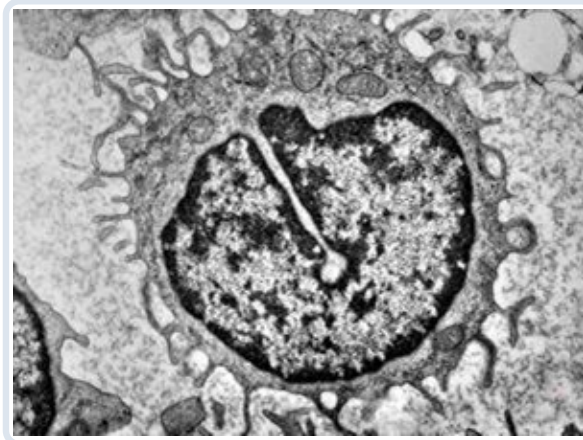
OK
A. t (9:22)

WHY THIS IS RIGHT

The source quiz contains the placeholder “\$2f” here and does not include a written explanation for this item.

QUESTION

Below is an electron microscopy depiction of a cellular structure. Determine the type of cell being depicted.



A Target cell

B Hairy cell

CORRECT

C Gaucher cell

D Sickle cell

RIGHT ANSWER

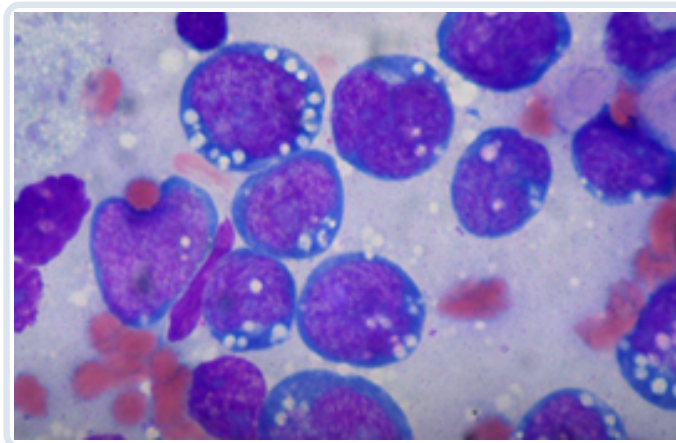
OK B. Hairy cell

WHY THIS IS RIGHT

The source quiz contains the placeholder "\$30" here and does not include a written explanation for this item.

QUESTION

A patient presented with complaint of a jaw swelling. His tissue was found to have the presence of t (8;14). The histopathological appearance of the bone marrow aspirate tissue is given in the image. Which of the following is a likely diagnosis for this patient?



A Follicular lymphoma

B Burkitt lymphoma

CORRECT

C Acute myeloid leukemia

D Multiple myeloma

RIGHT ANSWER

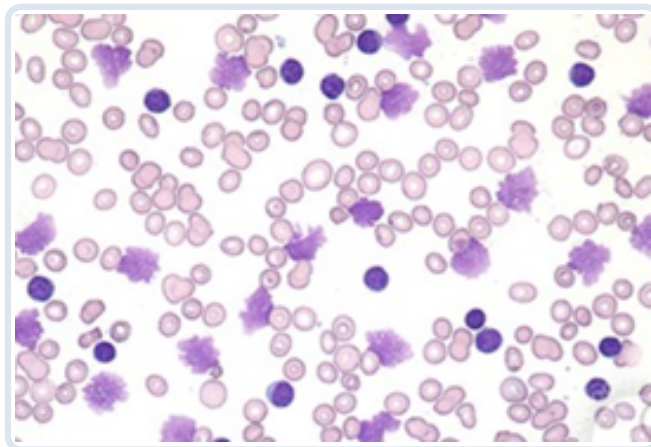
OK B. Burkitt lymphoma

WHY THIS IS RIGHT

The source quiz contains the placeholder “\$31” here and does not include a written explanation for this item.

QUESTION

A 62-year-old elderly male presented with persistent fatigue and lymph total leucocyte count of 50,000/ul. His peripheral smear was done and had the findings as shown. Which of the following is the next best step in the management of this patient?



- A** Bone marrow aspirate.
- B** Fluorescent in situ hybridization (FISH)
- C** Flow cytometry
- D** Polymerase chain reaction

CORRECT

RIGHT ANSWER

C. Flow cytometry

WHY THIS IS RIGHT

The source quiz contains the placeholder “\$32” here and does not include a written explanation for this item.

QUESTION

A patient with reduced hemoglobin and gum bleeding presented to you. He has thrombocytopenia (platelet count 25,000/ul) elevated PT, and aPTT. Which of the following can be the probable cause of his finding?

A AML t (8;21)

B AML t (15;17)

CORRECT

C AML t (16;16)

D AML with NMP

RIGHT ANSWER

OK

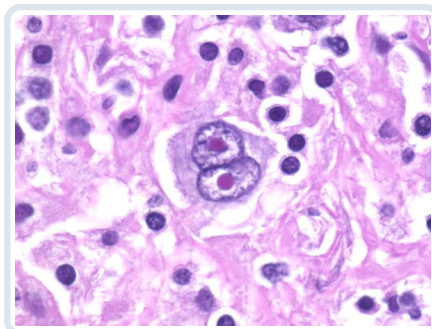
B. AML t (15;17)

WHY THIS IS RIGHT

The source quiz contains the placeholder “\$33” here and does not include a written explanation for this item.

QUESTION

A 45-year-old woman came with complaints of fever, night sweats, generalized itching, and unintentional weight loss of 10% in the last 3 months. On examination, she has enlarged cervical and axillary lymph nodes. The lymph node examination and biopsy showed the following picture. What would the likely diagnosis and treatment option be?



