

MiniBoard Exam 2011 Veterinary Pathology - Clinical Pathology

1. The following information is given for an 8 year old felid:

Na ⁺ -	138 mmol/L	Cl ⁻ -	102 mmol/L
Mg ⁺ -	2.4 mmol/L	Phos -	11.2 mg/dl
Ca ²⁺ -	10.1 mg/dl	HCO ₃ ⁻ -	10 mmol/L
K ⁺ -	7.9 mmol/L	PCO ₂ -	40 kPa

What is the anion gap?

- A. 5.8
- B. 13.9** (D +P pg. 143)
- C. 18.2
- D. 22.4
- E. 2.1

2. Which of the following is NOT a useful analyte for determining serum osmolality:

- A. BUN
- B. Glucose
- C. K⁺
- D. Na⁺
- E. CREA** (D+P pg. 137)

3-7. "Sunny" is a 10 year old neutered male domestic short hair cat presenting with a history of vomiting, anorexia, and urinating outside the litter box. On presentation, Sunny was dehydrated, had a low body temperature, and delayed capillary refill time.

White blood cell count:	14.0 X 10 ⁹ /L	(3.4-15.7)
Segmented neutrophils:	13.16 X 10 ⁹ /L	(1.2-13.2)
Band neutrophils:	0.0 X 10 ⁹ /L	(0-0.16)
Lymphocytes:	0.14 X 10⁹/L	(1.0-9.4)
Monocytes:	0.84 X 10 ⁹ /L	(0.1-1.2)
Eosinophils:	0.0 X 10 ⁹ /L	(0-1.2)
WBC Morphology: Normal		
Hematocrit:	22.7%	(26.1-46.5)
Hemoglobin:	7.6 g/dl	(8.8-16.0)
MCV:	39.5 fl	(39.0-50.6)
MCHC:	33.5 g/dl(31.5-36.5)	
RBC morphology: 1+ acanthocytes, 2+ echinocytes, 1+ Heinz bodies		
Platelets:	adequate(160,000-425,000)	
Plasma: Moderately lipemic		

BUN:	171 mg/dl	(12-39)
Creatinine:	5.2 mg/dl	(0.5-3.1)
Phosphorus:	9.1 mg/dl	(3.3-7.8)
Calcium:	7.4 mg/dl	(8.3-10.9)
Magnesium:	2.8 mEq/L	(1.6-2.4)
Total Protein:	6.5g/dl	(5.9-8.2)
Albumin:	3.0 g/dl	(2.4-4.1)
Globulin:	3.5 g/dl	(2.5-5.3)
Sodium:	133 mEq/L	(147-158)
Chloride:	84 mEq/L	(113-123)
Potassium:	2.5 mEq/L	(3.9-5.3)
Bicarbonate:	12.1 mEq/L	(12-20)
Anion Gap:	40	(19-30)
Total Bili:	0.6 mg/dl	(0.0-0.30)
ALP:	90 U/L	(2-88)
GGT:	4 U/L	(0-3)

ALT: 105 U/L (16-127)
AST: **53 U/L** (14-42)
Cholesterol: **822 mg/dl** (56-226)
Glucose: **556 mg/dl** (74-143)
Amylase: 745 U/L (555-1600)
Urinalysis: Cystocentesis
Urine specific gravity: 1.013 Ketones: 1+
Glucose: 3+ Protein: negative
Bilirubin: Negative
Sediment: rare granular casts, no WBC or RBC

3. Which of the following is the best interpretation of Sunny's CBC data?
- A. Epinephrine effects and chronic hemolysis
 - B. Corticosteroid effects and chronic hemolysis
 - C. Inflammation and anemia of chronic disease
 - D. Epinephrine effects and anemia of chronic disease
 - E. **Corticosteroid effects and anemia of chronic disease**
4. Which of the following are most likely contributing to Sunny's hypokalemia?
- A. Insulin deficiency and anorexia
 - B. **Polyuria and anorexia**
 - C. Insulin deficiency and polyuria
 - D. Oliguria and anorexia
 - E. Insulin deficiency and acidosis
5. Which of the following best explains Sunny's hyponatremia?
- A. Anorexia
 - B. **Hyperglycemia**
 - C. Free water loss
 - D. Acid-base disorder
 - E. Aldosterone deficiency
6. Which of the following best characterizes Sunny's acid base status?
- A. Uremic and ketoacidosis
 - B. Alkalosis due to vomiting
 - C. **Mixed acid base disorder**
 - D. Lactic acidosis due to poor perfusion
 - E. Normal (bicarbonate is within the reference interval)
7. What is the most likely cause of Sunny's hypercholesterolemia?
- A. Hypothyroidism
 - B. **Diabetes mellitus**
 - C. Nephrotic syndrome
 - D. Hyperadrenocorticism
 - E. Idiopathic hyperlipidemia
8. Which of the following may result in lymphocytosis?
- A. Chylothorax
 - B. SCID
 - C. **Hypoadrenocorticism** (D+P pg 75)
 - D. Acute systemic infection

