MM

NAME_____ COMMENTS ON QUESTIONS

#_____

#_____

DENT 215
MEDICAL MICROBIOLOGY/IMMUNOLOGY
EXAM II
Fall 2000

INSTRUCTIONS: Make sure you get complete information on your Answer Sheet. Use a number 2 pencil to mark all answers clearly. If you care to explain an answer or comment on a question, list the number of the question and the response you marked on your Answer Sheet in the space above and make whatever comments you care to make where the question appears in the Exam. Choose the BEST answer for each question.

I Multiple Choice Questions

1. Characteristic findings in a patient with multiple myeloma would most likely include:

A. High titer of rheumatoid factor in serum and deformed finger joints
B. High titer of anti-DNA antibody and low titers of C3 and C4 in serum
C. High titer of CRP, IgM, and anti-intercellular antibodies
D. High titer of smooth muscle antibody in serum and a T4:T8 ratio of 1:5
E. Bence-Jones proteins in the urine and increase of plasma cell in blood and a single, high sharp peak in the gamma globulin fraction

2. Characteristic findings in a patient with Grave's disease would include which of the following?

A. High serum titer of thyroxine and thyroid stimulating immunoglobulin (TSI)
B. High serum titer of ANA and significant hemolytic anemia
C. High serum titer of anti-thyroglobulin immunoglobulins and anti-microsomal antigen immunoglobulins
D. High serum titer of anti-HLA antigen immunoglobulins and renal basement membrane immunoglobulins
E. High serum titer of anti-thyroid stimulating hormone immunoglobulins

3. Which of the following therapies would be appropriate emergency treatment of a severe episode of anaphylactic shock?

A. Antilymphocytic serum
B. Complete blood transfusion
C. Bone marrow transplant
D. Epinephrine + antihistamine
E. Hyposensitization with a subcutaneous injection of a low dose of the allergen

4. Characteristic finding in a patient with active, severe, myasthenia gravia may include:

A. High titer of rheumatoid factor
B. High titer of anti-DNA antibody
C. LE cells
D. High titer of anti-acetylcholine receptor antibody
E. Bence-Jones proteins in the urine

5. Poison ivy lesions are caused by what type of disease?

A. Severe combined immunodeficiency
B. Type IV hypersensitivity
C. T cell immunodeficiency
D. Autoimmune disease
E. Immune complex hypersensitivity

6. Autoimmunity to a self-antigen necessarily occurs only under which of the following conditions?

A. When the individual cannot produce T_s clones for the self-antigen
B. When the B-cell clone responsive to the self-antigen is not wiped out during fetal development
C. When a particular HLA allelic antigen is present on tissue cells
D. When both the central and peripheral tolerance mechanisms for the self-antigen fail
E. When the idiotypic suppression network for the self-antigen is activated

7. Tissue transplant rejection is primarily associated with the action of what system?

A. Humorally mediated system
B. Cell mediated system
C. Phagocytic system
D. Complement system

8. Which of the following is classified as an immunodeficiency disease?

A. Hayfever
B. Serum sickness
C. Arthus reaction
D. Pernicious anemia
E. DiGeorge's syndrome

9. You would not expect rejection of skin tissue transplanted from one site on the body to another skin site on the same individual because this represents what type of transplant?

A. Allograft
B. Autograft
C. Xenograft
D. Isograft

10. Which of the following situations would most likely produce a serious transfusion reaction? Assume the recipient had never received a transfusion before.

A. Transfusing A, Rh+ blood into a person with A, Rh- blood type
B. Transfusing A, Rh+ blood into a person with 0, Rh+ blood type
C. Transfusing 0, Rh- blood into a person with A, Rh+ blood type
D. Transfusing A, Rh+ blood into a person with AB, Rh- blood type

11. Which of the following components of the immune response system provides the body with its primary protection against fungal infections?

A. Complement system
B. Neutrophilic phagocytosis
C. IgM immunoglobulins
D. Cell mediated immune response TYPE IV HYPERSENSITIVITY (T-CELL)
E. Immediate-type hypersensitivity response

12. Which of the following would you expect to find in the tissues at the site of a positive Tuberculin skin test and the reaction would be classified as what type of reaction?

