Bio 351. Pathophysiology/Pharmacology
Bio 280 Systemic Pathology

Supporting Structures
Final Exam

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A 32 year old woman complains of three months of pain and stiffness in both hands, wrists, elbows and feet. She notes that it is difficult for her to get out of bed in the morning because of stiffness. She has difficulty opening jars and picking up small objects. She denies fever, rash or chest pain. 

On exam, her PIPs, MCPs and wrists are swollen and tender bilaterally. There are firm bumps over both elbows. Laboratory testing reveals: hemoglobin 10.6, creatinine 0.8, ESR 42, rheumatoid factor 1:80, ANA — negative.

1. Which ONE of the following extra-articular findings are LEAST LIKELY to result in this patient?

   a. ocular inflammation
   b. pleural effusion
   c. rheumatoid nodules
   d. colitis
   e. neutropenia and splenomegaly

2. When considering the pathogenesis of the joint disease in this patient, which ONE of the following statements is TRUE?

   a. a common amino acid sequence is present in the Class I major histocompatibility complex in many patients with this arthritis
   b. the synovial tissue is infiltrated by polymorphonuclear leukocytes
   c. the antigen that initiates this form of arthritis is well characterized
   d. TH1 cells, a class of T helper cells, produce proinflammatory cytokines including IL-2, INF gamma, and TNF alpha
   e. the T cell receptor recognizes antigen independent of the major histocompatibility complex

3. Many of the systemic inflammatory features of this disease can be attributed to the action of TNF alpha and IL-1. These cytokines are responsible for all of the following EXCEPT:

   a. induce immune complex formation
   b. stimulation of macrophages to release other proinflammatory cytokines and chemokines
   c. cause endothelial cells to express adhesion molecules and vascular endothelial growth factors
   d. cause hepatocytes to produce C reactive protein
   e. stimulate type B synovial cells to produce matrix metalloproteinases
A 56 year old woman complains of pain in her hands, right hip and right knee. She reports hard painful bumps over her DIP joints in both hands. These bumps were painful initially but now just limit her ability to close a fist. Her hip and knee hurt when she walks and feels stiff for a few minutes when she wakes up in the morning and after sitting in the car for a long trip.

4. Which **ONE** of the following statements is **INCORRECT** about her arthritis?
   
   a. she suffers from the most common form of arthritis  
   b. disorders of calcium metabolism contributes to the pathogenesis of this form of arthritis  
   c. treatment with nonsteroidal anti-inflammatory medications may help her pain  
   d. the arthritis in her hip and knee may have been precipitated by a prior injury  
   e. her knee is likely to have a relatively non-inflammatory joint effusion

5. The pathogenesis of her arthritis involves all of the following **EXCEPT**:
   
   a. the subchondral bone becomes sclerotic and may develop cystic changes  
   b. the cartilage surface becomes smooth and hypertrophic  
   c. the chondrocytes are stimulated to produce more proteoglycan and collagen  
   d. matrix metalloproteinases are upregulated and there is a decrease in the natural inhibitors of these proteinases, TIMPs  
   e. inflammation is stimulated by pro-inflammatory cytokines and calcium crystal deposition/shedding

A 49 year old man with a 10 year history of rheumatoid arthritis complains of persistent joint pain and swelling. He has 3 hours of morning stiffness and 18 painful and swollen joints. He is taking methotrexate, prednisone, and a COX-2 inhibitor. You decide that its time to add a biologic agent to his treatment plan.

6. Which **ONE** of the following therapies is **NOT APPROPRIATE** for this patient given your understanding of the pathogenesis of rheumatoid arthritis?
   
   a. receptor antagonists to IL-1  
   b. monoclonal antibodies to TNF alpha  
   c. recombinant Interleukin-6 and Interleukin-8  
   d. monoclonal antibodies to B cell surface receptor  
   e. recombinant soluble TNF alpha receptor
A 48 year old man presents with a swollen left knee. His medial meniscus was removed 25 years ago following a high school football injury. The knee is now cool with a moderate amount of fluid in it. His other peripheral joints are normal.