E. Thymic necrosis

9. Which of the following correlates with stage 2 of lymphoma staging?

- A. The liver and spleen are involved
- B. Generalized lymph node involvement
- C. Single lymphoid tissue involvement excluding the BM
- D. Several regional nodes involved** (D+P pg 82-3)
- E. Involvement of solid organ with BM, blood and/or other organs

10. Which of the following regarding canine lymphoma is TRUE:

- A. Cutaneous is most common form
- B. Majority of canine lymphomas are T-cell origin
- C. Mycosis fungoides is predominantly multicentric
- D. Multicentric lymphoma is usually of B-cell origin** (D+P pg 83)
- E. Frequently associated with hypocalcemia

11. Basophil granules contain all of the following except ?

- A. Histamine
- B. Heparin
- C. Acid hydrolases** (Pg 54)
- D. Sulfated mucopolysaccharides

12. Toxic change of neutrophils include all of the following except?

- A. Cytoplasmic vacuolation
- B. Döhle bodies
- C. Nuclear hypersegmentation** (D+P pp. 59-60)
- D. Toxic granulation
- E. Cytoplasmic basophilia

13. A clinically important left shift in a bird is indicated by which of the following?

- A. Heterophils > 300 bands /ul
- B. Heterophils > 500 bands/ul
- C. Heterophils > 1,000 bands/ul** (D+P pg. 67)
- D. Greater than 1% of heterophils immature in a heteropenia
- E. Birds do not exhibit left shifts

14. Dog – What is the most likely diagnosis based on the following panel?

TEST	RESULT	REF INTERVAL
Sodium	143	144-157 mEq/L
Chloride	114	115-126 mEq/L
Potassium	3.3	3.6-6 mEq/L
Urea	14	8-29 mg/dL
Creatinine	1	0.7-1.6 mg/dL
Glucose	113	59-100 mg/dL
Cholesterol	90	97-210 mg/dL
Total Bilirubin	0	0-1 mg/dL
ALP	30	12-110 U/L

ALT	38	5-70 U/L
Total Protein	3	5-7.2 g/dL
Albumin	2	2.9-3.8 g/dL
Globulin	2	2.3-3.7

- A. Hepatic failure
- B. Protein losing nephropathy
- C. Gastrointestinal foreign body
- D. Protein losing enteropathy**
- E. Failure of passive transfer

15. Dog– What is the most likely diagnosis given the following results?

TEST	RESULT	REF INTERVAL
Cobalamin	180	290-400 ng/L
Folate	17.5	2-10 ug/L
TLI	< 0.1	5-20 ug/L

- A. Exocrine pancreatic insufficiency**
- B. Small intestinal bacterial overgrowth
- C. Proximal small intestinal disease
- D. Distal small intestinal disease
- E. Both proximal and distal small intestinal disease

16. Dog – what is the most likely diagnosis based on the following results?

TEST	RESULT	REF INTERVAL
Sodium	159	144-157 mEq/L
Chloride	128	115-126 mEq/L
Potassium	5.8	3.6-6 mEq/L
TCO2	22	17-29 mEq/L
Urea	50	8-29 mg/dL
Creatinine	2.0	0.7-1.6 mg/dL
USG	1.040	
ALT	54	5-70 U/L
ALP	60	12-110 U/L
Amylase	2500	350-1380 U/L
Lipase	970	180-460 U/L

Total Protein	7.5	5-7.2 g/dL
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- A. Renal failure
- B. Dehydration**
- C. Pancreatitis
- D. Proximal duodenal foreign body
- E. Portosystemic shunt

17. One-year-old bull. All of the following are potential diagnoses EXCEPT?

TEST	RESULT	REF INTERVAL
Sodium	135	150-160 mEq/L
Chloride	90	118-128 mEq/L
Potassium	3.1	4-5.8 mEq/L
TCO2	40	14-26 mEq/L

