IMMUNOLOGY/ SEROLOGY AND BLOOD BANKING

MTLE BOARD EXAM RECALLS

- MTLE *MARCH* *2023* RECALLS
- MTLE *AUGUST* *2023* RECALLS
- MTLE *MARCH* *2024* RECALLS
- MTLE *AUGUST* *2024* RECALLS

STUDY QUESTIONS

500 ITEMS

2022 - 2024

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1.Shelf-life of packed red blood cells obtained through open system with ACD anticoagulant:
a. 21 days
b. 35 days
c. 42 days
d. none of the choices

2. Major advantage of gel technology:
a. decreased sample volume
b. improved productivity
c. enhanced sensitivity and specificity
d. standardization

3. Agglutination reaction: Several large clumps with clear background”
a. 4+
b. 3+
c. 2+
d. 1+

4. Identify type based on the following reactions

FORWARD GROUPING		REVERSE GROUPING	
Anti- A	Anti- B	A Cells	B Cells
0	4+	3+	0

a. type O
b. type A
c. type B
d. type AB

5. This type of autologous donation occurs when blood is collected from the patient before the start of surgery. The patient’s blood volume is returned to normal with fluids, and autologous blood may be returned to the patient after the surgery is complete.
a. preoperative
b. normovolemic hemodilution
c. intraoperative salvage
d. postoperative salvage

6. Bombay phenotype antibodies include:
a. Anti- A
b. Anti- B
c. Anti- H
d. all of the choices

7. Indication for transfusion of neocytes:
a. immune thrombocytopenic purpura
b. hemolytic transfusion reaction
c. thalassemia
d. hydrops fetalis

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8. Citrate in ACD functions as:
a. anticoagulant
b. ATP source
c. RBC membrane stabilizer
d. caramelization inhibitor

9. Greatest amount of H antigen
a. A1
b. O
c. AB
d. B

10. The anticoagulant preferred in direct antiglobulin testing is:
a. EDTA
b. heparin
c. citrate
d. oxalate

11. A donor was deferred by the physician due to the presence of bluish purple areas under the skin of the donor. this is typical of:
a. syphilis
b. herpes simplex
c. candidiasis
d. Kaposi's sarcoma

12. A febrile transfusion reaction is defined as a rise in the body temperature of ___ occurring in association with the transfusion of blood or components and without any other explanation.
a. 1 C or more
b. 1 F or more
c. 3 C or more
d. 3 F or more

13. The most severe form of HDHDN is associated with:
a. Anti- A
b. Anti- B
c. Anti- K
d. Anti- D

14. The most common cause of transfusion-related sepsis is:
a. whole blood
b. packed red blood cells
c. leukocyte concentrates
d. platelet concentrates

15. What type of blood should be given in an emergency transfusion when there is no time to type the recipient's sample?
a. O Rh-negative, whole blood
b. O Rh-positive, whole blood
c. O Rh-negative, pRBCs
d. O Rh- positive, pRBCs

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16. The most common fungal infection for AIDS patients is caused by:
a. candida albicans
b. cryptococcus neoformans
c. blastomyces dermatitidis
d. cryptosporidium parvum

17. Polymerase chain reaction (PCR) is/an ____ assay
a. chemical
b. molecular
c. enzymatic
d. biologic

18. Restriction fragment length polymorphism (RFLP) is/an ___ assay
a. chemical
b. molecular
c. enzymatic
d. biologic

19. Hives and itching are under what type of hypersensitivity?
a. type I
b. type II
c. type III
d. type IV

20. Year of discovery of the T cell receptor gene:
a. 1964
b. 1974
c. 1984
d. 1994

21. Gamma counter uses these substances as labels:
a. isotopes
b. fluorochrome
c. enzymes
d. immune complexes

22. What is the most common complement component deficiency
a. C1
b. C2
c. C3
d. C4

23. Which disease might be indicated by antibodies to smooth muscle?
a. chronic active hepatitis
b. primary biliary cirrhosis
c. hashimoto's thyroiditis
d. myasthenia gravis

24. This dengue antigen has been detected in the serum of dengue virus infected patients as early as 1 day post onset of symptoms (DPO) and up to 18 DPO
a. NSI
b. C
c. E
d. prM

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25. Percentage of B cells present in the circulation
a. 2-5%
b. 5-10%
c. 10-15%
d. 75-85%

26. Other name for "HCV RNA":
a. viral clade
b. surface antigen
c. viral load
d. core antigen

27. C3b
a. anaphylatoxin
b. opsonin
c. chemotaxin

28. Which of the following activates both T and B cells?
a. Pokeweed mitogen
b. lipopolysaccharide
c. Concanavalin A
d. Phytohemagglutinin

29. Treponema pallidum immobilization (TPI) test 10% treponemes are immobilized. Interpret the result
a. Positive
b. Negative
c. Doubtful
d. Indetermine

30. It is used as the receptor for the sheep red blood cells (sRBC) for E-rosette assay:
a. CD2
b. CD4
c. CD8
d. CD21

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1. From the following, identify a specific component of the adaptive immune system that is formed in response to antigenic stimulation: Harr
a) Lysozyme
b) Complement
c) Commensal organisms
d) Immunoglobulin

2. Which cluster of differentiation (CD) marker appears during the first stage of T-cell development and remains present as an identifying marker for T cells? Harr
a) CD1
b) CD2
c) CD3
d) CD4 or CD8

3. All of the following are immunologic functions of complement except: Harr
a) Induction of an antiviral state
b) Opsonization
c) Chemotaxis
d) Anaphylatoxin formation

4. Which serum antibody response usually characterizes the primary (early) stage of syphilis? Harr
a) Antibodies against syphilis are undetectable
b) Detected 1–3 weeks after appearance of the primary chancre
c) Detected in 50% of cases before the primary chancre disappears
d) Detected within 2 weeks after infection

5. Which tests are considered screening tests for HIV? Harr
a) ELISA, 4th generation, and rapid antibody tests
b) Immunofluorescence, Western blot, radioimmuno-precipitation assay
c) Culture, antigen capture assay, DNA amplification
d) Reverse transcriptase and messenger RNA (mRNA) assay

6. Interpret the following results for HIV infection. Harr ELISA: positive; repeat ELISA: negative; Western blot: no bands
a) Positive for HIV
b) Negative for HIV
c) Indeterminate
d) Further testing needed

7. Which CD4:CD8 ratio is most likely in a patient with AIDS? Harr
a) 2:1
b) 3:1
c) 2:3
d) 1:2

8. What should be done if all forward and reverse ABO results as well as the autocontrol are positive? Harr
a) Wash the cells with warm saline, autoadsorb the serum at 4oC
b) Retype the sample using a different lot number of reagents
c) Use polyclonal typing reagents
d) Report the sample as group AB

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9. The k (Cellano) antigen is a high-frequency antigen and is found on most red cells. How often would one expect to find the corresponding antibody? Harr
a) Often
b) Rarely
c) Always
d) Never

10. Which of the following is not a requirement for the electronic crossmatch? Harr
a) The computer system contains logic to prevent assignment and release of ABO incompatible blood
b) There are concordant results of at least two determinations of the recipient's ABO type on record, one of which is from the current sample
c) Critical elements of the system have been validated on site
d) There are concordant results of at least one determination of the recipient's ABO type on file

11. What ABO types may donate to any other ABO type? Harr
a) O-
b) A-, O-
c) A-
d) A-,B-,AB-,O-

12. A major crossmatch and screening cells are 2+ at IS, 1+ at 37°C, and negative at the IAT phase. Identify the most likely problem. Harr
a) Combination of antibodies
b) Cold alloantibody
c) Rouleaux
d) Test error

13. All of the following are reasons for performing an adsorption, except: Harr
a) Separation of mixtures of antibodies
b) Removal of interfering substances
c) Confirmation of weak antigens on red cells
d) Identification of antibodies causing a positive DAT

14. When may an immediate spin crossmatch be performed? Harr
a) When a patient is being massively transfused
b) When there is no history of antibodies and the current antibody screen is negative
c) When blood is being emergency released
d) When a patient has not been transfused in the past 3 months

15. Which of the following vaccinations carries no deferral period? Harr
a) Rubella
b) Varicella zoster
c) HPV *in Harr, this was "recombinant HPV. The board of examiners removed the 'recombinant' in the choices.
d) Smallpox

16. What should be done when a woman who is 24 weeks pregnant has a positive antibody screen? Harr
a) Perform an antibody identification panel; titer if necessary
b) No need to do anything until 30 weeks gestation
c) Administer Rh immune globulin (RhIg)
d) Adsorb the antibody onto antigen-positive cells

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17. What is the latest method used in detecting HIV infection in its early acute phase? Harr
a) ELISA
b) Southern Blot
c) Western blot
d) Nucleic acid amplification testing

18. Who is the best candidate for a predeposit autologous donation? Harr
a) A 45-year-old man who is having elective surgery in 2 weeks; he has alloanti-k
b) A 23-year-old female leukemia patient with a hemoglobin of 10 g/dL
c) A 12-year-old boy who has hemophilia
d) A 53-year-old woman who has septicemia

19. ANA tests are performed to help diagnose which condition: BOC
a) SLE
b) Rheumatoid arthritis
c) Leukemia
d) Hemolytic anemia

20. To make a presumptive diagnosis of RA, which of the following qualitative methods is MOST sensitive? BOC
a) Latex agglutination
b) Immunoelectrophoresis
c) RID
d) ELISA

21. In chronic active hepatitis, high titers of which of the following antibodies are seen? BOC
a) Anti-smooth muscle
b) Antimitochondrial (Primary biliary cirrhosis)
c) Anti-DNA (SLE)
d) Anti-parietal cell (Pernicious anemia)

22. Anti-glomerular basement membrane antibody is MOST often associated with this condition: BOC
a) Goodpasture disease
b) SLE
c) Celiac disease
d) Chronic active hepatitis

23. Flocculation tests for syphilis detect the presence of: BOC
a) Reagin
b) Antigen
c) Hemolysin
d) Forssman antigen

24. Which of the following is a treponemal test? BOC
a) RST
b) RPR
c) FTA-ABS
d) VDRL

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25. The key structural difference that distinguishes immunoglobulin subclasses: BOC
a) Stereometry of the hypervariable region
b) Number of domains
c) Sequence of the constant regions
d) Number of disulfide bridges

26. Antibody idiotype is dictated by the: BOC
a) Constant region of heavy chain
b) Constant region of light chain
c) Constant regions of heavy and light chains (Allotype)
d) Variable regions of heavy and light chains

27. Immunoglobulin that is most efficient at crossing the placenta:
a) IgG
b) IgA
c) IgM
d) IgD

28. Which is most likely to activate the alternative pathway? BOC
a) Lipopolysaccharide
b) Glycoproteins
c) Haptens
d) IgG complexed with antigen

29. T lymphocytes are incapable of functioning as: BOC
a) Cytotoxic cells
b) Helper cells
c) Phagocytic cells
d) Regulatory cells

30.Which test is used to evaluate the cellular immune system in a patient? BOC
a) Skin test for commonly encountered antigens
b) Determination of isohemagglutinin titer
c) Immunoelectrophoresis of serum
d) Measurement of anti-HBsAg after immunization

31. Tumor markers found in the circulation are most frequently measured by: BOC
a) Immunoassays
b) TLC
c) HPLC
d) Colorimetry

32. Review:
CD8 surface marker – Class I – Cytotoxic T cell
CD4 surface marker – Class II – Helper T cell

Antigen receptors on T lymphocytes bind HLA class II molecules with the help of which accessory molecule?
a) CD2
b) CD3
c) CD4
d) CD8

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33.Bone marrow transplant donors and their recipients must be matched for which antigen systems? BOC
a) ABO & Rh
b) HLA
c) CD4/CD8
d) P

34.Which antibody characteristically gives a refractile mixed-field appearance? HARR
a) Anti-K
b) Anti-Dia
c) Anti-Sda
d) Anti-s

35.What does a minor crossmatch consist of? HARR
a) Recipient plasma and recipient red cells
b) Recipient plasma and donor red cells
c) Recipient red cells and donor plasma
d) Donor plasma and donor red cells

36. Most common Di phenotype is often associated with what ancestry:
a) Asian
b) African
c) European
d) Mongolian

37. Review: Situational question about Prozone and Postzone
Prozone – excessive antibody concentration
Postzone – excessive antigen concentration
B**oth cause false**-negative reaction.

38. Review: Calculations in Blood Banking
The following formulas can be used to calculate the adjusted volume of blood to be collected and anticoagulant to be used.
Volume to collect = (donor's weight in kg/50) × 450 mL
Volume to collect/450 × 63 mL = reduced volume of anticoagulant
63 mL – above calculated volume = amount of solution to be removed

39. Donor has history of cancer. Harmening p. 300
A history of cancer, leukemia, or lymphoma is generally a cause for indefinite deferral. Any donor presenting with a history of cancer should be reviewed by the blood bank medical director. The exceptions include basal or squamous cell cancer, carcinoma in situ of the cervix, and papillary thyroid carcinoma that has been surgically removed.

40. Symptoms of dyspnea, cough, hypoxemia, and pulmonary edema within 6 hours of transfusion:
a) Anaphylactic
b) Hemolytic
c) TRALI
d) TACO

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41. Review: Correct match of blood component and temperature

1–6°C	Whole blood pRBCs RBC aliquots Irradiated/Leukoreduced/Washed RBCs FVIII concentrates FIX concentrates	
≤–65°C	10 yr	Frozen RBCs
20–24°C	5 days 24 hrs 2 yrs	Platelets Granulocytes Rh Immunoglobulin
–18°C –65°C	1 yr 7 yr	FFP
–18°C 20–24°C	Frozen: 1 yr Thawed: 6 hr Pooled: 4 hr	Cryoprecipitate

42. Review: Expiry
CPD 21 days
CPDA-1 35 days
CP2D 21 days
ACD 21 days
Additive solutions 42 days

43. Kernicterus:
a) (?)
b) increased unconjugated bilirubin
c) increased conjugated bilirubin

44. Which is the most significant agent formed in the phagolysosome for the killing of microorganisms? Stevens
a) Proteolytic enzymes
b) Hydroxyl radicals
c) Hydrogen peroxide
d) Superoxides

45. Which of the following white blood cells is capable of further differentiation in the tissues? Stevens
a) Neutrophil
b) Eosinophil
c) Basophil
d) Monocyte

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46. Which of the following plays an important role as an external defense mechanism? Stevens
a) Phagocytosis
b) C-reactive protein
c) Lysozyme
d) Complement

47. How much diluent needs to be added to 0.2 ml of serum to make a 1:20 dilution? Stevens
a) 19.8 mL
b) 4.0 mL
c) 3.8 mL
d) 10.0 mL

48. Which of the following statements accurately describes competitive binding assays? Stevens
a) Excess binding sites for the analyte are provided.
b) Labeled and unlabeled analyte are present in equal amounts.
c) The concentration of patient analyte is inversely proportional to bound radioactive label.
d) All the patient analyte is bound in the reaction.

49. How do heterogeneous assays differ from homogeneous assays? Stevens
a) Heterogeneous assays require a separation step.
b) Heterogeneous assays are easier to perform than homogeneous assays.
c) The concentration of patient analyte is directly proportional to bound label in homogeneous assays.
d) Homogeneous assays are more sensitive than heterogeneous ones.

50. In a noncompetitive enzyme immunoassay, if a negative control shows the presence of color, which of the following might be a possible explanation? Stevens
a) No reagent was added.
b) Washing steps were incomplete.
c) The enzyme was inactivated.
d) No substrate was present.

51. Which of the following techniques uses restriction enzymes, electrophoresis, and then transfer of DNA fragments onto a solid matrix, followed by probing with labeled probes? Stevens
a) Dot-blot
b) Southern blot
c) Western blot
d) LCR

52. Most of the pathology associated with parasitic infections results from which of the following? Stevens
a) Symbiotic relationships with the host
b) Elaborate parasitic life cycles
c) Immune response to the offending organism
d) Innate defense mechanisms of the host

53.The chronic nature of parasitic infections is due to the host's Stevens
a) inability to eliminate the infective agent.
b) type I hypersensitivity response to the infection.
c) ability to form a granuloma around the parasite.
d) tendency to form circulating immune complexes.

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54. Antigen-antibody reactions are reversible.

55. PCR technology can be used to:
a) Amplify small amounts of DNA.
b) Isolate intact nuclear RNA.
c) Digest genomic DNA into small fragments.
d) Repair broken pieces of DNA.

56. Part of the surrogate testing for HBV that is no longer required: Harmening p. 311
a) ALT
b) HBsAg
c) Anti-HBc

Antibody to the core or interior protein on the hepatitis B virus has been implicated in hepatitis C disease. This test was once part of surrogate testing, along with its counterpart alanine transferase (ALT). In 1995, a National Institutes of Health consensus panel voted to discontinue the ALT test for blood donors because of the increased sophistication and sensitivity for anti-HCV testing; however, testing for anti-HBc has remained a requirement of blood donors in the prevention of post-transfusion hepatitis B

57. Whole Blood Collection Procedure If the volume collected is in the low volume range (300 to 404 mL in a 450-mL collection or 333 to 449 mL in a 500-mL collection), the unit must be labeled as a "low volume unit," and fresh frozen plasma (FFP) cannot be made from this unit, as it would not contain adequate levels of coagulation factors.

