

Monday, September 23, 2002, 8-9:50 a.m.

PHOTO-BASED QUESTIONS.

(2 photos, 1 question)

1. These photographs are taken of a lung biopsy from a 23 year-old female who presented with a several week history of non-productive cough. A chest radiograph revealed bilateral hilar lymphadenopathy and reticulonodular pulmonary infiltrates. Cultures of sputum, bronchoalveolar lavage, and biopsy tissue were negative, and the clinical suspicion of sarcoidosis was confirmed with this biopsy. What cells constitute chief components of the lesions illustrated here?
 - A. endothelial cells and fibroblasts
 - B. endothelial cells, epithelial cells, and fibroblasts
 - C. epithelioid histiocytes, giant cells, and lymphocytes
 - D. giant cells, lymphocytes, and fibroblasts
 - E. neutrophils, endothelial cells, and fibroblasts

Background: Tumor staging is an important aspect of managing cancer patients. Tumors are staged in order to select appropriate therapy and to give some indication of prognosis. Staging depends upon three attributes that indicate the size of a tumor and the extent to which tumor has spread. A 'T' designation of T1 to T4 is given for the primary tumor depending on whether the tumor is confined to the organ of origin (T1 or T2) or whether it has invaded outside of the organ into adjacent tissues (T3 or T4). N is the designation of lymph node status. N0 means no lymph node metastasis. Cases with lymph node metastasis can be designated as N1 to N3 depending upon the size and location of the nodal metastasis. NX means the lymph node status is not known. M is the designation for distant metastasis. M0 indicates no distant metastasis and M1 indicates the presence of distant metastasis. MX indicates that the presence or absence of distant metastasis is not known. For most cancer sites distant metastasis means hematogenous metastasis to a distant organ such as breast to lung or brain/ or colon to liver. However, this varies. For instance direct spread of a pancreatic carcinoma in the peritoneum is given an M1 designation, but direct spread of an ovarian carcinoma to the peritoneum is regarded as an attribute of the primary tumor and is designated T3 but still M0. Use these comments as a guide, when you answer the following questions (2-5).

(3 slides, 1 question)

2. A 52 year-old woman has had a mastectomy for carcinoma of the breast previously diagnosed by needle biopsy. Slide 1 is a microscopic section of the primary breast tumor that shows malignant tubule formation of a moderately differentiated adenocarcinoma. Slide 2 shows tumor cells within a small lymphatic channel beside a lymph node, and slide 3 demonstrates tumor within the lymph node. Select the one best answer that indicates the status of this breast cancer.
 - A. The lymph node shows a distant, hematogenous metastasis.
 - B. The lymph node represents the direct extension of the tumor into an adjacent organ.
 - C. The lymph node represents the direct spread of tumor within a body cavity.
 - D. The tumor is best designated as T1, N1, MX.
 - E. The tumor is best designated as T1,N0,MX.

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(3 slides, 3 questions)

3. A 64 year old woman dies after a 16 month long clinical course characterized by obstructive jaundice and ascites in which malignant cells were seen cytologically in a specimen of ascitic fluid. An autopsy demonstrated a mass present in the head of the pancreas. Slide 1 shows malignant tubule formation of a ductal adenocarcinoma of the head of the pancreas. Slide 2 shows multiple metastasis within the liver parenchyma. Slide 3 demonstrates tumor coating the peritoneal surface of her diaphragm. The tumor in the liver demonstrates the mechanism of (one answer):
 - A. Lymphatic metastasis.
 - B. Hematogenous metastasis.
 - C. Direct spread within the abdominal cavity.
 - D. Contiguous invasion from the pancreas.
 - E. A combination lymphatic metastasis and direct spread.

4. In the case above the tumor coating the diaphragm demonstrates the mechanism of (one answer):
 - A. Lymphatic metastasis.
 - B. Hematogenous metastasis.
 - C. Direct spread within the abdominal cavity.
 - D. Contiguous invasion from the pancreas.
 - E. A combination of hematogenous metastasis and contiguous invasion.