CORRECT

- A** Hodgkin's Lymphoma - ABVD regimen
- B** NHL - Rituximab monotherapy
- C** NHL - advanced stage - treated with radiotherapy
- D** Sarcoidosis - Started on Prednisolone 40 mg/day

RIGHT ANSWER

- OK** **A. Hodgkin's Lymphoma - ABVD regimen**

WHY THIS IS RIGHT

Correct answer is A because the biopsy shows Reed-Sternberg cells (large binucleate "owl eye" nuclei), characteristic of Hodgkin lymphoma, and the clinical features include B symptoms (fever, night sweats, weight loss, pruritus).

Lymphadenopathy

↓

B symptoms present

↓

Pruritus

↓

Biopsy: Reed-Sternberg cells

↓

Hodgkin lymphoma

Standard first-line treatment is ABVD regimen (Adriamycin, Bleomycin, Vinblastine, Dacarbazine).

| Feature | Hodgkin | NHL |

| ----- | ----- | --- |

| Spread | Contiguous | Non-contiguous |

| RS cells | Present | Absent |

| B symptoms | Common | Variable |

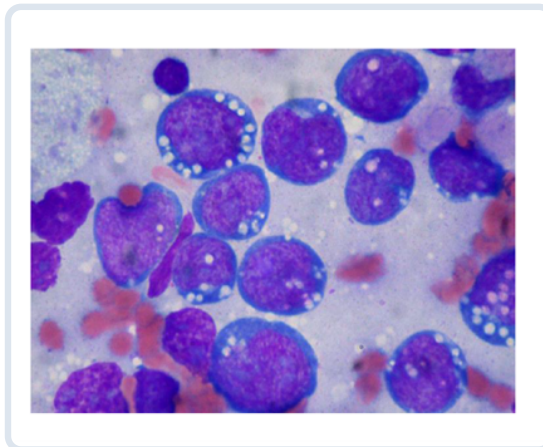
| Treatment | ABVD | R-CHOP etc. |

NHL usually lacks Reed-Sternberg cells. Radiotherapy alone is not used for advanced disease. Sarcoidosis shows non-caseating granulomas, not RS cells. Most common subtype:

- Nodular sclerosis HL
- Mediastinal involvement common

QUESTION

A 12-year-old child presented with cervical lymphadenopathy. A biopsy is obtained and it is as shown below. Flow cytometry showed the following findings: Tdt - negative, CD5/CD23 - negative, CD10/CD19/CD20, and SIg are positive. What is the likely diagnosis?



A Burkitt's lymphoma

CORRECT

B DLBCL (Diffuse Large B-Cell Lymphoma)

C ALCL (Anaplastic Large Cell Lymphoma)

D ALL (Acute Lymphoblastic Leukemia)

RIGHT ANSWER

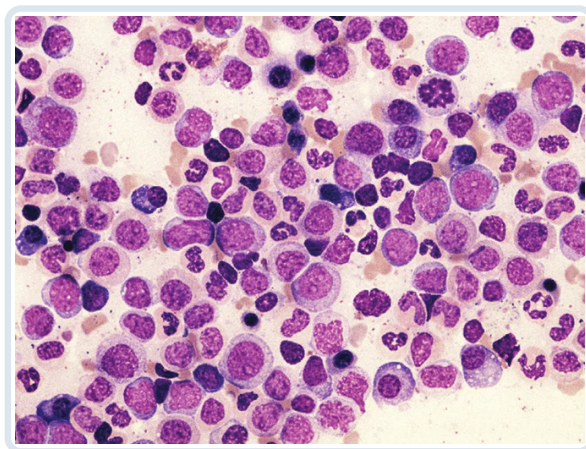
OK A. Burkitt's lymphoma

WHY THIS IS RIGHT

The source quiz contains the placeholder "\$34" here and does not include a written explanation for this item.

QUESTION

A 30-year-old patient presented with fatigue. Labs are as follows - Hb 8 g/dL, WBC 150,000, and platelets 50,000. Examination is significant for hepatosplenomegaly. Bone marrow biopsy is shown. What is the most common karyotypic abnormality?



A 46XY t(9;22)

CORRECT

B 47 XY +21

C 45XY t(14;21)

D 46XY SRY gene deletion

RIGHT ANSWER

OK

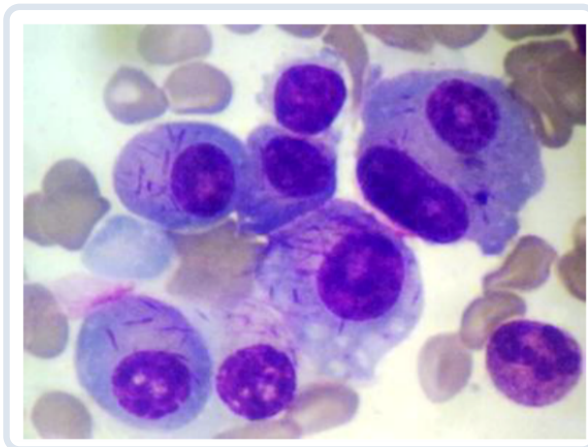
A. 46XY t(9;22)

WHY THIS IS RIGHT

The source quiz contains the placeholder "\$35" here and does not include a written explanation for this item.

QUESTION

A child presented with recurrent nasal bleeding. On examination, there was hepatosplenomegaly and WBC count is 40,000. Her peripheral smear is shown. On further evaluation, her PT, aPTT, and D-dimer were elevated. Which of the following cytogenetic changes is likely to be seen?



A PML-RARA

CORRECT

B BCR-ABL

C MYC-IgH

D DEK-MUP4

RIGHT ANSWER

OK A. PML-RARA

WHY THIS IS RIGHT

The source quiz contains the placeholder "\$36" here and does not include a written explanation for this item.

QUESTION

A 7-year-old child presented with fatigue. On examination, there were scattered purpuric rashes, and abdominal examination was notable for cervical lymphadenopathy and hepato-splenomegaly. Lab parameters are shown - Hb 7 g/dL, WBC 50,000, platelets 60,000. What is the treatment?