58. Which of the following is proper procedure for preparation of platelets from whole blood? BOC
a) Light spin followed by a hard spin
b) Light spin followed by two hard spins
c) Two light spins
d) Hard spin followed by a light spin

59. Plastic bag overwraps are recommended when thawing units of FFP in 37oC water baths because they prevent:
a) The FFP bag from cracking when it contacts the warm water
b) Water from slowly dialyzing across the bag membrane
c) The entry ports from becoming contaminate with water
d) The label from peeling off as the water circulates in the bath

60. A 10% red cell suspension in saline is used in a compatibility test. Which of the following would most likely occur?
a) False-positive due to antigen excess
b) False-positive due to prozone
c) False-negative due to prozone
d) False-negative due to antigen excess

61. Results of a serum sample tested against a panel of reagent red cells gives presumptive evidence of an alloantibody directed against a high incidence antigen. Further investigation to confirm the specificity should include which of the following?
a) Serum testing against red cells from random donors
b) Serum testing against red cells known to lack incidence antigens
c) Serum testing against enzyme-treated autologous red cells
d) Testing of an eluate prepared form the patient's red cells

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62. AHG control cells:
a) Positive control for anti-C3 reagents
b) Only for IAT
c) Coated only with IgG antibody
d) Must be used to confirm all positive antiglobulin reactions

63. Which of the following is consistent with standard blood bank procedure governing the infusion of fresh frozen plasma?
a) Only blood group-specific plasma may be administered
b) Group O may be administered to recipients of all blood groups
c) Group AB may be administered to AB recipients only
d) Group A may be administered to both A and O recipients

64. The most serious HTRs are due to which incompatibility:
a) ABO
b) Rh
c) MN
d) Duffy

65. Most frequent transfusion-associated disease complication of blood transfusions is:
a) CMV
b) Syphilis
c) Hepatitis
d) AIDS

66. Review: Hemoglobin-oxygen dissociation curve

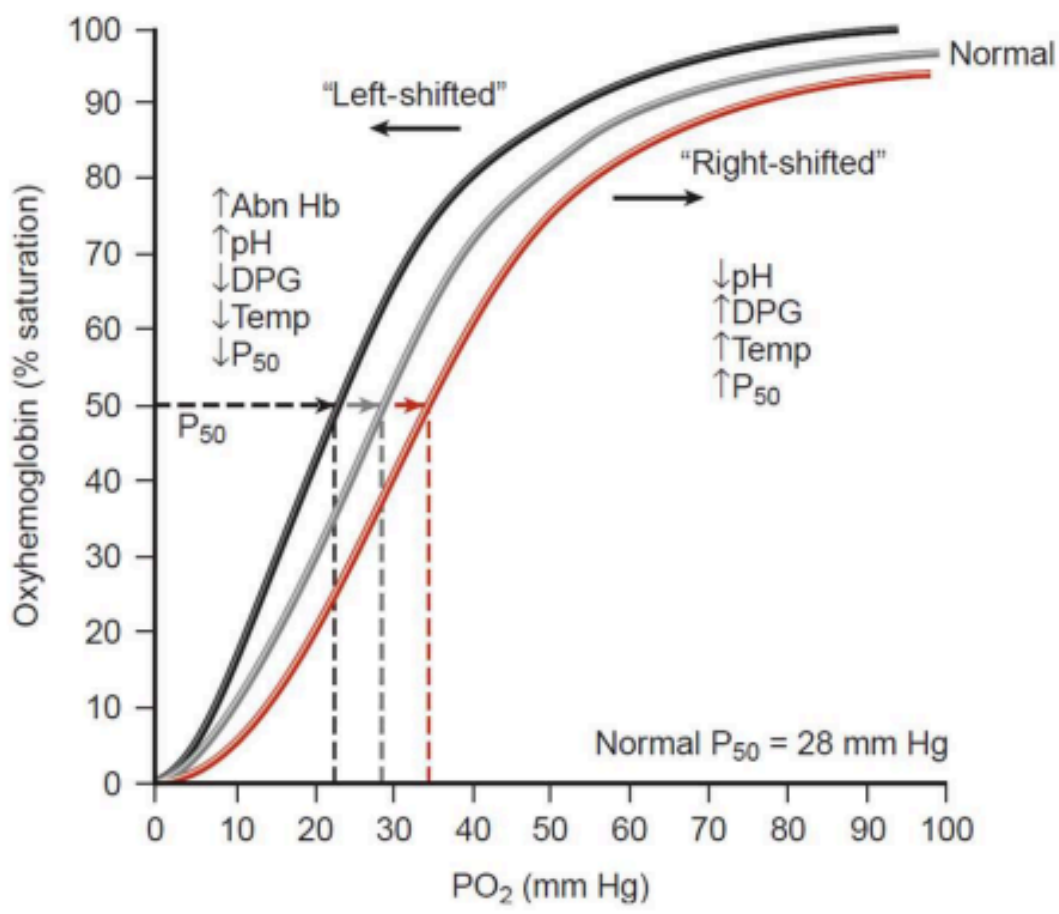

Figure 1–5. Hemoglobin-oxygen dissociation curve. *(Reprinted with permission from Harmening, DH: Clinical Hematology and Fundamentals of Hemostasis, 5th ed., FA Davis, Philadelphia, 2009.)*

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67. Mainly transmitted through the fecal/oral route: HAV, HEV
Primarily transmitted parenterally: HCV, HBV, HDV, HGV

68. Red cells (Transport temperature): Between 2oC and 10oC with a maximum transit time of 24 hours

69. If there are two different alleles on one locus, the person is heterozygous. If both alleles on that locus are the same, the person is homozygous.

Dominant: A trait or characteristic that will be expressed in the offspring even though it is carried on only one of the homologous chromosomes
Recessive: A type of gene that, in the presence of its dominant allele, does not express itself; expression occurs when it is inherited in the homozygous state.

70. The law mandates that all Blood Banks should have a?
a) Foot-operated sink
b) Biosafety cabinet
c) Safety plan
d) (?)

71. Nontreponemal tests: VDRL, RPR, RST, USR, TRUST
Treponemal tests: FTA-ABS, MHA-TP

72. Disease Transmission Prevention—Required Tests EXCEPT:
a) Tuberculosis
b) HIV
c) Malaria
d) Syphilis

MTLE AUGUST 2023 RECALLS

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1. What should be done when a woman who is 24 weeks pregnant has a positive antibody screen?
a. Perform an antibody identification panel; titer if necessary
b. No need to do anything until 30 weeks gestation
c. Administer RhIg (Rh immune globulin)
d. Adsorb the antibody onto antigen-positive cells

2. A donor bag is half filled during donation when the blood flow stops. Select the correct course of action
a. Closely observe the bag for at least 3 minutes; if blood flow does not resume, withdraw the needle
b. Remove the needle immediately and discontinue the donation
c. Check and reposition the needle if necessary; if blood flow does not resume, withdraw the needle
d. Withdraw the needle and perform a second venipuncture in the other arm

3. A major crossmatch and screening cells are 2+ at IS, 1+ at 37C, and negative at the IAT phase. Identify the most likely problem
a. Combination of antibodies
b. Cold antibody
c. Rouleaux
d. Test error

4. An EIA screening test for HTLV I/II was performed on a whole-blood donor. The results of the EIA were repeatedly reactive but the confirmatory test was negative. On the next donation, the screening test was negative by two different EIA tests. The donor should be:
a. Accepted
b. Deferred
c. Told that only plasma can be made from his donation
d. Told to comeback in 6 months

5. All of the following are routinely performed on a cord blood sample, except:
Answer**: Antibody screen**

6. FFP is used to treat the following, except:
Answer: **Idiopathic thrombocytopenic purpura**

7. What corrective action should be taken when rouleaux causes positive test results?
Answer: **Perform a saline replacement technique**

8. A patient with joint swelling and pain tested negative for serum rheumatoid factor (RF) by both latex agglutination and enzyme-linked immunosorbent assay (ELISA) methods. What other test would help establish a diagnosis of rheumatoid arthritis (RA) in this patient?
Answer: **Anti-cyclic citrullinated peptide (CCP) antibody**

9. Which of the following is the primary indication for transfusion of packed RBCs?
Answer: **Increase oxygen carrying capacity**

10. Triggers classical pathway
Answer: **IgM**
11. Major cell in peripheral circulation
Answer: **Neutrophil**

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1. Cryoprecipitate AHF contains all of the following, EXCEPT:
A. Red Blood Cells
B. Fibrinogen
C. vWF
D. Fibronectin

2. Phenotype of D negative
A. (+/+)
B. (-)
C. (+)
D. (-/-)

3. sDA can be neutralized by?
A. Milk
B. Hydatid cyst fluid
C. Plasma
D. Urine

4. The ability of a single cytokine to alter the expression of several genes is called
A. Autocrine stimulation
B. Endocrine
C. Pleiotropy
D. Redundancy

5. Which minor blood group system can cause HDN?
A. Vel
B. Gerbich
C. Gregory
D. Holley

6. Delayed Hemolytic Transfusion reaction EXCEPT:
A. Hemolytic
B. PTP
C. TA-GVHD
D. Hemosiderosis

7. Rh group:
A. Glycosylated proteins
B. Non-glycosylated proteins

8. Improvement methodology referring to non-value-added activities considered as waste.
A. Scrum
B. Agile
C. Lean
D. Six Sigma

9. Possible mother-fetus incompatibility if father is Rh +, mother is Rh -. They have their first child without undergoing treatment.
A. 0%
B. Less than 50%
C. 50%
D. 100%

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10. ABO discrepancies between forward or reverse blood typing with weak reacting or missing antibodies.
A. Patient with antibody to the weak Antigen
B. Patient is very young or very old
C. Patient with subgroup of Group
D. Patient with acquired B phenomenon

11. Lectin Dolichos biflorus expresses what antigen?
A. A1
B. P
C. B
D. K

12. The following are correct for storage and transport of blood components EXCEPT:
A. Blood must not be hemolyzed
B. Blood must be stored at -20C
C. Blood must in a hygienic environment
D. Blood must be protected from breakdown products of glycerol

13. An IF test with antibodies to detect CD3 will detect which cell?
A. Circulating T cells
B. T helper lymphocytes only
C. T. Suppressor lymphocytes only
D. NK cells

14. How is the patient who is RH negative in a RBC written.
A. (+/-)
B. (-)
C. (+)
D. (-/-)

15. Red cell immune antibody
A. IgG
B. IgA
C. IgM

16. CD8+ cell is also known as:
A. T helper
B. Cytotoxic
C. Killer
D. Null

17. Which type of hypersensitivity reaction involves immune complexes?
A. Type 1
B. Type 2
C. Type 3
D. Type 4

18. The red cell phenotype of an individual in routine forward and reverse grouping with the genotypes hh, AB
A. O
B. AB
C. A
D. B

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19. FFP is used to treat the following, EXCEPT:
A. DIC
B. Liver disease
C. Vitamin K Def9
D. Idiopathic Thrombocytopenic Purpura

20. Anti-G will not react to the following, except
A. D+C+
B. D-C-
C. D+C-
D. D-C+

21. Which cluster of differentiation marker appears during the first stage of T cell development and remains present as an identifying marker for T cells?
A. CD1
B. CD2
C. CD3
D. CD4 or CD8

22. Answer: IgM alloantibody

Cell	IS	37° C	AHG	CC
I	1+	0	0	✓
II	1+	0	0	✓
III	1+	0	0	✓

→

Poly	IgG	C3
0 ✓	NT	NT

→ Alloantibody
Class: IgM
Single specificity

23. Storage temperature of cryoprecipitate?
A. 20-23 C
B. -18 C
C. 37 C
D. -65 C

24. Sabin Feldman dye test for toxoplasmosis uses ___ toxoplasma
A. Live (tachyzoites)
B. Killed
C. Neutralized
D. Sensitive/Specific

25. What to check during blood donation, except:
A. Donor hyperventilating
B. Change in blood flow
C. Hematoma formation
D. Wounds in the arms and legs of donor

26. Blood group enhanced by enzymes
A. Kell
B. Kidd
C. MN
D. Duffy

27. Most common form of autoimmune hemolytic anemia and involves IgG autoantibodies with opt reactivity at 37%
A. WAIHA
B. CAIHA
C. Aplastic anemia

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28. Which of the following follows the correct base pairing in DNA?
a. A:T, G:C
b. A:C, G:T
c. A:U, G:C
d. A:C, D:C

29. In preparation of cryoprecipitate, fresh frozen plasma is thawed at ___ 'C
a. Ref temp
b. 37
c. room temp
d. 20

30. Which cluster of differentiation marker appears during the first stage of T- cell development and remains present as an identifying marker for T cells?
a. CD1
b. CD2
c. CD3
d. CD4 or CD8

31. FFP must be prepared from whole blood within _ hours
a. 12
b. 24
c. 10
d. 6

32. Which cluster of differentiation (CD) marker is the most specific identifying marker for mature T cells?
a. CD1
b. CD2
c. CD3
d. CD4 and CD8

33. The immunologic incompatibility between mother and infant is caused by RBC destruction is called:
a. Hydrops fetalis
b. Erythroblastosis fetalis
c. Leukoerythroblastic reaction
d. Erythropoietin

34. It represents the overall strength of antigen-antibody binding
a. Affinity
b. zone of equivalence
c. avidity
d. postzone phenomenon

35. Potentiator that causes RBCs to take up antibody more rapidly
a. PEG
b. LISS
c. 225 albumin
d. AHG

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36. the ability of cytokine to alter the expression of several genes is called
a. pleiotropy
b. redundancy
c. autocrine stimulation
d. endocrine effect

37. Which component in freund's complete adjuvant is responsible for stimulating a strong immune response?
a. aluminum
b. water
c. oil
d. attenuated bacteria

38. Which of the following is referred to as C3 convertase?
a. C1qrs
b. C3bBb
c. C3Bd
d. C4b5a

39. HLA-B8 antigens has been associated with an incidence of which of the following pairs of disease?
a. ankylosing spondylitis and myasthenia gravis
b. celiac disease and ankylosing spondylitis
c. myasthenia gravis and celiac disease
d. Reiter disease and multiple sclerosis

40. Anti- CCP (cyclic citrullinated proteins) is specifically associated with which autoimmune disease?
a. RA
b. myasthenia gravis
c. autoimmune hepatitis
d. Goodpasture's syndrome

41. Antimitochondrial antibodies are strongly associated with which disease?
a. autoimmune hepatitis
b. primary biliary cirrhosis
c. celiac disease
d. Goodpasture's syndrome

45. which of the following describes an antigen-antibody precipitation reaction of non-identity?
a. precipitin lines fuse, forming a single spur
b. precipitin lines cross, forming double spurs
c. no precipitin lines are formed
d. precipitin lines fuse, forming a single arc

46. which autoantibody specificity is found in patient's with paroxysmal cold hemoglobinuria?
a. Anti-I
b. Anti-P
c. Anti-i
d. Anti-P1

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47. What percentage of red blood cells must be retained when preparing red blood cells leukocytes reduced?
a. 50%
b. 70%
c. 85%
d. 100%

48. which of the following potentiating agents concentrates antibodies by removing water?
a. LISS
b. Bovine serum albumin
c. Polyethylene glycol
d. proteolytic enzymes

49. when preparing an eluate, what is the desired quality control result when testing the last wash?
a. reactive with all cells tested
b. nonreactive with all cells tested
c. reactivity equal to the direct antiglobulin test (DAT) result
d. stronger reactivity than the DAT result

50. Sda can be neutralized by:
a. hydatid cyst
b. plasma
c. urine
d. human breast milk

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1. Which part of an antibody provides flexibility?
a) Heavy chain (HC)
b) Light chain (LC)
c) Hinge region

2. Which of the following is the most frequently transmitted virus from mother to fetus?
a. HIV
b. Hepatitis
c. CMV
d. EBV

3. Which of the following is NOT classified as a Type 1 interferon?
a) IFN-alpha
b) Beta
c) Gamma
d) Omega

4. Which of the following is NOT a step in the PCR cycle?
A) Denaturation
B) Annealing
C) Extension
D) Analysis

5. Which of the following is a volume expander?
A. Whole Blood
B. Plasma
C.Granulocyte

6. Which of the following IAT methods requires the use of check cells?
A. Manual tube method with albumin
B. Gel
C. Automated solid-phase analyser

7. Which blood group systems are enhanced by enzyme treatment, EXCEPT?
a) Kidd
b) ABO
c) Rh
d) Duffy

8. What measure is taken to prevent cytomegalovirus infection from blood units?
Leukocyte reduction

9.
a) 5 minutes
b) 10 minutes
c) 15 minutes
d) 20 minutes

10. What is the standard expiration period for blood stored with CPDA-1 anticoagulant solution?
a) 21 days
b) 2 days
c) 35 days
d) 42 days

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11. What is the reaction called when soluble antigens combine with soluble antibodies?
A. Precipitation
B. Agglutination

12. What is performed/used (?) for HDFN Diagnosis
A. IAT with anti-IgG reagent
B. IAT with anti-IgM reagent
C. DAT with anti-IgG reagent
D. DAT with anti-IgM reagent

13. The mating of an Xg(a+) man and an Xg(a-) woman will only produce:
A. Xg(a-) sons and Xg(a-) daughters
B. Xg(a+) sons and Xg(a+) daughters
C. Xg(a-) sons and Xg(a+) daughters
D. Xg(a+) sons and Xg(a-) daughters

14. The Lewis phenotype of RBCs all newborn infants is:
A. Le (a+b-)
B. Le (a-b+)
C. Le (a+b+)
D. Le (a-b-)

15. Principle of the Indirect Immunofluorescence Assay (IFA) used in Rickettsia serology?

16. Most common congenital infection?
Cytomegalovirus (CMV)

17. In which of the following conditions is anti-RNP (anti-ribonucleoprotein) antibody most commonly seen?
a) Systemic Lupus Erythematosus (SLE)
b) Sjögren's Syndrome
c) Mixed Connective Tissue Disease (MCTD)
d) Rheumatoid Arthritis (RA)

18. In monitoring an HIV-infected patient, which parameter may be expected to be the most sensitive indicator of the effectiveness of antiretroviral treatment?
A. HIV antibody titer
B. CD4:CD8 ratio
C. HIV viral load
D. Absolute total T-cell count

19. Immune A and B alloantibodies differ from non-red cell stimulated (naturally occurring) A and B alloantibodies in that the immune antibodies:
A. Are generally IgG rather than IgM
B. Are unable to cross the placenta
C. Can be enhanced in reactivity by incubation at 4C
D. Cause direct agglutination at room temperature

20. How to prepare platelet rich plasma?
A. Hard spin followed by soft spin
B. Soft spin followed by hard spin
C. Hard spin only
D. Soft spin only

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21. How DNA Polymerase and Reverse Transcriptase synthesize DNA (?) basta ang combination ng choices are smth like:

A. Both in the 5' to 3' direction
B. Both in the 3' to 5' direction
C. DNA Polymerase 5' to 3', Reverse transcriptase 3' to 5'
D. DNA Polymerase 3' to 5', Reverse transcriptase 5' to 3'

22. Hepatitis that transmits through the fecal-oral route?

A. Hepatitis G
B. Hepatitis E
C. Hepatitis B
D. Hepatitis A

23. All tissues can be transplanted except:

A. Nerve
B. Heart valve
C. Tendon
D. Cord blood

24. All belong to broad specification, except:

A. DIHA
B. Alloimmune
C. Autoimmune
D. Mixed type

25. A 26 year old pregnant female is being tested prior to a scheduled C-section tomorrow. Her cell grouping (forward typing) is consistent with blood group O, while her serum grouping (reverse grouping or "back-typing") appears to be group A.