7. The following features are characteristic of this joint effusion EXCEPT:
   a. the fluid is an ultrafiltrate of plasma
   b. the fluid contains hyaluronic acid, albumin, lubricin and metabolites of synovial cells
   c. the fluid has a WBC – 500, with 10% neutrophils
   d. the fluid is clear and viscous
   e. the character of the fluid can be useful in differentiating osteoarthritis from osteonecrosis

8. The following features about cyclooxygenase(COX)-1, and COX-2 are true EXCEPT:
   a. both enzymes convert arachidonic acid to prostaglandins
   b. COX-2 promotes platelet aggregation
   c. COX-2 has a “side pocket” that is important in binding COX-2 specific inhibitors
   d. COX-2 is induced by pro-inflammatory cytokines such as TNF alpha
   e. COX-1 is found in the stomach, platelets, and synovial tissue

9. The following characteristics of articular cartilage are true EXCEPT:
   a. on a weight basis, water is the largest component of normal articular cartilage
   b. early in the course of osteoarthritis, chondrocytes respond by decreasing the amount of collagen and proteoglycan they produce
   c. hyaline cartilage is avascular, has no nerve supply and no lymphatic drainage
   d. proteoglycans and water provide elasticity and resiliency to cartilage
   e. type 2 collagen fibers are oriented to resist tensile stress and absorb joint loading

10. Over-reactivity of which of the following enzymes may be associated with clinical gout?
   a. Xanthine oxidase.
   b. Adenosine deaminase.
   c. Hypoxanthine-guanine phosphoribosyltransferase.
   d. PRPP synthetase.
   e. Purine nucleotide phosphorylase.
11. In a 51 year old man with a 3-day episode of marked swelling, discoloration and pain in his right ankle, the most definitive finding would be:
   
   a. A positive family history of gout  
   b. A serum uric acid level of greater than 10 mg. %  
   c. The presence of strongly birefringent crystals in the synovial fluid  
   d. A 24-hour urine excretion of uric acid greater than 750 mg.  
   e. Improvement of his symptoms with treatment with colchicine

12. Which of the following factors favors the nucleation and deposition of crystal species?
   
   a. Alkaline pH  
   b. Fluctuation of concentration of ionic species  
   c. Intact proteoglycan matrix  
   d. Fever  
   e. Protein depletion

13. Which of the following mechanisms is involved in the acute inflammatory attack of the gout?
   
   a. The release of chemotactic factor by PMN’s  
   b. Changes in the activity of amidophosphoribosyltransferase.  
   c. Ingestion of crystals of monosodium urate by lymphocytes.  
   d. Alteration in the tubular resorption of uric acid in the kidney.  
   e. Deposition of tissue urate.

A 33 year old woman presents to your office with a 6 month history of arthritis, facial rash, photosensitivity and intermittent pleuritic chest pain. She has a fever of 102.6. On laboratory evaluation, she is found to be anemic and have a positive test for antinuclear antibodies.

14. Which of the following is true?
   
   a. Her disease is probably mediated by immune complexes.  
   b. Serum complement levels would probably be normal if she was found to have kidney involvement.  
   c. Her disease is probably mediated by cytotoxic antibodies.  
   d. Antibodies to double-stranded DNA and to Sm are both specific and sensitive for her disease.
15. Which of the following is true regarding systemic lupus erythematosus?
   a. Clinical renal disease ultimately dominates the course of the disease.
   b. Arthritis tends not to produce erosive changes.
   c. Central nervous system involvement is common.
   d. Serologic factors that are sensitive for the disease tend to be specific for the disease as well.
   e. Malar rash is relatively specific

16. In the serum sickness model of immune-complex disease, which of the following is true?
   a. Usually chronic course.
   b. Generation of cytotoxic antibodies.
   c. Immune complex formation.
   d. Tissue injury involving the heart, brain and spleen
   e. Generation of anti-nuclear antibodies

17. Which of the following immunologic phenomena is the most specific finding associated with systemic lupus erythematosus?
   a. A decrease in suppressor T-cell activity.
   b. The demonstration of circulating immune complexes.
   c. A positive indirect immunofluorescence test for anti-nuclear antibodies.
   d. Circulating antibodies with specificity for double-stranded DNA
   e. Low levels of complement components in the serum.