- A IVIg
- B Doxorubicin + epirubicin
- C Radiotherapy to the lymph node
- D Prednisolone + Vincristine**

CORRECT

RIGHT ANSWER

- OK
- D. Prednisolone + Vincristine**

WHY THIS IS RIGHT

Correct answer is D because the presentation suggests acute lymphoblastic leukemia with anemia, thrombocytopenia (purpura), leukocytosis, lymphadenopathy, and hepatosplenomegaly.

Prednisolone

↓

Lymphoblast apoptosis

Vincristine

↓

Inhibits mitosis (microtubules)

↓

Kills leukemic cells

Initial induction therapy for ALL commonly includes combination chemotherapy with steroids (prednisolone) and vincristine to induce remission.

IVIg is used in immune thrombocytopenia. Doxorubicin/epirubicin are used in other malignancies. Radiotherapy is not first-line for systemic leukemia.

| Phase | Treatment |

| ---- | ----- |

| Induction | □ Steroid + Vincristine |

| Consolidation | Chemo |

| Maintenance | Methotrexate, etc. |

ALL markers:

- TdT positive
- CD10 (CALLA)

QUESTION

A 65-year-old patient presents with symptoms of bone pain, anemia, hypercalcemia, and renal impairment. A bone marrow biopsy confirms the diagnosis of multiple myeloma. The patient is started on a treatment regimen. Which of the following treatments is most likely associated with the reactivation of herpes zoster?

A Bortezomib

CORRECT

B Lenalidomide

C Daratumumab

D Melphalan

RIGHT ANSWER

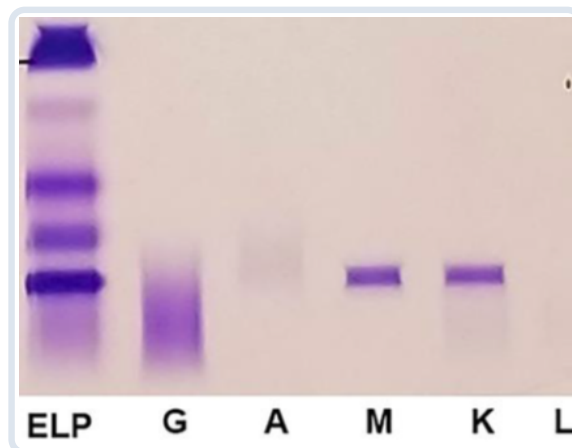
OK A. Bortezomib

WHY THIS IS RIGHT

The source quiz contains the placeholder “\$19” here and does not include a written explanation for this item.

QUESTION

An elderly male presented to the clinic with fatigue, headache, backache, and renal dysfunction. He had elevated calcium levels also. His serum electrophoresis had an M spike and the immunofixation pattern has been presented alongside. What is the likely diagnosis in the patient?



- A** Severe systemic infection
- B** MGUS (Monoclonal gammopathy of undetermined significance)
- C** Multiple myeloma with elevated IgG

D Multiple myeloma with elevated IgM

CORRECT

RIGHT ANSWER

OK D. Multiple myeloma with elevated IgM

WHY THIS IS RIGHT

The source quiz contains the placeholder “\$1a” here and does not include a written explanation for this item.

QUESTION

A 4-year-old child presented with sudden onset of fatigue due to severe anemia, multiple bruises on his limbs, and WBC count of $40,000/\text{cm}^3$. What is the likely karyotype of the child?

A 46XY t(9;22)

B 45X0

C 47XX (+21)

CORRECT

D 46XY

RIGHT ANSWER

OK

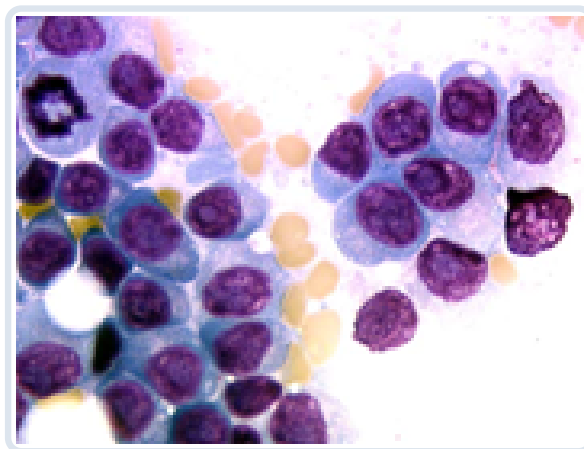
C. 47XX (+21)

WHY THIS IS RIGHT

The source quiz contains the placeholder "\$1b" here and does not include a written explanation for this item.

QUESTION

A patient presented with tingling and numbness in the legs, polyuria, and weight loss. He underwent a bone marrow aspirate (image as shown). Which of the following is the likely diagnosis?



- A** SACD due to diabetes
- B** SACD with B12 deficiency
- C** Multiple myeloma with renal involvement
- D** Metastasis

CORRECT

RIGHT ANSWER

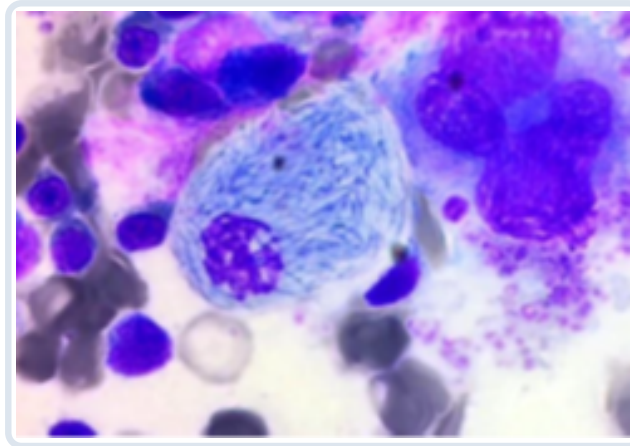
- OK** **C. Multiple myeloma with renal involvement**

WHY THIS IS RIGHT

The source quiz contains the placeholder "\$1c" here and does not include a written explanation for this item.

QUESTION

Which of the following is associated with a bone marrow aspirate having the finding as shown in the image?