The most common reason for this type of ABO discrepancy is:

A. She has the Bombay phenotype
B.She is a non-secretor, so her plasma lacks
C. Clerical errors or a sample mix-up

IMMUNOLOGY/ SEROLOGY AND BLOOD BANKING EXAMINATION AND RATIO

1. A 56-year-old female with cold agglutinin disease has a positive direct antiglobulin test (DAT). When the DAT is repeated using monospecific antiglobulin sera, which of the following is most likely to be detected?
a. IgM
b. lgG
c. C3d
d. C4a

2. Which antibody persists in low-level carriers of hepatitis B virus?
a. IgM anti-HBc
b. IgG anti-HBc
c. IgM anti-HBe
d. IgG anti-HBs

3. A patient types as AB positive. Two units of blood have been ordered by the physician. Currently, the inventory shows no AB units, 10 A-positive units, 1 A-negative unit, 5 B-positive units, and 20 O-positive units. Which should be set up for the major crossmatch?
a. A-positive units
b. O-positive units
c. B-positive units
d. Call another blood supplier for type-specific blood

4. Which cluster of differentiation (CD) marker appears during the first stage of T-cell development and remains present as an identifying marker for T cells?
a. CD1
b. CD2
c. CD3
d. CD4 or CD8

5. RhIg (Rhogam) is indicated for:
a. Mothers who are Rh-positive
b. Infants who are Rh-negative
c. Infants who have anti-D
d. Mothers who are Rh-negative

6. Which tests are considered screening tests for HIV?
a. ELISA, 4th generation, and rapid antibody tests
b. Immunofluorescence, Western blot, radioimmuno-precipitation assay
c. Culture, antigen capture assay, DNA amplification
d. Reverse transcriptase and messenger RNA (mRNA)

7. The chronic nature of parasitic infections is due to the host's:
a. Inability to eliminate the infective agent
b. Type I hypersensitivity response to the infection
c. Ability to form granuloma around the parasite
d. Tendency to form circulating immune complexes.

8. Interpretation of Hepatitis B panel: HBsAg negative
Anti-HBc positive Anti-HBs positive
a. Acutely infected
b. Immune because of natural infection
c. Immune because of hepatitis B vaccination
d. Might be susceptible to a false-positive anti-HBc

9. Which test, other than serological markers, is most consistently elevated in viral hepatitis?
a. Antinuclear antibodies
b. Alanine aminotransferase (ALT)
c. Absolute lymphocyte count
d. Lactate dehydrogenase

10. What ABO types may donate to any other ABO type?
a. A negative, B negative, AB negative, O negative
b. O negative
c. A negative, B negative
d. AB negative, A negative, B negative

11. How often can a blood donor donate whole blood?
a. Every 24 hours
b. Once a month
c. Every 8 weeks
d. Twice a year

12. The key structural difference that distinguishes immunoglobulin subclasses is the:
a. Number of domains
b. Stereometry of the hypervariable region
c. The sequence of the constant regions
d. Covalent linkage of the light chains

13. What corrective action should be taken when rouleaux causes positive test results?
a. Perform an auto absorption
b. Perform a glucose replacement technique
c. Perform a saline replacement technique
d. Run a panel

14. ABO discrepancies between forward or reverse blood typing with weak reacting or missing antibodies:
a. Patient with antibody to the weak antigen
b. Patient is very young or very old
c. Patient with subgroup of Groups A and B
d. Patient with acquired B phenomenon

15. The prevalence of this antigen in Northern Europeans is 1% but is higher in the Mennonite population.
a. Sc1
b. Sc2
c. Xg
d. None of the above

16. Serological testing provides the most practical and reliable means of confirming a measles diagnosis. Samples collected before ___ may yield false-negative results, and repeat testing on a later sample is recommended in that situation.
a. 72hours
b. 5days
c. 6days
d. 9days

17. The acute phase reactant that has the fastest response time and can rise 100x is:
a. Alpha-1 antitrypsin
b. Haptoglobin
c. C-reactive protein
d. Ceruloplasmin

18. A 38-year-old female weighing 153 lbs, who received the rubella vaccine 2 months previously, presents to donate whole blood. She also received 2 units of packed cells after the delivery of her eighth child 8 weeks ago. Based on this information, would you accept, permanently defer (PD), or temporarily defer (TD) the donor?
a. Accept the donor
b. TD because of the packed cells 8 weeks ago
c. PD because of receiving blood products
d. TD because of the rubella vaccine

19. Interpret the following results for HIV infection:
ELISA: Positive Repeat
ELISA: Negative
Western blot: No bands

a. Positive for HIV
b. Negative for HIV
c. Indeterminate
d. Further testing needed

20. Which of the following fungal organisms is best diagnosed by an antigen detection test as opposite to an antibody detection assay?
a. Histoplasma
b. Cryptococcus
c. Candida
d. Aspergillus

21. Cryoprecipitate must be transfused within what period of time following thawing and pooling?
a. 4 hours
b. 8 hours
c. 12 hours
d. 24 hours

22. What does a minor crossmatch consist of?
a. Recipient plasma and recipient RBCs
b. Recipient plasma and donor RBCs
c. Recipient RBCs and donor plasma
d. Donor plasma and donor RBCs

23. CPDA-1 prolongs shelf life by:
a. 21 days
b. 35 days
c. 42 days
d. 2 days

24. Which tumor marker is associated with cancer of the urinary bladder?
a. CA-19-9
b. CA-72-4
c. Nuclear matrix protein
d. Cathepsin-D

25. Which serum antibody response usually characterizes the primary (early) stage of syphilis?
a. Antibodies against syphilis are undetectable
b. Detected 1-3 weeks after appearance of the primary chancre
c. Detected in 50% of cases before the primary chancre disappears
d. Detected within 2 weeks after infection

26. Which blood group has the least amount of H antigen?
a. A1B
b. A2
c. B
d. A1

27. Immunoglobulin that is the most efficient at crossing the placenta:
a. IgG
b. IgA
c. IgM
d. IgD

28. What component is most frequently involved with transfusion-associated sepsis?
a. Whole blood
b. Platelets
c. Plasma
d. Packed RBC

29. Blood products are tested for which virus before being transfused to newborns?
a. EBV
b. HumanT-lymphotropic virus II (HTLV-II)
c. Cytomegalovirus (CMV)
d. Hepatitis D virus

30. Which vaccination does not need deferral?
a. HPV
b. Varicella
c. Measles
d. Smallpox

31. T lymphocyte are incapable of functioning as:
a. Cytotoxic cells
b. Helper cells
c. Phagocytic cells
d. Regulatory cells

32. Which of the following is an acceptable time in which a unit of whole blood is collected?
a. 33 minutes
b. 25 minutes
c. 20 minutes
d. 13 minutes

33. The main function of T cells in the immune response is to:
a. Produce cytokines that regulate both innate and adaptive immunity
b. Produce antibodies
c. Participate actively in phagocytosis
d. Respond to target cells without prior exposure

34. Crossmatch results at the antiglobulin phase were negative. When 1 drop of check cells was added, no agglutination was seen. The most likely explanation is that the:
a. Red cells were over washed
b. Residual patient serum inactivated the AHG reagent
c. Centrifuge speed was set too high
d. Laboratorian did not add enough check cells

35. The detection of galactomannan in serum by EIA has increased the ability to diagnose invasive:
a. Aspergillus species
b. Candida species
c. Cryptococcus species
d. None of the above

36. All of the following are systemic autoimmune disease, EXCEPT:
a. SLE
b. RA
c. GPA
d. Hashimoto's thyroiditis

37. A 10% red cell suspension in saline is used in a compatibility test. Which of the following would most likely occur?
a. False-positive due to antigen excess
b. False-positive due to pro zone
c. False-negative due to prozone
d. False-negative due to antigen excess

38. The serum of an individual who received all doses of the hepatitis B vaccine should contain:
a. anti-HBs
b. anti-HBe
c. anti-HBc
d. All of the above

39. All of the following are routinely performed on a cord blood sample, EXCEPT:
a. Forward ABO typing
b. Antibody screen
c. Rh typing
d. DAT

40. Interpret the following results for EBV infection: IgG and IgM antibodies to viral capsid antigen (VCA) are positive.
a. Infection in the past
b. Infection with a mutual enhancer virus such as HIV
c. Current infection
d. Impossible to interpret; need more information

41. Fatal transfusion reactions are mostly caused by?
a. Serologic errors
b. Improper storage of blood
c. Clerical errors
d. Improper handling of the product

42. Which test is used to evaluate the cellular immune system in a patient?
a. Skin test for commonly encountered antigens
b. Determination of isohemagglutinin titer
c. Immunoelectrophoresis of serum
d. Lymphocyte proliferation to mitogen/antigen

43. Marginal B cells remain in the:
a. Bone marrow
b. Lymph nodes
c. Spleen
d. Thymus

44. What type of antigen is used in the RPR card test?
a. Live treponemal organisms
b. Killed suspension of treponemal organisms
c. Cardiolipin
d. Tanned sheep cells

45. Which of the following characteristically gives a refractile mixed-field appearance?
a. Anti-K
b. Anti-Dia
c. Anti-Sda
d. Anti-s

46. Congestive heart failure, severe headache and/or peripheral edema occurring soon after transfusion is indicative of which type of transfusion reaction?
a. Hemolytic
b. Febrile
c. Anaphylactic
d. TACO

47. Interferons (IFN) have been demonstrated to act as:
a. Immunomodulators
b. Antiviral agents
c. Antineoplastic agents
d. All of these

48. Concerning the component and the required quality control results, which of the following is TRUE?
a. FFP must have 80 international units of fibrinogen in 7 units tested
b. Cryoprecipitate must have 80 international units of factor VIII
c. Leukocyte-reduced red blood cells must have fewer than 3.3 x 1011 WBCs in each unit
d. Platelets must have no red blood cells

49. The ability of a single cytokine to alter the expression of several genes is called:
a. Autocrine stimulation
b. Endocrine
c. Pleiotropy
d. Redundancy

50. A technologist removed 4 units of blood from the blood bank refrigerator and placed them on the counter. A clerk was waiting to take the units for transfusion. As she checked the paperwork, she noticed that one of the units was leaking onto the counter. What should she do?
a. Issue the unit if the red cells appear normal
b. Reseal the unit
c. Discard the unit
d. Call the medical director and ask for an opinion

51. Father of Immunology:
a. Edward Jenner
b. Louis Pasteur
c. Gerald Edelman
d. Paul Ehrlich

52. Protection from smallpox could be generated by the transfer of pustular material from cowpox lesion instead of the more hazardous smallpox lesion:
a. Edward Jenner
b. Louis Pasteur
c. Jules Bordet
d. Robert Kaus

53. Discovery of genetic principles underlying the generation of antibodies with different specificities:
a. Edward Jenner
b. Ellie Metchnikoff
c. Emil von Behring
d. Susumu Tonegawa

54. The antigenic component of the hepatitis B vaccine differs from those of many of the conventional vaccines in that it consists of a:
a. Live, attenuated virus
b. Inactivated virus
c. Cryptic antigen
d. Recombinant antigen

55. The cells that Metchnikoff first observed are associated with which phenomenon?
a. Innate immunity
b. Adaptive immunity
c. Humoral immunity
d. Specific immunity

56. Which of the following statements best characterizes adaptive immunity?
a. Relies on normally present body functions
b. Response is similar for each exposure
c. Specificity for each individual pathogen
d. Involves only cellular immunity

57. All are components of the second line of defense, EXCEPT:
a. Macrophages
b. Mast cells
c. Neutrophils
d. B cells

58. The main function of T cells in the immune response is to:
a. Produce cytokines that regulate both innate and adaptive immunity
b. Produce antibodies
c. Participate actively in phagocytosis
d. Respond to target cells without prior exposure

59. The process by which cells are capable of moving from the circulating blood to the tissues by squeezing through the wall of a blood vessel:
a. Chemotaxis
b. Diapedesis
c. Endosmosis
d. Phagocytosis

60. The term for enhancement of phagocytosis by coating of foreign particles with serum proteins is
a. Opsonization
b. Agglutination
c. Solubilization
d. Chemotaxis

61. Which best explains the difference between immunogens and antigens?
a. Only antigens are large enough to be recognized by T cells
b. Only immunogens can react with antibody
c. Only immunogens can trigger an immune response
d. Only antigens are recognized as foreign

62. Where do lymphocytes mainly come in contact with antigens?
a. Secondary lymphoid organs
b. Bloodstream
c. Bone marrow
d. Thymus

63. A vacuole formed within a phagocytic cell as pseudopodia surround a particle during the process of phagocytosis:
a. Neutrophil
b. Monocyte
c. Phagosome
d. Phagolysosome

64. Cytokines produced by T cells and other cell lines that inhibit viral synthesis or act as immune regulators:
a. Integrins
b. Interferons
c. Complement
d. Antibodies

65. Efficacious in treating multiple sclerosis, although the exact mechanism of action remains unclear:
a. TGF-alpha
b. TGF-beta
c. IFN-alpha
d. IFN-beta

66. Most efficient antigen-presenting cell (APC):
a. B cell
b. T cell
c. Dendritic cell
d. Neutrophils

67. Plays an important role in protecting the kidney from damage and in preventing the loss of iron by urinary excretion:
a. Alpha1-antitrypsin
b. Ceruloplasmin
c. Haptoglobin
d. Fibrinogen

68. A biomarker that exhibits greater specificity than other proinflammatory markers in identifying patients with sepsis and can be used in the diagnosis of bacterial infections:
a. Ceruloplasmin
b. Cytokines
c. CEA
d. Procalcitonin

69. Macrophages in the liver are called:
a. Alveolar macrophages
b. Microglial cells
c. Kupffer cells
d. Histiocytes

70. Cells that express CD56 and/or CD16:
a. B cells
b. T cells
c. NK cells
d. All of the above

71. All of the following are NOT characteristics of B cells EXCEPT:
a. Phagocytic
b. Participate in antibody-dependent cellular cytotoxicity (ADCC) reactions
c. Contain surface immunoglobulins
d. Secrete the C5 component of complement

72. HLA molecules A, B, and C belong to which MHC class?
a. Class I
b. Class II
c. Class III
d. Class IV

73. Antigen receptors on T lymphocytes bind HLA class II peptide complexes with the help of which accessory molecule?
a. CD2
b. CD3
c. CD4
d. CD8

74. Which antibody is best at agglutination and complement fixation?
a. IgA
b. IgG
c. IgD
d. IgM

75. Most heat-labile of all immunoglobulins:
a. IgA
b. IgD
c. IgE
d. IgM

76. Which is a distinguishing feature of a pre-B cell?
a. μ chains in the cytoplasm
b. Complete IgM on the surface
c. Presence of CD21 antigen
d. Presence of CD25 antigen