A. IgE producing plasma cells; Type I hypersensitivity
B. Cytotoxic T cells; autoimmune reaction
C. T_{DTH} cells and activated macrophages; Type IV hypersensitivity
D. Elevated levels of complement and histamines; Type II hypersensitivity
E. IgG-Ag-C complexes and neutrophils; Type III hypersensitivity

13. What are Bence-Jones proteins and are associated with what condition(s)?

A. Proteins that trigger the alternate pathway of the complement system; complement deficiency
B. Light chain peptides that appear in the urine in some individuals suffering from multiple myeloma or monoclonal gammopathy
C. Short chain peptides such as C3a or C5a that are released during the activation of the complement cascade; Type III hypersensitivities
D. Surface antigens found on T cells and not B cells; Sheep RBC rosettes
E. A minor blood group antigen found in Type 0 individuals; Hemolytic anemia

14. Class II MHC antigens are encoded by what HLA locus and are found on what type of cells?

A. Locus ABC - all nucleated cells
B. Locus ABC - B cells, macrophage and activated T cells
C. Blood group locus AB0 - all body cells and RBC
D. Locus D - all body cells
(E) Locus D - B cells, activated T cells and macrophage

ANA

15. Which of the following diseases is indicated by finding high levels of antinuclear antibodies in the serum of a patient?

A. DiGeorge's Syndrome
B. Contact dermatitis
(C) Hashimoto's thyroiditis
D. Myasthenia gravis
E. Immune complex hypersensitivity

16. An individual shows a positive type I hypersensitivity skin test reaction. If you took a biopsy of the site, which of the following cells would you expect to find at the site?

A. B memory
B. Plasma cells
C. Activated macrophages
(D) Degranulated mast cells
E. A and C above

(17) Condyloma accuminata is caused by which of the following?
↳ ANOGENITAL WART

(A) Human papilloma virus
B. HSV-1
C. HSV-2
D. Parovirus B-19
E. Molluscum contagiosum virus]

(18) The usual route of transmission of HAV hepatitis is what mode?

F. Blood transfusions
G. Sexual transmission
H. Arthropod vector transmission
(I) Contaminated food or water
J. Direct contact

(19) Which of the following viruses has not been shown to cause a chronic or latent infection?

(A) Hepatitis E virus NOT CHRONIC
B. Cytomegalovirus HERPES 5
C. Hepatitis C virus
D. Herpes Simplex 1 virus
E. Human papilloma virus LATENT

20. Which of the following is **not** a characteristic of EBV infectious mononucleosis?

a. Exudative pharyngitis
b. Heterophile antibody in serum
c. Lymphadenopathy
d. Abnormal lymphocytes in peripheral blood
e. Hemolytic anemia

21. What enzyme do retroviruses produce that is not produced by other viruses and what type of nucleic acid is found in the retrovirus?

A. Early enzymes; RNA
B. Reverse transcriptase; RNA
C. Reverse transcriptase; DNA
D. Lysozyme; DNA
E. Neuraminidase: RNA

22. Which of the following is not a feature of infectious mononucleosis?

A. Abnormal lymphocytes in peripheral circulation
B. Pharyngitis
C. Elevated heterophile antibodies in circulation
D. Vesicular mucocutaneous lesions around the mouth
E. Rash

23. Which of the following is not a member of the herpes virus group?

A. Varicella zoster virus
B. Vaccinia virus
C. Epstein Barr virus
D. Cytomegalovirus
E. HH6

24. Which of the following statements concerning Parvovirus B-19 is true?

A. It is a highly teratogenic virus
B. A primary, acute infection with this virus in a pregnant woman may cause fetal loss
C. The virus causes benign epithelial cell tumors that usually spontaneously regress
D. The infection is accompanied by a papular rash over the entire body
E. The virus belongs to the Adenovirus family

(25) Which of the following is caused by a member of the pox virus group?

A. Chicken pox HHV-3
(B) Molluscum contagiosum
C. Condyloma acuminatum
D. Kaposi's Sarcoma HHV8
E. Roseola HHV6

(26) Which of the following is true of the human papilloma viruses?