- A** Acute myeloid leukemia
- B** Acute lymphoblastic leukemia
- C** Chronic myeloid leukemia
- D** Chronic lymphocytic leukemia

CORRECT

RIGHT ANSWER

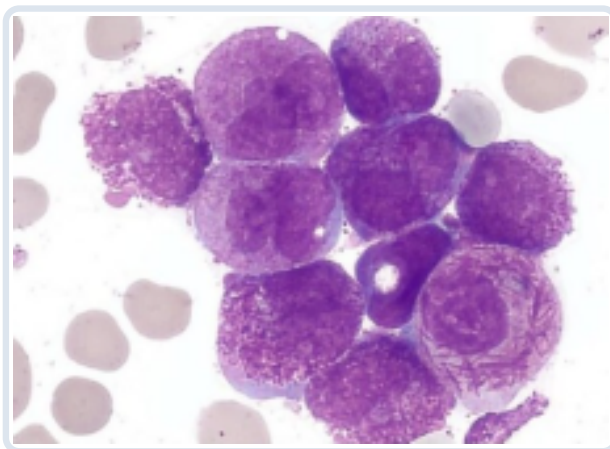
- OK** C. Chronic myeloid leukemia

WHY THIS IS RIGHT

The source quiz contains the placeholder "\$1d" here and does not include a written explanation for this item.

QUESTION

A 60-year-old man presents with weakness, fatigue, and bleeding tendencies. His peripheral smear showed 25% blast-like cells, as shown in the image. What is the most common type of genetic abnormality seen in this hematological malignancy?



A inv(16)

B t(8;21)

C AML with NPM1

D t (15;17)

CORRECT

RIGHT ANSWER

OK

D. t (15;17)

WHY THIS IS RIGHT

The source quiz contains the placeholder “\$1e” here and does not include a written explanation for this item.

QUESTION

A 28-year-old female presents with multiple cervical lymphadenopathies. IHC markers were positive for CD10 and BCL-2. Peripheral smear shows a large number of small cells (centrocytes) and occasional large cells (centroblasts). What is the most common genetic defect in this condition?

A t (14;18) BCL2-IGH

CORRECT

B t (2;5) ALK

C t (11;18) MALT1

D t (11;14) Cyclin D1-IGH

RIGHT ANSWER

OK A. t (14;18) BCL2-IGH

WHY THIS IS RIGHT

The source quiz contains the placeholder “\$1f” here and does not include a written explanation for this item.

QUESTION

| Which of the following statements is/are incorrect about Hodgkin's lymphoma?

A Nodular sclerosis is the most common and involves the mediastinum

B Waldeyer's ring is commonly involved

CORRECT

C CD15 & CD30 positivity in Reed Sternberg cells

D Reed Sternberg cells are derived from B cells

RIGHT ANSWER

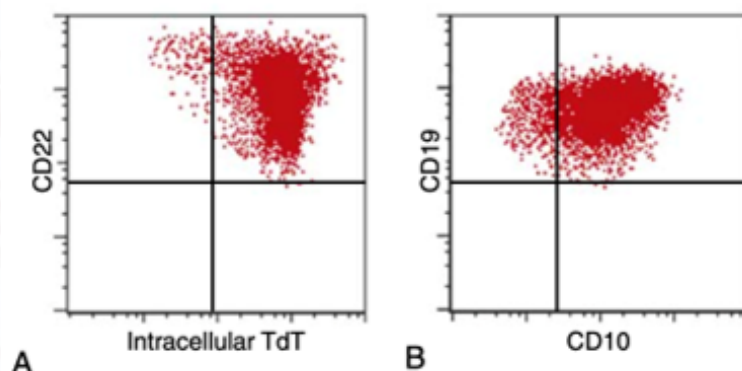
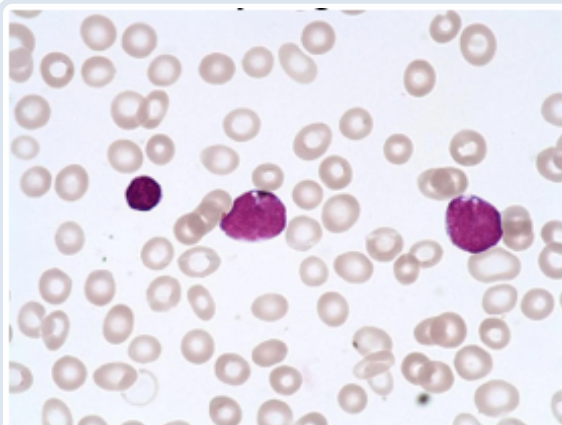
OK B. Waldeyer's ring is commonly involved

WHY THIS IS RIGHT

The source quiz contains the placeholder "\$20" here and does not include a written explanation for this item.

QUESTION

A 5-year-old child presents with gums bleeding, hepatosplenomegaly has a peripheral smear finding shown in the image. Flow cytometry was ordered for patient and shown below. What is the likely diagnosis?



A ALL B Lymphocyte Type

CORRECT

B ALL T Lymphocyte Type

C AML

D CML

RIGHT ANSWER

OK A. ALL B Lymphocyte Type

WHY THIS IS RIGHT

The source quiz contains the placeholder "\$21" here and does not include a written explanation for this item.

QUESTION

Which of the following represent the primary defect in patients with Bernard-Soulier syndrome?

- A Defect in fibrinogen
- B Defect in von Willebrand factor
- C Defect in GplIb

D Defect in Gplb

CORRECT

RIGHT ANSWER

D. Defect in Gplb

WHY THIS IS RIGHT

Solution- Normal:

Vessel injury

↓

vWF binds exposed collagen

↓

Platelet Gplb binds vWF

↓

Platelet adhesion

Correct answer is D because Bernard-Soulier syndrome is caused by deficiency or dysfunction of platelet Gplb receptor, leading to defective platelet adhesion to subendothelial vWF.

Gplb defect

↓

No binding to vWF

↓

No platelet adhesion

↓

Bleeding

It presents with thrombocytopenia, giant platelets, and prolonged bleeding time.

