

ANSWER the following concerning the condition shown (1-5) (Biopsy on the left is normal; Biopsy on right is from patient)

1. The condition is best described as a

- a. Bacterial infection
- b. Viral infection
- c. Autoimmune reaction
- d. Toxigenic reaction
- e. Rejection phenomenon

2. The disease is primarily a

- a. CD4 Th1 cell response
- b. CD4 Th2 cell response

3. The condition usually leads to

- a. Hypothyroidism
- b. Hyperthyroidism

4. The principle cells seen on biopsy are

- a. Plasma cells
- b. Macrophages
- c. B cells
- d. Lymphocytes
- e. Giant cells

5. The primary treatment is:

- a. Removal of the thyroid by surgery or radioisotope

b. Replacement therapy with synthetic thyroid hormone

6. Depending upon the technique and substances used in the test, which cells could be identified?

- a. T cells
- b. B cells
- c. Macrophages
- d. a, b, c

7. The predominant cells seen in this biopsy of a palpable purpuric lesion are

- a. Polymorphonuclear leukocytes
- b. B cells
- c. T cells
- d. Crophages

8. The test shown is used to detect which of the following? (control is on the left)

- a. Numbers of macrophages
- b. Functional activity of macrophages
- c. Numbers of T cells
- d. Functional activity of T cells
- e. Numbers and function of B cells

9. Indicate the correct statement based upon the lower intestinal biopsy shown (Upper biopsy is normal)

- a. The patient was an adult
- b. The patient would have an elevated IgE level
- c. Skin test to foods would be positive

- d. Serum antibodies would be elevated
- e. Few if any cells would be seen on higher magnification

10. Indicate when the aeroallergen shown would produce most symptoms in the NY area

- a. March to early June
- b. May to the middle of July
- c. May to mid September
- d. August to the first frost
- e. Throughout the year

Answer the following based upon the condition shown below (11-15)

11. The reaction is a typical Gell and Coombs

- a. Type 1 (anaphylactic)
- b. Type 2 (cytotoxic)
- c. Type 3 (immune complex)
- d. Type 4 (cell mediated)

12. The condition would be seen how long after exposure?

- a. 1 hour after exposure
- b. 6 hours after exposure
- c. 24 to 48 hours after exposure
- d. 3 days after exposure

13. A biopsy would reveal

- a. Dermal edema with few eosinophils
- b. Neutrophil infiltration with occluded arterioles
- c. Dermal mononuclear infiltration and perivascular cuffing
- d. Lymphocytes including giant cells and epithelioid cells

14. To avoid future more severe episodes it would be wise to skin test as one would do for an aeroallergen allergy

- a. True
- b. False

15. Treatment usually consists of topical soothing compresses and topical steroids with occasional use of antihistamines and at times oral or injectable steroids

- a. True
- b. False

16. Which of the following is an organ specific autoimmune disease?

- a. Pernicious anemia
- b. Dermatomyositis
- c. Systemic lupus erythematosus
- d. Progressive systemic sclerosis
- e. Rheumatoid arthritis

17. Indicate in which of the following ways is autoimmunity least likely to be induced

- a. Antigenic cross-reactivity
- b. Virus specific cytotoxicity
- c. Exposure to sequestered antigens
- d. Induction of class II MHC by viral infection

e. Tolerant antigens

18. In Infectious mononucleosis and Cold agglutinin disease the antibody is

- a. IgG
- b. IgM
- c. IgA
- d. IgE
- e. IgD

19. The most common cause of cold hemolysin disease is due to:

- a. IgG
- b. IgM
- c. IgA
- d. IgE

MATCH the self-antigen with the disease given (20-24). Each choice may be used once, more than once or not at all.

- a. Acetylcholine receptor
- b. Gastric parietal cell antigen
- c. Streptococcal cell wall antigens
- d. Myelin basic protein
- e. Nuclear debris

- 1. 20. Acute rheumatic fever
- 2. 21. Pernicious anemia

- 3. 22. Myasthenia gravis
- 4. 23. Multiple sclerosis
- 5. 24. Systemic lupus erythematosus

MATCH the statement with the immunological test you would order (25-29). Each choice may be used once, more than once or not at all.

- .a. Radioimmunoassay
- .b. Nitrobluetetrazolium test (NBT)
- .c. Direct immunofluorescence
- .d. Ochterlony double diffusion in gel
- .e. “One-way” mixed lymphocyte culture

- 25. Determine if renal pathology is Goodpasture’s syndrome or post-streptococcal C
- 26. Determine IgE level as indicator of atopy from cord of a newborn
- 27. Planned transplant of kidney from father to son
- 28. Recurrent infections due to *Staphylococcus. Aureus*
- 29. Determine if two samples of immunoglobulin are the same

MATCH the test of immunologic function with the statement given (30-34). Each choice may be used once, more than once or not at all.

- .a. Test of inflammatory response
- .b. Test of humoral function
- .c. Test of cytotoxic injury
- .d. Test of antigen-antibody complex injury

.e. Test of IgE (Reagin) hypersensitivity

1. 30. Antinuclear factor
2. 31. Antiglobulin test
3. 32. Quantitation of immunoglobulins
4. 33. Chemotactic assay
5. 34. Immediate hypersensitivity skin test

MATCH the type of immunizing agent with the condition given (35-39). Each choice may be used once, more than once or not at all.