18. In senile osteoporosis,
   a. the ratio of mineralized bone to total osteoid is normal
   b. the ratio of mineralized bone to total osteoid is lower than normal
   c. the ratio of mineralized bone to total osteoid is higher than normal
   d. the total amount of osteoid is increased ×
   e. the total amount of osteoid is normal ×

19. The mechanism that would best explain why avascular necrosis develops in a patient with sickle cell disease is
   a. alkaline phosphatase deficiency
   b. mechanical overload
   c. autoimmunity
   d. vascular occlusion
   e. collagen $\square$ 1(1) mutation
20. From a teleologic perspective, long bones are configured as hollow cylinders in order to:
   a. minimize rotational inertia
   b. maximize bending strength
   c. increase flexibility
   d. make bone less brittle
   e. make room for hydroxyapatite deposition

21. Fracture healing is most similar to which of the following?
   a. osteoporosis
   b. creeping substitution
   c. development of a bone metastasis
   d. avascular necrosis
   e. endochondral ossification in the growth plate

22. Osteogenesis Imperfecta involves a defect in:
   a. calcification of long bones
   b. excessive osteoclast resorption
   c. deficient osteoblast function
   d. qualitative and/or quantitative disorder of type I collagen
   e. qualitative and/or quantitative disorder of fibrillin

23. A 15 year-old boy presents to you with scoliosis, which you feel requires surgery. You notice that he is very tall, has long, thin fingers and very flexible joints. The next step should be:
   a. pulmonary function test to detect pulmonary vascular involvement
   b. proceeding with surgery to avoid curve progression requiring a more complex procedure
   c. referral to a dermatologist for skin biopsy
   d. referral to a cardiologist
   e. renal ultrasound to rule out abnormalities

24. In septic arthritis, bacteria may enter a joint by:
   a. Direct hematogenous seeding
   b. Direct extension through adjacent osteomyelitis
   c. Direct inoculation
   d. all of the above
   e. a and b
25. Children are more likely to get osteomyelitis than adults because:
   a. sluggish blood flow and poor phagocytosis in the metaphysis allows hematogenous seeding and subsequent infection
   b. Children have lower white blood cell counts than adults
   c. children get frequent transient bacteremia, which never occurs in adults. X
   d. Children's bones are "sweeter", given the high glucose count in the lamellae X
   e. none of the above

   Patient Z is a 70 year old insulin-dependent diabetic. He presents with low back pain which has been increasing in severity over the past 2 months. For the 2 weeks prior to presentation, the pain has been constant and not relieved by bedrest. Review of systems is positive for malaise and a recent 20 lb weight loss. On physical examination he has a low-grade fever and is in moderate distress. There is no neurologic deficit.

26. Which of the following conditions should be included in the differential diagnosis for patient Z?
   a. pyogenic sacroilitis
   b. vertebral osteomyelitis
   c. pyelonephritis
   d. metastatic disease of the lumbar spine
   e. all of the above

   The initial work-up provides the following data:
   Laboratory tests - white blood cell count 12; hematocrit 30; ESR 95
   Radiographs – diminished height of L4-5 disc space; irregularity of the vertebral body endplates adjacent to the L4-5 disc
   MRI – increased signal intensity in the L4 & L5 vertebral bodies and the 4-5 disc space

27. Which of the following processes best explains Patient Z’s test results?
   a. loss of water content from the intervertebral disc
   b. alteration in proteoglycan content of the nucleus pulposus
   c. enzymatic destruction of disc & osseous tissue by bacteria
   d. motion segment instability at the L4-5 level
   e. metastatic spread of neoplastic cells to the spinal column
Approximately 12 hours later Patient Z complains of numbness in both legs and over his perineum. Examination now shows decreased sensation in the legs, feet, buttocks and perianal area. There is diminished rectal tone along with profound bilateral weakness affecting the ankle dorsiflexor, great toe extensor, peroneal and hamstring muscles.

28. Based on the current clinical picture, what neurologic structure(s) is/are involved by the pathologic process?
   a. spinal cord
   b. cauda equina
   c. first sacral nerve root
   d. lumbosacral plexus
   e. sciatic nerve

29. Taking all of the clinical information into consideration, what is the most plausible cause of the neurologic compromise in Patient Z?
   a. instability at the L4-5 level with associated stenosis of the spinal canal
   b. pathologic fracture of the L4 vertebral body with displacement of bone material and tumor tissue into the spinal canal
   c. spread of bacterial infection from the spinal column with accumulation of purulent material in the epidural space
   d. degenerative stenosis of the lumbar spine with chronic compression of the dural sac
   e. acute herniation of the L4-5 disc with compression of the cauda equina

A 20 year pre-med basketball player complains of knee pain, swelling and giving way after an injury to her knee. Her examination is consistent with a lateral meniscus tear (knee, tender lateral joint line and a positive McMurray sign.)