77. The immunoglobulin classes most commonly found on the surface of circulating B lymphocytes in the peripheral blood of normal persons are:
a. IgM, IgA
b. IgM, IgG
c. IgM, IgD
d. IgM, IgE

78. Recurrent, periodic fevers may be associated with increased production of which immunoglobulin?
a. IgG
b. IgM
c. IgD
d. IgE

79. Immunoglobulin IDIOTYPES are antibodies with variations in the domains of which of the following?
a. CH1 and CH2
b. VH and VL
c. VH and CL
d. CH1, CH2 and CH3

80. Papain digestion of an IgG molecule results in which of the following?
a. 2 Fab' and 1 Fc' fragment
b. F(ab')2 and 1 Fc' fragment
c. 2 Fab and 2 Fc fragments
d. 2 Fab and 1 Fc fragment

81. Type I hypersensitivity is:
a. Associated with complement-mediated cell lysis
b. Due to immune complex deposition
c. Mediated by activated macrophages
d. An immediate allergic reaction

82. Which immunologic mechanism is usually involved in bronchial asthma?
a. Immediate hypersensitivity
b. Immune complex
c. Antibody mediated cytotoxicity
d. Delayed hypersensitivity

83. It is considered the gold standard in testing for contact dermatitis:
a. RIST
b. RAST
c. Tuberculin test
d. Patch test

84. A kidney transplant from one identical twin to another is an example of a(n):
a. Allograft
b. Autograft
c. Isograft
d. Xenograft

85. The type of graft rejection that occurs within minutes of a tissue transplant is _____.
a. Acute
b. Chronic
c. Hyperacute
d. Accelerated

86. The type of immunity that follows the injection of an immunogen is termed:
a. Artificial active
b. Natural active
c. Artificial passive
d. Innate

87. A woman with breast cancer is treated with a monoclonal antibody to HER2. This is an example of:
a. A cancer vaccine
b. An immunotoxin
c. Passive immunotherapy
d. Active immunotherapy

88. The antibody most frequently present in systemic lupus erythematosus is directed against:
a. Surface antigens of bone marrow stem cells
b. Surface antigens of renal cells
c. Nuclear antigen
d. Myelin

89. A patient with joint swelling and pain tested negative for serum RF by both latex agglutination and ELISA methods. What other test would help establish a diagnosis of RA in this patient?
a. Anti-CCP
b. ANA testing
c. Flow cytometry
d. Complement levels

90. Positive rheumatoid factor is generally associated with:
a. Anemia
b. Azotemia
c. Decreased ESR
d. Hyperglobulinemia

91. Loss of self-tolerance results in:
a. Autoimmune disease
b. Graft-versus-host disease
c. Immunodeficiency
d. Tumors

92. The activity of natural killer (NK) cells:
a. Does not require previous exposure to an antigen
b. Involves phagocytosis and killing of bacteria
c. Requires interaction with cytotoxic T cells
d. Requires interaction with B cells

93. How do cytotoxic T cells kill target cells?
a. They produce antibodies that bind to the cell.
b. They engulf the cell by phagocytosis.
c. They stop protein synthesis in the target cell.
d. They produce granzymes that stimulate apoptosis.

94. The classical complement pathway is activated by:
a. Most viruses
b. Antigen–antibody complexes
c. Fungal cell walls
d. All of the above

95. C1 consists of three subunits: C1q, C1r and C1s, which are bound together by:
a. Magnesium
b. Calcium
c. Iron
d. Chloride

96. Mannose-binding lectin is similar to which component of the classical pathway?
a. C3
b. C2
c. C1q
d. C5a

97. Which of the following complement proteins is part of the membrane attack complex (MAC)?
a. C1
b. C3
c. C4
d. C5

98. A patient with hereditary angioedema has which of the following deficiencies?
a. C5-9
b. Phagocytic cell function
c. Mature B cells
d. C1 Inhibitor

99. Which tumor marker is associated with cancer of the urinary bladder?
a. CA 19-9
b. CA 72-4
c. Nuclear matrix protein
d. Cathepsin-D

100. The best use of serum tumor markers is considered to be in:
a. Screening for cancer
b. Initial diagnosis of cancer
c. Monitoring patients undergoing cancer treatment
d. Determining patient prognosis

101. It represents the sum of all the attractive forces between an antigen and an antibody:
a. Affinity
b. Avidity
c. Precipitation
d. Agglutination

102. The prozone phenomenon can result in a (an):
a. False-positive reaction
b. False-negative reaction
c. Enhanced agglutination
d. Diminished antigen response

103. Inactivation of sera for serological tests is performed for what purpose?
a. Destruction of complement
b. Increasing sensitivity of test
c. Removal of particulate matter
d. Restoration of refrigerated sera to appropriate temperature for testing

104. Tiny agglutinates turbid background:
a. 0
b. W+
c. 1+
d. 2+

105. A few isolated aggregates; mostly free-floating cells; supernatant appears red:
a. Negative
b. Mixed-field
c. Weak
d. 1+

106. In a slide agglutination test, what would happen if the slide were rotated for 10 minutes?
a. Possible false-positive result
b. Possible false-negative result
c. No effect
d. Depends on the amount of antibody present in the sample

107. Typing of RBCs with reagent antiserum represents which type of reaction?
a. Direct hemagglutination
b. Passive hemagglutination
c. Hemagglutination inhibition
d. Reverse passive hemagglutination

108. For which of the following tests is a lack of agglutination a positive reaction?
a. Hemagglutination
b. Passive agglutination
c. Reverse passive agglutination
d. Agglutination inhibition

109. A bacterial protein used to bind human immunoglobulins is:
a. HAV antibody, IgA type
b. Escherichia coli protein C
c. Staphylococcal protein A
d. HAV antibody, IgG type

110. Which of the following is used to detect allergen specific IgE?
a. RIST
b. RAST
c. IEP
d. CRP

111. Which of the following is the most common application of Immunoelectrophoresis (IEP)?
a. Identification of the absence of a normal serum protein
b. Structural abnormalities of proteins
c. Screening for circulating immune complexes
d. Diagnosis of monoclonal gammopathies

112. Which technique represents a single-diffusion reaction?
a. Radial immunodiffusion
b. Ouchterlony diffusion
c. Immunoelectrophoresis
d. Immunofixation electrophoresis

113. What is the interpretation when an Ouchterlony plate shows crossed lines between wells 1 and 2?
a. No reaction between wells 1 and 2
b. Partial identity between wells 1 and 2
c. Nonidentity between wells 1 and 2
d. Identity between wells 1 and 2

114. In a ____ immunofluorescent assay, antibody that is conjugated with a fluorescent tag is added directly to unknown antigen that is fixed to a microscope slide:
a. Direct immunofluorescent assay
b. Indirect immunofluorescent assay
c. Inhibition immunofluorescent assay
d. Fluorescent quenching

115. In Fluorescence Polarization Immunoassay (FPIA), the degree of fluorescence polarization is ____ proportional to concentration of the analyte.
a. Direct
b. Inverse
c. Variable
d. No effect

116. The first serological marker to appear in patients with acute hepatitis B virus infection is:
a. Anti-HBs
b. Anti-HBc
c. Anti-HBe
d. HBsAg

117. Which of the following tests is positive during the window period of infection with hepatitis B?
a. Hepatitis B surface antigen
b. Hepatitis B surface antibody
c. Hepatitis B core antibody
d. Hepatitis C antibody

118. If only anti-HBs is positive, which of the following can be ruled out?
a. Hepatitis B virus vaccination
b. Distant past infection with hepatitis B virus
c. Hepatitis B immune globulin (HBIG) injection
d. Chronic hepatitis B virus infection

119. All of the following hepatitis viruses are spread through blood or blood products EXCEPT:
a. Hepatitis A
b. Hepatitis B
c. Hepatitis C
d. Hepatitis D

120. As AIDS progresses, the quantity of _____ diminishes and the risk of opportunistic infection increases.
a. HIV antigen
b. HIV antibody
c. CD4+ T lymphocytes
d. CD8+ T lymphocytes

121. In monitoring an HIV-infected patient, which parameter may be expected to be the most sensitive indicator of the effectiveness of antiretroviral treatment?
a. HIV antibody titer
b. CD4:CD8 ratio
c. HIV viral load
d. Absolute total T-cell count

122. The fourth-generation ELISA tests for HIV detect:
a. HIV-1 and HIV-2 antigens
b. HIV-1 and HIV-2 antibodies
c. p24 antigen
d. HIV-1 and HIV-2 antibodies and p24 antigen

123. False-negative test results in a laboratory test for HIV antibody may occur because of:
a. Heat inactivation of the serum before testing.
b. Collection of the test sample before seroconversion.
c. Interference by autoantibodies.
d. Recent exposure to certain vaccines.

124. What outcome results from improper washing of a tube or well after adding the enzyme antibody conjugate in an ELISA system?
a. Result will be falsely decreased
b. Result will be falsely increased
c. Result will be unaffected
d. Result is impossible to determine

125. Which is most likely a positive Western blot result for infection with HIV?
a. Band at p24
b. Band at gp60
c. Bands at p24 and p31
d. Bands at p24 and gp120

126. An HLA specimen is collected in a tube containing:
a. ACD
b. EDTA
c. Silica
d. Thrombin

127. Serologic HLA testing uses a form of complement-dependent microlymphocytotoxicity (CDC) performed in 60-well or 72-well microtiter trays. Trays are usually read on:
a. Brightfield microscopes
b. Darkfield microscopes
c. Polarizing microscopes
d. Inverted phase contrast microscopes

128. For serum VDRL, the slide is rotated at:
a. 100 rpm for 4 minutes
b. 100 rpm for 8 minutes
c. 180 rpm for 4 minutes
d. 180 rpm for 6 minutes

129. Antigen in the RPR test:
a. Anti-cardiolipin
b. Cardiolipin
c. Charcoal
d. Reagin

130. FTA-ABS is used to identify which of the following in the patient's serum?
a. Treponemal antibody
b. Treponemes
c. Reagin
d. Cardiolipin

131. Which test is recommended for testing cerebrospinal fluid neurosyphilis?
a. RPR
b. VDRL
c. FTA-ABS
d. Enzyme immunoassay

132. False-positive nontreponemal tests for syphilis may occur because of which of the following?
a. Infectious mononucleosis
b. Systemic lupus erythematosus
c. Pregnancy
d. All of these

133. Diagnosis of group A streptococci (Streptococcus pyogenes) infection is indicated by the presence of:
a. Anti-protein A
b. Anti-DNase B
c. Anti-beta-toxin
d. C-reactive protein

134. A single ASO titer is considered to be moderately elevated if the titer is at least _____ Todd units in a child.
a. 160
b. 200
c. 240
d. 320

135. Which of the following is considered to be nonsuppurative complication of streptococcal infection?
a. Acute rheumatic fever
b. Scarlet fever
c. Impetigo
d. Pharyngitis

136. Current recommendations include the combined detection of mannan and anti mannan antibodies for the specific identification of _____ species in serum samples.
a. Bordetella
b. Mycobacterium
c. Candida
d. Cryptococcus

137. Most sensitive and reliable; reference method for VZV antibody:
a. Latex agglutination
b. ELISA
c. FAMA
d. PCR

138. Most common cause of congenital infections:
a. Cytomegalovirus
b. Rubella
c. Syphilis
d. Toxoplasmosis

139. Method of choice for diagnosis of congenital toxoplasmosis:
a. EIA
b. IFA
c. FAMA
d. PCR

140. Prenatal congenital toxoplasmosis can be diagnosed by performing _____ on amniotic fluid to detect T. gondii DNA.
a. EIA
b. IFA
c. FAMA
d. PCR

141. The Weil-Felix test is used for the detection of which type of antibodies:
a. Salmonella
b. Mycoplasma
c. Rickettsial
d. Viral

142. Cold agglutinins may develop after infection with:
a. Klebsiella pneumonia
b. Mycoplasma pneumonia
c. Streptococcus pneumonia
d. Haemophilus influenza

143. In the anti-dsDNA procedure, the antigen most commonly utilized is:
a. Rat stomach liver
b. Mouse kidney tissue
c. Crithidia luciliae
d. Toxoplasma gondii

144. The serologically detectable antibody produced in rheumatoid arthritis (RA) is primarily of the class:
a. IgA
b. IgE
c. IgG
d. IgM

145. A patient report states the presence of serum antibodies to OspC. What disease does the patient most likely have?
a. Syphilis
b. Strep throat
c. Lyme disease
d. Rubella

146. Patient serum is mixed with a suspension of guinea pig antigen. When the sample is then mixed with horse red blood cells, agglutination occurs. This is suggestive of an infection caused by:
a. Borrelia burgdorferi
b. Hepatitis B virus
c. Hepatitis C virus
d. Epstein-Barr virus

147. Which of the following serologic tests detects the polysaccharide capsule antigen in serum and CSF of patients with suspected infection with Cryptococcus neoformans?
a. Complement fixation
b. India ink test
c. Latex agglutination
d. Hemagglutination test

148. Two cross-reacting antigen types of herpes simplex virus have been identified:
a. EBV and CMV
b. HHV6 and HHV7
c. VZV and CMV
d. HSV1 and HSV2

149. Which of the following stages of infectious mononucleosis infection is characterized by antibody to Epstein-Barr nuclear antigen?
a. Recent (acute) infection
b. Past infection (convalescent) period
c. Reactivation of latent infection
d. Past infection, reactivation of latent infection

150. Reported the use of sodium citrate as an anticoagulant solution for transfusions in 1914:
a. Edward Lindemann
b. Hustin
c. Lewisohn
d. Rous and Turner

151. A genetic state in which no detectable trait exists is called:
a. Recessive
b. Dominant
c. Incomplete dominance
d. Amorph

152. What type of serological testing does the blood bank technologist perform when determining the blood group of a patient?
a. Genotyping
b. Phenotyping
c. Both genotyping and phenotyping
d. Polymerase chain reaction

153. Which of the following describes the expression of most blood group antigens?
a. Dominant
b. Recessive
c. Codominant
d. Corecessive

154. What blood type is NOT possible for an offspring of an AO and BO mating?
a. AB
b. A or B
c. O
d. All are possible

155. From the following ABO mating, what are the probabilities of the ABO phenotypes of potential offspring? Mother: Group O; Father: Group B (heterozygous)
a. 50% BO, 50% OO
b. 100% BO
c. 50% B, 50% O
d. 50% B, 50% A

156. Which of the following sugars must be present on a precursor substance for A and B antigenic activity to be expressed?
a. D-Galactose
b. N-Acetylgalactosamine
c. Glucose
d. L-Fucose

157. What chain is formed when the terminal galactose on the ABH precursor substance is attached to the N acetylglucosamine in beta 1, 4 linkage?
a. Type 1 precursor chain
b. Type 2 precursor chain
c. Type 3 precursor chain
d. Type 4 precursor chain

158. N-acetyl-D-galactosamine is the immunodominant carbohydrate that reacts with:
a. Arachis hypogaea
b. Salvia sclarea
c. Dolichos biflorus
d. Ulex europeaus

159. What should be done if all forward and reverse ABO results are negative?
a. Perform additional testing such as typing with anti-A1 lectin and anti-A,B
b. Incubate at 22°C or 4°C to enhance weak expression
c. Repeat the test with new reagents
d. Run an antibody identification panel

160. A stem cell transplant patient was retyped when she was transferred from another hospital. What is the most likely cause of the following results?
a. Viral infection
b. Alloantibodies
c. Immunodeficiency
d. Autoimmune hemolytic anemia

161. All of the following are true about the anti-A and anti-B, EXCEPT:
a. They are well-developed at birth
b. They are "naturally occurring"
c. They are IgM isoagglutinins
d. They are reactive at cold temperature

162. The most serious hemolytic transfusion reactions are due to incompatibility in which of the following blood group systems?
a. ABO
b. Rh
c. MN
d. Duffy

163. If a blood type cannot be resolved, what ABO group should be selected for a red blood cell transfusion?
a. Group A
b. Group B
c. Group O
d. Group AB

164. Acquired B antigens have been found in:
a. Bombay individuals
b. Group O persons
c. All blood groups
d. Group A persons 1

165. Which blood group has the LEAST amount of H antigen?
a. A1B
b. A2
c. B
d. A1

166. What type RBCs can be transfused to an A2 person with anti-A1?
a. A only
b. A or O
c. B
d. AB

167. Which genotype(s) will give rise to the Bombay phenotype?
a. HH only
b. HH and Hh
c. Hh and hh
d. hh only

168. What antibodies are formed by a Bombay individual?
a. Anti-A and anti-B
b. Anti-H
c. Anti-AB
d. Anti-A, anti-B and anti-H

169. Rh antibodies are predominantly:
a. IgM
b. IgG
c. IgD
d. IgA

170. Which of the following is the most common haplotype in the Asian population?
a. DCe
b. DcE
c. Dce
d. ce

171. A complete Rh typing for antigens C, c, D, E, and e revealed negative results for C, D, and E. How is the individual designated?
a. Rh positive
b. Rh negative
c. Positive for c and e
d. Impossible to determine

172. Anti-c can be formed by persons with the genotype:
a. R1R2
b. R1R1
c. R2r
d. rr

173. A patient tests positive for weak D but also appears to have anti-D in his serum. What may be the problem?
a. Mixup of samples or testing error
b. Most weak D individuals make anti-D
c. The problem could be due to a disease state
d. A D mosaic may make antibodies to missing antigen parts