- .a. Toxoid
- .b. Killed bacteria
- .c. Attenuated virus
- .d. Subunit vaccine (recombinant antigen)
- .e. Gamma globulin

1. 35. Prophylaxis following a dirty penetrating wound with concern about tetanus
2. 36. An Rh negative woman with rising Rh positive titer in 2nd trimester of pregnancy
3. 37. Prevention of Pertussis (whooping cough)
4. 38. Immunization against measles, mumps, rubella (MMR)
5. 39. Immunization against Hepatitis

.40. Which of the following immunizations should not be given before 1 year of age?

- .a. MMR (measles-mumps-rubella)
- .b. Hepatitis B
- .c. DTP (diphtheria-tetanus-pertussis)

.d. HiB (Haemophilus influenza type B)

.e. IPV (enhanced inactivated polio)

41. An intern previously immunized against Hepatitis B is stuck with a needle while assisting in surgery on a patient with active hepatitis B. Your advice should be:

.a. Obtain blood samples over the next several months and reassure the intern

.b. Administer Hepatitis B gamma globulin

.c. Administer Hepatitis B active immunization

.d. Administer Hepatitis B gamma globulin and give a “booster” for active immunization against Hepatitis B

.e. Cleanse and then cauterize the site of the needle stick

MATCH the following (42-44). Each choice may be used once, more than once or not at all.

.a. Passive immunization

.b. Active immunization

.c. Both passive and active immunization

1. 42. Immunity develops in 5 to 14 days

2. 43. Possibility of adverse reaction following administration

3. 44. Duration of immunity days to weeks

.45. Indicate the **correct** statement concerning adverse reactions to foods

.a. Most adverse reactions to foods are due to immunological hypersensitivity

.b. IgG, IgM, IgA, or IgE can be involved in a hypersensitivity food reaction

.c. Most adverse hypersensitivity food reactions are seen during the teen age

- .d. Most common cause of food hypersensitivity reactions in infancy is shell fish
- .e. Concentration of food bears little relationship to development of reactions

46. Indicate which of the following adverse food reactions is IgE mediated

- .a. Celiac disease
- .b. Serum Sickness
- .c. Migraine headache
- .d. Urticaria due to milk
- .e. Contact skin reaction due to application of patch test of berries

47. The most effective **practical** therapy for food hypersensitivity is

- .a. Antihistamines prior to the ingestion of the suspected food
- .b. Cromolyn sodium prior to the ingestion of the suspected food
- .c. Careful immunotherapy (desensitization) to food positive skin tests
- .d. Food elimination diet
- .e. Corticosteroids prior to and following the ingestion of the involved food

48. Skin testing for food allergies is of little practical value, especially in children

- .a. True
- .b. False

49. A 40 year old male develops a localized rash at exactly the same place on his penis each time he takes Ex-Lax (containing phenolphthalein). This is probably a:

- .a. Drug fever
- .b. Venereal lesion
- .c. Contact dermatitis

- .d. Fixed drug reaction
- .e. Munchausen syndrome

50. The most effective management of drug reactions is

- .a. Taking a detailed drug history
- .b. Use of epinephrine 1:1000
- .c. Corticosteroids
- .d. Antihistamines
- .e. Use of drugs that are of a similar type but give a history of less adverse reactions

51. A 25 year old male has a proven case of gonorrhea, but gives a history of an acute anaphylactic reaction following prior administration of penicillin. Your action is:

- .a. Test him with the major penicillin haptenic group and if negative administer penicillin
- .b. Test him with the minor penicillin haptenic group and if negative administer penicillin
- .c. Test him with the major and minor haptenic group and if negative administer penicillin
- .d. Test him with both groups and if positive admit to the hospital and give a “rush” administration of penicillin under careful supervision
- .e. Treat with another antibiotic to which gonococci are sensitive and to which the patient has no history of an adverse reaction

52. The test that is **least** productive in diagnosing an allergic reaction is

- .a. History and physical examination
- .b. Skin testing
- .c. Radioallergosorbent test
- .d. Basophil degranulation test
- .e. Examination of nasal and chest secretions

53. The difference between the “late allergic response” and true delayed type of hypersensitivity is that in the late allergic response alone there is

- .a. Primarily a lymphocytic response
- .b. Fixation of complement
- .c. A 24 to 48 hour time lapse between exposure and effect
- .d. Involvement of antibody
- .e. Transfer of memory by cellular factors

54. Your patient has severe tree allergic rhinitis and wants to know when he should exercise by jogging. You should advise him that the worse time would be on a

- .a. Clear bright sunny day at 7 AM
- .b. Clear bright sunny day at 12 noon
- .c. Misty or fine rain day at 7 AM
- .d. Misty or fine rain day at 12 noon

55. In the New York area the most important aeroallergen is

- .a. Alternaria
- .b. Oak tree pollen
- .c. June grass pollen
- .d. Ragweed pollen
- .e. Goldenrod