- A. Proximal duodenal foreign body
- B. Abomasal displacement
- C. Bovine renal failure
- D. Secretory diarrhea**
- E. All of the above are likely

18. Cat – Which of the following diagnoses is most likely given the following profile?

TEST	RESULT	REF INTERVAL
Total Bilirubin	6.3	0-1 mg/dL
ALP	800	16-75 U/L
ALT	332	13-55 U/L
AST	30	6-98 U/L
GGT	2	0-7 U/L

- A. Cholangiohepatitis
- B. Hepatic necrosis
- C. Cirrhosis
- D. Bile duct obstruction
- E. Hepatic lipidosis**

19. Horse – Which diagnosis is most likely given the following results?

TEST	RESULT	REF INTERVAL
Total Bilirubin	6.4	0.6-2.1 mg/dL
AST	200	185-300 U/L
GGT	15	7-17 U/L
CK	355	140-405 U/L
Ammonia	40	20-60 umol/L

- A. Pancreatitis
- B. Bile duct obstruction
- C. Anorexia**
- D. Cholangiohepatitis

E. Gastrointestinal disease

20. Which of the following erythrocyte characteristics are most likely with pyridoxine (vitamin B6) deficiency?

- A. Macrocytic hypochromic
- B. Microcytic hypochromic
- C. Macrocytic normochromic
- D. Microcytic normochromic**
- E. Normocytic hypochromic

21. Which of the following erythrocyte characteristics are most likely with cobalamin (vitamin B12) deficiency?

- A. Macrocytic hypochromic
- B. Microcytic hypochromic
- C. Macrocytic normochromic**
- D. Microcytic normochromic
- E. Normocytic hypochromic

22. Which of the following disease processes is NOT a potential cause of hyperammonemia in a horse:

- A. Gastrointestinal disease with bacterial overgrowth
- B. Liver disease
- C. Nursing foals with portosystemic shunts
- D. Genetic abnormality of Morgan foals
- E. Urea toxicity**

23. In cats with hyperthyroidism, which isoenzyme(s) is/are responsible for the increase in serum ALP?

- A. L-ALP
- B. B-ALP
- C. I-ALP
- D. L-ALP and B-ALP**
- E. L-ALP, B-ALP, and I-ALP

24. In dogs, corticosteroid-induced ALP is of:

- A. Liver origin
- B. Intestinal origin**
- C. Bone origin
- D. Placental origin
- E. Both bone and liver origins

25. Cats with disease processes that lead to a decreased sodium: potassium ratio often concurrently have evidence of:

- A. Hyperadrenocorticism
- B. Body cavity effusion**
- C. Gastrointestinal parasitism
- D. Neurologic disease
- E. Dermatitis

26. All of the following correlate with the severity of hepatic lipidosis in cattle EXCEPT?

- A. OCT
- B. AST
- C. Total bilirubin
- D. Serum bile acids**
- E. All of the above correlate

27. Dogs with congenital portosystemic shunts have decreases in all EXCEPT?

- A. Platelets
- B. Factor II
- C. Factor V
- D. Factor VII
- E. Factor VIII**

28. All are good indicators of hepatocellular injury in rats EXCEPT?

A. ALT

B. SDH

C. ALP

D. GDH

E. Bile acids

29. Diabetes mellitus can be associated with excess glucagon in the presence of hyperglycemia in which of the following species?

A. Ferrets

B. Guinea Pigs

C. Birds

D. Rabbits

E. None of the above

30. Bilirubinuria without disease is a common finding in which species?

i. Dogs

ii. Ferrets

iii. Rabbits

iv. Sheep

v. Cats

A. i

B. i, ii

C. i, ii, iii

D. i, ii, iii, iv

E. i, ii, iii, iv, v

31. Which is the primary breakdown product of heme in birds?

A. Bilirubin

B. Biliverdin

C. Cholate

D. Stercobilinogen

E. Urobilinogen

32. ALP increases in birds are most likely due to?

A. Cholestatic liver disease

B. Gastrointestinal disease

C. Renal failure

D. Osteoblastic activity

E. Corticosteroid treatment

33. Which is the most liver specific enzyme in birds?

A. AST

B. ALT

C. GDH

D. ALP

E. GGT

34. Food restriction can lead to changes in which enzyme in rats?

A. AST

B. ALT

C. GDH

D. ALP

E. GGT

35. In equine endometrial cytology the presence of eosinophils has been associated with which of the following:

- A. *Taylorella equigenitalis* infection
- B. Active inflammation
- C. Equine Herpes III infection
- D. Equine piroplasmiasis outbreaks
- E. Pneumouterus** (D&Prasse, 4th edition, pg 329)