174. Why is testing a pregnant woman for weak D not required?
a. An Rh-negative fetus may yield false positive results in a fetal maternal bleed
b. An Rh-positive fetus may yield false positive results in a fetal maternal bleed
c. D antigen strength decreases during pregnancy
d. D antigen strength increases during pregnancy

175. Rh-HDN occurs in what type of mother and child:
a. Mother and child are both Rh (-)
b. Mother and child are both Rh (+)
c. Mother is Rh (+), child is Rh (-)
d. Mother is Rh (-), child is Rh (+)

176. If an Rh negative woman recently delivered an Rh positive baby and the Kleihauer-Betke test result is 5%, how many vials of Rh Ig should be administered?
a. 6
b. 7
c. 8
d. 9

177. The immunogenicity of the common Rh antigens may be described from greatest to least:
a. D>C>E>c>e
b. D>c>E>e>C
c. c>D>C>E>e
d. D>c>E>C>e

178. Which of the blood group systems is associated with antibodies that are generally IgM?
a. Rh
b. Duffy
c. Kell
d. Lewis

179. If a person has the genetic makeup Hh, AO, LeLe, sese, what substance will be found in the secretions?
a. A substance
b. H substance
c. Lea substance
d. Leb substance

180. The antigen system closely associated phenotypically with Rh is known as:
a. McCoy
b. Lutheran
c. Duffy
d. LW

181. Which of the following is the most common antibody seen in the blood bank after ABO and Rh antibodies?
a. Anti-Fya
b. Anti-k
c. Anti-Jsa
d. Anti-K

182. A patient showed positive results with screening cells and 4 donor units. The patient autocontrol was negative. What is the most likely antibody?
a. Anti-H
b. Anti-S
c. Anti-Kpa
d. Anti-k

183. Which blood group system is associated with resistance to Plasmodium vivax malaria?
a. P
b. Kell
c. Duffy
d. Kidd

184. Laura expresses the blood group antigens Fya, Fyb,and Xga. James shows expressions of none of these antigens. What factor(s) may account for the absence of these antigens in James?
a. Gender
b. Race
c. Gender and race
d. Medication

185. Which of the following Duffy phenotypes is prevalent in blacks but virtually nonexistent in whites?
a. Fy (a^+b^+)
b. Fy (a^-b^+)
c. Fy (a^-b^-)
d. Fy (a^+b^-)

186. Antibodies to antigens in which of the following blood groups are known for showing dosage?
a. I
b. P
c. Kidd
d. Lewis

187. Which of the following statements is true concerning the MN genotype?
a. Antigens are destroyed using bleach-treated cells
b. Dosage effect may be seen for both M and N antigens
c. Both M and N antigens are impossible to detect because of cross-interference
d. MN is a rare phenotype seldom found in routine antigen typing

188. Which antigen is destroyed by enzymes?
a. P1
b. Js
c. Fy
d. Jk

189. Which antibody is most commonly associated with delayed hemolytic transfusion reactions?
a. Anti-s
b. Anti-k
c. Anti-Lu
d. Anti-Jk

190. A weakly reactive antibody with a titer of 128 is neutralized by plasma. Which of the following could be the specificity?
a. Anti-JMH
b. Anti-Ch
c. Anti-Kn
d. Anti-Kp

191. Which autoantibody specificity is found in patients with paroxysmal cold hemoglobinuria?
a. Anti-I
b. Anti-i
c. Anti-P
d. Anti-P1

192. An antibody shows strong reactions in all test phases. All screen and panel cells are positive. The serum is then tested with a cord cell and the reaction is negative. What antibody is suspected?
a. Anti-I
b. Anti-i
c. Anti-H
d. Anti-p

193. The antibody to this high-prevalence antigen demonstrates mixed-field agglutination that appears shiny and refractile under the microscope.
a. Vel
b. JMH
c. Jr
d. Sd

194. How can interfering anti-P1 antibody be removed from a mixture of antibodies?
a. Neutralization with saliva
b. Agglutination with human milk
c. Combination with urine
d. Neutralization with hydatid cyst fluid

195. A characteristic of the Xga antigen:
a. Has a higher frequency in women than in men
b. Has a higher frequency in men than in women
c. Is enhanced by enzymes
d. Is usually a saline reacting antibody

196. The prevalence of___ in Northern Europeans is 1% but is higher in the Mennonite population.
a. Di
b. In
c. Sc1
d. Sc2

197. Leach phenotypes may have weak expression of ___ blood group antigens.
a. MN
b. Kell
c. Kidd
d. P

198. A patient's serum contains a mixture of antibodies. One of the antibodies is identified as anti-D. Anti-Jka or anti-Fya and possibly another antibody are present. What technique(s) may be helpful to identify the other antibody(s)?
a. Enzyme panel; select cell panel
b. Thio reagents
c. Lowering the pH and increasing the incubation time
d. Using albumin as an enhancement media in combination with selective adsorption

199. An anti-M reacts strongly through all phases of testing. Which of the following techniques would NOT contribute to removing this reactivity so that more clinically significant antibodies may be revealed?
a. Acidifying the serum
b. Prewarmed technique
c. Adsorption with homozygous cells
d. Testing with enzyme-treated red cells

200. How many days before a pretransfusion specimen expires?
a. 3 days
b. 7 days
c. 14 days
d. 1 month

201. Which of the following would be cause for deferral for a male donor?
a. Temperature of 99.2°F
b. Hematocrit of 37%
c. Received a blood transfusion 2 years ago
d. Pulse rate 60 bpm

202. A whole-blood donor currently on clopidogrel (Plavix) is precluded from donating which product?
a. Platelets
b. Red blood cells
c. FFP
d. Cryoprecipitate

203. Which of the following tests is not required as part of the donor processing procedure for allogeneic donation?
a. ABO
b. Rh
c. Serologic test for syphilis (STS)
d. Anti-CMV

204. Which antibodies to a component of complement are contained in the rabbit polyspecific AHG reagent for detection of in vivo sensitization?
a. Anti-IgG and anti-C3a
b. Anti-IgG and anti-C3d
c. Anti-IgG and anti-IgM
d. All of these options

205. How can IgG antibodies be removed from red cells?
a. Elution
b. Adsorption
c. Prewarming
d. Neutralization

206. Check (Coombs control) cells are:
a. Added to every negative antiglobulin test
b. Added to negative direct antiglobulin tests only
c. Used to confirm a positive Coombs' reaction
d. Coated with both IgM and C3d

207. All of the following are enhancement media for AHG testing, EXCEPT:
a. Albumin
b. Polyethylene glycol (PEG)
c. Normal saline
d. LISS

208. What does a minor crossmatch consist of?
a. Recipient plasma and recipient red cells
b. Recipient plasma and donor red cells
c. Recipient red cells and donor plasma
d. Donor plasma and donor red cells

209. If a group A patient was crossmatched with an O donor, the result would be:
a. Major side incompatible
b. Minor side incompatible
c. Major and minor sides incompatible
d. Major and minor sides compatible

210. What type(s) of red cells is (are) acceptable to transfuse to an O-negative patient?
a. A negative, B negative, AB negative, or O negative
b. O negative
c. AB negative
d. AB negative, A negative, B negative

211. What is the maximum volume of blood that can be collected from a 110- lb donor, including samples for processing?
a. 450 mL
b. 500 mL
c. 525 mL
d. 550 mL

212. Which of the following occurs during storage of red blood cells?
a. pH decreases
b. 2,3-DPG increases
c. ATP increases
d. Plasma K^+ decreases

213. Additive solutions (AS) are approved for storage of red blood cells for how many days?
a. 1 days
b. 42 days
c. 35 days
d. 7 days

214. Heavy spin centrifugation:
a. 1,000 x g for 5 minutes
b. 2, 000 x g for 2 to 3 minutes
c. 3,000 x g for 2 to 3 minutes
d. 5, 000 x g for 5 minutes

215. Which of the following lists the correct shelf-life for the component?
a. Deglycerolized RBCs—24 hours
b. RBCs (CPD)—35 days
c. Platelet concentrate—7 days
d. FFP—5 years

216. Whole blood and RBC units are stored at what temperature?
a. 1°C to 6°C
b. 20°C to 24°C
c. 37°C
d. 24°C to 27°C

217. Minimum weight of female donor for double RBC pheresis:
a. 90 lbs
b. 100 lbs
c. 130 lbs
d. 150 lbs

218. What is the lowest allowable pH for a platelet component at outdate?
a. 6
b. 5.9
c. 6.8
d. 6.2

219. Quality control for packed RBCs requires a maximum hematocrit level of:
a. 75%
b. 80%
c. 85%
d. 90%

220. Cryoprecipitate that has been pooled must be transfused within _____ hours.
a. 24
b. 6
c. 4
d. 8

221. Which of the following can be given to an apheresis donor to increase the number of circulating granulocytes?
a. DDAVP
b. Hydroxyethyl starch (HES)
c. Immune globulin
d. G-CSF

222. What is the component of choice for a patient with chronic granulomatous disease (CGD)?
a. FFP
b. Granulocytes
c. Cryoprecipitate
d. RBCs

223. What method can be employed to detect bacteria in random donor platelets?
a. pH
b. Glucose
c. Pan genera detection (PGD) assay
d. Gram stain

224. Even though it is properly collected and stored, which of the following will fresh frozen plasma (FFP) not provide?
a. Factor V
b. Factor VIII
c. Factor IX
d. Platelets

225. The last unit of autologous blood for an elective surgery patient should be collected no later than __ hours before surgery.
a. 24 hours
b. 36 hours
c. 48 hours
d. 72 hours

226. Blood for intrauterine transfusion should be all of the following, EXCEPT:
a. More than 7 days old
b. Screened for CMV
c. Gamma-irradiated
d. Compatible with maternal serum

227. A unit of packed RBCs is split using the open system. One of the half units is used. What may be done with the second half unit?
a. Must be issued within 24 hours
b. Must be issued within 48 hours
c. Must be irradiated
d. Must retain the original expiration date

228. How does irradiation prevent transfusion associated graft-versus-host disease (TA-GVHD)?
a. Gamma rays and x-rays destroy the lymphocytes' ability to divide
b. X-rays cause lysis of the lymphocytes
c. Gamma rays enhance lymphocyte reactivity
d. Ultraviolet radiation induces apoptosis of lymphocytes

229. The most serious hemolytic transfusion reactions are due to incompatibility in which of the following blood group systems?
a. ABO
b. Rh
c. MN
d. Duffy

230. A woman begins to breathe rapidly while donating blood. Choose the correct course of action.
a. Continue the donation; rapid breathing is not a reason to discontinue a donation
b. Withdraw the needle, raise her feet, and administer ammonia
c. Discontinue the donation and provide a paper bag
d. Tell her to sit upright and apply a cold compress to her forehead

231. Which of the following is acceptable to be given intravenously with a blood transfusion?
a. 5% dextrose in water
b. Physiologic saline
c. Ringer's solution
d. Potassium chloride in saline

232. What component is most frequently involved with transfusion-associated sepsis?
a. Plasma
b. Packed red blood cells
c. Platelets
d. Whole blood

233. What may be found in the serum of a person who is exhibiting signs of TRALI (transfusion-related acute lung injury)?
a. Red blood cell alloantibody
b. IgA antibody
c. Antileukocyte antibody
d. Allergen

224. What is the component of choice for someone who needs a RBC transfusion when there is a history of febrile transfusion reactions?
a. RBCs less than 5 days old
b. Leukocyte-reduced RBCs
c. RBCs 30 to 35 days old
d. Frozen RBCs that have been thawed and deglycerolized

225. Which type of transfusion reaction occurs in about 1% of all transfusions, results in a temperature rise of 1°C or higher, is associated with blood component transfusion, and is not related to the patient's medical condition?
a. Immediate hemolytic
b. Delayed hemolytic
c. Febrile nonhemolytic reaction
d. Transfusion-related acute lung injury

226. Which immunoglobulin class is most often implicated in anaphylactic reaction?
a. IgA
b. IgD
c. IgE
d. IgG

227. All paperwork checks on this transfusion reaction are OK. The pretransfusion sample has straw-colored plasma. The post-transfusion sample has RED-tinged plasma. This is indicative of a(an):
a. Uncomplicated transfusion
b. Intravascular transfusion reaction
c. Error in which drugs have been infused with the blood
d. Febrile transfusion reaction

228. Pain at infusion site and hypotension are observed with what type of reaction?
a. Delayed hemolytic transfusion reaction
b. Acute hemolytic transfusion reaction
c. Allergic reaction
d. Febrile nonhemolytic reaction

229. Hemoglobinuria, hypotension and generalized bleeding are symptoms of which of the following transfusion reactions?
a. Allergic
b. Circulatory overload
c. Hemolytic
d. Anaphylactic

230. Hemolytic transfusion reactions are the most serious type of reactions to blood transfusion. The majority of hemolytic transfusion reactions are caused by ____ errors.
a. Blood typing
b. Antibody identification
c. Clerical
d. Crossmatching

231. Which of the following is characteristic of iron overload?
a. Delayed, nonimmune complication
b. Chelating agents are used
c. Multiorgan damage may occur
d. All of the above

232. Posttransfusion purpura (PTP) is usually caused by:
a. Anti-A
b. White cell antibodies
c. Anti-HPA
d. Platelet wash out

233. The laboratory assay of brain natriuretic peptide (BNP) may be used to aid in the diagnosis of:
a. TRALI
b. FNHTR
c. TACO
d. Iron overload

234. What would be the result of group A blood given to an O patient?
a. Nonimmune transfusion reaction
b. Immediate hemolytic transfusion reaction
c. Delayed hemolytic transfusion reaction
d. Febrile nonhemolytic transfusion reaction

235. The temperature of a blood refrigerator without a continuous recording device should be recorded:
a. Daily
b. Every 4 hours
c. Once every 24 hours
d. Every 30 minutes

236. When should quality control be performed on routine blood typing reagents?
a. At the beginning of each shift
b. Once daily
c. Weekly
d. Only when opening a new vial

237. An antibody commonly associated with delayed transfusion reactions is:
a. Anti-Lua
b. Anti-S
c. Anti-Jkb
d. Anti-M

238. All of the following are immunologic functions of complement, EXCEPT:
a. Induction of an antiviral state
b. Opsonization
c. Chemotaxis
d. Anaphylatoxin formation

239. A mother's first baby has HDFN due to D antigen. What is the most probable cause?
a. Very strong antigenic stimulation during pregnancy
b. Presence of naturally occurring D antigen in the mother's blood
c. Leakage of fetal RBCs to the mother's circulation
d. Transfusion of Rh-positive blood to the mother O

240. Suppose a 30-year-old man was found to be a suitable donor for a kidney transplant to his younger sister. This is an example of:
a. Autograft
b. Allograft
c. Isograft
d. Xenograft

241. All are TRUE for IgM, EXCEPT:
a. Highest in anamnestic response
b. Has five subunits
c. Predominant in primary immune response
d. Immediate response

242. HLA-DR, HLA-DQ, HLA-DP belong to which MHC class?
a. Class I
b. Class II
c. Class III
d. Class IV

243. Which of the following cytokines is also known as the T-cell growth factor?
a. IFN-gamma
b. IL-12
c. IL-2
d. IL-10

244. What antibodies are present in polyspecific AHG reagent?
a. Anti-IgG
b. Anti-IgM and anti-IgG
c. Anti-IgG and anti-C3d
d. Anti-C3d

245. What is the ideal volume of whole blood collected from a donor (in mL)?
a. 400 mL
b. 500 mL
c. 425 mL
d. 450 mL

246. Which CD4:CD8 ratio is most likely in a patient with AIDS?
a. 2:1
b. 3:1
c. 2:3
d. 1:2

247. What is the most significant agent formed in the phagolysosome for the killing of microorganisms?
a. Proteolytic enzymes
b. Hydroxyl radicals
c. Hydrogen peroxide
d. Superoxide

248. Which specimen is the sample of choice to evaluate latent or tertiary syphilis?
a. Serum sample
b. Chancre fluid
c. CSF
d. Joint fluid

249. The procedure that removes intact antibodies from the red cell membranes is:
a. Auto adsorption
b. Enzyme pretreatment
c. Neutralization
d. Elution

250. Which of the following techniques uses restriction enzymes, electrophoresis, and then transfer of DNA fragments onto a solid matrix, followed by probing with labeled probes?
a. Dot-blot
b. Southern blot
c. Western blot
d. LCR

251. What would be the result of group A blood given to an O patient?
a. Nonimmune transfusion reaction
b. Immediate hemolytic transfusion reaction
c. Delayed hemolytic transfusion reaction
d. Febrile nonhemolytic transfusion reaction

252. Anti-CCP (cyclic citrullinated proteins) is specifically associated with which autoimmune disease?
a. RA
b. MG
c. Autoimmune hepatitis
d. Goodpasture's syndrome

253. A biological false-positive reaction is LEAST likely with which test for syphilis?
a. VDRL
b. FTA-ABS
c. RPR
d. All are equally likely to detect a false-positive result

254. Screening cells and major crossmatch are positive on IS only, and the auto control is negative. Identify the problem.
a. Cold alloantibody
b. Cold autoantibody
c. Abnormal protein
d. Antibody mixture