30. You advise the patient that:
   a. meniscal and articular cartilage injuries have no potential for healing.
   b. meniscal and articular cartilage injuries heal with predominantly type II collagen.
   c. meniscal cartilage efficiently dissipates load bearing stress and shock absorption of articular cartilage and also plays a role in joint stability.
   d. meniscal cartilage has the potential for healing except with peripheral tears.
   e. the preferred treatment is arthroscopic surgery with removal of her entire meniscus (total meniscectomy) in order to decrease the articular cartilage contact area.
31. Her risk for development of osteoarthritis is increased with all of the following except:
   a. osteoporosis
   b. weight gain
   c. joint malalignment
   d. increased age
   e. muscle atrophy

32. Articular cartilage response to injury with superficial laceration that does not cross the tide mark is characterized by all of the following except:
   a. loss of proteoglycan
   b. increased permeability
   c. pluripotential cell migration
   d. no healing of defect
   e. progressive injury (fraying and cleft formation)

33. Viscoelastic behavior
   a. is determined primarily by a tissue’s elastin content
   b. is defined for tendons and ligament structures, but not for articular cartilage
   c. of articular cartilage reflects the stress strain characteristics of collagen and its crosslinks only, not the proteoglycan matrix
   d. of articular cartilage reflects the stress strain characteristics of the proteoglycan matrix only, not collagen and its crosslinks
   e. of articular cartilage reflects the stress strain characteristics of collagen and its crosslinks only and the proteoglycan matrix

34. The biomechanical properties of ligaments are characterized by:
   a. less stiffness and more repeatable load deformation curves with preconditioning
   b. a less distinct toe region due to parallel collagen fiber alignment
   c. a more distinct toe region due to parallel collagen fiber alignment
   d. increased stiffness and crimp angle with increased age
   e. decreased ultimate tensile strength with exercise
35. Highest stiffness
   a. a
   b. b
   c. c
   d. d
   e. e

36. Grade III ligament injury
   a. a
   b. b
   c. c
   d. d
   e. e

37. Deformation
   a. b
   b. c
   c. d
   d. e

38. Crimp/collagen orientation dependent
   a. a
   b. b
   c. c
   d. d
   e. e
39. All of the following are typically macular lesions except:
   a. Lentigo
   b. Tinea versicolor
   c. Vitiligo
   d. Telangiectasia
   e. Petechiae

40. African-American skin most resembles Caucasian skin in which respect?
   a. Number of melanocytes
   b. Amount of melanin
   c. Melanoma risk
   d. Size and shape of melanosomes
   e. Number of melanosomes

41. The primary lesion in herpes simplex is
   a. a papule
   b. a vesicle
   c. a pustule
   d. a crusted erosion
   e. an ulcer

42. Which statement most applies to the pathophysiology of vitiligo?
   a. Defect in transfer of melanosomes to keratinocytes, leading to diminished pigmentation
   b. Mutation in gene for tyrosinase leading to absent melanin production.
   c. Absence of melanocytes in lesions
   d. Congenital disorder of pigment cell migration from neural crest to skin
   e. Defect in intracellular protein necessary for transport of melanin precursor

43. The cell which is responsible for the process of cornification is:
   a. Merkel cell
   b. Langerhans cell
   c. Dermal fibroblast
   d. Keratinocyte
   e. Stratum corneum
44. Atopic dermatitis presents primarily in:
   a. children
   b. adolescents
   c. middle-aged adults
   d. women of child-bearing age
   e. the elderly

45. Which of the following is frequently seen in association with atopic dermatitis?
   a. diabetes
   b. arthritis
   c. asthma
   d. cardiovascular anomalies
   e. hearing loss

46. Development of psoriatic lesions at sites of skin trauma is known as:
   a. Koebner response
   b. Darier’s sign
   c. Auspitz sign
   d. Dennie-Morgan line
   e. triple response of Lewis

47. Which type of psoriasis may present following a streptococcal infection?
   a. psoriasis vulgaris
   b. erythrodermic psoriasis
   c. guttate psoriasis
   b. pustular psoriasis
   e. scalp psoriasis

48. Which of the following presents with classic targetoid lesions?
   a. bullous pemphigoid
   b. pemphigus vulgaris
   c. staphylococcal scalded skin syndrome
   d. erythema multiforme
   e. dermatitis herpetiformis
49. The mechanism of blister formation for pemphigus vulgaris includes:
   a. reticular degeneration
   b. acantholysis
   c. cytolysis
   d. basement membrane zone destruction
   e. ballooning degeneration