36. Abdominocentesis is performed on a dog in an ER clinic run by Dr. Taylor Chance, who doesn't know his ass-from-a-hole-in-the-ground so he calls you for help. The cytologic specimen he describes has the following features: "neutrophils, macrophages, moderate numbers of binucleate and multinucleate cells with occasional mitosis and moderate anisokaryosis, erythrocytes, lymphocytes, some proteinaceous debris, and occasional macrophage contains few bacteria and yellow-green to blue-green pigment." A likely diagnosis may be:

- A. Ruptured bowel
- B. Pancreatic "carcinomatosis"
- C. Uroperitoneum
- D. Bile peritonitis** (D&Prasse, 4th edition, pg 318)
- E. Acute abdominal trauma

37. A dog has the following thyroid profile:

tT4=decreased; fT4=decreased; TSH=Within Reference Interval; TgAA= Neg

All of the following are possible explanations EXCEPT:

- A. Sick euthyroidism,
- B. Nonthyroidal illness
- C. Secondary hypothyroidism due to pituitary gland dysfunction
- D. Hypothyroxemia due to effects of drugs
- E. Primary hypothyroidism due to thyroid atrophy** (Stockham&Scott, 1st edition, pg 551, table 17.4)

38. All of the following may cause hypermagnesemia EXCEPT:

- A. Increased urinary excretion** (Stockham&Scott, 1st edition, pg 423, table 11.6)
- B. Increased intestinal absorption of Mg²⁺ without increased PTH
- C. Milk Fever
- D. Shift of free Mg²⁺ from ICF to ECF
- E. Excessive IV infusion of MG

39. All the following parasites predominantly cause extravascular hemolysis EXCEPT:

- A. Babesia spp.** (DP pg 31, Table 1.2)
- B. *Anaplasma* spp.
- C. *Cytauxzoon* spp.
- D. *Theileria* spp.
- E. *Trypanosoma* spp.

40. From the following values, what is the approximate sensitivity of a certain ELISA test?

True positives- 90
True negatives- 110
False positives- 10
False negatives- 5

- A. 80%
- B. 90%
- C. 95%** (D+P, pg. 335; TP divided by TP+FN x 100)

D. 98%
E. 100%

Miniboard Exam 2011 Veterinary Pathology- Small Animal

1. Pandemic (H1N1) 2009 influenza virus antigen was detected in all of the following tissues in the cat EXCEPT:

- A. Bronchial epithelium** (Vet Path 2010 pg 381)
- B. Bronchiolar epithelium
- C. Type II pneumocytes
- D. Type I pneumocytes
- E. Alveolar macrophages

2. The most common site for development of Feline cutaneous leishmaniasis is:

- A. The periocular skin
- B. The muzzle
- C. The pinna** (Vet Path 2010 pg 1076)
- D. The ventral abdomen
- E. The digits

3. The strongest predictive variable for feline mast cell tumor is:

- A. Cytoplasmic granule density
- B. Mitotic index** (Vet Path 2010 pg 643)
- C. Eosinophil count
- D. KIT pattern
- E. Lymphocytic infiltrates

4. Which of the following is NOT a criteria for diagnosing a high grade mast cell tumor using the 2-tier histologic grading system:

- A. Tumor depth** (Vet Path OnlineFirst, 9 Nov 2010)
- B. ≥ 3 multinucleated (3 or more nuclei) cells in 10 hpf
- C. ≥ 3 bizarre nuclei in 10 hpf
- D. Karyomegaly
- E. ≥ 7 mitotic figures in 10 hpf

5. The pulmonary nematode *Aelurostrongylus abstrusus* has also been identified in the glands of which section of the gastrointestinal tract in the cat:

- A. Stomach
- B. Duodenum
- C. Jejunum
- D. Ileum
- E. Colon** (JVDI 2010 pp. 652-655)

6. Using multivariate analysis, which parameter was the most effective in predicting outcome in dogs with oral melanoma:

- A. Mitotic rate
- B. A high Ki-67 score
- C. Nuclear atypia** (Vet Path Online, 1 Dec 2010, Prognostic evaluation of Ki-67 threshold value in canine oral melanoma)
- D. Location within the oral cavity
- E. Amount of melanin pigment within neoplastic cells