255. Immunoglobulin classes are differentiated according to the molecular structure of:
a. Light chains
b. Heavy chains
c. Fabfragment
d. Fcfragment

256. Which test would measure the coating of red cells by antibody as occurs in hemolytic transfusion reactions?
a. Indirect antiglobulin test (IAT)
b. Direct antiglobulin test (DAT)
c. ELISA
d. Hemagglutination

257. Which of the following is found on the T cell subset known as helpers?
a. CD19
b. CD4
c. CD8
d. CD56

258. What is the safest blood that patient can receive?
a. Autologous blood
b. Blood from directed donor
c. Blood that was crossmatched
d. Blood that was crossmatched and screened for transfusion-transmitted infections

259. Which of the following is most likely to activate the alternative pathway of complement activation?
a. Lipopolysaccharides
b. Glycoproteins
c. Haptens
d. lgG complexed with antigen

260. All of the following are requirements for the tag on the cross matched donor unit, EXCEPT:
a. ABO and Rh type
b. Name of the donor
c. Unit expiration date
d. Interpretation of the crossmatch

261. Autoantibodies demonstrating blood group specificity in warm autoimmune hemolytic anemia are associated more often with which blood group system?
a. Rh
b. I
c. P
d. Fy

262. Which of the following is used for the confirmation of infection with HIV-1?
a. Western blot (immunoblot) assay
b. ELISA
c. Complement fixation
d. p24 Antigen testing

263. Which lgG subclass is least efficient at crossing the placenta?
a. lgG1
b. lgG2
c. lgG3
d. lgG4

264. Primary function of the eosinophil:
a. Phagocytosis
b. Activation of the inflammatory response
c. Reacting in acute, systemic hypersensitivity reactions
d. Suppression of the inflammatory response

265. Complement can be inactivated by heating to 56° C for how many minutes?
a. 60minutes
b. 30minutes
c. 10minutes
d. 120 minutes

266. What temperature is used to achieve DNA denaturation to a single strand?
a. 74°C
b. 92°C
c. 94°C
d. 102 °C

267. Which of the following medications is most likely to cause production of autoantibodies?
a. Penicillin
b. Cephalosporin
c. Methyldopa
d. Tetracycline

268. Cryoprecipitate may be used to treat all of the following, EXCEPT:
a. von Willebrand's disease
b. Hypofibrinogenemia
c. Idiopathic thrombocytopenic purpura (ITP)
d. Factor XIII deficiency

269. How much diluent needs to be added to 0.2 mL of serum to make a 1:20 dilution?
a. 19.8 mL
b. 4.0 mL
c. 3.8 mL
d. 10.0 mL

270. From the following, identify a specific component of the adaptive immune system that is formed in response to antigenic stimulation:
a. Lysozyme
b. Complement
c. Commensal organism
d. Immunoglobulin or antibodies

271. Interpret the following ASO results: Tube Nos. 1–4 (Todd unit 125): no hemolysis Tube No. 5 (Todd unit 166): hemolysis
a. Positive Todd unit 125
b. Positive Todd unit 166
c. Noantistreptolysin O present
d. Impossible to interpret

272. When should quality control be performed on routine blood typing reagents?
a. At the beginning of each shift
b. Oncedaily
c. Weekly
d. Only when opening a new vial

273. What should be done if a noticeable clot is found in an RBC unit?
a. Issue the unit; the blood will be filtered
b. Issue the unit; note the presence of a clot on the release form
c. Filter the unit in the blood bank before issue
d. Do not issue the unit

274. Which cells are capable of further differentiation in tissues?
a. Lymphocyte
b. Monocytes
c. Neutrophils
d. Dendritic cells

275. A hospital employee received the final dose of the hepatitis B vaccine 3 weeks ago. She wants to donate blood. Which of the following results are expected from the hepatitis screen, and will she be allowed to donate blood?
a. HBsAg, positive; anti-HBc, negative; she may donate
b. HBsAg, negative; anti-HBc, positive; she may not donate
c. HBsAg, positive; anti-HBc, positive; she may not donate
d. HBsAg, negative; anti-HBc, negative; she may donate

276. A donor bag is half filled during donation when the blood flow stops. Select the correct course of action.
a. Closely observe the bag for at least 3 minutes; if blood flow does not resume, withdraw the needle
b. Remove the needle immediately and discontinue the donation
c. Check and reposition the needle if necessary; if blood flow does not resume, withdraw the needle
d. Withdraw the needle and perform a second venipuncture in the other arm

277. Antibodies to thyroid peroxidase can be detected by using agglutination assays. Which of the following diseases may show positive results with this type of assay?
a. Graves' disease and Hashimoto's thyroiditis
b. Myasthenia gravis
c. Granulomatous thyroid disease
d. Addison's disease

278. The most serious HTRs are due to which incompatibility:
a. ABO
b. Rh
c. MN
d. Duffy

279. Many enhancement media used in the blood bank promote hemagglutination in the presence of IgG antibodies by reducing which of the following?
a. Hydrophilic forces
b. Low ionic potential
c. van der Waals forces
d. Zeta potential

280. Which physical examination result is cause for rejecting a whole-blood donor?
a. Weight of 105 lb
b. Pulse of 75
c. Temperature of 99.3°F
d. Diastolic pressure of 110 mm Hg

281. All of the following are blood groups enhanced by enzymes, EXCEPT:
a. P
b. Rh
c. I
d. Chido

282. Antibodies to which of the following viral antigens are usually the first to be detected in HIV infection?
a. gp120
b. gp160
c. gp41
d. p24

283. A soluble antigen and soluble antibody reacting to form an insoluble product describes
a. Agglutination reactions
b. Heterophile reactions
c. Labeled reactions
d. Precipitation reactions

284. Performing dilution, ten tubes are prepared. Each tube contains 0.2 ml of diluent. Patient serum (0.2 ml) is added to tube one. This is carefully mixed, and then 0.2 ml is withdrawn and added to tube two. The process is continued until the last tube is reached. After tube ten is mixed, the last 0.2 ml of the dilution is discarded. What is the titer on Tube 6?
A. 1:32
B. 32
C. 1:64
D. 64

285. It is the noncovalent combination of an antigen with its respective specific antibody.
A. Specificity
B. Affinity
C. Avidity
D. Immune Complex

286. In the classical pathway of complement activation, the sequence of activation is C1 , C2, C4, and C3. Alternative pathway can be activated in the absence of specific antigen-antibody complexes.
A. Only the first statement is correct
B. Only the second statement is correct
C. Both statements are correct
D. Both statements are incorrect

287. Mast cells contain granules that are rich in histamine and heparin. What is the ratio of heparin to histamine?
A. 1:2
B. 2:1
C. 1:6
D. 6:1

287. Mast cells contain granules that are rich in histamine and heparin. What is the ratio of heparin to histamine?
A. 1:2
B. 2:1
C. 1:6
D. 6:1

288. Type II hypersensitivity reactions are responsible for all the following except:
A. Thrombocytopenia
B. HDFN
C. Serum Sickness
D. Transfusion Reactions

289. The best precipitating antibody:
A. Antibody with a sedimentation rate of 19 S
B. The predominant immunoglobulin in humans
C. Antibody with the longest half-life of any immunoglobulin
D. class Band C

290. Antibodies in rheumatoid arthritis are:
A. lgG antibodies against the Fab protion of lgM antibodies
B. lgM antibodies against the Fab protion of lgG antibodies
C. lgG antibodies against the Fe protion of lgM antibodies
D. lgM antibodies against the Fe protion of lgG antibodies

291. A 40-year-old female went to her doctor because she was feeling tired all the time. She had gained about 10 pounds in the last few months and exhibited some facial puffiness. Her thyroid gland was enlarged. Laboratory results indicated a normal red and white blood cell count, but her T4 level was decreased, and an assay for antithyroglobulin antibody was positive. What do these results likely indicate?
A. Myasthenia Gravis
B. Graves' Disease
C. Hashimoto's Thyroiditis
D. SLE

292. Which of the following statements regarding Bruton's X-linked agammaglobulinemia is true?
A. T cells are abnormal
B. Majority of cases occurs in females
C. Lack of immunoglobulin of all classes
D. Lack of pre-B cells in the bone marrow

293. Each marker below is correctly paired with a disease in which it can be used for conditional monitoring except:
A. CEA: Choriocarcinoma
B. CA 125: Ovarian carcinoma
C. HER2lneu: Breast adenocarcinoma
D. CA 19-9: Pancreatic cancer

294. Patients with SLE characteristically manifest:
A. Butterfly rash over the bridge of the nose
B. Skin lesions on the arms and legs
C. Ulcerations on the trunk
D. Photophobia

295. Class I MHC presents antigen to which one of the following?
A. CD4+ Th1 cells
B. CD4+ Th2 cells
C. Natural killer cells
D. CD8+ T cells

296. A patient exhibits increased urination, appetite and thirst. Tests reveal an increased blood sugar both in serum and in urine. Which of the following HLA molecules would you anticipate to be present?
A. HLA-DR3
B. HLA-B27
C. HLA-A2
D. HLA-C4

297. Which of the following results does not explain Neisseria infection?
A. Absent properdin
B. Low C5-C8
C. MIRL Deficiency
D. MBL Deficiency

298. Which one of the following molecules is a potent chemotactic factor for neutrophils?
A. IL-2
B. IL-4
C. IL-6
D. IL-8

299. A positive tuberculin skin test involves the interaction of:
A. antigen, complement, and lymphokines
B. antigen-antibody complexes, complement, and neutrophils
C. memory T cells, cytokines, and macrophages
D. lgE antibody, antigen, and mast cells

300 . Which of the following is incorrect regarding Lewis antibodies?
A. Lewis antibodies do not cross the placenta
B. These antibodies are made by Le(a-b-) individuals
C. Lewis antibodies causes HDFN
D. They are naturally occurring

301. Both donor and recipient samples must be stored for a minimum of how many days following transfusion?
A. 3 days
B. 5 days
C. 7 days
D. 14 days

302. A potential blood donor received a rubeola vaccine. She should be deferred for?
A. 24 hours
B. 2 weeks from the vaccination period
C. 4 weeks from the vaccination period
D. No deferral

303. Random-donor platelet concentrates should contain at least 5.5 x 10'1 O platelets. These are stored at 20' C to 24' C with continuous agitation, contain sufficient plasma (typically 40 to 70 ml) to yield a pH of greater than or equal to 6.0.
A. First statement is correct, second statement is incorrect
B. Second statement is correct, first statement is incorrect
C. Both statements are correct
D. Both statements are incorrect

304. Results of forward and reverse typing didn't match. There is no error in specimen collection and identification. What should you do next?
A. Request a new sample to be drawn from the patient.
B. Wash patient's RBCs with saline and repeat testing
C. Look up information on patient: Diagnosis, Medications, Transfusions, etc.
D. Run auto control

305. What hematocrit is acceptable for packed RBCs?
A. 75%
B. 85%
C. 95%
D. 83%

306. It is involved in the autoantibody specificity in PCH
A. ISBT 003
B. ISBT 005
C. ISBT 007
D. ISBT 010

307. What is the standard acceptable color of Anti- B grouping serum?
A. Colorless
B. Green
C. Blue
D. Yellow

308. Which physical examination result is cause for rejecting a whole blood donor?
A. Weight of 115 lbs
B. Hematocrit: 38%
C. Temperature of 99.3°F
D. Diastolic pressure of 130 mm Hg

309. How much anticoagulant would have to be removed from the collection bag given a donor who weighs 90 lbs?
A. 12 ml
B. 15 ml
C. 20 ml
D. 23 ml

310. Cryoprecipitate must be transfused within 6 hours after thawing. Once cryoprecipitate is thawed, it is stored at room temperature until transfused.
A. Only the first statement is correct
B. Only the second statement is correct
C. Both statements are correct
D. Both statements are incorrect

311. With regards to inheritance, most blood group systems are:
A. autosomal dominant
B. sex-linked dominant
C. autosomal recessive
D. autosomal codominant

312. The recommended dose of gamma radiation administered to a blood product to reduce the risk of graft-versus-host disease is:
A. 15 Gy to any part of the blood unit
B. 15 Gy to the central portion of the blood unit
C. 25 Gy to any part of the blood unit
D. B and C

313. The advantages of cordocentesis include all of the following except:
A. Allows measurement of fetal hemoglobin and hematocrit levels
B. Allows antigen typing of fetal blood
C. Allows direct transfusion of fetal circulation
D. Decreases risk of trauma to the placenta

314. Components of an information system consist of all of the following except:
A. Hardware
B. Software
C. Validation
D. People

315 . Elevated alpha-fetoprotein will most likely be found in serum in:
A. Lung cancer
B. Hepatoma
C. Breast cancer
D. Stomach cancer

316. Which outcome indicates a negative result in a complement fixation test?
A. Hemagglutination
B. Hemolysis
C. Absence of Hemagglutination
D. Absence of Hemolysis

317. When C3b is deposited onto a bacterial surface, the alternative pathway of complement is activated and a C3 convertase is assembled on the microbial surface. Complement components directly/indirectly required for formation/stabilization of this C3 convertase include all the following EXCEPT:
A. Properdin
B. Factor B
C. Factor D
D. Factor H

318. Grading of agglutination reactions: Moderate clumping with fairly clear fluid background
A. 4+
B. 3+
C. 2+
D. 1+

319. The directions for a slide agglutination test instruct that after mixing the patient's serum and latex particles, the slide must be rotated for 2 minutes. What would happen if the slide were rotated for 10 minutes?
A. Possible false-negative result
B. Possible false-positive result
C. Depending on the amount of antibody present in the sample
D. No effect

320. An example of allograft:
A. Kidney transplant between monozygous twins
B. Fetus on mother's womb
C. Synthetic heart valves
D. Skin graft from the same individual

321. For which immunodeficiency syndrome should patients receive irradiated blood products to protect against the development of GvH disease?
A. Bruton's agammaglobulinemia
B. Severe IgA deficiency
C. Severe Combined Immunodeficiency
D. Chronic granulomatous disease

322. What clinical manifestation would be seen in a patient with myeloperoxidase deficiency?
A. Defective T-cell function
B. Inability to produce
C. IgG Defective NK cell function
D. Defective neutrophil function

323. What protein whose concentration can increase almost a thousand fold and removes cholesterol from cholesterol filled macrophages at the site of tissue injury?
A. Serum Amyloid A
B. CRP
C. Alpha-1 Antitrypsin
D. Haptoglobin

324. What is the role of T-Helper 2 cells?
A.Produces IFN-y and TNF-Jl
B. Protect cells against intracellular pathogens
C. Protect cells against extracellular pathogens
D. Suppresses the immune response to self-antigens

325. Pre-B cell is characterized by the presence of what chain in their cytoplasm?
A. Alpha
B. Delta
C. Gamma
D. Mu

326. Interpret the following results for HIV infection: HIV 1, 2 ELISA: Positive, HIV-1 Western Blot: Indeterminate, p24 antigen: Negative
A. Positive for antibodies to HIV-1
B. Positive for antibodies to HIV-2
C. Negative for HIV
D. Additional testing is required

327. Which of the following is incorrect regarding ABO HDFN?
A. It can occur in the first pregnancy
B. It can be predicted by titers
C. Increased fragility of infant's RBCs
D. Infants have normal hemoglobin levels at birth

328. What is the maximum interval during which a recipient sample may be used for compatibility testing if the patient has recently been transfused or was pregnant within the past 3 months?
A. 24 hours
B. 2 weeks
C. 7 days
D. 3 days

329. Hydroxyethyl starch is a rouleaux-promoting agent used to:
A. Increase the harvest of granulocytes in leukapheresis
B. Treat patients following hemolytic transfusion reaction
C. Resolve ABO typing discrepancy
D. Stabilize the pH of stored platelets

330. Which of the following is a method for determining approximate volume of fetal-maternal bleed?
A. Kleihauer-Betke test
B. Eluate testing
C. Nucleic acid amplification testing
D. Antibody screening

331. Cryoprecipitated AHF concentrates are used to treat all of the following except:
A. Classic Hemophilia
B. Christmas Disease
C. von Willebrand disease
D. Factor X 111 Deficiency

332. Corticosteroids such as prednisone or dexamethasone are given to the donor prior to:
A. Plasmapheresis
B. Plateletpheresis
C. Leukapheresis
D. RBC Pheresis

333. Which of the following is incorrect regarding intermittent flow centrifugation?
A. Blood is processed in cycles
B. Two venipuncture sites are necessary
C. Blood is drawn and reinfused through the same needle
D. Whole blood is drawn from an individual with the assistance of a pump

334. Which of the following chemicals in anticoagulant solutions extends shelf-life from 21 to 35 days?
A. Citrate
B. Monobasic sodium phosphate
C. Adenine
D. Dextose

335. What is the maximum volume of blood that can be collected from a 110-lb donor, including samples for processing?
A. 450 ml
B. 500 ml
C. 525 ml
D. 550 ml

336. Which of the following is the most common cause of bacterial contamination of platelet products?
A. Entry of skin plugs into the collection bag
B. Incorrect storage temperature
C. Environmental contamination during processing
D. Bacteremia in the donor