GplIb/IIIa defect is seen in Glanzmann thrombasthenia. vWF defect is seen in von Willebrand disease. Fibrinogen defects cause coagulation abnormalities, not platelet adhesion defects.

| Disorder | Defect | Problem | Key Feature |

| ----- | ----- | ----- | ----- |

| Bernard-Soulier | Gplb | Adhesion | Giant platelets |

| Glanzmann | GplIb/IIIa | Aggregation | Normal size platelets |

| vWD | vWF | Adhesion + Factor VIII | ↑ aPTT |

QUESTION

A male patient sustained a fall after which he developed swelling of the knee. Laboratory investigations show increased APTT, with normal bleeding time and normal PT. Which of the following is the most likely diagnosis?

A Von Willebrand disease

B Hemophilia A

CORRECT

C ITP

D DIC

RIGHT ANSWER

OK B. Hemophilia A

WHY THIS IS RIGHT

The source quiz contains the placeholder “\$22” here and does not include a written explanation for this item.

QUESTION

A young patient began taking a weight loss medication that works by preventing fat absorption from food. She developed easy bruising and increased menstrual bleeding after a few weeks. Which of the following vitamins deficiency is likely to be responsible for her condition?

A Vitamin E

B Vitamin K

CORRECT

C Vitamin B6

D Vitamin D

RIGHT ANSWER

OK

B. Vitamin K

WHY THIS IS RIGHT

Correct answer is B because fat absorption inhibitors reduce absorption of fat-soluble vitamins, and vitamin K deficiency leads to impaired synthesis of clotting factors II, VII, IX, and X, causing bleeding tendency.

Fat absorption blocked

↓

↓ Fat-soluble vitamins (A, D, E, K)

↓

↓ Vitamin K

↓

↓ Clotting factors (II, VII, IX, X)

↓

Bleeding

This explains easy bruising and menorrhagia.

Vitamin E deficiency causes neuropathy. Vitamin D deficiency causes bone disease. Vitamin B6 is water soluble and not affected by fat malabsorption.

QUESTION

A patient with deep vein thrombosis was started on a new drug. After 2 days, he presented with the given finding. Which of the following drugs is implicated in causing the above condition?



A Warfarin

CORRECT

B Heparin

C Dabigatran

D Rivaroxaban

RIGHT ANSWER

OK

A. Warfarin

WHY THIS IS RIGHT

Correct answer is A because warfarin can cause early skin necrosis (purple toe/dermal vascular necrosis) due to rapid fall in protein C levels before full anticoagulation, creating a transient hypercoagulable state.

Warfarin started

↓

↓ Protein C (short half-life)

↓

↓ Temporary hypercoagulable state

↓

↓ Microthrombosis in skin

↓

↓ Skin necrosis

It is more common in patients with underlying protein C deficiency and typically occurs within the first few days of therapy. Mechanism:

BUT ALSO:

Result: Initial hypercoagulable state

Heparin causes HIT-related thrombosis. Dabigatran and rivaroxaban are not associated with warfarin skin necrosis.

Time after starting warfarin	Event
1-3 days	□ Skin necrosis
Later	Anticoagulation effect

QUESTION

The mechanism of action of tissue plasminogen activator is:

- A** Inhibit extrinsic pathway
- B** Inhibits platelet aggregation
- C** Enhance fibrin degradation
- D** Inhibit clot formation

CORRECT

RIGHT ANSWER

- OK** **C. Enhance fibrin degradation**

WHY THIS IS RIGHT

Fibrin clot

↓

tPA activates plasminogen

↓

Plasmin formed

↓

Fibrin degraded

↓

Clot dissolved

Correct answer is C because tissue plasminogen activator converts plasminogen to plasmin, which breaks down fibrin clots and enhances fibrin degradation (fibrinolysis).

It does not inhibit clotting pathways directly or platelet aggregation; instead, it dissolves already formed fibrin thrombi.

| Drug Type | Mechanism |

| ----- | ----- |

| tPA | ☒ Breaks clot (fibrinolysis) |

| Heparin | Prevents clot formation |

| Warfarin | Inhibits vitamin K factors |

| Aspirin | Inhibits platelets |

QUESTION

A patient with a malignancy is undergoing chemotherapy. The platelet counts were reduced after the previous cycle of chemotherapy. Which of the following drugs can be used in the treatment of this patient?

A Oprelvekin (IL-11)

CORRECT

B Filgrastim

C Erythropoietin

D Amifostine

RIGHT ANSWER

OK

A. Oprelvekin (IL-11)

WHY THIS IS RIGHT

Correct answer is A because oprelvekin (IL-11) stimulates megakaryocyte proliferation and platelet production and is used for chemotherapy-induced thrombocytopenia.

Filgrastim stimulates neutrophil production. Erythropoietin stimulates RBC production. Amifostine is a cytoprotective agent used to reduce chemotherapy toxicity, not to increase platelets.

Drug	Target Cell Line	Use
---	-----	---
Oprelvekin (IL-11)	□ Platelets	Thrombocytopenia
Filgrastim (G-CSF)	Neutrophils	Neutropenia
Erythropoietin	RBCs	Anemia
Amifostine	Cytoprotective	Prevent toxicity

Oprelvekin side effects:

- Fluid retention
- Edema
- Cardiac issues

QUESTION

A 10-year-old boy presented with complaints of recurrent bleeding. He has a retroperitoneal hematoma and develops joint pain with swelling on slight exercise. There is no mucosal bleeding in the patient. Which of the following coagulation factor can be responsible for the patient?

A Von willebrand factor deficiency

B Factor 8/9 deficiency

CORRECT

C Lupus anticoagulant

D Factor 9/12 deficiency

RIGHT ANSWER

OK

B. Factor 8/9 deficiency

WHY THIS IS RIGHT

Correct answer is B because recurrent deep tissue bleeding, hemarthrosis, and retroperitoneal hematoma without mucosal bleeding is typical of hemophilia due to factor VIII (Hemophilia A) or factor IX (Hemophilia B) deficiency.