5. The patient was known to have liver metastasis at the time of her initial diagnosis. The staging of her tumor was best designated as (one answer):
 - A. T2, N0, M0, stage 2
 - B. T2, N1, M0, stage 3.
 - C. T3, NX, M0, stage 3.
 - D. T2, NX, M1, stage 4.
 - E. T1, N0, M0, stage 1.

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6. A patient enters the clinic complaining of back pain. Urinalysis reveals proteinuria and a renal biopsy is performed. The biopsy reveals hydropic change in proximal tubule cells. The best explanation for the hydropic change is:
- A. Recent renal ischemia
 - B. Prolonged renal ischemia
 - C. Chronic renal disease
 - D. Irreversible damage to proximal tubule cell mitochondria
 - E. Apoptosis of proximal tubule cells
7. A patient has a malignant lymphoma involving lymph nodes. The patient is treated with a chemotherapeutic agent which results in the loss of individual neoplastic cells through fragmentation of individual cell nuclei and cytoplasm. Over several weeks, the size of the lymphoma decreases. By which of the following mechanisms has the neoplasm primarily responded to therapy?
- A. Coagulative necrosis
 - B. Mitochondrial poisoning
 - C. Phagocytosis
 - D. Acute inflammation
 - E. Apoptosis
8. A 53-year-old man has experienced severe chest pain for the past few hours. He is found to have elevated serum troponin. A coronary angiogram is performed and reveals occlusion of the left anterior descending artery. In this setting, an irreversible injury to myocardial fibers can be recognized when:
- A. Glycogen stores are depleted
 - B. Cytoplasmic sodium increases
 - C. Nuclei undergo karyorrhexis
 - D. Mitochondria swell
 - E. Blebs form on cell membranes
9. While removing a squamous cell carcinoma from the right lung of a 54-year-old man, the thoracic surgeon notes that the hilar lymph nodes are jet black in color. These lymph nodes would be described as having:
- A. Lipofuscin deposition
 - B. Dystrophic calcification
 - C. Anthracotic pigmentation
 - D. Hemosiderosis
 - E. Metastatic change

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10. Upper GI endoscopy is performed on a 43-year-old man who has complained of heartburn for several years following meals. Upper GI biopsies are taken from just above the gastroesophageal junction. There is no ulceration, and no hemorrhage noted. The biopsies demonstrate the presence of columnar epithelium. These findings are most consistent with:
- A. Metastatic calcification
 - B. Hyperplasia
 - C. Carcinoma
 - D. Ischemia
 - E. Metaplasia
11. A 64-year-old woman had loss of consciousness for over an hour. When she regained consciousness, she could not speak and she could not move her right arm or leg. A cerebral angiogram revealed an occlusion to her left middle cerebral artery. A subsequent CT scan shows a large cystic area in her left parietal lobe cortex. The cystic area represents the resolution of which of the following processes:
- A. Atrophy
 - B. Liquefactive necrosis
 - C. Coagulative necrosis
 - D. Caseous necrosis
 - E. Apoptosis
12. A patient has a history of blood pressure measurements in the range of 180/110 mm Hg, but does not regularly take anti-hypertensive medications. At autopsy, the patient's heart weighed 540 g (normal 250-350 g) primarily because of which of the following processes involving the myocardial fibers:
- A. Hyperplasia
 - B. Fatty infiltration
 - C. Hypertrophy
 - D. Fatty degeneration
 - E. Edema
13. A 38-year-old man has a chest x-ray that shows a nodule in the right lower lobe. The nodule has focal calcifications. A wedge resection is done and microscopically the lesion proves to be a granuloma with caseous necrosis and calcification. Which of the following is also probably true for this patient? He has:
- A. A tumor of the parathyroid gland
 - B. Hypercalcemia
 - C. Normal serum calcium levels
 - D. Metastatic calcification
 - E. A history of excessive ingestion of calcium

