TB

NAME [redacted]

EXAM I

[redacted]

COMMENTS ON QUESTIONS

9 - answer on Scantron is B.
- did not put E, because A is
false since IgM needs to have Ag attached + Fab site to unmask Fc for C1qrs attachment

DENT 215
Exam I - 2000

I. Multiple Choice Questions: Choose the best answer

1. Which of the following would be a characteristic of botulinal toxin(toxoid?)

A. A specific immunoglobulin in the blood of an individual immunized against the exotoxin of *Clostridium botulinum*
B. The specific cytokine that activates B cell lymphocytes to produce an immunoglobulin against *Clos. botulinum*
C. The active form of the potent exotoxin produced by *Clos. botulinum*
D. The detoxified form of the botulinal exotoxin used to immunize individuals to form immunoglobulins that bind and detoxify botulinal toxin
E. The endotoxin of the cell wall of *Clos. botulinum* that is a potent neurotoxin

2. An infectious disease that exhibits epidemic level spread internationally is best described by which of the following terms?

A. Endemic disease
B. Pandemic disease
C. Index case disease
D. Sporadic disease
E. Communicable disease

↓BP ↓WBC 7-10,000.

3. A patient presents with the following symptoms and test results:
Elevated ESR; Blood pressure 100/45; WBC 18.1 x 10 /l; positive for CRP in serum; subcutaneous hemorrhage lesions on face, arms, buttocks, and ankles; temperature 103.7 F
these symptoms would indicate what presumptive diagnosis and what would you most likely also find in his blood specimen?

A. Septic shock; Toxic Shock Syndrome *Staph aureus*
B. Blood intoxication; Hemolytic enzymes
C. Septic shock with DIC; Gram negative bacteria
D. Viral meningitis; Viremia with West Nile Disease Virus
E. Generalized autoimmune reaction against RBC; Cytotoxic T cells against RBC

4. Which of the following blood cells is a PMN leucocyte but is **not** phagocytic?

D

A. Neutrophil
B. Monocyte
C. Basophil
D. CD4 lymphocyte
E. NK cell

42. The surface markers present on the surface of a Td (Tdth) cell:

A. CD4, CD3, HLA-class I, HLA-class II
B. CD8, IL-2, HLA-class I
C. IgM, IgD, HLA-class I, HLA-class II
D. CD3, TCR, HLA-class I
E. CD8

43. The basis of immune deficiency associated with Bruton's X-linked agammaglobulinemia:

A. Lack of development of thymus
B. Lack of development of pluripotent stem cell
C. Lack of development of mature B cell lymphocytes
D. Lack of ability of B cell lymphocytes to carry out class switching
E. Lack of development of lymphocytic cell line

44. Structure of functional IgM immunoglobulin in serum:

A. Monomer on surface of mast cells
B. Dimer
C. Trimer
D. Pentamer
E. Not found in blood serum

45. Immunoglobulin isotype(s) capable of crossing the placenta into fetal circulation:

A. IgG, IgM
B. IgM
C. IgG
D. IgA, IgE
E. IgE

46. What is released into circulation from the activation of a B cell immune response reaction in a regional lymph node:

A. Immunoglobulins
B. Plasma cells
C. Tc CD8 lymphocytes
D. Immunoglobulins and NK cells
E. Th CD4 lymphocytes

47. Last stage in the course of an acute primary infection:

A. Incubation
B. Crisis
C. Prodromal
D. Resolution
E. Convalescent

48. The most common presenting symptom that would lead you to suspect an immuno-defiency condition in a patient:

A. High neutrophil count in differential WBC count
B. Repeated recurrent infections
C. Low RBC count
D. Elevated ESR
E. Bence-Jones proteins in urine

49. Type of immunodeficiency involved in Ataxia -Telangectasia Syndrome:

A. Phagocytic cell
B. Complement
C. Stem cell
D. T cell
E. B cell

50. White blood cell normally found in highest numbers in peripheral circulation:

A. Neutrophil
B. Eosinophil
C. Basophil
D. Macrophage
E. Lymphocyte

Problem Questions: Answer the questions concerning the following clinical situation.