56. A forty-year old male has typical nasal and eye allergic symptoms only in March and late September. He probably is allergic to

- .a. Trees and grasses
- .b. Trees and ragweed
- .c. Trees and molds

- .d. Grasses and ragweed
- .e. Grasses and English plantain

57. A highly emotional 40 year old woman has moderate nasal congestion, sneezes infrequently, has profuse rhinorrhea with marked post nasal drip, skin tests are negative, and she has a poor response to antihistamines, steroids, and nasal decongestants. Nasal smear shows few eosinophils. The diagnosis is probably

- .a. Seasonal allergic rhinitis
- .b. Perennial allergic rhinitis
- .c. Vasomotor rhinitis
- .d. Perennial non-allergic rhinitis

58. An immunologically mediated cause of drug-induced urticaria is

- .a. Aspirin
- .b. Radiocontrast material
- .c. Penicillin
- .d. NSAIDs
- .e. Opiates

59. The most practical screening test for hereditary angioedema is

- .a. C 1
- .b. C 1 esterase inhibitor
- .c. C 2
- .d. C 3
- .e. C 4

60. An infrequent cardiovascular finding in an anaphylactic reaction is

- .a. Hypotension

- .b. Bradycardia
- .c. Capillary leakage
- .d. Decreased cardiac motility

61. Indicate the correct statement concerning an anaphylactic reaction

- .a. Usually occurs 1 to 2 hours after exposure
- .b. There is a slow progression of symptoms
- .c. Cutaneous and respiratory symptoms are the most common
- .d. The later the symptoms appear the greater the danger to life
- .e. Premedication can prevent virtually all anaphylactic reactions

62. Indicate which drug should **not** be used where there is danger of an anaphylactic reaction

- .a. Propranolol (beta blocker)
- .b. Aspirin (analgesic/antiinflammatory)
- .c. Hydrochlorothiazide (diuretic)
- .d. Glucagon (anti hypoglycemic)
- .e. Digoxin (cardiac glycoside)

63. Indicate which is not an effect of immunotherapy for allergic diseases

- .a. An initial fall in patient's serum IgE level at start of therapy
- .b. Increased IgG production
- .c. Production of antigen-specific suppressor T lymphocytes
- .d. Decreased production of IL-4 cells
- .e. Decreased release of histamine from basophils

64. Generally the best one to diagnose and treat most allergic conditions is

- .a. An Osteopathic physician engaged in primary care
- .b. Clinical immunologist
- .c. Certified allergist/immunologist
- .d. Registered nurse with extensive experience in an allergy office
- .e. Physician who has suffered from allergic disease for many years

ANSWER THE FOLLOWING PATIENT ORIENTED PROBLEM SOLVING CASE # 1 (65-71)

CASE # 1: You are called to the nursery to see a newborn male with a history of convulsions. You note facial abnormalities, and on auscultation find cardiac abnormalities. The most significant finding is a hypocalcemia and an absence of the thymic shadow on x-ray.

65. Which immunodeficiency should you suspect?

- .a. Agammaglobulinemia
- .b. Wiskott-Aldrich syndrome
- .c. Severe combined immunodeficiency (SCID)
- .d. DiGeorge syndrome
- .e. Chronic granulomatous disease

66. A laboratory finding most likely present would be

- .a. An increased number of T cells with decreased function
- .b. Decreased numbers of T cells with decreased function
- .c. Normal numbers of T cells with normal function
- .d. Increased numbers of B cells with increased function
- .e. An increase in numbers of all cells of the hematopoietic system

ANSWER the following questions True or False for CASE # 1 above (67-70)

67. The condition is associated with an embryonic abnormality of the thyroid

- .a. True
- .b. False

68. Most cases are detected at birth (prior to 6 months of life)

- .a. True
- .b. False

69. Treatment involves gamma globulin every 30 days

- .a. True
- .b. False

70. Serum concentrations of immunoglobulins are frequently normal with antibody responses generally impaired

- .a. True
- .b. False

71. A patient is known to have a deficiency in the lymphoid stem cells. This deficiency generally results in:

- .a. Deficiencies in both T and B cell function
- .b. Diminished B cell function but normal T cell functions
- .c. Diminished T cell function but normal B cell functions
- .d. Selective absence of immunoglobulin isotypes (e.g., IgA)
- .e. Elevated IgM, and decreased IgA, IgG and IgE levels

MATCH the following patient oriented problem solving cases (POPS) (72-76). Each choice may be used once, more than once or not at all.

- a.Chronic granulomatous Disease (CGD)
- b.Chronic Mucocutaneous Candidiasis
- c.Goodpasture's syndrome
- d.Multiple myeloma
- e.Agammaglobulinemia

72. Autoimmune reaction against lung and renal basement membrane

73. Infection by catalase positive bacteria

74. Fungal infection with normal T cell and B cell count

75. Malignancy of immune lymphoid cells

76. Onset of infections and symptoms after 3 months of age

MATCH the patient oriented problem solving cases (POPS) (77-81). Each choice may be used once, more than once or not at all.