A. Are capable of producing hemorrhagic cystitis and progressive multifocal leukoencephalopathy
B. Are transmitted by arthropod bites
(C) Infect cutaneous and mucosal squamous epithelial cells inducing benign localized tumors
D. Are capable of spreading to the brain and inducing encephalitis and gliomas
E. Are capable of producing lung cancers

(27) The Herpes virus group viruses are all capable of producing what type of infection?

A. Meningitis and encephalitis
B. Infection of RBC's with replication in blood
C. Slow virus infections
D. Skin infections
(E) Latent infection with reactivation

(28) Herpes Simplex Virus-I are more apt to produce infections of what tissues than are HSV-II?

(A) Oral mucocutaneous tissue
B. Genital tract mucocutaneous tissue
C. Neural tissue
D. Epithelial tissue
E. Lymphoid tissue

(29) Disseminated (systemic) infections by HSV-2 viruses are more likely to occur in which of the following:

A. Sexually active adults
B. School age children
C. Individuals who have been previously infected by another virus of the Herpes virus group
(D) Individuals with a suppressed cell mediated immune response system
E. Individuals with a chronic erythropoietic deficiency condition

30. For what member of the Herpes Virus family do we have an effective widely used, protective vaccine?

A. HSV-II
B. EBV
C. HSV-I
D. There is no effective vaccine for any member of this viral family
E. VZV

31. What is the usual causative agent of infectious mononucleosis in adolescents and young adults?

A. HSV-I
B. VZV
C. EBV
D. HH6
E. Hepatitis E Virus

32. Viruses that are released from their host cell by budding are usually what type of viruses?

A. Naked viruses
B. Enveloped viruses
C. Enteroviruses
D. Viruses that contain both DNA and RNA
E. Retroviruses

33. Oncogenic viruses have what in common?

A. The ability to lyse the host cell
B. The ability to insert oncogenic DNA sequences into the host cell genome
C. The ability to infect any cell in the host organism
D. The ability to prevent interferon production by the host cell
E. The ability to prevent formation of circulating antibodies

Hepatitis E

34. Which of the following represents the usual method of transmission of HEV infection?

A. Heterosexual transmission
B. Insect vectors
C. Needle stick
D. Blood transfusion
E. Ingestion of contaminated water

35. The orf virus would be best classified as:

A. An RNA virus transmitted by arthropods
B. A DNA zoonotic virus
C. A DNA virus causing hemorrhagic fever
D. An RNA virus causing no known human infection
E. A picornavirus enterovirus

36. Shingles represents the reactivation of cutaneous lesions caused by:

A. Varicella Zoster Virus
B. Adenovirus
C. Herpes Simplex Virus-1
D. Human Papilloma Virus
E. HH-6

II. Matching Questions

Match the word or phrase in the left-hand column with the term in the right-hand column with which it is most closely related. You may use answers more than once or not at all.

37-40 Viral Disease Transmission - Usual Route

37. Chickenpox A
38. Hepatitis B B
39. Genital Herpes D
40. Warts D

A. Respiratory route
B. Blood-borne transmission
C. Ingestion
D. Direct contact with lesion
E. Arthropod vector

41-43 Viral Structure and Replication

41. Simple envelope E
42. Pro virus D
43. RNA viruses B

A. Generally replicate in nucleus
B. Generally replicate in cytoplasm
C. Generally replicate in red blood cells
D. Viral DNA integrated into cell genome
E. Indicates ether sensitive

44-48 Viral Disease Cause

44. Roseola D
45. Pharyngoconjunctival fever B
46. Infectious mononucleosis A
47. Molluscum contagiosum C
48. Fetal death E

A. CMV
B. Adenovirus
C. Poxvirus
D. HH-6
E. Parvovirus B-19

49-53 Immune Dysfunctions

49. Arthus reaction C
50. SLE D
51. Multiple Myeloma E
52. Hay Fever A
53. Anaphylactic Shock A

A. Type I hypersensitivity
B. Type II hypersensitivity
C. Type III hypersensitivity
D. Autoimmune disease
E. Immunoproliferative disease