Problem 1

Ms Lowry is an 18-year-old street prostitute with a 5 year history of alcohol and cocaine abuse who becomes pregnant and delivers a 4lb 10oz male neonate at 32 weeks. At delivery the neonate is cyanotic and breathing is initiated with dificulty. An immediate assessment reveals facial anomalies of low-set ears and a "fish-shaped" mouth; cardiac abnormalities of a ventral septal defect is also noted. The child responds to delivery room procedures and "pinks up" and begins to breathe normally. The child is placed in an incubator unit in the NICU where he shows improvement of all vital functions and begins to breast-feed on the second day. On the third day develops muscle tetany and a seizure at which time the following laboratory results were obtained:

Hematology

RBC = 5.0×10^{12}/l
WBC= 5.4×10^{9}/l
Differential
Neutrophills- 88%
Eosinophils- 2%
Basophils- .5%
Monocytes- 4%
Lymphocytes- 5.5%
Hemoglobin= 15.0g/dl (16)
Blood glucose= 7.2mmol/l (10.0)
Na = 139mmol/l (134-145)
K = 4.2mmol/l (3.5- 5.0)
Cl = 97mmol/l (95- 105)
Creatinine = 87umol/l (70- 150)
Ca = 1.5mmol/l (2.12 - 2.65)
PO = 1.25mmol/l (0.8- 1.45)
Special Tests
Parathyroid hormone = 0.04ug/l (0.1 - 0.73)
Serum Protein Profile = Normal peaks
% T cell : B cell lymphocytes in peripheral circulation = 10%

51. The most likely diagnosis indicated in this child is:
A. Hemolytic anemia
B. SCID
C. Ataxia telangectasia
(D) DiGeorge's syndrome
E. Monoclonal gammopathy

52. This child is at special risk for development of which of the following?
A. Acute pyogenic bacterial infections of the skin
B. Toxic effects of systemic infections with toxigenic bacteria
C. Systemic viral infections that spread to critical organs through the blood
(D) Fungal infections of skin, lungs and GI tract

53. Which of the following would also be most likely to be observed in this child?
   A. Thymic aplasia or hypoplasia
   B. Lack of cells in the follicles and germinal centers in lymphoid tissues
   C. Increased response to antigenic challenge with a T-cell dependent antigen
   D. Hypoplasia in paracortical medullary regions of regional lymph nodes
   E. A and D above

Problem 2

In preparation for orthodonture you are going to have to do 4 dental extractions under general anaesthesia on a 15-year-old patient. You ask for a CBC and Differential prior to the oral surgery. When the results come back they are as follows:

WBC	-	47,000/mm³ ↑ WBC
RBC	-	low
Platelets	-	low
Differential WBC		
Neutrophils	-	12%
Basophils	-	0 %
Eosinophils	-	1 % ↓ WBC
Monocytes	-	1 %
Lymphocytes	-	86% with mostly atypical cells

54. What condition would you suspect in this patient?

   A. Severe infection
   B. Underlying autoimmune disease
   C. Lymphoma
   D. Lymphocyte leukemia — ~~K~~ 1
   E. Multiple myeloma

55. Is it safe to proceed with your oral surgery?

   A. Yes, as long as you provide prophylactic antibiotic therapy
   B. Yes, as long as you provide antibiotic therapy to clear up the infection and then do the surgery
   C. Yes, as long as you provide immunosuppressive therapy prior to and following the surgery and also provide prophylactic antibiotic therapy
   D. No, you should wait until the infection is past and the WBC count returns to normal
   E. No, you should cancel the elective surgery and refer the case immediately to an oncologist

Problem 3

What conclusions can be drawn from the following clinical data and test results?

56. A lymph node biopsy in a two-week-old infant demonstrates no cells in the follicular germinal centers in the cortex of the node with normal paracortical/medullary cell population.

B cell def.
T cell normal

A. Leucopenia
B. B-cell deficiency
C. DiGeorge's syndrome
D. SCID
E. Multiple myeloma

57. 58-year-old patient with bone pain, hypercalcemia, proteinuria, thrombocytopenia, anemia, recurrent infections, and renal failure.

A. Polyclonal gammopathy
B. ~~SLE~~ myeloperoxidase deficiency
C. Myelocytic leukemia
D. IgA secretory deficiency — in mucosa
E. Multiple myeloma

58. 16-year-old male with temperature of 101.6 F(oral), WBC = 13,400/mm ↑, Elevated neutrophils with a shift-to-left, Elevated ESR, Positive for C-reactive protein in serum, and BP = 110/70 normal

Infection inflammation

A. ~~Septic shock~~
B. Ongoing inflammatory response of unknown cause
C. Severe viremia
D. Bacterial infection
E. Probable myelocytic leukemia

Problem 4

After a recent boxer short/hot tub party hosted by a fraternity, 24 of the 35 members of the fraternity develop symptoms of severe vomiting, diarrhea and stomach cramps on the morning after the party. The symptoms in all individuals disappear over the next 24 hours and no further cases among the members are reported during the next two weeks. The University Health Service tests the foods served at the party and finds the home-made bean dip has a high count of Staph. aureus.