50. The direct immunofluorescent pattern of pemphigus vulgaris is:
   a. linear IgA at the basement membrane zone
   b. linear IgG and C3 at the basement membrane zone
   c. intercellular IgG and C3
   d. intercellular IgA and C3
   e. granular IgA in the dermal papillae

51. The direct immunofluorescent pattern of bullous pemphigoid is:
   a. linear IgA at the basement membrane zone
   b. linear IgG and C3 at the basement membrane zone
   c. intercellular IgG and C3
   d. intercellular IgA and C3
   e. granular IgA in the dermal papillae

52. Which autoimmune blistering disease most frequently presents with mucosal ulcers?
   a. bullous pemphigoid
   b. pemphigus vulgaris
   c. dermatitis herpetiformis
   d. pemphigus foliaceus
   e. staphylococcal scalded skin syndrome

53. Allergic contact dermatitis is an example of:
   a. Type I immediate hypersensitivity reaction
   b. Type II hypersensitivity reaction
   c. Type III hypersensitivity reaction
   d. Type IV delayed hypersensitivity reaction
   e. Type V hypersensitivity reaction

54. Common site for melanoma in women is:
   a. face
   b. anterior trunk
   c. posterior trunk
   d. upper arm (shoulder)
   e. posterior leg
55. About 80% of all newly diagnosed skin cancers will be:
   a. squamous cell carcinoma
   b. superficial spreading melanoma
   c. basal cell carcinoma
   d. sebaceous carcinoma
   e. actinic keratosis

56. The lifetime risk of developing invasive melanoma is:
   a. one in 37
   b. one in 57
   c. one in 65
   d. one in 79
   e. one in 100

57. The most important prognostic factor on malignant melanoma is:
   a. presence of regression
   b. mitotic index
   c. Clark’s level
   d. tumor thickness (Breslow’s level)
   e. presence of satellite lesions

58. The lifetime risk of developing melanoma-in situ or invasive melanoma is:
   a. one in 37
   b. one in 57
   c. one in 65
   d. one in 79
   e. one in 100
Pathology questions

Match the features in the questions with A-C below. (1 point each)

59. 2-3% overall rate of metastasis

60. Palisading is a helpful microscopic feature for diagnosis

61. Local recurrence is a problem

62. Multiple primary site tumors can arise

63. Sometimes arise from actinic keratoses
   a. Basal cell carcinoma
   b. Squamous cell carcinoma
   c. Both
A 65 year old man had had a pigmented lesion on his upper back for many years. Recently it grew larger and became irregular and varied in color. The microscopic section below shows a high magnification view of cells in the dermis. Such cells extended through the dermis into the subcutaneous tissue.

Answer true (A) or false (B) to the following (1 point each)

64. The most likely diagnosis is dysplastic nevus A

65. Dysplastic nevi are precursor lesions of malignant melanoma A

66. The only sites in the body from which malignant melanomas arise are the skin and eye A

67. Clark's level is a measure of radial growth, a factor closely associated with prognosis B
Questions 68-69

A 20 year old patient had received injections of penicillin for a throat infection. She subsequently developed a rash as illustrated below. It was characterized by multiple macules, papules, and vesicles distributed symmetrically on both upper extremities. A microscopic section of skin biopsy is also illustrated.

Fill in the blanks: (1 point per question)

68. The diagnosis is ________________

69. If the patient becomes febrile and seriously ill with development of erosions and crusts of the lips and oral mucosa, she will be said to have ________________ syndrome.
Question 70-72

A 15 year old boy complained of pain in the region of the knee, gradually increasing over the prior 2 months. X-ray revealed a dense lesion in the metaphysis in the distal femur with destruction of the cortex. A microscopic section of the tumor is shown below.

Choose the best answer to the following questions about the entity represented by this case. (1 point each)

70. Is this tumor classified as an (A) cartilage-forming or a (B) bone-forming tumor?

71. If we chart age against incidence of this tumor, is the curve (A) bell-shaped with peak at about 20 years or (B) bimodal with the first taller peak before 20?