III. Clinical Problems:

Problem 1

Ms. Lake is a 27 year old woman pregnant with her third child. Each of her other two children had different fathers. She is not sure who the father of this child is, but she thinks that it must be one of two men, Mr. Erie or Mr. Ontario. Ms. Lake experiences a normal pregnancy and delivery. The neonate, however, begins to show signs of jaundice on the second day after birth and a hemolytic anemia in the child is suspected. Given below are the results of Blood Type and HLA Type of the mother and baby:

Ms. Lake - Blood Type: A RhD+
HLA Type: A 4, 8; B 17, 27; C 6, 9; DR 21, 32

Baby Lake- Blood Type: B RhD+
HLA Type: A 8, 21; B 17, 33; C 9, 12; DR 21, 26

54. RBC's from Baby Lake show no hemagglutination but when Coomb's Reagent is added to the baby's RBC's they show Agglutination. Which of the following conclusions would be valid?

A. The jaundice is due to an ABO blood group incompatibility hemolytic anemia
B. The jaundice is due to an Rh blood group incompatibility hemolytic anemia
(C) The jaundice is due to a minor blood group incompatibility hemolytic anemia
D. The jaundice is due to an HLA antigen incompatibility hemolytic anemia
E. The jaundice is not due to a hemolytic anemia

55. Test on Baby Lake's serum on the 2nd day after birth does not demonstrate the presence of any IgM iso antibodies. Would you consider this to be unusual?

A. Yes, since maternal IgM anti-A iso antibodies would be expected
B. Yes, since maternal IgM anti-B iso antibodies would be expected
C. Yes, since neonatal IgM anti-A iso antibodies would be expected
D. Yes, since neonatal IgM anti-B iso antibodies would be expected
(E) No, since the neonate is too young to have developed iso antibodies yet

To determine paternity the blood types and HLA types of the two men thought to be the father were determined:

Mr. Erie - Blood Type O RhD-
HLA Type: A 8, 12; B 14, 20; C 2, 11; DR 9, 12

Mr. Ontario - Blood Type AB RhD+
HLA Type: A 5, 16; B 29, 38; C 4, 9; DR 11, 25

56. Can either man be ruled out as the father of this based on just the Blood Type results?

(A) Yes, Mr. Erie can be ruled out
B. Yes, Mr. Ontario can be ruled out
C. Yes, both men can be ruled out
D. No, neither man can be ruled out
E. No, Because Blood Type data is not predictable so it is not useful for this purpose

57. Can either man be ruled out as the father of this child based on just the Tissue Type results?

A. Yes, Mr. Erie
B. Yes, Mr. Ontario
C. Yes, both men
D. No, neither man
E. No, HLA Type data is not predictable

Problem 2

You have been asked by a dental supply company to use a new impression material made from "natural organic compounds." The material has all of the positive characteristics of the "artificial" impression polymers, but is being marketed as superior because it is "all natural." You use the new material extensively with excellent results. On the current patient when you apply the impression material, however, you notice that his lips seem to be swelling like he has a "fat lip" and there is a spreading erythematous ring beginning to spread from his lips onto his cheeks and chin within minutes of the application of the impression material. The patient reports his lips "feel funny" but otherwise he is OK.

58. What is the cause of this reaction?

A. Type I hypersensitivity reaction
B. The material activates the complement cascade
C. A localized inflammatory response reaction has been triggered
D. Type II hypersensitivity reaction
E. Type III hypersensitivity reaction

59. What would be the most appropriate therapy?

A. Immediately remove the impression material and give the patient an injection of epinephrine and antihistamine to prevent serious sequelae
B. Immediately remove the impression material, have the patient thoroughly rinse his mouth, inspect the oral cavity to see how far the swelling has spread, offer an oral antihistamine such as benadryl and observe the patient for at least 30 minutes
C. Finish taking the impression because the condition will get no worse; the reaction is limited to only the tissues in direct contact with the impression material, and the reaction will subside as quickly as it developed
D. Call 911 for medical support, take the patient's blood pressure, be ready to provide CPR, but don't remove the impression material because this might trigger hemorrhage at the site
E. Remove the impression material as soon as the impression is completed, have the patient rinse his mouth with a disinfectant and explain that his mouth will be sore but an anti-inflammatory, like aspirin, will reduce the swelling and pain