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14. A splinter becomes embedded in the finger of a young man. He does not remove it, and over the next few days the area round the splinter becomes red, swollen, and tender. Neutrophils migrate into the injured tissue. Expression of which of the following substances on endothelial cells is most instrumental in promoting the neutrophil migration into the tissue:
- A. L-selectin
 - B. Hageman factor
 - C. Opsonic fragment
 - D. E-selectin
 - E. Prostacyclin
15. A 37-year-old man has had nausea, vomiting, and abdominal pain for several weeks. Upper GI endoscopy is performed, and there is a 1.5 cm diameter lesion in the gastric antrum which appears to be an area with loss of the epithelial surface. This description is most typical for which of the following:
- A. Abscess
 - B. Ulcer
 - C. Squamous metaplasia
 - D. Granuloma
16. A young man incurs a stab wound to the chest. Two months later there is a firm mass with intact overlying epithelium in the region of the wound. The scar is firm, but not tender nor erythematous. The mass is excised and microscopically is found to be composed of fibroblasts with abundant collagen. By which of the following mechanisms has this series of events most likely occurred?
- A. Foreign body response from suturing
 - B. Granuloma
 - C. Poor wound healing from diabetes mellitus
 - D. Hypertrophic scar (keloid) formation
 - E. Wound infection
17. A 40-year-old man has had fever and cough for several days and now has more difficulty breathing. Pleural effusions are seen by chest radiograph. Thoracentesis is performed and the fluid obtained has a cloudy appearance and contains neutrophils. The best description is:
- A. Serous exudate
 - B. Purulent exudate
 - C. Fibrinous inflammation
 - D. Chronic inflammation
 - E. Granulomatous inflammation

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18. Recent experimental therapies for some renal diseases have included inhibition of transforming growth factor-beta (TGF- β). While helping to slow the progression of some renal diseases, inhibition of TGF- β as a therapy has some drawbacks. One major complication of anti-TGF- β therapy would be:
- A. Inhibition of acute inflammation
 - B. Excess collagen synthesis
 - C. Inhibition of granulation tissue formation
 - D. Excess proliferation of epithelial cells
 - E. Increased formation of purulent exudates
19. Type II hypersensitivity mechanisms include all of the following **EXCEPT**:
- A. long acting thyroid stimulator IgG antibodies (LATS) in Graves' disease.
 - B. granulomatous hypersensitivity
 - C. anti-acetyl choline receptor antibodies in myasthenia gravis
 - D. complement-dependent reactions that lead to lysis of cells or render them susceptible to phagocytosis.
 - E. antibody-dependent cell-mediated cytotoxicity (ADCC)
20. The following disease is mediated mainly by both Type II hypersensitivity and destructive lymphocytic infiltration:
- A. contact dermatitis
 - B. chronic granulomatous disease
 - C. autoimmune hemolytic anemia
 - D. Hashimoto's thyroiditis
 - E. systemic lupus erythematosus
21. In flow cytometry, side scatter indicates:
- A. granularity
 - B. size
 - C. cell number
 - D. channel number
 - E. fluorescence intensity
22. Two tests are being evaluated for use in the Clinical Laboratory by 10 repetitive measurements of the same sample with following results.
- TEST 1: 10, 12, 15, 7, 13, 20, 5, 12, 21, 12: mean equals 11.7
- TEST 2: 18, 20, 17, 19, 20, 17, 21, 18, 18, 19, mean equals 18.7
- The sample is then sent to a reference laboratory for testing using the "gold standard test for this analyte" and they obtain a result of 12.1.

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Which of the following best characterizes the two tests?

- A. Test 1 is both specific and sensitive.
- B. Test 1 is more accurate but test 2 is more precise.
- C. Test 1 is more precise and accurate.
- D. Test 1 is more precise but test 2 is more accurate.
- E. Test 1 is more sensitive but test 2 is more specific.

FOR THE NEXT TWO QUESTIONS

23. A new test is run on 1000 patients and it is determined that there were 97 true positive results (patients with the disease who tested positive), 100 false positive (patient without disease who tested positive), 3 false negatives (patients with the disease but testing negative) and 800 true negatives (patients without disease who test negative).

What is the sensitivity for this test?

- A. 99%
- B. 97%
- C. 90%
- D. 11.1%
- E. 3%

24. You want to make the test more sensitive by moving the reference range. What is the most likely effect?

- A. Decreased accuracy
- B. Decreased prevalence
- C. Decreased specificity
- D. Increased incidence
- E. No effect

25. Sodium and potassium levels are ordered on a patient. The sample is drawn from the same arm vein, just downstream to the needle insertion, that has a 1/2 normal saline IV running at 80cc/hour. Both the Na and K are reported to the Medicine Resident as "Panic values" abnormally low. This is most likely an example of?