- .a. Hodgkin's disease
- .b. Agammaglobulinemia
- .c. DiGeorge syndrome
- .d. Multiple myeloma
- .e. Infectious mononucleosis

1. 77. Viral invasion of B cells with strong subsequent T cell response

2. 78. "Monoclonal spike" on protein electrophoresis

3. 79. Defect in embryologic development of the 3rd and 4th pharyngeal pouches

4. 80. In early life very susceptible to infections by encapsulated bacteria (e.g. pneumococcus)

5. 81. Reed Sternberg cells found in tissue

82. Following dental surgery a 35-year-old female developed severe angioedema. She was told she had the inherited form of angioedema, but a screening for C4 complement level was reported as normal. You are called upon to confirm or refute the diagnosis. The test most diagnostic would be

a. Total hemolytic complement

b. Skin test of the local anesthetic used

c. C1 determination

d. Functional assay of C1 esterase inhibitor

e. Total level of C3

MATCH the following practical tests of immunologic function with the statement given (83-87). Each choice may be used once, more than once or not at all.

a. Test of inflammatory response

b. Test of humoral function

c. Test of cytotoxic injury

d. Test of antigen-antibody complex injury

e. Test of IgE (Reagin) hypersensitivity

83. Suspected case of Waldenström's macroglobulinemia

84. Suspected case of vasculitis

85. Suspected case of Hemolytic disease of the newborn

86. Suspected case of latex induced anaphylaxis

87. Suspected immunodeficiency in a one-week-old male infant

MATCH the following in the clinical differential diagnosis of rhinitis (88-91). Each choice may be used once, more than once or not at all.

- .a. Seasonal allergic rhinitis
- .b. Perennial allergic rhinitis
- .c. Perennial non-allergic rhinitis
- .d. Vasomotor rhinitis
- .e. Eosinophilic non-allergic rhinitis

1. 88. A 6-year-old girl with frequent sneezing, profuse rhinorrhea, frequent eye symptoms, itching , many eosinophils, skin test positive with an excellent response to immunotherapy.

2. 89. 15 year old male with recurrent rhinorrhea, sneezing, nasopharyngeal itch and lacrimation with little nasal congestion, no evidence of sinusitis, but has eosinophilia

3. 90. A 45 year old female with moderate nasal congestion, rare sneezing, rare eye symptoms, no anosmia, few eosinophils, skin tests negative; poor response to antihistamines

4. 91. A 37 year-old male complaining of marked nasal congestion, frequent anosmia and polyps, rarely any eye symptoms, frequent infections, and a fair response to antihistamines but no response to immunotherapy

.92. Your patient is scheduled for a radiocontrast procedure. There is a history of an adverse reaction to the dye during a prior examination. Which of the following would be of little or **no** value in your management?

- .a. Use of a low molality contrast media
- .b. Consider a different procedure that might give the same information
- .c. Skin test to determine if the patient is allergic to the contrast material
- .d. Pre-medicate with steroids and antihistamine according to a protocol
- .e. Take a detailed history of the prior reaction and response to therapy

93. A 32 year old male develops severe chest pain 2 weeks post myocardial infarction. EKG shows a pericarditis but cardiac enzymes are unchanged; a pleural and pericardial effusion is noted on chest x-ray. Indicate the correct statement

- .a. Condition is a most often an immune reaction to a streptococcus infection

- .b. Rising antibody titre against cardiac tissue can be found
- .c. The condition requires intensive antibiotic therapy
- .d. Immediate therapy with anticoagulants is indicated
- .e. The condition is usually fatal

94. You gave a 19 year old female an injection of penicillin since there was no prior history of penicillin allergy. Moments after receiving the injections she reports she is very nervous. She reports she is nauseous, becomes pale and diaphoretic, and slides to the floor. Your examination reveals a blood pressure of 114/70, her skin is moist, and her pulse is a regular sinus rhythm at 58/min. She is responsive after one minute and she reports she feels better. All signs have returned to normal. Based upon the above a correct statement is:

- .a. The episode was an acute anaphylactic reaction to penicillin
- .b. Epinephrine 1:1000 in dose of 1 ml IV should have been given
- .c. The episode was probably a vaso-vagal reaction
- .d. Skin test her at this time to determine future plans for penicillin therapy
- .e. Send her home with instruction to take Benadryl, corticosteroids, and admonish her to never receive penicillin again regardless of need

95. An 18 year-old female presents to your office complaining of “hives” after eating strawberries. The medical terminology for this allergic reaction is called:

- .a. Contact Dermatitis
- .b. Urticaria
- .c. Allergic Rhinitis
- .d. Tinea Corporis
- .e. Eczema

96. The treatment for the above disorder would be a combination of avoidance of the offending allergen and:

- .a. A topical corticosteroid
- .b. An oral anti-histamine

- .c. An antibiotic ointment
- .d. An oral antibiotic
- .e. An oral leukotriene modifier

97. A patient with Multiple Myeloma would be most likely to have a combination of the following elements on history and laboratory testing?