Problem 3

A 23 year old female singer is referred to the clinic with a 3-week history of malaise, vague fever, epigastric discomfort, nausea and pale diarrhea. Two days prior to clinic attendance she developed pain in her right knee and the small joints of her left hand, and her boyfriend had noticed that her eyes looked yellow. She had not felt like smoking her usual 15 cigarettes a day. She denies any illicit drug use but admits to drinking several alcoholic drinks on most evenings. She had a legal termination of pregnancy 6 weeks ago at which time she received one unit of blood. She lives with her 27 year old boyfriend, 2 and 4 year old children and 62 year old mother.

On examination she looks lethargic and has obvious jaundice with a rash on her trunk. Her temperature is slightly raised at 37.6° C. Her liver is palpable 2 cm below the costal margin but she has no detectable splenomegaly. There is no swelling of her joints, although passive movement of her right knee causes mild discomfort. Her muscles are not tender and there are no features of encephalopathy. Her urine is dark and the color of strong tea. Admission blood tests show (normal values in parentheses)

Haematology: Hb 11.5 g/dl (12-16)
WBC 6,000/mm^3
Neutrophils 55%, lymphocytes 48%, monocytes 7%
Eosinophils 5%
Platelets 148 x 10^9/1 (150-450)

Serum Biochemistry: Bilirubin 248 µmol/l (0-22)
AST 636 u/l (5-45) Liver enzyme
γGT 500 u/l (0-30) Liver enzyme
Alk phos. 242 u/l (30-120) Liver enzyme
Albumin 38 g/l, total protein 70 g/l (36-50) (60-80)

60. Which of the following could you rule out as a cause of her symptoms?
A. HAV hepatitis
B. HBV hepatitis
C. HCV hepatitis
D. HSV hepatitis
E. EBV hepatitis

61. Which of the following diagnoses should also probably be considered?

a. CMV hepatitis
b. HDV hepatitis
c. Post-surgical hemolytic anemia
d. Adenovirus hepatitis
e. BK Virus hemorrhagic cystitis

62. Finding a negative reaction for the presence of heterophile antibody in the patient's serum Would allow you to rule out with some certainty which of the possible diagnoses when this f finding is coupled with the finding of no spenomegaly?

A. HAV hepatitis
B. HDV hepatitis
C. Post-surgical hemolytic anemia
D. CMV hepatitis
E. EBV hepatitis

Serological tests of the blood of both the singer and her boyfriend with the results shown:

Serologic Tests Table

	Singer	Boyfriend
Anti-HAV IgM Antibody	-	-
Anti-HAV IgG Antibody	-	-
HBsAg	-	+
Anti-HBs Ag IgG Antibody	-	-
Anti-HCV IgM Antibody	+	-
Anti-HCV IgG Antibody	-	-
Anti-HDV IgG Antibody	-	-
Anti-EBV IgM Antibody	-	-
Anti-EBV IgG Antibody	+	+
Anti-CMV IgM Antibody	-	-
Anti-CMV IgG Antibody	+	+

63. What stage of the infection is exhibited in the singer?

A. Primary preicteric stage
B. HbsAg window stage
C. Chronic active stage
D. Primary icteric stage
E. Convalescent stage

64. What diagnosis is most appropriate for the boyfriend?

A. Chronic Hepatitis B infection
B. Active primary Hepatitis A infection
C. Hepatitis C fulminant infection
D. Convalescent Hepatitis B infection
E. Primary EBV hepatitis

65. How did the singer most likely acquire her infection?

A. Ingestion of contaminated food or water
B. In the blood transfusion she received
C. Sexual contact with her boyfriend
D. From her aborted fetus at the time of her abortion
E. Oral contact with another member of her family