- A. A cause for concern because the patient is sure to die unless the Resident intervenes and aggressively corrects these analytes immediately
- B. Analytical error
- C. Preanalytical error
- D. Post analytical error
- E. The wrong patient being drawn

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26. Which of the following statements is true?
- A. Hemolysis of blood sample has no effect on any test results.
 - B. Laboratory tests are designed so that there is no difference in results based upon gender.
 - C. Neonates are just tiny adults so that adult reference ranges can be used to evaluate their test results.
 - D. The time of day the sample was drawn has no effect on drug peaks and troughs.
 - E. What you ate for lunch could have an effect on your laboratory values.
27. A well-circumscribed tumor of the lung is found incidentally in a routine chest X-ray of a 54 year-old man. It is removed by a wedge resection of lung and is diagnosed by the pathologist as a bronchial hamartoma. A hamartoma has which of the following characteristics?
- A. It is composed of mature (benign) tissues that are found in a normal bronchus.
 - B. It is composed of malignant tissues not normally found in the lung.
 - C. It is composed of malignant epithelial cells.
 - D. It is composed of malignant stromal cells.
 - E. It is composed of mature (benign) tissues that are not normally found in the lung.
28. A 54 year-old woman was treated in 1993 with a mastectomy for carcinoma of the breast. A biopsy of a recently discovered lung mass shows a well circumscribed adenocarcinoma that is histologically identical to the previous breast cancer. This reoccurrence in the lung best demonstrates the mechanism of:
- A. Hematogenous metastasis within the mesenteric venous system.
 - B. Direct spread within a body cavity.
 - C. Lymphatic metastasis.
 - D. Hematogenous metastasis within the systemic venous system.
 - E. Direct invasion from the breast.
29. A 24 year-old woman has a hysterectomy and a salpingoophorectomy (removal of a fallopian tube and ovary). A 7 cm in diameter tumor is found in the left ovary that is composed of well differentiated skin, hair, bone, intestinal epithelium, and neural tissue. Which of the following is true about this tumor?
- A. It has arisen from a germ cell that has differentiated into tissues not normally found in the ovary.
 - B. It has originated from a germ cell that has differentiated into tissues normally found in the ovary.
 - C. It should be diagnosed as a hamartoma.
 - D. It is a sarcoma because it contains mesenchymal elements represented by bone or cartilage.
 - E. It is a squamous cell carcinoma because of the squamous epithelium represented in the skin.

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30. Metalloproteinases play an important role in tumor invasion and metastasis by:
- A. Stimulating angiogenesis.
 - B. Attaching tumor cells to endothelium at metastatic sites.
 - C. Reducing cell to cell adhesion in the primary tumor.
 - D. Inhibiting proteolytic digestion of the extracellular matrix.
 - E. Digesting extracellular matrix.
31. The progression from a resting state of a tissue to a neoplasm capable of invasion and metastasis is the result of:
- A. A single genetic mutation.
 - B. A process involving multiple genetic mutations.
 - C. The development of tumor associated antigens.
 - D. The derepression of genes silenced in adult tissues.
 - E. The expression of both tumor specific and tumor associated antigens.
32. The chromosomal translocation t (14;18) that produces a mutation of the bcl-2 gene is seen in 90% of follicular (low grade) lymphomas. This structural chromosomal mutation promotes the development of the lymphoma by which of the following mechanisms?
- A. The inactivation of programmed cell death (apoptosis).
 - B. Increased cell proliferation rates.
 - C. The inactivation of a tumor suppressor gene.
 - D. Activation of a proto-oncogene.
 - E. The increased expression of the myc nuclear regulatory protein.
33. Which of the following statements best characterize small (point) mutations involved in the inactivation of tumor suppressor genes or the activation of proto-oncogenes?
- A. They are fragile sites where chromosomal breaks commonly occur.
 - B. They result in the deletion of chromosomal segments.
 - C. They are commonly the result of abnormal mitotic events.
 - D. They duplicate chromosomal material and produce double minutes.
 - E. They involve changes in the nucleotide sequences of the coding regions of genes, or the upstream regulators of gene activity.
34. Which of the following is a true statement about genetic mutations that cause cancer?
- A. Most are acquired after birth and occur in the somatic cells of developed organs.
 - B. The majority of cancers are caused by mutations inherited in the germline.
 - C. When they are acquired in post-natal development, the mutations are seen in the tumor and in normal tissue.
 - D. None of the above.
 - E. All of the above.