- .a. Fatigue, Constipation, and Hypochromic Microcytic Anemia
- .b. Fatigue, Rectal Bleeding, and Hypochromic Microcytic Anemia
- .c. Fatigue, Memory Loss, and Hypochromic Macrocytic Anemia
- .d. Fatigue, Cough, and Normochromic Normocytic Anemia
- .e. Fatigue, Back Pain, and Normochromic Normocytic Anemia

98. In Multiple Myeloma the peripheral smear would show:

- .a. Basophilic Stippling
- .b. Rouleux Formation
- .c. Anisocytosis
- .d. Increased Platelet Size
- .e. Bence Jones Proteins

99. An afebrile patient with a history of seasonal nasal congestion, clear rhinorrhea and blue-colored nasal turbinates on physical exam most likely has:

- .a. Allergic Rhinitis
- .b. Perennial Rhinitis
- .c. Vasomotor Rhinitis
- .d. Upper Respiratory Infection
- .e. Acute Sinusitis

100. On musculoskeletal exam, in a patient with an acute flair-up of there allergic rhinitis, you would expect to find a somatic dysfunction at:

- .a. T1-T5
- .b. T5-T9
- .c. T10-T12
- .d. L1-L2
- .e. L2-L5

HEME EXAM

1. Which condition may be associated with an elevated lymphocyte count (lymphocytosis)?

- a. Leukemias of lymphoid origin

- b. Collagen vascular disease
- c. Viral hepatitis
- d. All of the above

2. Mature B cells (B lymphocytes) are typically characterized by which of the following statements?

- a. Expression of immunoglobulin on the cell membrane (typically IgM, IgD)
- b. Origin, maturation, and differentiation in lymph nodes
- c. Expression of CD 20 by flow cytometry
- d. All of the above

3. One of the advantages to the fetus of having fetal hemoglobin (alpha and gamma chains) is that fetal hemoglobin binds oxygen more tightly than does adult hemoglobin.

- a. True
- b. False

4. In fetal life, red blood cells contain fetal hemoglobin that has alpha and gamma chains. The “hemoglobin switch” refers to what phenomenon?

- a. Switch from alpha to beta chains late in fetal life
- b. Switch from gamma to alpha chains late in fetal life
- c. Switch from gamma to beta chains late in fetal life
- d. Switch from alpha to gamma chains late in fetal life

5. Hematopoietic stem cells (cells that are used for transplantation) are typically characterized by which of the following statements?

- a. CD 34 expression on flow cytometry
- b. Lack of expression of HLA-DR
- c. Capability of proliferation and self renewal

d. All of the above

6. Natural Killer Cells (NK cells) are typically characterized by which of the following?

- a. CD 56 positivity
- b. Expression of FLT-3 ligand
- c. Cooperation with T cells, B cells and dendritic cells to achieve cellular cytotoxicity
- d. All of the above

7. Neutrophils are typically characterized by which of the finding?

- a. Expression of T cell receptors
- b. Expression of bound surface immunoglobulin that is internally secreted
- c. Cytoplasmic granules that contain peroxidase, elastase, and numerous bacteriocidal peptides
- d. Expression of interleukin-2 receptors (IL-2 r)

8. Which of the following statements about red blood cells is true?

- a. Hemoglobin levels should remain constant with age
- b. Gender does not affect hemoglobin levels
- c. A decreased MCV (suggestive of microcytosis) can be seen in iron deficiency
- d. An increased MCV (suggestive of macrocytosis) is typical for patients with Thalassemia trait

9. Which of the following statements about white blood cells is true?

- a. White blood cells are important in hemostasis
- b. Absolute neutropenia refers to a neutrophil count of < 500 and is an indicator of a high risk for developing infection
- c. Lymphocyte counts are commonly elevated in patients with parasitic infections or drug reactions
- d. Eosinophil counts are commonly elevated in patients with viral infections

10. Which of the following statements regarding coagulation is true?

- a. The bleeding time may be prolonged if the platelet count is low or the platelets are dysfunctional
- b. A low platelet count will result in a prolonged PT and aPTT
- c. The bleeding time is prolonged in patients with hemophilia
- d. The PT is prolonged in patients with von Willebrand's disease

11. The aPTT is used when screening for the following:

- a. Vitamin K deficiency
- b. Factor VII deficiency
- c. von Willebrand's disease
- d. Dysfunctional platelets

12. Which of the following are usually seen with hemolytic anemia?

- a. Increased haptoglobin levels
- b. Increased reticulocyte count
- c. Elevated PT
- d. Elevated aPTT
- e. Prolonged bleeding time

13. Which of the following patients is most appropriate for a red blood cell transfusion?

- a. A 32 year old female with a hemoglobin of 7.2 (low) following a complicated C-section
- b. A 54 year old male who is receiving chemotherapy every three weeks and now has a hemoglobin of 9.4 (low)
- c. A 64 year old male admitted for a gastrointestinal bleed who now has a Hgb of 9.4 (low) and is short of breath and complaining of chest discomfort
- d. A 68 year old female who presents with profound fatigue and is found to have iron deficient anemia with a Hgb of 9.3 (low)

14. Fresh Frozen Plasma (FFP) is best indicated in which of the following patients?

- a. A patient with an elevated Prothrombin (PT) time due to liver disease who is bleeding from esophageal varices
- b. A patient who is on heparin with supratherapeutic levels who has developed GI bleeding and requires rapid reversal of the anticoagulant
- c. A patient with von Willebrand's disease who is bleeding postoperatively
- d. A patient who has been on Coumadin and is scheduled for elective surgery during which anticoagulation must be reversed

15. A hemolytic transfusion reaction is most likely to occur in which of the following patients?

- a. Following transfusion with ABO incompatible blood
- b. In response to donor leukocytes
- c. As a reaction to donor plasma proteins
- d. In a patient transfused with bacterially contaminated blood

16. You are called to see a patient who is having a transfusion reaction. Your immediate best course of action should be which of the following?