Test Finding
--- -----
Bleeding time Normal
PT Normal
aPTT ↑
Platelets Normal

Von Willebrand disease causes mucocutaneous bleeding. Lupus anticoagulant causes thrombosis rather than bleeding. Factor XII deficiency prolongs aPTT but does not cause clinical bleeding.

Feature Hemophilia vWD
----- ----- ---
Bleeding type Deep Mucosal
Platelets Normal Normal
Bleeding time Normal ↑
aPTT ↑ Mild ↑

QUESTION

A woman at 30 weeks of gestation is diagnosed with deep vein thrombosis (DVT). Which of the following is the most appropriate for this patient for prophylaxis?

A Warfarin

B Low Molecular Weight Heparin (LMWH)

CORRECT

C Apixaban

D Fondaparinux

RIGHT ANSWER

OK

B. Low Molecular Weight Heparin (LMWH)

WHY THIS IS RIGHT

Mechanism:

Advantages:

- Does NOT cross placenta
- Predictable action
- Less bleeding risk
- No monitoring needed (usually)
- Correct answer is B because low molecular weight heparin is the anticoagulant of choice in pregnancy as it does not cross the placenta and has predictable anticoagulant effect with good safety profile.

Warfarin is teratogenic and contraindicated in pregnancy. Direct oral anticoagulants like apixaban and fondaparinux are generally avoided due to limited safety data in pregnancy.

Drug	Placental Transfer	Use
LMWH	No	Drug of choice
Unfractionated heparin	No	Alternative
Warfarin	Yes	Contraindicated
DOACs	?	□ Avoid

LMWH → Activates antithrombin → ↓ Factor Xa

QUESTION

Which of the following is false about von Willebrand disease?

A Type I vWD presents with severe bleeding since birth

CORRECT

B Type II vWD has reduced activity of von Willebrand factor

C Type III vWD has very low levels of von Willebrand factor

D Type III vWD presents clinically as a severe disease

RIGHT ANSWER

OK

A. Type I vWD presents with severe bleeding since birth

WHY THIS IS RIGHT

Correct answer is A because Type I von Willebrand disease is a partial quantitative deficiency and usually causes mild bleeding, often presenting later in life rather than severe bleeding since birth. Type II vWD is a qualitative defect with reduced functional activity of vWF. Type III vWD has near absence of vWF and presents with severe bleeding resembling hemophilia.

Type	Defect	Severity	Key Feature
Type I	Partial quantitative ↓	□ Mild	Most common
Type II	Qualitative defect	Moderate	Dysfunctional vWF
Type III	Severe deficiency	□ Severe	Almost absent vWF

Feature	vWD	Hemophilia
Bleeding type	Mucosal	Deep (joints)
Platelet function	Abnormal	Normal
Bleeding time	↑	Normal
aPTT	Mild ↑	↑

QUESTION

A patient presents with bleeding due to factor IX deficiency. In which of the following conditions will you find an improvement after administering Vitamin K parenterally?

A Pernicious anemia

B Bile duct obstruction

CORRECT

C Hepatitis A

D Classical hemophilia

RIGHT ANSWER

OK B. Bile duct obstruction

WHY THIS IS RIGHT

Vitamin K-dependent factors

Without Vitamin K -> these factors are produced but non-functional

Correct answer is B because vitamin K is required for hepatic synthesis of vitamin K-dependent clotting factors (II, VII, IX, X), and in bile duct obstruction fat-soluble vitamin absorption is impaired, leading to deficiency that improves with parenteral vitamin K.

Pernicious anemia is due to vitamin B12 deficiency. Hepatitis A causes hepatocellular injury where vitamin K response may be limited. Classical hemophilia (factor VIII deficiency) does not respond to vitamin K.

Condition	Problem	Vitamin K effect
-----	-----	-----
Bile duct obstruction	↓ absorption	☐ Improves
Vitamin K deficiency	↓ activation	☐ Improves
Hemophilia	Factor absent	☐ No effect
Liver disease	↓ synthesis	☐ Limited

QUESTION

A 45-year-old patient presents with widespread purpura and easy bruising. Laboratory tests reveal a significantly low platelet count with normal hemoglobin and white blood cell count, indicating a diagnosis of isolated thrombocytopenia. The patient has no prior history of autoimmune disorders or recent viral infections. Considering these symptoms and diagnosis, which tyrosine kinase inhibitor would be appropriate for this patient

A Oprelvekin

B Fostamatinib

CORRECT

C Eltrombopag

D Bosutinib

RIGHT ANSWER

OK B. Fostamatinib

WHY THIS IS RIGHT

The source quiz contains the placeholder “\$23” here and does not include a written explanation for this item.

QUESTION

A 26-year-old female with bleeding disorder, gives family history of her father and sister suffering from the same bleeding disorders. Which is the most likely disorder?

A Von Willebrand disease

CORRECT

B Hemophilia A

C Christmas disease

D Factor 12 Deficiency

RIGHT ANSWER

OK A. Von Willebrand disease

WHY THIS IS RIGHT

Mechanism:

- ↓ vWF → ↓ platelet adhesion + ↓ Factor VIII stability

Dual defect:

- Platelet function
- Coagulation pathway

Correct answer is A because von Willebrand disease is usually autosomal inherited and affects both males and females, commonly presenting with mucocutaneous bleeding such as menorrhagia and positive family history across genders. Hemophilia A and Christmas disease (Hemophilia B) are X-linked recessive and mainly affect males. Factor XII deficiency usually does not cause clinical bleeding despite abnormal coagulation tests.

Feature	vWD	Hemophilia A/B
-----	---	-----
Inheritance	AD	X-linked
Gender	Both	Males
Bleeding type	Mucosal	Deep (joints)
Bleeding time	↑	Normal
aPTT	Mild ↑	↑

QUESTION

| Which of the following STD is transmitted by all components of the blood?