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35. A karyotype from tumor tissue of a non-familial retinoblastoma shows a deletion of a segment of the long arm of one chromosome 13 involving 13q14. The other chromosome 13 is structurally normal but contains a point mutation in the retinoblastoma gene that cannot be detected by karyotyping. Which of the following statements about the relationship of the abnormality to the development of the tumor is likely to be true.
- A. The abnormality resulted from chromosomal nondisjunction.
 - B. The karyotype shows an acquired structural chromosomal abnormality that deletes a tumor suppressor gene.
 - C. The abnormality was inherited from one of the patient's parents.
 - D. The karyotype shows a structural abnormality that activates a proto-oncogene.
 - E. The karyotype shows a structural abnormality that inactivates an apoptosis regulating gene.
36. A 54 year-old man has a white blood cell count of $120,000 \text{ mm}^3$. These white cells are well-differentiated myeloid cells and many are mature neutrophilic granulocytes. A cytogenetic analysis of the patient's bone marrow is reported as positive for the Philadelphia chromosome. Which of the following is a true statement about the Philadelphia chromosome?
- A. It is a translocation involving chromosome 13q that inactivates the retinoblastoma gene.
 - B. It is a translocation involving chromosome 18q that results in increased bcl-2 expression.
 - C. It is the chromosomal translocation seen in most follicular B-cell lymphomas.
 - D. It is a balance translocation between chromosomes 8 and 14 that is seen in Burkitt's lymphoma.
 - E. It is a translocation that relocates the c-abl tyrosine kinase proto-oncogene creating a chimeric or fusion gene product.
37. A 25 year-old woman has an erythematous rash over her face on both cheeks and across the bridge of her nose, which is made worse by exposure to sunlight. She has also experienced muscle and joint pains for 3 to 4 months. More abnormalities of joints are revealed by x-rays. Which of the following laboratory tests would most likely be positive in her disease?
- A. anti-neutrophil cytoplasmic antibodies
 - B. elevated serum IgE levels
 - C. HLA-B27 genotype
 - D. antibodies to double-stranded DNA
 - E. decreased absolute CD4 lymphocyte count

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38. A 23 month-old male has experienced repeated infections since he was six months old with such microorganisms as *Hemophilus influenzae*, *Streptococcus pneumoniae* and *Staphylococcus aureus*. These have induced pneumonia, otitis media and impetigo. *Giardia lamblia* infections of the gut have led to repeated bouts of diarrhea. Although his parents and sisters are normal, he had an older brother who experienced similar symptoms and died of infection. Laboratory studies show markedly decreased immunoglobulins. Which of the following is most likely the cause of this condition?
- A. adenosine deaminase deficiency
 - B. mutations in a cytoplasmic tyrosine kinase (*btk*) that block signal transduction for B cell maturation
 - C. diminished T-cell-mediated immunity
 - D. failure of B cells to differentiate into IgA-secreting plasma cells
 - E. diminished complement C3
39. After 3 years on hemodialysis, a 25 year-old diabetic patient with renal failure receives a cadaveric renal allotransplant even though the laboratory test revealed that she had a 90% positive panel reactive antibody (PRA) level. Within minutes following surgical anastomosis of the vasculature, the transplanted kidney becomes cyanotic, flaccid, forms a few drops of bloody urine and is removed. Histopathological examination reveals fibrin-platelet thrombi in capillaries, vascular congestion, interstitial edema, neutrophilic infiltrates and neutrophil vasculitis with fibrinoid necrosis. This pathologic picture is consistent with :
- A. chronic rejection
 - B. hyperacute rejection
 - C. renal vein thrombosis
 - D. anaphylaxis
 - E. acute rejection
40. A two year-old boy is found to have thrombocytopenia, eczema and recurrent infection. Laboratory tests reveal a variable loss of cellular immunity and a failure to form antibodies against polysaccharide antigens. Serum IgG levels are normal. The IgM levels are decreased but the levels of IgA and IgE are elevated. The thymus is morphologically normal but there is secondary depletion of T cells in the blood and lymph nodes. Which of the following is the most likely diagnosis in this patient?
- A. selective IgA deficiency
 - B. adenosine deaminase deficiency
 - C. severe combined immunodeficiency
 - D. chronic granulomatous disease
 - E. Wiskott-Aldrich syndrome