7. In feline pulmonary Langerhans cell histiocytosis, lesional histiocytes expressed which of the following?

- A. CD20
- B. CD18
- C. Vimentin
- D. B and C** (Feline Pulmonary Langerhans Cell Histiocytosis with Multiorgan Involvement VP 45:816-824 (2008))
- E. All of the above

8. Which of the following is not used to classify a lesion as Actinic Keratosis in cats?

- A. Loss of the normal architecture confined to the basal and spinous layers

B. Superficial involvement of the hair follicle

C. Abrupt transition between the lesional and nonlesional epidermis (Clinical, Histologic, and Immunohistochemical Analyses of Feline Squamous Cell Carcinoma In Situ VP 46:25-33(2009))

D. Mild to moderate nuclear atypia

E. Presence of apoptotic cells

9. Which of the following is FALSE in cases of feline gastrointestinal eosinophilic sclerosing fibroplasias?

A. Vomiting was the most common presenting sign

B. In some cases the lesions involved the pancreas

C. The lesions most commonly involved the pyloric sphincter

D. The fewest cases were noted in the small intestine

E. Lymph nodes were not noted to be involved (Feline Gastrointestinal Eosinophilic Sclerosing Fibroplasia VP 46:63-70(2009))

10. Which of the following is TRUE in dogs with *Leishmania infantum* infections?

A. Dogs with facial skin lesion showed a higher parasite load in cervical lymph nodes

B. Dogs with facial skin lesion showed a higher parasite load in parotid lymph nodes (Cervical, Mandibular, and Parotid Lymph Nodes of Dogs Naturally Infected with *Leishmania infantum*: A Histopathologic and Immunohistochemistry Study and Its Correlation with Facial Skin Lesions VP 45:613-616(2008))

C. Dogs with facial skin lesion showed a higher parasite load in mandibular lymph nodes

D. All of the above

E. None of the above

11. All are features of uveodermatologic syndrome (Vogt-Koyanagi-Harada-like syndrome) EXCEPT:

A. Leukotrichia

B. Pigmentary incontinence

C. Interface dermatitis with histiocytic predominance

D. Frequent vacuolar degeneration of basal keratinocytes (JKP vol.1, pp. 509-10 and 602-3)

E. Granulomatous endophthalmitis

12. When present, _____ is the pathognomonic lesion of glaucoma in the dog and cat:

A. Goniodysgenesis

B. Buphthalmos with corneal striae

C. Atrophy of retinal inner nuclear cell layer

D. Loss of retinal ganglion cell layer

E. Excavation (“cupping”) of the optic disk (JKP vol.1, p. 517)

13. The intestine and the _____ are the most commonly involved sites of protothecosis in dogs:

A. Skin

B. Eye (JKP vol.2, p.231)

C. Liver

D. Brain

E. Heart

14. All of the following are causes of feline ulcerative stomatitis EXCEPT:

A. Uremia

B. Feline calicivirus

C. Feline herpesvirus I

D. Pemphigus vulgaris

E. Diabetes insipidus (JKP vol. 2 pp. 15-18)

15. All of the following histologic changes were noted in dogs with congenital hepatic fibrosis EXCEPT:

A. Severe bridging fibrosis

B. Marked increase in numbers of bile ducts

C. Absence or lack of portal vein profiles

D. Nodular regeneration (Vet Path – JAN 2010 pgs 102-107 (Pg. 3, “Nodular regeneration was absent in ALL 5 CASES, and inflammation was absent to minimal.”)

E. Mild arteriolar hyperplasia

16. All of the following are true regarding copper associated hepatitis in labrador retrievers EXCEPT:

A. Histologic lesions include centrilobular pigmented granulomas

B. The identified genetic defect is in the COMD1 gene (Vet Path – May 2009 , 46: pp. 484-490. No genetic defect has been identified. (This was mentioned several times in the article that the genetic defect has NOT been identified.)