59. This is an example of:

A. An endemic disease pattern outbreak
B. A propagated epidemic pattern outbreak of infection
C. A common source epidemic pattern outbreak
D. A pandemic pattern outbreak
E. Mass hangover syndrome hysteria

60. The basis of the problem was:

A. Ingestion of S. aureus enterotoxin exotoxin
B. Infection by S. aureus that spread among members
C. Probably not the bean dip
D. More likely to be contaminated hot tub water
E. More than one of the above

5. Which of the following sets of terms best describes Lyme disease?

A. Zoonoses acquired by direct transmission
B. Zoonoses transmitted by biologic vector ✓
C. Chronic infection transmitted by perinatal transmission
D. Immunodeficiency caused by lack of development of thymus
E. Congenital infection acquired transplacentally from mother

6. Finding antibodies against the Varicella-Zoster virus in the blood of an individual who has no history of chickenpox but who is suffering from the condition of shingles now at the age of 64 years of age, would indicate which of the following?

A. She has lost the Ts clone of lymphocytes controlling against formation of the antibody producing clone
B. She has acquired a Th clone of lymphocytes necessary to produce the antibody
C. She must have had a subclinical case of chickenpox earlier in her life ✓
D. She had no immunity to the Varicella-Zoster virus and has acquired a primary acute infection on exposure to an infected individual
E. She has had an unrecognized chronic infection caused by this virus for some long period of time

7. The Complement System component C4 is active in which phase of which Complement pathway?

A. Membrane damage phase of Classical pathway
B. Recognition phase of Alternative pathway
C. Enzymatic phase of Alternative pathway
D. Enzymatic phase of Classical pathway
E. Recognition phase of Classical pathway

8. Which of the following represents the fully differentiated immunoglobulin-producing cell; what cell line is it differentiated from; and where would you expect to find it?

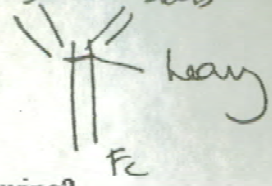
Plasma Tcell, Bcell line bone marrow

A. Cytotoxic T cell; CD4 T cell line; peripheral circulation
B. Tdth cell; CD8 cell line; in tissues at site of antigen-labelled cells
C. NK cell; Macrophagic cell line; spleen
D. Plasma cell; T cell line; peripheral circulation
E. Plasma cell; B cell line; cortical germinal centers of lymph node

9. Which of the following would be capable of initiating the binding of a C1qrs component of the Complement system?

must have Ag attached to Fab portion inorder to allow C1 to bind to Fc

A. An Fc fragment of an IgM immunoglobulin
B. The Fc region of an IgG immunoglobulin monomer that had attached to its antigenic determinant
C. An IgE immunoglobulin monomer bound to the surface of a mast cell by an Fc-epsilon receptor
D. The Fc region of an IgA immunoglobulin dimer attached to a viral antigenic determinant in the mucosal layer of the respiratory tract
E. More than one above



10. The hinge region of an IgG monomer is found on which of the following?

A. Constant region of gamma-type heavy chains
B. Variable region of gamma-type heavy chains
C. Intrachain disulfide bonding region of of mu-type heavy chains
D. Interchain disulfide bonding region of gamma-type light chains
E. Fc fragment of any type of immunoglobulin monomer

11. If a child is born with a deficieny in the ability to synthesize cellular myeloperoxidase, what resistance capacity would you expect to be reduced in that child?

A. Ability to carry out phagocytosis
B. Ability to synthesize MHC class II surface antigens
C. Ability to kill phagocytized bacteria
D. Ability to differentiate mature B cells
E. Ability to synthesize IL-2

12. Which of the following cells would not be expected to be carrying MHC class II antigens displayed on its surface?

A. B cell lymphocyte
B. Activated Th lymphocyte
C. Activated macrophage
D. Mature neutrophil
E. All of the cells above would have surface HLA class II antigens

13. Which of the following organs is classified as a primary organ of the immune response system?

A. Thymus
B. Spleen
C. Inguinal lymph node
D. Dendritic cell system of the skin
E. Head and neck lymph nodes

14. Which of the following situations would not be expected to produce tolerance to Antigen-1 (Ag-1)?

A. Contact with Ag-1 in high dosage during fetal development
B. Presence of clone of Ts CD8 cells specific for Ag-1
C. Lack of clone of Th CD4 cells specific for Ag-1
D. Presence of Ag-1 in a sequestered site in the fetus and postnatally
E. All of the above would be expected to produce tolerance to Ag-1