A Hepatitis

B Filariasis

C Malaria

CORRECT

D Syphilis

RIGHT ANSWER

OK C. Malaria

WHY THIS IS RIGHT

Malaria

- The parasite (Plasmodium) lives inside RBCs
- During component preparation, no component is 100% RBC-free:
- Platelets -> contain residual RBCs
- Plasma -> may have minimal RBC contamination
- Even very small numbers of infected RBCs can transmit malaria

Therefore, malaria can be transmitted via:

- Packed RBCs
- Platelets
- Plasma

Hence, effectively transmitted by all components

Why other options are wrong

A) Hepatitis B / Hepatitis C ☐

- Virus is mainly plasma-borne
- Conceptually linked to plasma transmission, not the “all components via contamination” principle tested here

B) Filariasis ☐

- Not a routine transfusion-transmitted infection
- Not relevant to component-based transmission

D) Syphilis ☐

- Organism is fragile
- Killed by storage at 4°C
- Transmission mainly via fresh blood only

QUESTION

Which of the following is used in the treatment of hemophilia B?

- a) Fresh Frozen Plasma (FFP)
- b) Cryoprecipitate
- c) Factor VIII concentrates
- d) Cryo-poor Plasma

A a & c

B a & d

CORRECT

C a, b, c

D All of above

RIGHT ANSWER

OK B. a & d

WHY THIS IS RIGHT

The source quiz contains the placeholder “\$24” here and does not include a written explanation for this item.

QUESTION

| Which of the following anticoagulants requires coagulation profile monitoring?

A Enoxaparin

B Lepirudin

CORRECT

C Fondaparinux

D Dabigatran

RIGHT ANSWER

OK B. Lepirudin

WHY THIS IS RIGHT

The source quiz contains the placeholder "\$25" here and does not include a written explanation for this item.

QUESTION

A 26-year-old female presents to the ER with menorrhagia. She mentions that her father and sister also suffer from bleeding disorders. Which of the following is likely?

A Factor X deficiency

B Factor VIII deficiency

C Factor IX deficiency

D Von Willebrand Disease

CORRECT

RIGHT ANSWER

OK

D. Von Willebrand Disease

WHY THIS IS RIGHT

The source quiz contains the placeholder “\$26” here and does not include a written explanation for this item.

QUESTION

| Which of the following is not a component of TTP?

A Thrombocytopenia

B Renal failure

C **Thrombosis**

CORRECT

D Haemolytic anemia

RIGHT ANSWER

OK **C. Thrombosis**

WHY THIS IS RIGHT

Thrombotic Thrombocytopenic Purpura (TTP)

Caused by deficiency of:

ADAMTS13 deficiency

↓

Large vWF multimers persist

↓

Platelet aggregation in microvasculature

↓

Microthrombi formation

↓

↓ Platelets + RBC fragmentation

Thrombotic thrombocytopenic purpura is classically characterized by a pentad:

1. Thrombocytopenia ☐

2. Microangiopathic hemolytic anemia (MAHA) ☐

3. Neurological symptoms (confusion, seizures)

4. Renal dysfunction ☐

5. Fever

• Although microvascular platelet-rich thrombi are central to the pathophysiology, “thrombosis” (as a clinical feature like DVT/PE) is not part of the classical pentad.

QUESTION

A newborn presents with umbilical cord stump bleeding and a history of recurrent bleeding episodes. Laboratory results reveal normal PT, APTT, and platelet count, but a positive urea clot solubility test. What coagulation factor deficiency is most likely responsible for these symptoms?

A Factor XII

B Factor XI

C Factor VIII

D Factor XIII

CORRECT

RIGHT ANSWER

OK D. Factor XIII

WHY THIS IS RIGHT

The source quiz contains the placeholder “\$27” here and does not include a written explanation for this item.

QUESTION

| Which of the following is not an inherited cause of thrombosis?

- A** Protein S deficiency
- B** Homocystinuria
- C** PNH (Paroxysmal Nocturnal Haemoglobinuria) CORRECT
- D** Antithrombin III deficiency

RIGHT ANSWER

- OK** **C. PNH (Paroxysmal Nocturnal Haemoglobinuria)**

WHY THIS IS RIGHT

The source quiz contains the placeholder "\$28" here and does not include a written explanation for this item.

QUESTION

A patient presents with a history of petechiae, ecchymosis, thrombocytopenia, and large platelets on peripheral smear. What is the most appropriate treatment?

A Intravenous immunoglobulin (IVIG)

CORRECT

B Methotrexate

C Aspirin

D Bone Marrow Transplant

RIGHT ANSWER

OK

A. Intravenous immunoglobulin (IVIG)

WHY THIS IS RIGHT

The source quiz contains the placeholder "\$29" here and does not include a written explanation for this item.

QUESTION

| Which of the following is the most common inherited bleeding disorder?

A Von Willebrand Disease

CORRECT

B Disseminated Intravascular Coagulation

C Factor V Deficiency

D Hemophilia

RIGHT ANSWER

OK

A. Von Willebrand Disease

WHY THIS IS RIGHT

The source quiz contains the placeholder “\$2a” here and does not include a written explanation for this item.

QUESTION

A patient involved in a road traffic accident was admitted to the emergency department. During the first 2-4 hours, he received 4 units of packed red blood cells. Which of the following complications is most likely to occur in this patient?

A Hyponatremia

B Hypocalcemia

CORRECT

C Hypocitratemia

D Hypernatremia

RIGHT ANSWER

OK

B. Hypocalcemia

WHY THIS IS RIGHT

Stored blood contains citrate

↓

Citrate binds calcium

↓

↓ Ionized calcium

↓

Hypocalcemia

Answer is B because stored blood contains citrate as an anticoagulant, which binds ionized calcium during rapid or massive transfusion, leading to hypocalcemia.

Mechanism:

This can cause tetany, hypotension, and arrhythmias during transfusion.

Sodium abnormalities and hypocitratemia are not typical complications of blood transfusion.