72. Is the 10 year survival rate for those who show initial good response to chemotherapy (A) 97%, (B) 73%, (C) 10% or (D) 5%?
Fill in the blanks

73. Name a bone malignancy associated with translocation involving chromosomes 11 and 22.  **Ewing Sarcoma** (1 point)

74. Metastases to bone result in osteolysis through stimulation of **osteoclasts** (name the cell involved) (1 point)

Name 3 underlying constitutional states, diseases, environmental factors or therapeutic measures which are associated with an increased incidence of non-metastatic malignant bone tumors (1 point each)

75. **Osteoporosis**

76. **Excess alcohol consumption**

77. **Prolonged bed rest**

Match the features in each numbered question with diagnoses A-C. (1 point each)

78. Deletion of COL1A1, COL1A2; fractures in utero

79. Mutation in FGFR 3 and early postnatal death due to respiratory insufficiency

80. Seventh nerve paralysis

a. Thanatophoric dwarfism
b. Osteogenesis imperfecta, type II
c. Osteopetrosis
Pharmacology Questions

Questions #88-115: Indicate the single best answer

88. Which of the following is the primary mechanism by which non-selective NSAIDs damage the gastric mucosa?
   a. Direct stimulation of gastric acid secretion
   b. Increased gastric mucosal blood flow
   c. Direct gastric mucosal injury
   d. Inhibition of prostaglandin production in the stomach
   e. Stimulation of parasympathetic responses

89. Which of the following is a disadvantage of acetaminophen?
   a. The risk of gastrointestinal ulcers
   b. The risk of bleeding from an antiplatelet effect
   c. The lack of anti-inflammatory activity
   d. The delay of at least 1-2 weeks before an anti-inflammatory effect is seen
   e. The risk of hypersensitivity reactions

90. Which of the following is used only as an acute therapy and not as a prophylactic agent in gout?
   a. Probenecid
   b. Sulfinpyrazone
   c. High-dose aspirin
   d. Allopurinol
   e. Colchicine

91. With respect to antihistamines which of the following is INCORRECT?
   a. The newer 2nd generation antihistamines are more effective in providing symptom relief than the older drugs
   b. The non-sedating antihistamines have poor penetration into the CNS
   c. Regardless of sub-class, all antihistamines work by blocking H1 receptors
   d. They can cause paradoxical excitation in children or at high doses in adults
   e. They may be beneficial in reducing nausea and vomiting
92. Which of the following is NOT a common characteristic shared by all NSAIDS?
   a. Inhibition of COX-2
   b. Highly protein bound (albumin)
   c. Analgesia occurs only secondary to anti-inflammatory action
   d. Gastrointestinal upset
   e. Antipyresis

93. Which of the following is NOT likely to be a side effect of long term systemic glucocorticoid therapy?
   a. Osteoporosis
   b. Hypotension
   c. Weight gain
   d. Cushing's Syndrome
   e. Hyperglycemia

94. Which of the following is correct regarding COX-1 and COX-2 isoforms?
   a. Inhibition of COX-1 is associated with anti-inflammatory effects
   b. Inhibition of COX-1 is associated with GI toxicity
   c. Inhibition of COX-2 is associated with renal toxicity
   d. Inhibition of COX-2 is associated with antiplatelet effects

95. Which of the following DMARDs is associated with a high incidence of lupus or myasthenia gravis?
   a. Hydroxychloroquine
   b. Methotrexate
   c. Gold Salts
   d. D- Penicillamine
   e. Azathioprine

96. The current thinking regarding the mechanism for an increased risk of harmful cardiovascular events with the COX-2 inhibitors is:
   a. Inhibition of COX-2 in vascular endothelial cells decreasing PGI₂
   b. Inhibition of COX-2 in platelets
   c. Stimulation of calcium entry into cardiac muscle cells
   d. Secondary stimulation of COX regeneration in platelets
97. Which of the following is NOT associated with increased risk for acetaminophen toxicity?

a. Chronic alcohol use
b. Total daily doses of greater than 4 grams
c. Underlying hepatic impairment
d. Concurrent use of cytochrome P450 inhibitors

98. Which of the following medications is believed to inhibit COX-1 and Cox-2 equally and may have less GI toxicity than the traditional NSAIDs?

a. Diclofenac (Voltaren)
b. Nabumetone (Relafen)
c. Indomethacin
d. Aspirin
e. Ibuprofen

99. Which of the following is generally NOT a therapeutic mechanism for any of the DMARDs?

a. Inhibition of monocyte and macrophage function
b. Decreases in synovial concentration of IL-1
b. Decrease synthesis of leukotriene B4 in neutrophils
c. Inhibition of collagen formation / cross-linking
d. Inhibition of phospholipases and cyclooxygenase