337. How often can a blood donor donate whole blood?
A. Every 24 hours
B. Once a month
C. Every 8 weeks
D. Twice a year

338. An excess of unbound immunoglobulin leads to a prozone effect, and a surplus of antigen leads to a postzone effect. Both effects produce a false-negative result.
A. Only the first statement is correct
B. Only the second statement is correct
C. Both statements are correct
D. Both statements are incorrect

339 . Which of the following ABO blood groups contains the least amount of H substance?
A. A2
B. A2B
C. A1B
D. B

340. Cryoprecipitated AHF contains how many units of Factor VIII?
A. 40
B. 50
C. 80
D. 120

341. Anti-Sda has been identified in a patient. What substance would neutralize this antibody and allow detection of other alloantibodies?
A. Saliva
B. Hydatid cyst fluid
C. Urine
D. Human breast milk

342. Protein A captures antibodies by binding to:
A. Fab portion of immunoglobulin
B. Fe portion of immunoglobulin
C. Surface of test cells
D. Surface of indicator cells

343. Plateletpheresis donors who have ingested aspirin should be deferred for how many days and for what reason?
A. 2 days, interfere with platelet adhesion
B. 2 days, interfere with platelet aggregation
C. 14 days, interfere with platelet adhesion
D. 14 days, interfere with platelet aggregation

344. Which blood product should be selected for vitamin K deficiency?
A. Cryoprecipitate
B. Factor VIII concentrate
C. Factor IX concentrate
D. Plasma

345. Which of the following reactions does not occur when there is a massive blood transfusion?
A. Hypothermia
B. Hypercalcemia
C. Citrate toxicity
D. None of the above

346. Performing Davidsohn Differential test, the serum is both adsorbed by guinea pig kidney cells and beef erythrocytes. This indicates:
A. Normal Result
B. Serum Sickness·
C. Infectious Mononucleosis
D. None of the Above

347. Principle: Light scattering by immune complexes is measured. What is the immunoassay described?
A. Flocculation
B. Nephelometry
C. Turbidimetry
D. RID

348. Which surface marker is a reliable marker for the presence of high levels of hepatitis B virus (HBV) and a high degree of infectivity?
A. HBeAg
B. HBsAg
C. HBcAg
D. Anti-HBs

349. In HIV infections, a window period of seronegativity extends from the time of initial infection up to:
A. 2 weeks
B. 2 to 6 weeks or longer
C. 6 to 12 weeks or longer
D. 4 to 8 months or longer

3350. To determine if a patient is allergic to rye grass, the best test to perform is:
A. RAST
B. RIST
C. Skin Test
D. Total lgE Assay

351. Patients with Waldenstrom's macroglobulinemia exhibit abnormally large amounts of:
A. lgM
B. lgG
C. lgE
D. lgA

352. Which of the following nontreponemal tests uses charcoal particles to visualize the reaction?
A. VDRL
B. RPR
C. TRUST
D. Band C

353. Which of the following is a marker of pre-B CALLA?
A. CD 3
B. CD 10
C. CD 16
D. CD 21

354. Which Immunoglobulin helps initiate the classic complement pathway?
A. IgA
B. IgE
C. IgD
D. IgG

355. Which of the following choices describes Class I MHC molecules?
A. presents antigens to CD4 T cells
B. 8 to 11 amino acids
C. has classes DP, DQ, DR
D. 13 to 18 amino acids

356. the presence of human microbiota acts as defense mechanism by:
A. Maintaining an acidic environment
B. Competing with potential pathogens
C. Keeping phagocytes in the area
D. Coating of mucosal surfaces

357. The following statements correctly describes SAA EXCEPT:
A. activates monocytes and macrophages
B. increases up to 1000x during inflammation
C. normal concentration is 20-40 mg/dL
D. response time usually takes 24 hours

358. How is complement activity destroyed in vitro?
A. Heating serum at 56C for 30 minutes
B. Heating Serum at 56C for 10 minutes
C. Heating serum at 37C for 30 minutes
D. Heating serum at 37C for 10 minutes

359. Which of the following Immunoglobulins is involved in anamnestic response?
A. IgM
B. IgG
C. IgE
D. IgA

360. Which IgG subclass has the largest hinge region and the largest number of interchain disulfide bonds?
A.IgG3
B.IgG2
C.IgG1
D.IgG4

361. Arrange the Immunoglobulins from highest to lowest molecular weight, what is the sequence?
A. IgG > IgA > IgM > IgD >IgE
B. IgM > IgE > IgD > IgA > IgG
C. IgM > IgA > IgG > IgD > IgE
D. IgG > IgM > IgA > IgE > IgD

362. What is the serum half-life of IgA (in days)?
A. 23 days
B. 6 days
C. 5 days
D. 3 days

363. C8 is associated with what disease?
A. Sepsis
B. PNH
C. Glomerulonephritis
D. Neisseria

364. Hereditary angioedema is associated with what deficient component?
A. MIRL
B. C3
C. MBL
D. C1 inhibitor

365. Instability Hazard : Violent chemical change
A. 1
B. 2
C. 3
D. 4

366. All of the following are examples of Examination errors EXCEPT:
A. inability to identify interfering substances
B. misinterpretation of quality control data
C. reagent deterioration
D. sample misidentification

367. Which of the following precipitation techniques is used for complex antigens such as fungal antigens?
A. Immunofixation electrophoresis
B. Immunoelectrophoresis
C. Ouchterlony double diffusion
D. Radial immunodiffusion

368. Concentrations of antigen and antibody that yields maximum binding
A. Prozone
B. Postzone
C. ZOI
D. Avidity

369. Which cell surface marker is present on cells seen in Hairy cell leukemia?
A. CD138
B. CD 33
C. CD 103
D. CD 34

370. Which of the following is a delayed type of Hypersensitivity reaction?
A. Type I
B. Type III
C. Type II
D. Type IV

371. Also known as Complex mediated hypersensitivity reaction
A. Type I
B.Type III
C.Type II
D.Type IV

372. Myasthenia gravis is an example of what type of hypersensitivity?
A. Type I
B. Type II
C. Type III
D. Type IV

373. What is the target cells/tissue of Sjogren's syndrome?
A. Connective tissue
B. Eyes
C. Small intestine
D. Adrenal glands

374. Anti-CCP is specifically associated with which autoimmune disease?
A. RA
B. MG
C. MS
D. SLE

375. An RPR test done in a 19 year old woman as part of a prenatal work up was negative but exhibited a rough appearance. What should the medical technologist do next?
A. Report the result out as Negative
B. Do a VDRL test
C. Send the sample for confirmatory testing
D. Make serial dilution and do a titer

376. The chronic nature of parasitic infections is caused by the host's:
A. inability to eliminate the infective agent
B. type I hypersensitivity response to infection
C. ability to form a granuloma around the parasite
D. tendency to form circulating immune complexes

377. Which of the following hepatitis viruses is transmitted via fecal-oral route?
A. Hepatitis B
B. Hepatitis C
C. Hepatitis D
D. Hepatitis E

378. Which of the following protein product is associated with env gene?
A. p17
B. gp 120
C. p24
D. p23

379. Cells known to be actively phagocytic includes:
A. Neutrophils, monocytes, basophils
B. Neutrophils, eosinophils, monocytes
C. Monocytes, lymphocytes, neutrophils
D. Lymphocytes, eosinophils, monocytes

380. The antigen marker most closely associated with transmissibility of HBV infection is:
A. HBsAg
B. HBeAg
C. HBcAg
D. HBV

381. Which two organs are considered primary lymphoid organs?
A. Thyroid and Bone marrow
B. Thymus and peyer patches
C. Thymus and Bone marrow
D. Spleen and Lymph nodes

382. From the following , identify a psecific component of the adoptive immune system that is formed in response to antigenic stimulation:
A. Lysozyme
B. Complement
C. Commensal organism
D. Immunoglobulins

383. Which immunoglobulin class(es) have a J chain?
A. IgM
B. IgE and IgD
C. IgM and sIgA
D. IgM and IgG3

384. Which specimen is the sample of choice to evaluate latent or tertiary syphilis?
A. Serum
B. Chancre fluid
C. CSF
D. Joint fluid

385. In 1894, Complement was discovered by:
A. Jules Bordet
B. White & Douglas
C. Rosalyn Yallow
D. Portier & Richet

386. Which statement best describes passive agglutination reactions used for serodiagnosis?
A. Such agglutination reactions are more rapid because they are a single-step process.
B. Reactions require the addition of a second antibody.
C. Passive agglutination reactions require biphasic incubation
D. Carrier particles for antigen such as latex particles are used.

387. Which serum antibody response usually characterizes the early stage of syphilis?
A. Antibodies against syphilis are undetectable.
B. Detected 1-3 weeks after appearance of the primary chancre.
C. Detected in 50% of cases before the primary chancre appears
D. Detected within 2 weeks after infection.

388. Interpret the following results for HIV infection. ELISA: positive; repeat ELISA: negative; Western blot: no bands
A. Positive for HIV
B. Negative for HIV
C. Indeterminate
D. Further testing needed

389. What is the general definition for Autoimmunity?
A. Increase tolerance to self-antigens
B. Loss of self-tolerance to self-antigens
C. Increase clonal deletion of mature cells
D. Manifestation of immunosuppression

390. A patient deficient in the C3 complement component would be expected to mount a normal:
A. Type I & Type IV
B. Type II & Type IV
C. Type I & Type III
D. type II & Type III

391. What is the correct procedure upon receipt of a test request for human chorionic gonadotropin on the serum from a 60 year old man?
A. Return the request, hCG is not performed on men
B. Perform a qualitative hCG test to see if hCG is present
C. Perform the test; hCG may be increased in testicular tumors
D. Perform the test but used different standards and controls.

392. All of the following are characteristic of Innate immunity EXCEPT:
A. Limited diversity
B. intrinsically present
C. standard response
D. Inducible

393. Which of the following are included in the body's Second line of defense?
A. Lysozyme & Memory cells
B. pH & Cilia
C. Phagocytic cells & fever
D. Inflammation & Lymphocytes

394. Arrange the steps of Phagocytosis in correct order:
A. Engulfment > Granule contact > Digestion > Excretion
B. Adherence > Formation of Phagolysosome > Formation of Phagosome > Digestion
C. Formation of Phagosome > Formation of Phagolysosome > Digestion > Excretion
D. Adherence > Granule contact > Formation of Phagosome > Excretion.

395. Myasthenia Gravis
A. HLA-B8 & HLA-DR2
B. HLA-DR3 & HLA-DR4
C. HLA-B8 & HLA-DR3
D. HLA-DR2 & HLA-DR4

396. Spleen is one of the Secondary lymphoid organs, In which part of the spleen can you find T cells?
A. PALS
B. Follicles
C. Paracortex
D. Cortex

397. In Annealing, DNA is cooled to ___C to allow primers to bind/ anneal to complimentary sequences on the separate DNA strands.
A. 95C
B. 52C
C. 62C
D. 72C

398. It is the preferred method for the detection of HIV in infants younger than 18 months.
A. PCR
B. HIV Nucleic acid test
C. p24 antigen detection
D. Immunophenotyping w/ Flow cytometry

399. In VDRL, the antigen Cardiolipin is consist of:
A. 0.03% cardiolipin, 0.9% Lecithin, 0.21% cholesterol
B. 3%, Cardiolipin, 9% Lecithin, 21% cholesterol
C. 0.3% cardiolipin, 0.09 cholesterol, 0.21% lecithin
D. 0.03% cardiolipin, 0.9% cholesterol, 0.21% lecithin

400. Which of the following is Treponemal test?
A. Plasmacrit
B. Toluidine Red unheated serum
C. Reiter protein complement fixation
D. Unheated serum reagin

401. Transfer of cells or tissues to a member of different species.
A. Autograft
B. Xenograft
C. Allograft
D. Syngeneic

402. Kaposi Sarcoma is associated with what virus?
A. EBV
B. HPV
C. HHV-8
D. Merkel Cell polyomavirus

403. Marker of Familial medullary cancer
A. CEA
B. ER/PR
C. PSA
D. Calcitonin

404. In 1980, Snell, Dauset and Benaceraf discovered:
A. HPV vaccine
B. HIV
C. MHC
D. Immunologic basis of some allergy

405. Uses bacteria as inert particles to which antibody is attached.
A. Agglutination inhibition
B. Coagglutination
C. Direct Agglutination
D. Passive agglutination

406. Which of the following Hepatitis Virus belongs to the family Calciviridae?
A. HAV
B. HEV
C. HCV
D. HCV

407. Which agglutination test in detecting syphilis uses glutaraldehyde-stabilized turkey RBCs?
A. HATTS
B. TPHA
C. MHA-TP
D. TPPA

408. What is the causative agent of Brill-Zinsser disease?
A. R. typhi
B. R. akari
C. R.tsutsugamushi
D. R.prowazekii

409. Which hepatitis B marker is the best indicator of early acute infection?
A. HBsAg
B. HBeAg
C. Anti-Bc
D. Anti-HBs

410. Which Immunoglobulin can cross the placenta?
A. IgG
B. IgM
C. IgA and IgG
D. IgG and IgM

411. Chromogranin A is associated with:
A. Neuroblastoma
B. Gastric carcinoma
C. Pituitary carcinoma
D. Urinary bladder carcinoma

412. A heterophile antigen is one that:
A. is a self-antigen
B. exist in unrelated plants or animals
C. has been used previously to stimulate antibody response.
D. is from the same species but is different from the host.

413. Which would be the most effective immunogen?
A. Protein with a molecular weight of 200,000
B. Nylon polymer with a molecular weight of 250,000
C. Polysaccharide with a molecular weight of 220,000
D. Protein with a molecular weight of 175, 000

414. All of these antigens are associated with B cells except:
A. CD 19
B. CD 40
C. CD 4
D. CD 21

415. Which of the following would represent a double negative thymocyte?
A. $CD2^- CD3^+ CD4^- CD8^+$
B. $CD2^- CD3^- CD4^+ CD8^-$
C. $CD2^+ CD3^+ CD4^- CD8^-$
D. $CD2^- CD3^- CD4^+ CD8^+$

416. Anti-centromere :
A. CREST syndrome
B. SLE
C. Polymyositis
D. Sjogren syndrome

417. Which ELISA generation detects HIV-1 antibodies, HIV-2 antibodies and p24?
A. First
B. Second
C. Third
D. Fourth

418. What is the name of the process by which phagocytic cells are attracted to a substance such as bacterial peptide?
A. Diapedesis
B. Degranulation
C. Chemotaxis
D. Phagotaxis

419. What type of antigen is used in the RPR card test?
A. Live treponemal organisms
B. Killed suspension of terponemal organism
C. Cardiolipin
D. Tanned sheep cells

420. Which of the following is the most sensitive test to detect congenital syphilis?
A. VDRL
B. RPR
C. MHA-TP
D. PCR

421. A biological false positive reaction is least likely with which test for syphilis?
A. VDRL
B. FTA-ABS
C. RPR
D. All are equally likely to detect a false-positive result.

422. A request is received in the laboratory for the assistance in selecting the appropriate test(s) for detecting lyme disease. Which of the following would be suggested?
A. Stool culture should be done to isolate the causative organism.
B. The organism is difficult to isolate, an d antibody titers will provide the most help.
C. B. burgdorferi is easily isolated from routine blood cultures.
D. This is an immunologic syndrome and cultures are not indicated.

423. A patient with a B-cell deficiency will most likely exhibit:
A. decreased phagocytosis
B. increased bacterial infections
C. decreased complement levels
D. increased complement levels.

424. A patient with a T-cell deficiency will most like exhibit:
A. increased immune complex formation
B. increased parasitic infections
C. decreased IgE mediated responses.
D. decreased complement levels.

425. Acute-phase reactants: When injured, the body produces acute-phase reactants (proteins).Which APR is is vital in aerobic energy production, collagen formation, and protection against superoxide ions. Deficiency is called Wilson disease.
A. Ceruloplasmin
B. Haptoglobin
C. a2-Macroglobulin
D. a1-antitrypsin

426. T. pallidum enters the body, reaches the bloodstream, and is disseminated to all organs. This early asymptomatic phase lasts 10 days to 10 weeks. What disease stage of Syphilis is being described in the statement?
A. Incubation
B. Primary
C. Secondary
D. Tertiary

427. The HLA complex is located primarily on:
A. Chromosomes
B. Chromosome 6
C. Chromosome 9
D. Chromosome 17

428. Which class of immunoglobulin possesses delta heavy chains?
A. IgA
B. IgD
C. IgE
D. IgG

429. A kidney transplant from one identical twin to another is an example of a(n)
A. Allograft
B. Autograft
C. Isograft
D. Xenograft

430. Monoclonal antibodies are produced by:
A. Cultured T cells
B. Human plasma cells
C. Mouse plasma cells
D. Hybridomas

431. The activity of natural killer (NK) cells:
A. Does not require previous exposure to an antigen
B. Involves phagocytosis and killing of bacteria
C. Requires interaction with cytotoxic T cells
D. Requires interaction with B cells

432. Which complement protein is present in the greatest concentration in human serum?
A. C1
B. C2
C. C3
D. C4

433. A cut on a person's finger becomes contaminated with the bacterium Staphylococcus aureus. The first response by the immune system consists of activity of:
A. B cells
B. Monocytes
C. Neutrophils
D. T cells

434. Which of the following is characteristic of contact hypersensitivity reactions?
A. Caused by preformed IgE antibody
B. Characterized by infiltration of neutrophils into the area of reaction
C. The primary symptoms often occur in the respiratory tract.
D. Usually due to a hapten

435. In patients with human immunodeficiency virus infection, immune status can be monitored by measuring the ratio of
A. $CD3^+$ cells to $CD8^+$ cells
B. $CD4^+$ cells to $CD8^+$ cells
C. Lymphocytes to monocytes
D. T cells to B cells

436. Why does vaccination against hepatitis B virus (HBV) also prevent hepatitis D virus (HDV) infections?
A. An immunogen from HBV in the vaccine is also associated with HDV.
B. The HBV vaccine induces formation of heterophile antibodies that cross react with HDV.
C. The HBV vaccine stimulates liver cells to produce antiviral molecules active against all hepatitis viruses.
D. HDV requires the host to be concurrently infected with HBV.