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41. A cocaine addict develops chills, fever, malaise, sore throat and mild rash three weeks after sharing a needle contaminated with HIV infected blood. To support his habit, he returns to the blood bank where he has repeatedly sold blood for cash in the past. How would the blood bank determine that this individual was now infected with HIV-1?
- A. detection of antibody to p24 antigen in blood
 - B. detection of gp41 antigen in blood
 - C. detection of gp120 antigen in blood
 - D. detection of p24 antigen in blood
 - E. detection of gp41 antibody in blood
42. A 36 year-old man who has been HIV-1 positive for the past 9 years begins to experience difficulties in his daily activities. His memory is beginning to fail and he has diminished capacity to perform functions that require fine motor control such as writing or painting. His absolute CD4 lymphocyte count is 125/ μ L. Which of the following cell types is most likely responsible for disseminating the infection into the central nervous system.
- A. infected monocytes/macrophages
 - B. infected CD4 lymphocytes
 - C. infected Langerhans cells
 - D. infected neutrophils
 - E. infected eosinophils
43. A 3 year-old boy has experienced recurrent bacterial infections since birth and has been treated with antibiotics and supportive therapy all of his life. His neutrophil leukocytes are shown by the nitroblue tetrazolium (NBT) test to be deficient in NADPH oxidase. There is also a defective killing curve when the patient's neutrophils are combined with a culture of *E. coli*. Which of the following is the most likely diagnosis?
- A. Wiskott-Aldrich syndrome
 - B. chronic granulomatous disease
 - C. acquired immune deficiency syndrome
 - D. severe combined immunodeficiency
 - E. hyper-IgM syndrome
44. Two months following a bout of malaise, fatigue and generalized musculoskeletal pain, a 27 year-old woman experiences swollen, warm, painful and particularly stiff metacarpophalangeal and proximal interphalangeal joints on arising or following inactivity. Radiographs reveal joint effusions and juxtaarticular osteopenia with erosions and narrowing of the joint space with loss of articular cartilage. Her blood serum is found to contain IgM antibodies directed to her own IgG molecules serving as antigen. Which of the following is the most likely diagnosis?
- A. systemic lupus erythematosus
 - B. Sjögren's syndrome
 - C. rheumatoid arthritis
 - D. ankylosing spondylitis
 - E. osteoarthritis

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45. A 10 year-old Caucasian child presents with a respiratory infection and is discovered to have a history of gastrointestinal and urogenital tract infections. There is also a history of recurrent sinopulmonary infections and diarrhea. Laboratory tests reveal extremely low levels of both serum and secretory IgA. Which of the following would be ill advised in this patient?
- A. Antibiotics
 - B. transfusion with washed red cells
 - C. transfusion with blood containing normal IgA
 - D. a tuberculin test
 - E. exposure to sunlight
46. A 28 year-old HIV-1 positive male homosexual discovers multiple, 0.5 to 1.2 cm plaque-like reddish, purple skin lesions on his trunk, face and extremities. Some of the larger lesions appear to be nodules. These lesions have developed during the past 6 months. The lesions are found to be comprised of spindle cells with new capillary formation and are associated with the genome of which of the following viruses?
- A. Epstein-Barr virus
 - B. cytomegalovirus
 - C. human herpes virus-8
 - D. arenavirus
 - E. adenovirus
47. A 37 year-old male IV drug abuser has been HIV-1 positive for 8 years but has recently stopped taking his cocktail of antiretroviral and protease inhibitor drugs. Which of the following is the best way to determine whether his HIV disease progression to the final crisis phase will be “stormy” and brief or moderate and extended?
- A. degree of weight loss
 - B. HIV-1 viral load (HIVmRNA/mm³)
 - C. CD4/CD8 ratio
 - D. pulmonary opportunistic infections
 - E. decreased absolute CD4 lymphocyte count
48. A 55 year-old female consults her physician after developing malar rash and other features suggestive of lupus erythematosus. On taking a careful history, the physician determines that she has been treated with hydralazine for long standing hypertension. He orders anti-doublestranded DNA, anti-Sm and anti-histone antibody assays of her blood serum. The results reveal an anti-nuclear histone antibody titer of 1:2,560. Both the anti-double stranded DNA and anti-Sm antibody tests are negative. Which of the following is the most likely diagnosis.
- A. discoid lupus erythematosus
 - B. drug-induced lupus-like syndrome
 - C. systemic lupus erythematosus
 - D. pemphigus erythematosus
 - E. limited lupus erythematosus