Massive Transfusion Complications-

| Complication | Mechanism |

| ----- | ----- |

| Hypocalcemia | Citrate binding |

| Hyperkalemia | RBC lysis |

| Hypothermia | Cold blood |

| Acidosis | Poor perfusion |

Prevention:

- Monitor calcium
- Give IV calcium gluconate if needed

QUESTION

Match the blood product with the shelf life mentioned in the next column:

Blood Product	Shelf Life
A. Single donor platelet	1. 42 days
B. Packed red blood cells	2. 24 hours
C. Cryoprecipitate	3. 5 days
D. Granulocyte concentrate	4. 1 year

- A

A-3, B-1, C-4, D-2

CORRECT
- B

A-2, B-3, C-1, D-4
- C

A-3, B-4, C-2, D-1
- D

A-3, B-1, C-2, D-1
- OK

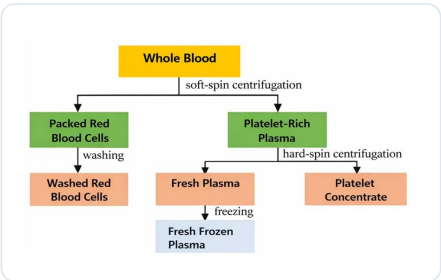
RIGHT ANSWER

A. A-3, B-1, C-4, D-2

WHY THIS IS RIGHT

Blood Component	Storage Duration
Single Donor Platelet	5 days
Packed Red Blood Cells	42 days
Cryoprecipitate	1 year
Granulocyte Concentrate	24 hours

Product	Storage Temp	Shelf Life	Key Reason
Packed RBCs	2-6°C	42 days	SAGM
Platelets	20-24°C	5 days	Risk of bacterial growth
Cryoprecipitate	-30°C	1 year	Frozen
Granulocytes	Room temp	24 hours	Very fragile



QUESTION

A patient with an unknown blood group experiences trauma and is unstable, requiring an urgent blood transfusion. Which types of blood should be transfused?

- a. A+
- b. AB+
- c. O+
- d. O-

A a & b

B c & d

CORRECT

C None of above

D All of above

RIGHT ANSWER

OK B. c & d

WHY THIS IS RIGHT

Unknown blood group + unstable patient

↓
Need immediate transfusion

↓
Use O group blood

↓
If female / childbearing -> O negative
If adult male -> O positive acceptable

Correct answer is B because in emergency transfusion with unknown blood group, group O blood is safest as it lacks A and B antigens, minimizing risk of acute hemolytic reaction.

O negative is universal donor and preferred, especially in females of reproductive age to prevent Rh sensitization. O positive can be used in life-threatening emergencies, especially in males or when O negative is unavailable.

| Term | Meaning |

| --- | ----- |

| Universal donor (RBC) | O- |

| Universal recipient (RBC) | AB+ |

| Plasma donor (universal) | AB |

| Plasma recipient (universal) | O |

A+ and AB+ contain A and/or B antigens and can cause severe hemolytic transfusion reactions in incompatible recipients.

QUESTION

Regarding ABO blood grouping, which statement is false?

- A** IgM is the most common antibody in ABO
- B** ABO antibodies are natural and present since birth CORRECT
- C** ABO antigens are carbohydrates
- D** Antibodies are present only if antigens are absent

RIGHT ANSWER

- OK** **B. ABO antibodies are natural and present since birth**

WHY THIS IS RIGHT

Birth -> No ABO antibodies

↓

Exposure to gut bacteria / food antigens

↓

Immune system recognizes similar antigens

↓

Formation of IgM antibodies

Correct answer is B because ABO antibodies are naturally occurring but are not present at birth; they develop within the first few months of life due to exposure to environmental antigens (e.g., gut bacteria).

| Blood Group | Antigen | Antibody |

| ----- | ----- | ----- |

| A | A | Anti-B |

| B | B | Anti-A |

| AB | A & B | None |

| O | None | Anti-A & Anti-B |

ABO antibodies are predominantly IgM. ABO antigens are carbohydrate structures on RBC membrane. Antibodies develop against ABO antigens that are absent on an individual's RBCs.

QUESTION

Which of the following is a feature of delayed blood transfusion reaction?

1. Increased unconjugated bilirubin
2. Cola colored urine after 2 hours
3. Increased LDH
4. Failure of rise of hemoglobin after transfusion

A 1 and 2

B 1, 2 and 3

C 1, 3 and 4

CORRECT

D 1, 2, 3, 4

RIGHT ANSWER

OK

C. 1, 3 and 4

WHY THIS IS RIGHT

The source quiz contains the placeholder “\$2b” here and does not include a written explanation for this item.

QUESTION

| All blood products are separated by Centrifugation except:

- A Platelet
- B RBC
- C Serum albumin**
- D Cryoprecipitate

CORRECT

RIGHT ANSWER

- OK C. Serum albumin**

WHY THIS IS RIGHT

The source quiz contains the placeholder “\$2c” here and does not include a written explanation for this item.

QUESTION

A patient with a history of road traffic accident (RTA) presents with massive blood loss and has been transfused with 4 units of packed red blood cells within a few hours. Which of the following electrolyte abnormalities is most likely to occur?

A Hypernatremia

B Hypocalcemia

CORRECT

C Hyperkalemia

D Hyponatremia

RIGHT ANSWER

OK

B. Hypocalcemia

WHY THIS IS RIGHT

Massive transfusion delivers citrate from stored blood, which chelates ionized calcium in the circulation. This reduces free Ca^{2+} and leads to transfusion-related hypocalcemia. Low calcium leads to:

- Neuromuscular irritability
- Tetany
- Cardiac arrhythmias

Rapid transfusion increases the risk because citrate metabolism is overwhelmed. The key electrolyte complication of massive transfusion is hypocalcemia.

| Complication | Mechanism |

| ----- | ----- |

| Hypocalcemia | Citrate binds Ca^{2+} |

| Hyperkalemia | RBC lysis $\rightarrow$ K^+ release |

| Hypothermia | Cold blood transfusion |

| Coagulopathy | Dilution of clotting factors |