100. Traditional or first generation antihistamines may block additional receptors leading to either secondary therapeutic benefit or unwanted side effects. Which of the following also binds to and blocks serotonin receptors?

a. Loratadine
b. Diphenhydramine
c. Cyproheptadine
d. Fexofenadine
e. Promethazine

101. For psoriasis involving less than 15% of the body surface the first choice for therapy is:

a. A topical glucocorticoid
b. A topical retinoid
c. Systemic methotrexate
d. Photo-chemotherapy
e. Biologic response modifier (e.g. etanercept: Enbrel)
102. All of the following factors are true regarding the properties of vehicles used for the topical delivery of drugs EXCEPT:

a. Vehicles are classified as either monophasic, biphasic or triphasic
b. Vehicles can have beneficial effects
c. Vehicles can decrease drug metabolism
d. Vehicles can influence the rate of drug absorption
e. Vehicles can be a source of irritation

103. Which of the following statements is NOT true?

a. Generic and brand name topical medications are not equivalent
b. Most side effects of glucocorticoids are not dose dependent
c. Oral glucocorticoids are only used for severe dermatological illnesses
d. Topical delivery of drugs typically has less side effects than oral delivery
e. Oral retinoids are potent teratogens

104. All of the following statements about factors that influence the percutaneous absorption of drugs are true EXCEPT:

a. Temperature can influence absorption
b. Occlusion increases absorption
c. Age of the patient can influence absorption
d. Hydration of the skin has no effect on absorption
e. Anatomic site can influence absorption

105. All of the following are potential toxic side effects of a high potency topical steroid EXCEPT:

a. Fetal malformation
b. Rosacea
c. Overgrowth of fungus and bacteria
d. Striae
e. Skin atrophy

106. All of the following statements about the rate of topical drug absorption are true EXCEPT:

a. The thicker the stratum corneum, the lower the rate of absorption
b. The lower the concentration of drug in the vehicle, the lower the rate of absorption
c. Vehicle composition can influence the rate of absorption
d. The higher the molecular weight of the drug, the lower the rate of absorption
e. The thicker the layer of cream applied, the higher the rate of absorption
107. All of the following statements about biologic response modifiers for the
treatment of psoriasis are true EXCEPT:

a. Biologic response modifiers have been approved by the FDA
b. Biologic response modifiers are applied topically
c. Some biologic response modifiers are administered by the patient
d. Psoriasis can reoccur if administration of biologic response modifiers is
   halted
e. Some biologic response modifiers target T-cells

108. A family physician is not allowed to write a prescription for a Control
    Substance Drug that is classified as a:

a. Schedule I Drug.
b. Schedule II Drug
c. Schedule III Drug
d. Schedule IV Drug

109. In a prescription, instructions to the pharmacist are give in the part of the
    prescription known as:

a. The Superscription
b. The Inscription
c. The Subscription
d. The Signatura

110. Which of the following statements concerning a prescription for morphine to
    relieve pain is NOT correct?

a. It must contain the physician’s DEA Number
b. It may be refilled only once.
c. It must be written in ink
d. It must be dated by the physician.

111. Which one of the following statements is CORRECT?

a. Refills for Schedule I drugs may be refilled after 1 month.
b. A new prescription for Schedule III drugs is required after 3 refills
c. A new prescription for Schedule IV drugs is required after 4 months
   after the date of issue
d. A new prescription for Schedule III, IV and V drugs is required
   after five refills or after six months after the date of issue
112. Typically, at which of the following Clinical Trial Phases is it possible to obtain the first indications that a drug candidate has some therapeutic efficacy?

a. Phase I studies  
b. Phase II studies  
c. Phase III studies  
d. Phase IV studies

113. The primary consideration in all clinical trials is to:

a. Ensure that there is no risk to the patient  
b. Determine the safety of the drug  
c. Provide for the welfare of the subject  
d. Determine whether the drug is efficacious

114. What is the single largest cause of attrition in drug development (i.e., where does a drug candidate fail)?

a. Absorption, distribution, metabolism, and elimination properties  
b. Adverse effects in man  
c. Adverse effects and toxicity in animal models  
d. Commercial reasons or business decisions

115. Which of the following is a major responsibility of the FDA?

a. Ensure the safety of the blood supply  
b. Decide whether a drug is to be made available for general medical use  
c. Protect the rights & interests of patients in clinical trials  
d. All of the above