15. Which of the following cytokines plays a prominent role as an endogenous pyrogen?

A. IL-1
B. IL-2
C. IL-4
D. IF-alpha
E. IL-2 receptor

16. If you wanted to develop an immunization that would protect against an airborne viral infection, you would want to make sure that the immunizing agent elicited the formation of:

A. IgM immunoglobulins
B. IgA immunoglobulins
C. IgG immunoglobulins
D. IgE immunoglobulins
E. Tc lymphocytes

17. Cytotoxic T cells have what marker on their surface and recognize their specific epitope on a target cell when it is displayed on the surface of a cell associated with which class of MHC antigen?

CD8 - class II

A. CD8; MHC I
B. CD4; MHC II
C. CD3; MHC II
D. CD1; MHC I
E. IL-2; MHC III

18. Arrange the following events in the local inflammatory response reaction into the proper chronologic sequence:

a. Cellular exudation
b. Vascular dilation
c. Cellular phagocytosis
d. Cellular injury
e. WBC margination
f. Fibroblast infiltration

A. d, a, f, e, c, b
B. f, d, e, b, a, c
C. d, b, e, a, c, f
D. a, c, d, b, e, f
E. d, e, b, a, f, c

d b c e a

19. Arrange the following cells in the specific immune response reaction into the proper chronologic sequence of their involvement in the synthesis of specific IgG immunoglobulin synthesis.

a. Plasma cell
b. Th cell synthesis of cytokines
c. B cell with IgM/IgD specific for antigen on surface
d. Macrophage with antigen displayed on surface
e. Activated B cell with IgG specific for antigen on surface

d b c e a

A. a, e, b, c, d
B. d, e, c, a, b
C. c, e, d, b, a
D. d, b, c, e, a
E. d, e, b, a, c

20. Which of the following is **not** a mechanism that bacteria use to avoid phagocytic destruction by WBC's?

A. Production of hemolysin
B. Production of leucocidin
C. Production of capsule
D. Production of acid fast cell wall
E. Production of coagulase

21. Which of the following would you expect to find in a child who was diagnosed with Bruton's X-linked infantile agammaglobulinemia?

a. Monoclonal single high peak in serum protein profile on + pole side of origin
b. Lack of cells in germinal centers of cortex of lymph nodes
c. Small lymph nodes and tonsils small or absent
d. Inability to mount a cell-mediated immune response
e. Lack of lymphocytes in peripheral circulation
f. Missing peak in gamma globulin fraction of serum protein profile
g. Thymic aplasia or hypoplasia
h. Increased susceptibility to bacterial pyogenic infections and pneumonias
i. Increased susceptibility to fungal infections and latent viral infections

A. a, d, e, i
B. b, c, f, h
C. c, d, g, h
D. a, b, g, i
E. e, f, g, i

b, c, f, h

22. Which of the following conditions can be traced to the inability of the proper development of the pluripotent stem cell into the lymphoblastic cell line?

A. IgA dysgammaglobulinemia
B. Acute myeloblastic leukemia
C. Digeorge's syndrome
D. Chronic granulomatous disease
E. SCID

23. An immunization program needs to achieve what level of herd immunity to provide protection against the spread of the disease in a population?

A. At least 10%
B. At least 25%
C. At least 50%
D. At least 85%
E. At least 100%

24. The condition of chronic mucocutaneous candidiasis can be traced to a deficiency in which of the following systems?

A. T-cell
B. B-cell
C. Complement
D. PMN cell
E. Macrophage

25. Finding which of the following in a boy suffering from repeated pyogenic skin infections would allow you to diagnose the condition as transient infantile hypogammaglobulinemia rather than X-linked infantile agammaglobulinemia?

A. CD4 lymphocytes in peripheral circulation
B. B-cells in peripheral circulation
C. Neutropenia
D. Increased levels of C4 complement fraction in serum
E. Lack of IgG in gamma globulin fraction

26. Which of the following would you not expect to be immunogenic?

a. Glycogen
b. Haptenic antigenic determinant
c. Human albumen taken from one individual and injected into another person
d. Lipid A of endotoxin
e. Bacterial capsular material composed of polymerized fructose

A. a, b, c
B. b, d
C. a, c, e
D. All of the above would be expected to be immunogenic
E. None of the above would be expected to be immunogenic

27. Which of the following sets of surface molecules allow a T-cell to recognize and interact with its antigenic determinant when presented to the T-cell on the MHC Class II marker of a macrophage?