- a. Stop the blood transfusion and request a new unit of blood from the blood bank
- b. Stop the blood transfusion and remove the IV in the patient's arm to prevent any blood left in the line from infusing.
- c. Stop the blood transfusion and send a sample of blood from the patient to the blood bank along with the rejected unit of blood for repeat cross matching
- d. Slow the rate of transfusion and give the patient benadryl and hydrocortisone to treat the transfusion reaction

17. Which of the following regarding transfusion-transmitted infections is true?

- a. With careful and appropriate screening, no patients will develop hepatitis or HIV from blood transfusions
- b. It is rare to transmit parasites such as malaria or babesiosis in blood transfusions
- c. Donors should be screened regarding their dietary habits
- d. Bacterial contamination can cause septic shock in a patient receiving a blood transfusion

18. The S-Hemoglobin found in sickle cell disease involves a substitution of valine for glutamic acid at the

- a. 6th carbon position of the beta chain
- b. 8th carbon position of the alpha chain
- c. 6th carbon position of the gamma chain
- d. 8th carbon position of the beta chain
- e. none of the above

19. Coumarin-induced skin necrosis is occasionally seen with the institution of oral anticoagulants in patients with:

- a. Antithrombin III deficiency
- b. Protein C deficiency
- c. Protein S deficiency
- d. Plasminogen deficiency
- e. Dysfibrinogenemia

20. A 16-years old boy presented with deep vein thrombosis and pulmonary embolism. There is no family history of thromboembolic disease. The platelet count on admission was 325,000/mm³; prothrombin time (PT) was 11.3 seconds (normal); activated partial thromboplastin time (aPTT) was 55 seconds (the normal value is 24-28 seconds) and mixing studies do not correct the prolonged aPTT and thrombin time was 14 seconds (normal). The most likely reason for this thrombotic diathesis in this patient is the presence of:

- a. Dysfibrinogenemia
- b. Congenital antithrombin III deficiency
- c. Lupus anticoagulant
- d. Factor XI deficiency
- e. Protein C deficiency

21. Which of the following statements regarding BOTH hemophilia A (factor VIII deficiency) and hemophilia B (factor IX deficiency) is FALSE:

- a. The defective gene is located on the X-chromosome
- b. The affected factors require vitamin K for biologic activity
- c. The activated partial thromboplastin time (aPTT) is elevated but the prothrombin time (PT) is normal
- d. The aPTT corrects the mixing studies
- e. Joint bleeding is common

22. In thalassemia involving defects in the alpha chain, absence of four genes confers the following prognosis to the newborn child

- a. Susceptibility to infections with gram negative organisms
- b. Requirement of bone marrow transplantation within two years
- c. The child will likely be stillborn
- d. Requirement for erythropoietin for the remainder of life
- e. Requirement for weekly blood transfusions

23. Which of the following conditions is associated with a prolonged activated partial thromboplastin time (aPTT)?

- a. Antithrombin III deficiency
- b. Protein S deficiency
- c. Protein C deficiency
- d. Hemophilia A
- e. Factor V Leiden mutation

24. Which of the following clotting factor deficiencies is NOT associated with an increased risk of bleeding:

- a. Factor VIII deficiency
- b. Factor XI deficiency
- c. Factor XII deficiency
- d. Factor IX deficiency

e. Factor II deficiency

25. In persons who have chronic myelogenous leukemia (CML), the translocation that accounts for the presence of a Philadelphia chromosome most commonly is found in:

- a. All cells of the body
- b. The three hematopoietic cell lines but not in non-hematopoietic cell lines
- c. All cells of granulocytic cell lines but not in non-granulocytic cells
- d. All bone marrow stem cells but not in mature cells
- e. All marrow stem cells and certain mature granulocytes

26. A 32-year-old man with acute myeloid leukemia (AML) in first remission undergoes an allogeneic bone marrow transplant with non-purged marrow from his HLA-identical sister. Prior to the administration of his sister's marrow, the patient underwent preparation with high-dose cyclophosphamide and total body irradiation. About 6 days after the administration of the graft, the patient feels quite ill. He develops a fever to 39 degrees Celsius (102.2 degrees F) and begins to note a maculopapular skin rash over the arms and back. He has severe diarrhea and intermittent abdominal pain. Results of his liver function tests are markedly abnormal with elevation of the serum bilirubin, ALT/SGOT, and alkaline phosphatase. The most likely cause for this clinical syndrome is:

- a. Graft-versus-host disease
- b. Cytomegalovirus infection
- c. Autoimmune transfusion reaction
- d. Bacterial sepsis
- e. Veno-occlusive disease of the liver

27. Evaluation of a patient who has pure red blood cell aplasia would be expected to reveal:

- a. Markedly hypocellular bone marrow
- b. Normochromic and normocytic red blood cells
- c. Decreased bone marrow iron stores
- d. A reticulocyte count greater than 3%
- e. Decreased plasma erythropoietin content.