437. Which cell is the principal source of interleukin 2?
A. B cell
B. T cell
C. Monocyte
D. Plasma cel

438. After exposure to antigen, the first antibodies that can be detected belong to the class
A. IgA
B. IgE
C. IgG
D. IgM

439. A molecule found in human serum sometimes used as a tumor marker is:
A. a-Fetoprotein
B. HBsAg
C. Biotin
D. CD1

440. A 25-year-old male presents to his family physician complaining of fatigue, diarrhea, and weight loss of a few months duration. On physical examination the patient is found to have a fever and abdominal discomfort. Laboratory results indicate a white blood cell count of 14.3 X 109/L (reference range 4.8-10.8 X 109/L). Assays for HBSAg and anti HCV are negative. An ELISA test for antibodies to the human immunodeficiency virus (HIV) performed on the patient's serum is found to be reactive. What step should be taken next?
A. Call the physician with the HIV result.
B. Repeat the HIV ELISA test on the sample.
C. Test the patient's serum for anti-HBs.
D. Contact the patient to collect a second sample.

441. Incompatible blood transfusions are examples of:
A. Type I hypersensitivity reactions
B. Type II hypersensitivity reactions
C. Type III hypersensitivity reactions
D. Type IV hypersensitivity reactions

442. In 1975, Köhler, Milstein, and Jerne discovered how to fuse lymphocytes to produce a cell line that was both immortal and a producer of specific antibodies. These scientists were awarded the Nobel Prize in Physiology and Medicine in 1984 for developing this hybridoma (cell hybrid) from different lines of cultured myeloma cells (plasma cells derived from malignant tumor strains). To induce the fusion of cells, they used a virus that characteristically causes cell fusion. This virus is:
A. Sendai Virus
B. Bourbon Virus
C. Isavirus
D. H3N2 Virus
E. H1N1 Virus

443. In 1901, Karl Landsteiner discovered ABO blood group system. He wrote a book which was published in 1917, detailing the results of an exhaustive study of haptens that has contributed greatly to our knowledge of Ag-Ab reactions. What was the title of the book that he wrote?
A. The Specificity of Serologic Reactions
B. The Sensitivity of Serologic Reactions
C. The Specificity of Immunologic and Serologic Reactions
D. The Sensitivity of immunologic and Serologic Reactions
E. The Specificity and Sensitivity of Immunologic and Serologic Reactions

444. Which of the following cells expresses IgM and IgD on the cell surface?
A. Pro-B Cell
B. Pre-B Cell
C. Immature B Cell
D. Naïve Mature B Cell
E. Plasma Cell

445. A cell derived from monocytes that attach to the arterial intima and accumulate lipids is a:
A. M1 macrophage
B. M2 macrophage
C. Kupffer cell
D. Foam cell
E. Giant cell

446. Which of the following describes a giant cell?
A. A syncytial cell found within granuloma
B. A cell performing somatic hypermutation
C. A cell found in the circulation that secretes INFα and INFβ
D. A cell directed by IFNγ to promote ROS production and cytolysis
E. A cell that secretes large quantities of antibody but does not express surface immunoglobulin

447. Which of the following describes an immature myeloid-derived dendritic cell?
A. A cell producing cytotoxic compounds following Th1 cell activation
B. A cell expressing cell surface MHC Class II, CD80/88 and secretes IL-12
C. A cell captured by endocytosis using transmembrane immunoglobulin
D. A cell with a majority of MHC Class II located within intracellular compartments
E. An epithelial-derived cell expressing cell surface C3-antigen

448. Which of the following is associated with defective killing by phagocytes?
A. Chediak-Higashi Syndrome
B. Chronic Granulomatous Disease
C. Alder-Reilly Anomaly
D. SCID E. Digeorge Syndrome

449. It is an Acute Phase Reactant, originally thought to be an antibody to the c-polysaccharide of pneumococci. It consists of five identical subunits held together by non-covalent bonds. Binding with foreign particles is calcium-dependent and non-specific, and the main substrate is phosphocholine, a common constituent of microbial enzymes. It can be thought of as a primitive, nonspecific form of antibody molecule that is able to act as a defense against microorganisms or foreign cells until specific antibodies can be produced
A. CRP
B. Serum Amyloid A
C. MBP
D. AAT
E. Complement

450. Actions of Anaphylatoxin except:
A. Increased Vascular permeability
B. Contraction of smooth muscle
C. Release of histamine from basophils and mast cells
D. Coating of foreign cell to neutralize the charge

451. Mixed lymphocyte culture assay (MLC) is a special type of lymphocyte stimulation assay based on the ability of histoincompatible lymphocytes from one individual to stimulate the lymphocytes of another individual (mixed lymphocyte reaction). The major determinant of the MLC phenomenon is found in what HLA locus?
A. A
B. B
C. C
D. D
E. R

452. Most of the IgD present is found on the surface of immunocompetent but unstimulated B lymphocytes. It is the second type of immunoglobulin to appear (IgM being the first), and it may play a role in B-cell activation, regulation of B-cell maturation and differentiation and prolonging its life span in the periphery. IgD was not discovered until 1965, when it was found in a patient with
A. Multiple Myeloma
B. Waldenstroms Macroglubulinemia
C. Multiple Sclerosis
D. Guillaine-Barre Syndrome
E. Ankylosing Spondylitis

453. DiGeorge Syndrome or Congenital Thymic Hypoplasia is characterized by a faulty development of 3rd and 4th pharyngeal pouches during embryogenesis. There is also an Aplasia or hypoplasia of thymus and parathyroid glands. Abnormally high $CD4^+/CD8^+$ ratio is present because of a decrease in $CD8^+$ cells. The cause of this congenital anomaly is:
A. Deletion on Chromosome 22
B. Duplication of Chromosome 22
C. Inversion of Chromosome 22
D. Robertsonian Translocation
E. Chromosomal Insertion

454. Eleven different organs or human body parts can be transplanted—blood vessels, bone, bone marrow or stem, cornea, heart, kidneys, liver, lung, middle ear, pancreas, and skin. Successful organ transplants have increased since the advent of the immunosuppressive drug cyclosporine (cyclosporin A). In corneal transplant, Graft rejection is minimal because of
A. Avascularity
B. Low concentration of class I transplantation antigens
C. Absence of class II antigens.
D. All of these

455. Which of the following is a test for specific treponemal antibody?
a. VDRL
b. RPR
c. FTA-ABS
d. All of the above

456. There is an intermediate risk for graft rejection among the following except:
A. Recipients of autologous or allogeneic bone marrow grafts
B. Infants receiving intrauterine transfusions, followed by exchange transfusions
C. Patients receiving total-body radiation
D. Individuals under immunosuppressive therapy

457. Wheal-Flare reaction is also known as:
A. Prausnitz-Kustner Reaction
B. Jenner-Bordet Reaction
C. Tonegawa Reaction
D. Pfeiffer's Reaction

458. It is an adhesion molecule mediating homing to peripheral lymphoid organs.
A. CD 25
B. CD 34
C. CD 44
D. CD 45R

459. This is a product of genetic mutations in the Central regulators of the growth in normal cells that code for proteins involved in growth and repair processes in the body. Its activation causes overexpression of growth promoting proteins, resulting in hypercellular proliferation and tumorigenesis.
A. Proto-oncogene
B. Oncogene
C. Oncofetal Antigen
D. Tumor

460. These antibodies are the most specific for SLE and the antibodies are associated with active/severe disease. Although they are found in only 40-70% of patients, the presence of these antibodies is considered diagnostic for SLE; the antibodies typically produce a peripheral or a homogenous staining pattern in FANA/IIF.
A. Anti-dsDNA
B. Anti-Sm
C. Anti-RNP
D. Anti-DNP
E. Anti-Nucleolar

461. When a precipitation reaction is converted to agglutination by increasing the size of the antigen particles, the test is then referred to as
A. Direct agglutination
B. Optimal agglutination
C. Passive agglutination
D. Prozone reaction

462. An electrophoretically abnormal protein displaced from the normal position may be recognized by
A. Precipitin band of moderate curvature
B. Lines of fusion
C. Precipitin band markedly curved
D. "Gull wing" formation

463. Advantage of counter IE
A. Precipitin lines not sharp
B. Precipitation does not occur at the intermediate point
C. Precipitin lines visible within 30 minutes
D. None of these

464. A laboratory test is evaluating an ELISA for detecting an anti-CCP, which is a more specific marker for RA. The laboratory includes serum from healthy volunteers and patients with other connective tissue diseases in the evaluation. These specimens determine which factor of the assay?
A. A negative result in the absence of the disease
B. A positive result in the presence of the disease
C. Ability of the assay to repeatedly yield the same results on a single specimen
D. Bias result E. Closeness of the result to the true value

465. Third generation tests for the detection of HBsAg except:
A. RIA
B. ELISA
C. Reverse Passive Agglutination Test
D. Rheophoresis

466. The alternative complement pathway
A. Can be activated by bacterial capsule polysaccharides
B. Uses C5b as a C3 convertase
C. Bypasses steps C3 through C5
D. Is activated by properdin

467. A PCR assay needs to be developed to determine the HIV status of a newborn in the pediatric intensive care unit whose mother is HIV positive. Which set of primers should be used for the assay?
A. The primers should consist of antiparallel complements of two parts of a noninfected human genome.
B. The primers should be designed so that, after annealing with potential infective DNA, the 5' end of primer 1 would "face" the 3' end of primer 2.
C. The primers should be synthesized so that, after annealing with potential infective DNA, the 50 end of both primers "face" each other.
D. The primers should be designed to be synthesized with dideoxynucleotides to allow sequencing of the mutation.
E. The primers should be designed with identical sequences to those in the HIV genome and must bind to DNA in a complementary, antiparallel manner.

468. When performing EMIT, how is the ligand in the patient's serum detected?
A. Agglutinates by binding to antibody-coated latex beads
B. Binds to enzyme-labeled antibody
C. Forms antigen-antibody complex and precipitates
D. Competes with enzyme-labeled antigen for binding to a specific antibody

469. Paloma is a prostitute working in Cardo's Taverna, an infamous night club in Angeles City, Pampanga. Recently, she has undergone a serologic exam for syphilis and the results of her tests were as follows: RPR: Reactive VDRL: Reactive HATTS: Nonreactive What is the most likely interpretation of her syphilis serologic result?
A. Neurosyphilis
B. Secondary syphilis
C. Successful treatment of syphilis
D. Suspected HIV

470. Where are all undifferentiated lymphocytes made?
A. Thymus
B. Spleen
C. Bone marrow
D. Lymph nodes

471. In the thymus, positive selection of immature T cells is based upon recognition of which of the following?
A. Self-antigens
B. Stress proteins
C. MHC antigens
D. Mu chains

472. When does genetic rearrangement for coding of light chains take place?
A. Before the pre-b cells stage
B. Not until the cell becomes a mature b cell
C. As the cell becomes a mature b cell
D. When the b cell becomes a plasma cell

473. Which of the following best describes the TCR for antigen?
A. It consists of IgM and IgD molecules
B. It is the same for all T cells
C. Alpha and beta chains are unique for each antigen
D. It is present in the double-negative stage

474. What is measured in CH50 assay?
A. RBC quantity needed to agglutinate 50% of antibody
B. Complement needed to lyse 50% of patient red cells
C. Complement needed to lyse 50% of red cells coated with hemolysin
D. Antibody and complement needed to sensitize 50% of red blood cells

475. What is the indicator system used in the complement fixation test?
A. Sensitized sheep red cells
B. Guinea pig complement
C. Patient antibodies
D. Known reagent antigen

476. The isotype of an immunoglobulin antibody
A. Is defined by the heavy chain
B. Is defined as different alleles of the same antibody type (e.g., IgG)
C. Is constant for all immunoglobulins of an individual
D. Is the variation within the variable region

477. IgM antibodies react well in complement fixation tests. Because of this, complement fixation tests for antibodies should
A. Be positive early in the course of the disease
B. Be useful in identifying antibodies responsible for a delayed hypersensitivity reaction
C. Be useful in identifying antibodies responsible for anaphylactic reactions
D. Detect transplacental antibodies

478. The activity of NK cells
A. Does not require previous immunologic insult
B. Involves phagocytosis and killing of bacteria
C. Requires interaction with cytotoxic T cells
D. Requires interaction with B cells

479. The VDRL test for syphilis is classified as a (an)
A. Agglutination reaction
B. Flocculation reaction
C. Hemagglutination reaction
D. Precipitation reaction

480. The type of immunity that follows the injection of an immunogen is termed
A. Artificial active
B. Natural active
C. Artificial passive
D. Innate

481. Complement activation seldom involves only one pathway. Uptake of immune response complexes in the spleen appears to be complement dependent.
A. First statement is correct, second is incorrect
B. First statement is incorrect, second statement is correct
C. Both statements are correct
D. Both statements are incorrect

482. The alpha and beta polypeptide chains of C5 are linked by
A. Covalent bond
B. Disulfide bond
C. Vander Waals Forces
D. H-bond E. Non-Covalent bond

483. Which of the following plays an important role as a defense mechanism in infancy during the interval between the loss of maternal antibody and the acquisition of a full-fledge antibody response to pathogens?
A. Serum amyloid A
B. CRP
C. MBL
D. C3 convertase
E. C5b6789

484. Enhancement of phagocytosis by coating of foreign particles with serum proteins is called
A. Opsonization
B. Agglutination
C. Solubilization
D. Chemotaxis

485. The action of CRP can be distinguished from that of an antibody in which of the following ways?
A. CRP acts before the antibody appears
B. The antibody triggers the complement cascade
C. Binding of antibody is calcium-dependent
D. Only CRP acts as an opsonin

486. Natural barriers of the immune system include all except which of the following?
a. pH of secretions
b. Coughing
c. Hair follicles
d. Intestinal bacteria

487. The fundamental difference between primary and secondary organs of the lymphatic system is:
a. Antibody production occurs only in the primary lymph organs
b. Complement production occurs only in the primary lymph organs
c. Maturation of lymphocytes occurs in secondary organs, and activation occurs in primary organs
d. Maturation of lymphocytes occurs in primary organs, and activation occurs in secondary organs

488. Anti-dsDNA antibodies are associated with which of the following?
a. Syphilis
b. CMV infection
c. SLE
d. Hemolytic anemia

489. Toll-like receptors act in which way?
a. Enhance recognition of bacteria by phagocytic cells
b. Activate B cells to produce antibody
c. Activate helper T cells
d. Aid in processing antigen in the form of an MHC molecule

490. Neutrophils and monocytes have receptors for which part of the immunoglobulin molecule?
a. Fc
b. Fab
c. Hinge region
d. Variable region

491. A double-positive T-cell would express which markers?
a. $CD4^+$ | $CD8^+$ | $CD3^+$
b. $CD4^-$ | $CD8^+$ | $CD3^+$
c. $CD4^-$ | $CD8^-$ | $CD3^-$
d. $CD4^+$ | $CD8^-$ | $CD3^+$

492. Which cell is considered to be a bridge between the innate and adaptive immune systems?
a. NK cell
b. Mast cell
c. Monocyte-macrophage
d. T cell

493. Immunoglobulin that is most efficient at crossing the placenta:
a. IgG
b. IgA
c. IgM
d. IgD

494. The key structural difference that distinguishes immunoglobulin subclasses:
a. Stereometry of the hypervariable region
b. Number of domains
c. Sequence of the constant regions
d. Number of disulfide bridges

495. A haptenic determinant will react with:
a. Both T cells and antibody
b. T cells but not antibody
c. Neither T cells nor antibody
d. Antibody but not T cells

496. The function of the complement system include(s) which of the following?
a. Clearance of cellular debris
b. Chemotaxis
c. Lysis of bacteria
d. All of the above

497. Immunoglobulin idiotypes are antibodies with variations in the domains of which of the following?
a. CH1 and CH2
b. VH and VL
c. VH and CL
d. CH1, CH2, and CH3

498. Mannose-binding lectin is similar to which component of the classical pathway?
a. C3
b. C2
c. C1q
d. C5a

499. Post-zone causes false-negative reactions in antibody titers as a result of which of the following?
a. Too much diluent added to test
b. Excess antibody in test
c. Excess antigen in test
d. Incorrect diluent added to test

500. Antibodies produced against two or more epitopes of specific antigen are considered _____.
a. Monoclonal
b. Pleomorphic
c. Dimorphic
d. Polyclonal