A. TCR, CD4, CD3
B. IgM, CD4
C. TCR, CD8
D. CD4, IgD, HLA-D
E. CD4, IL-2 receptor

28. T-suppressor cells are derived from what lymphocytic cell line?

A. CD3
B. CD4
C. CD8
D. Macrophage
E. NK

29. Which of the following cytokines would be expected to be most active in signalling final B-cell differentiation into an immunoglobulin-producing cell?

A. IL-1
B. IF- alpha
C. IL-2
D. IL-3 and IF-gamma
E. IL-4, IL-5

30. The recognition and attack of a virally infected cell by a cytotoxic T cell is accomplished by the Tc cell recognizing the viral antigen displayed on the surface of the infected cell in association with what?

A. CD4 marker
B. HLA Class I marker
C. HLA Class II marker
D. CD8 marker
E. IL-2 receptor

31. Which of the following is an endogenous pyrogen and is responsible for signalling acute phase protein synthesis by the liver?

A. IL-1
B. IL-2
C. IL-6
D. IF-beta
E. C3b Complement fragment

32. An immunogen is shown to elicit the production of only IgM and no memory cells. This immunogen would be classified as what type of immunogen?

A. Lipid antigen
B. Incomplete antigen
C. T-cell independent antigen
D. T-cell dependent antigen
E. Denatured antigen

33. Introduction of an adjuvant such as Freund's adjuvant along with a weakly immunogenic antigen would be expected to produce what result?

A. Increased immune response to the antigen
B. Increased immune response to the adjuvant
C. Activation of the Complement cascade
D. Initiation of a local inflammatory response at the site of introduction
E. Suppression of the immune response to the antigen

34. What immunoglobulin isotype would you expect to find in the highest concentration in the serum of a fetus at 37 weeks of gestation?

A IgA of fetal origin
B. IgD of fetal origin
C. IgG of maternal origin
D. IgM of maternal origin
E. IgG of fetal origin

35. Which of the following terms best describes the usual transmission pattern of Group B streptococcal meningitis diagnosed in a 3-day-old neonate?

A. Direct vertical perinatal transmission
B. Direct horizontal congenital transmission
C. Indirect biologic vector-borne zoonotic transmission
D. Indirect mechanical vector-borne congenital transmission
E. Non-communicable perinatal transmission

36. If in the determination of HLA-Class I tissue type of an individual, Complement is added to a well in which the individuals lymphocytes had been treated with the monoclonal antibody against HLA-B4 and the cells underwent lysis, what conclusion would be valid?

A. The only HLA-B antigen on his cells would be HLA-B4
B. He would have HLA-B4 as one of the Class I MHC antigens on his cells
C. HLA-B4 would be ruled out as a tissue type antigen on his cells
D. He would have ABO blood type B
E. No conclusion could be drawn as to his tissue type from this test

37. Which of the following is not a characteristic of Superantigens?

A. They do not require processing by antigen presenting cells
B. Some can activate both CD4 and CD8 T cells
C. They are presented to T cells associated with MHC Class II antigens, but they bind outside of the peptide-binding groove where processed antigens bind
D. They can activate the Complement system without the involvement of an antigen-antibody reaction
E. There are differences in the activation pathways of T cells activated by Super-antigens and conventional antigens

38. Which of the following would be an example of natural passive acquired specific immunity?

A. Immunization with the diphtheria toxoid
B. Recovery from a childhood viral disease
C. Transplacental transfer of maternal immunoglobulins to the fetus
D. Injection of IF-alpha
E. Injection of pooled human gammaglobulins into an immunodeficient patient

39. Perforins are used by what type of cell to produce cell damage on target cells?

A. Tdth CD8 lymphocytes
B. Activated macrophages
C. IgE producing B cell lymphocytes
D. Mast cells with IgE bound to their surface
E. Tc CD8 lymphocytes

40. In which of the following conditions would it be inappropriate and even potentially dangerous to treat the patient with human immune globulin? IgA ↓

A. Transient infantile hypogammaglobulinemia
B. Bruton's X-linked infantile agammaglobulinemia
C. IgA dysgammaglobulinemia
D. IgG2 dysgammaglobulinemia
E. SCID

Identification Questions: Identify the information sought

41. Term used to describe degree of pathogenicity:

A. Viremia
B. Toxigenicity
C. Invasiveness
D. Virulence
E. Dosage