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49. A 55 year-old man with a recent history of recurrent bacterial infections presents with bone pain and pathologic fractures. Laboratory studies reveal hypercalcemia and Bence Jones proteinuria. Electrophoresis shows increased immunoglobulin in blood and light chains in the urine. A skull x-ray shows punched-out bone lesions in the calvarium. A renal biopsy reveals an amorphous, eosinophilic, hyaline fibrillar substance that has accumulated in the extracellular mesangial areas. Which of the following best describes the extracellular deposits in this patient?
- A. ATTR amyloid
 - B. α fetoprotein
 - C. AL amyloid
 - D. AA amyloid
 - E. β_2 microglobulin
50. A 54 year-old black lady presents to her physician complaining of striking skin changes that have led to virtual immobilization of her fingers creating a claw-like flexion deformity. The physician discovers that she also has Raynaud's phenomenon manifested as episode of vasoconstriction of the arteries and arterioles of the extremities. She has had difficulty swallowing and respiratory difficulties. Her blood pressure is 220/110 mm Hg, and she is found to have mild proteinuria. Her skin biopsy reveals extensive deposition of dense collagen in the dermis with virtual absence of appendages and thinning of the epidermis. There is also thickening of arterioles. The most likely autoantibody to be found in this patient's serum is:
- A. Anti-double stranded DNA autoantibodies
 - B. Anti-Sm autoantibodies
 - C. Anti-Jo1 autoantibodies
 - D. Anti-ScI-70 (DNA topoisomerase I) autoantibodies
 - E. Anti-nuclear RNP autoantibodies
51. A 37 year-old black male who received a successful renal allotransplant seven years ago is found on examination by his physician to have an increased creatinine level in the blood. A renal biopsy reveals interstitial fibrosis, thick glomerular walls, arterial and arteriolar intimal thickening and tubular atrophy. The most likely diagnosis is:
- A. hyper acute rejection
 - B. fatal insufficiency
 - C. acute rejection
 - D. vascular rejection
 - E. chronic rejection

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52. A 26 year-old female on hemodialysis is evaluated for cadaveric renal allotransplantation and found to have a 0% panel reactive antibody (PRA) and B blood group. Tissue typing reveals that she is HLA-A1, A2, B7, B53, DR15, DR17. Which of the following ABO group B donors is the best match for her?
- A. HLA A1, A51, B7, B70, DR15, DR17
 - B. HLA A1, A2, B7, B53, DR1, DR2
 - C. HLA A1, A30, B40, B53, DR3, DR15
 - D. HLA A1, A2, B7, B53, DR7, DR17
 - E. HLA A3, A24, B7, B53, DR15, DR18
53. An 8 year-old girl who received an allogeneic bone marrow transplant for treatment of aplastic anemia develops a generalized maculopapular skin rash, jaundice and bloody diarrhea 2 weeks following transplantation. Which of the following most accurately describes her condition?
- A. chronic rejection
 - B. acute graft-versus-host disease
 - C. hyperacute rejection
 - D. acute host-versus-graft disease
 - E. allogeneic inhibition
54. A 41 year-old white female presented to her physician with parotid gland swelling which was first incorrectly diagnosed as mumps. She also complained of dry, burning eyes, as a manifestation of keratoconjunctivitis sicca, and dry mouth (xerostomia) with difficulty swallowing. Which of the following antinuclear antibodies would be expected in this patient?
- A. Anti-Sm autoantibodies
 - B. Anti-SSA(Ro) and Anti-SS-B(La) autoantibodies
 - C. Anti-centromere autoantibodies
 - D. Anti-Jo-1 autoantibodies
 - E. Anti-nuclear RNP autoantibodies
55. An attending physician teaching a group of medical students at the bedside of a University Hospital patient with systemic lupus erythematosus asks the student to explain the patient's propensity to develop venous and arterial thromboses leading to focal cerebral and ocular ischemia. Which of the following would be the answer to this question?
- A. anti-double stranded DNA autoantibodies
 - B. lupus anticoagulant
 - C. anti-Sm autoantibodies
 - D. lupus procoagulant
 - E. anti-histone autoantibodies