66. After diagnosis of her condition and being monitored in the hospital for five days, she was released to return home. Who in her family is at greatest risk of acquiring the infection from the patient?

a. Her mother because of her age
b. Her children because she prepares their food
c. Her boyfriend if they have sex
d. No one because she is no longer infectious

Problem 4

67. You get a call from the lawyer of a 62 year-old patient for whom you carried out root canal dental care 20 days earlier informing you that the patient is suing you for 4.5 million dollars to compensate for pain, suffering and medical costs. Three days after your therapy she developed a painful, vesicular, coalescent rash that covered her lower right jaw to chin midline and spread down her neck on the right side. It has developed a scab and she has begun to notice some facial paralysis. What is your reaction?

A. Call your insurance carrier and your lawyer and tell them that you're probably going to have to settle a case of mulloscum contagiosum disease contracted in a patient under your care.

B. Explain to the lawyer that he does not have a case because the woman is suffering from shingles which is a reactivation of the varicella zoster virus acquired during childhood chicken pox and had nothing to do with your care.

C. Call your lawyer and check your hands and the hands of other caregivers for the presence of a herpetic whitlow.

D. Explain to the lawyer that his client has acquired a herpes simplex infection but that she could not have gotten it from your treatment because the primary infection incubation period is about 10 days to two weeks.

E. Explain to the lawyer that it sounds to you like the woman has a bacterial infection and to have her come in and you will be happy to have a physician diagnose and provide antibiotic therapy free of charge.

Problem 5

Provide the information sought in each of the following situations:

68. A 24 year old graduate student presents with genital warts. Identify the causative agent and the most likely method of acquisition of the condition.

A. Herpes Simplex Type I; oral-genital sex with an infected individual
B. Herpes Simplex Type II; sexual contact with active lesions
C. Polyoma BK virus; reactivation of the latent infection
D. Human Papilloma virus; sexual contact with an individual infected
E. Molluscum contagiosum virus; swimming in contaminated water

69. An 11 year old black child with a history of sickle cell anemia develops mild, flu-like symptoms with a macular rash followed by development of a bone marrow aplastic crisis. Identify the causative agent.

A. Cytomegalovirus
B. Epstein-Barr virus
C. Human Papilloma virus
D. Hepatitis B virus
E. Parvovirus B19

70. A 17 year old woman who has received no prenatal care delivers a full term infant that has indications of slight microcephaly, unilateral deafness and mild mental retardation. What might you suspect as having caused this anomaly?

A. The mother had a case of Fifth disease during pregnancy
B. The mother had a primary cytomegalovirus infection during pregnancy
C. The mother had a latent cytomegalovirus infection prior to pregnancy
D. The mother had an active case of Herpes Simplex Type II at the time of birth
E. The mother had a vaccinia virus infection during pregnancy

71. A 4 year old child presents with a combination of red papules, vesicles and scabbed lesions on the trunk, face and scalp. He has a slight fever, malaise and anorexia. Identify the disease.

A. Herpes Simplex Type I infection
B. Herpes Simplex Type II infection
C. Chickenpox
D. Smallpox
E. Cowpox

72. The type of immune dysfunction associated with multiple sclerosis

A. Hypersensitivity
B. Autoimmune disease
C. Lymphoma
D. Immunodeficiency
E. Monoclonal gammopathy

73. The type of skin reaction that would develop at the site where a small amount of allergen to which the individual had a Type I hypersensitivity was injected subcutaneously.

A. Purulent necrotic lesion with accumulation of neutrophils and macrophages
B. Induration and erythema with lymphocyte infiltration
C. Bullous vesicular lesion
D. Wheal-flare reaction
E. Inflammatory erythematous lesion with neutrophil infiltration

74. The type of blood test used prior to transfusion when the donor RBC's are mixed with the recipient serum.

A. Major cross match
B. Minor cross match
C. Mixed lymphocyte reaction
D. ABO typing
E. HLA typing

75. The type of molecule of the Rheumatoid Factor

A. IgE immunoglobulin
B. HLA - B27 marker
C. IgM immunoglobulin
D. IgA immunoglobulin
E. Anaphylatoxic complement fragment