28. Which of the following two hematologic conditions are likely to demonstrate the presence of a microcytic, hypochromic appearance to red blood cells on a peripheral smear of blood?

- a. Iron deficiency anemia and thalassemia
- b. Vitamin B12 and folate deficiency
- c. None of the above
- d. All of the above

29. Which of the following neoplasms are of T-cell lineage:

- a. Chronic lymphocytic leukemia (CLL)
- b. Small lymphocytic lymphoma
- c. Follicular lymphoma
- d. Burkitt's lymphoma
- e. Acute T-cell leukemia-lymphoma.

30. Which of the following is not a complication of autologous bone marrow transplantation:

- a. Infection
- b. Bleeding
- c. Mucositis
- d. Neutropenia
- e. Acute graft versus host disease

31. A 25 year old healthy female presents to your office complaining of severe fatigue. Her work-up reveals iron deficiency anemia. Her anemia is most likely secondary to:

- a. Colon cancer
- b. Menorrhagia

- c. Vitamin B12 deficiency
- d. Malabsorption
- e. Sick cell trait

32. The classic laboratory findings of iron-deficiency anemia are:

- a. Hypochromia, Macrocytosis, Low Iron, Elevated TIBC, Low Ferritin
- b. Hypochromia, Macrocytosis, Low Iron, Low TIBC, Elevated Ferritin
- c. Hypochromia, Microcytosis, Low Iron, Low TIBC, Low Ferritin
- d. Hypochromia, Microcytosis, Low Iron, Elevated TIBC, Low Ferritin
- e. Hypochromia, Microcytosis, Low Iron, Low TIBC, Elevated Ferritin

33. A 66 year old male presents to your office for a complete physical examination. anemia with a low mean corpuscular volume (MCV). Your primary concern is for:

Routine laboratory testing reveals

- a. HIV
- b. Multiple Myeloma
- c. Pernicious Anemia
- d. B12 Deficiency
- e. Colon Cancer

34. In a patient with a significant anemia, name a test that can be performed on physical examination to assess hemodynamic stability.

- a. Orthostatic blood pressure testing
- b. Rectal examination
- c. Romberg's test
- d. Lloyd's sign
- e. Position sense

35. A 56 year old male presents to the emergency department with left lower extremity pain and edema. On laboratory testing his D-dimer assay is positive. Your primary concern is for:

- a. Cellulitis
- b. Congestive heart failure (CHF)
- c. Deep venous thrombosis (DVT)
- d. Peripheral vascular disease
- e. Gangrene

36. Aspirin does all of the following except:

- a. Inhibit the secondary wave of platelet aggregation in response to ADP or epinephrine
- b. Irreversibly inhibit cyclo-oxygenase
- c. Relieve headaches
- d. Prolong the aPTT by acting as a circulating anticoagulant

37. Coumadin (Warfarin) can cause thrombosis in patients with

- a. Protein C deficiency
- b. Anti-thrombin III deficiency
- c. Vitamin K deficiency
- d. Disseminated Intravascular Coagulation (DIC)
- e. Activated Protein C resistance

38. Platelet aggregation studies should be done when:

- a. The platelet count is less than 100,000
- b. A surgeon wants to be reassured that a patient is not at risk for unusual bleeding
- c. A patient has a bleeding disorder and prolonged bleeding time

- d. A patient has just taken aspirin
- e. The reptilase time is abnormal

39. Each of the following causes a prolonged thrombin time except:

- a. Antithrombin III deficiency
- b. Heparin
- c. Dysfibrinogenemia
- d. Fibrin split products
- e. Dysproteinemias

40. You are called in consultation for a 20 year-old Polish nursing student who was admitted to the hospital from the emergency department because of hemarthrosis following a sports injury. She recalls a similar episode that required immobilization when she was a child. Family history reveals a cousin who died in infancy from intracerebral hemorrhage. Lab studies include a platelet count of 249,000, a PT time of 80 seconds (prolonged), an aPTT of 29 seconds (control is 30 seconds), normal thrombin time and a negative anticoagulant assay. The most likely cause of this patient's bleeding disorder is

- a. Surreptitious Warfarin ingestion
- b. Prothrombin deficiency
- c. Factor IX deficiency
- d. Factor V deficiency
- e. Factor VII deficiency

41. A 20 year-old male comes to your office because his father was recently diagnosed with cirrhosis, type 2 diabetes mellitus and congestive heart failure. He wants to make sure the same will not happen to him but his insurance will allow only one test. You order:

- a. Iron saturation
- b. a CBC
- c. TIBC
- d. HFE mutation analysis

42. The underlying defect in hereditary hemochromatosis is

- a. Increased release of iron from organic compounds
- b. Increased absorption of intestinal iron
- c. Increased storage of iron as ferritin
- d. Increased breakdown of RBCs

43. All of the following are required for iron absorption except:

- a. An intact stomach
- b. An intact small intestine
- c. Stomach acid
- d. R-protein

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1. 44. A 70 year-old male presents with anemia, an MCV of 75 and a ferritin of 10. You are allowed one test. You

.45. In part I of the Schilling's Test, radioactive B12 excreted in the urine suggests which of the following causes of B12 deficiency?