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Match the following features of a tumor. An answer may be used once, more than once, or not at all.

- 56. The part of the tumor that contains genetic mutations.
- 57. The part of a tumor derived from the normal tissue of a host.
- 58. The neoplastic element of a tumor.

- A. Tumor Parenchyma
- B. Tumor stroma

Match the following tumor antigens with the indicated characteristics of that antigen. An answer may be used once, more than once, or not at all.

- 59. Arise as a result of genetic mutations.
- 60. Result from the derepression of genes silenced in the adult.
- 61. Can evoke an immune response.

- A. Tumor specific antigens.
- B. Oncofetal antigens.

Match the following types of genes involved in the development of neoplasia with their genetic attributes and effect on normal state of a cell. An answer may be used once, more than once, or not at all.

- 62. The activated gene stimulates cell growth.
- 63. The normal gene inhibits cell growth.
- 64. The inactivation of both genes of an allelic pair is required for unregulated cell growth.
- 65. The mutation of one gene of an allelic pair results in unregulated cell growth.

- A. Tumor suppressor genes.
- B. Proto-oncogenes.

BONUS QUESTION. (2 points)

A 55 year-old male presents with a 1-day history of abdominal pain and vomiting. Physical examination reveals a distended abdomen and marked tenderness with guarding. A healed appendectomy scar is noted. Free air beneath the diaphragm is noted on an abdominal radiograph. Emergency laparotomy reveals a perforated, necrotic small bowel. An early peritonitis is present, as well as dense fibrous serosal adhesions that make removal of the necrotic bowel difficult. Give a brief discussion of the most likely events in the **development of the fibrous serosal adhesions**. (Minimum of 3 steps required for full credit with the 3rd step being the presence of fibrous serosal adhesions. No chemical mediators need to be mentioned.)

UNIVERSITY OF MISSISSIPPI MEDICAL CENTER

Test Analysis program - Student Grade Sheet Instructor: DR. KAY ALLEN

Number of students= 101 Number of Items= 45 Date: 09/23/02
 Name: Course: PATHOLOGY 621
 Your Raw Score: 62.00 Your Percent Score: 95.38 Class Mean Raw : 59.45 Class Mean Percent: 91.45

Item Number
 Item Number 1 1 1 1 1 1 1 1 1 1 2 2 2 2 2 2 2 2 2 2 3 3 3 3 3 3 3 3 4 4 4 4 4 4 4 4 4 5
 Item Number 1 2 3 4 5 6 7 8 9 0 1 2 3 4 5 6 7 8 9 0 1 2 3 4 5 6 7 8 9 0 1 2 3 4 5 6 7 8 9 0

Incorrect Items X X
 Your Answers C B B C D A E C C E B C C D B D B C B D A B B C C E A D A E B A E A B E D B B E D A B C C A B B C C
 Correct Answers C D B C D A E C C E B C C D B D B C B D A B B C C E A D A E B A E A B E D B B E D A B C C C B B C D

Item Number
 Item Number 5 5 5 5 5 5 5 5 5 6 6 6 6 6
 Item Number 1 2 3 4 5 6 7 8 9 0 1 2 3 4 5

Incorrect Items
 Your Answers E A B B B A B A A B A B A A B
 Correct Answers E A B B B A B A A B A B A A B

*.....ALL STUDENTS WERE GIVEN CREDIT FOR THIS ITEM
 0.....ITEM WAS THROWN OUT