- .a. Pancreatic insufficiency
- .b. Pernicious anemia
- .c. Bacterial overgrowth
- .d. None of the above

choose:

- a. Iron saturation
- b. Urine for hemosiderin
- c. Colonoscopy
- d. CT of the chest

46. For screening the siblings of a patient with idiopathic hemochromatosis, the most appropriate initial test is:

- .a. Liver biopsy with iron stain
- .b. Serum ferritin measurement
- .c. Bone marrow aspiration and iron stain
- .d. Transferrin saturation measurement
- .e. HLA typing

47. A 45 year-old alcoholic male presents to the emergency department with anemia. Six hours later you are consulted and suspect folate deficiency as the cause. Serum folate is normal. You should obtain:

- .a. A Vitamin B12 level
- .b. An RBC folate level
- .c. A Homocysteine level

48. Patients with autoimmune hemolytic anemia may have which of the following on physical exam?

- .a. Enlarged spleen
- .b. Enlarged lymph nodes
- .c. Swollen joints
- .d. All of the above

.e. None of the above

49. Sickle cell anemia is a disorder characterized by

- .a. Frequent painful crises
- .b. Spoon nails
- .c. Pagophagia
- .d. Antibodies to intrinsic factor

50. A patient with ulcerative colitis develops anemia. The most likely cause is:

- .a. Autoimmune hemolytic anemia
- .b. Hereditary spherocytosis
- .c. Iron deficiency
- .d. Folate deficiency

51. Which one of the following would conclusively exclude a diagnosis of iron deficiency anemia?

- .a. Normal mean corpuscular volume (MCV)
- .b. Normal percentage saturation of serum iron-binding capacity
- .c. Normal serum ferritin
- .d. Normal bone marrow iron stores
- .e. Normal hematocrit

52. The initial screening test for the presence of a monoclonal gammopathy is:

- .a. Skeletal x-rays
- .b. Bone marrow exam

- .c. Serum protein electrophoresis
- .d. Hematologic consultation
- .e. Urinalysis

53. Monoclonal gammopathies are:

- .a. Defined by the presence of an identical immunoglobulin of a given type
- .b. Always malignant in origin
- .c. Associated with a uniformly poor prognosis
- .d. Rare in all age groups
- .e. Only seen in urinary proteins

54. Rouleaux formation is:

- .a. Common in casinos
- .b. Found on peripheral blood smears
- .c. A football line up
- .d. Noted on skeletal x-rays

55. The most common radiologic finding in multiple myeloma patients is:

- .a. Lytic bone lesions
- .b. Soft-tissue plasmacytomas
- .c. Pathologic fractures
- .d. Diffuse osteopenia
- .e. Normal bones

56. The immunoglobulin most commonly produced in multiple myeloma is:

- .a. IgG
- .b. IgA
- .c. IgM
- .d. IgD
- .e. IgE

57. Hyperviscosity syndrome is characterized by:

- .a. Association with platelet disorders
- .b. Red blood cell agglutination at cold temperature
- .c. Mucocutaneous bleeding
- .d. Petechiae
- .e. Characteristic bone lesions

58. A 79 year-old woman who has not been to the doctor in years because she has been “relatively well” presents to your office at the urging of her daughter because of fatigue and malaise. She has no known medical or surgical history. On physical examination, she is found to be pale but otherwise well. Laboratory evaluation reveals decreased hemoglobin, decreased hematocrit, decreased MCV and decreased MCHC. Which of the following would you consider ordering as part of the work-up of this patient’s anemia?

- .a. a vitamin B12 level
- .b. a folate level
- .c. a urine leukocyte esterase assay
- .d. a colonoscopy

59. A 33 year-old Caucasian man of Irish descent has a five year history of type 2 diabetes mellitus and presents to the emergency department complaining of weakness and generalized aches and pains. He is noted to have a bronze appearance to his skin as compared to the photo taken a year earlier on his insurance card. He denies any other past medical history and reports taken a mega-multivitamin daily for many years. Given his history and presentation, which hematologic condition should you suspect?

- .a. von Willebrand's disease
- .b. Cooley's anemia
- .c. Sickle cell anemia
- .d. Osler-Weber-Rendu syndrome
- .e. Hemachromatosis

60. Which of the following hematologic disorders is more common in Chinese Asians, African-Americans and individuals of Mediterranean background (e.g., Italian, Greek, Turk)?

- .a. Sickle cell anemia
- .b. Beta thalassemia
- .c. Lupus anticoagulant
- .d. Hereditary spherocytosis
- .e. None of the above