C. Histologic lesions include bridging fibrosis

D. Histologic lesions include nodular regeneration

E. Histologic lesions include pseudolobule formation

17. In an acute fatal outbreak of hemorrhagic pneumonia in intensively housed shelter dogs in California, all of the following statements are true EXCEPT:

A. All dogs had hemothorax

B. The primary bacterial isolate was *Streptococcus equi subsp. zooepidemicus*

C. Large and medium sized airways were worst affected (Vet Path Jan 2008 45: 51-53 (Large and medium airways were UNAFFECTED))

D. Septic thromboemboli were common

E. Large numbers of gram-positive cocci were found with macrophages and free within alveolar spaces

18. In the feline liver, the progenitor cell compartment is easily demonstrated by immunohistochemical staining for:

A. CK19

B. CK7 (Vet Path 2009 46:614-621)

C. CK18

D. Hepar1

E. MRP2

19. In a recent review of canine synovial myxomas the most commonly affected sites were:

A. Stifle and digit (Vet Path 2010 47(5): 931-936)

B. Stifle and elbow

C. Stifle and shoulder

D. Elbow and digit

E. Digit and shoulder

20. All of the following are lesions associated with cocaine toxicosis in canines EXCEPT:

A. Subepicardial and epicardial hemorrhage

B. Degeneration of cardiac myofibers

C. Pericardial effusion

D. Valvulopathy (Veterinary Toxicology: Basics and principles by Ramesh Chandra Gupta, Academic Press (2007), p.401 (Ames 2010 TQ))

E. Pulmonary hemorrhage

21. All of the following are histological lesions in dalmatian dogs with familial acute respiratory distress syndrome (ARDS) EXCEPT:

A. Atypical hyperplasia of bronchiolar epithelium

B. Consistent formation of alveolar hyaline membranes (Comp path 141:254-259 (2009) – Pulmonary histopathology in Dalmatians with familial acute respiratory distress syndrome (ARDS) (Ames 2010 TQ))

C. Patchy fibrosis

D. Squamous and myofibroblastic metaplasia

E. Lymphohistiocytic interstitial inflammation

22. All of the following are histologic findings of juvenile pancreatic atrophy in greyhounds EXCEPT:

A. Only the exocrine pancreatic cells are affected (JVIM 23(1):67-71 (2009), Juvenile Pancreatic Atrophy in Greyhounds – both endocrine and exocrine pancreas are affected (Ames 2010 TQ))

B. Acinar cell apoptosis

C. Zymogen granule loss

D. Lymphoplasmacytic pancreatitis

E. Cytoplasmic clearing or vacuolar changed

23. Which of the following is NOT true regarding Myopathy of Labrador Retrievers?

A. Affected muscles exhibit a marked increase in fiber size variation

B. Variation in fiber size is most severe in older dogs

C. Autosomal recessive

D. Muscle atrophy is consistently apparent grossly (JKP Vol 1, p.216-217 – muscle atrophy may or may not be apparent (Ames 2010 TQ))

E. The temporalis muscles appear to be particularly prone to atrophy

24. Which of the following is NOT a histologic feature of progressive juvenile nephropathy of french mastiff dogs?

A. Capillary wall thickening with immune complex deposition (JVIM 24:314-322 (2010) Progressive juvenile glomerulonephropathy in 16 related French Mastiff (Bordeaux) dogs – NO immune complex deposition (Ames 2010 TQ))

B. Cystic glomerular atrophy

C. Glomerular hypercellularity

D. Tubular atrophy

E. Renal dysplasia

25. Degenerative polymyopathy in cats is primarily due to which of the following?

A. Hyperkalemia

B. Hypocalcemia

C. Hypokalemia (JKP vol 1 p. 249 &257 (Ames 2010 TQ))

D. Hypomagnesium

E. Hypercalcemia

Miniboard Exam 2011 General Pathology

1. Pre-miRNA is processed to miRNA by which enzyme:

- A. RNA protease
- B. Dicer**
- C. DNA protease
- D. mRNA ligase
- E. Donner

2. An error in mitosis or meiosis that results in a cell with a chromosome number which is not an exact multiple of the haploid number is called:

- A. Euploidy
- B. Polyploidy
- C. Diploidy
- D. Aneuploidy**
- E. Megaploidy

3. The complement component binds to what portion of the B-cell receptor complex to generate Signal 2 which promotes B cell activation?

- A. CD 21**
- B. IgM
- C. CD 28
- D. CD 4
- E. CD 3

4. Which cytokines induce the proliferation of Thelper17 (TH17) cells?

- 1. IFN- γ
- 2. IL-4
- 3. TGF- β
- 4. IL-6
- 5. IL-12

A. 1 and 4

B. 1 and 3

C. 3 and 4

D. 2 and 3

E. 1 and 5

5. Phosphorylation of RB protein is mediated by which complex?

- A. Cyclin B-CDK1
- B. Cyclin A-CDK1
- C. Cyclin A-CDK2
- D. Cyclin E-CDK1
- E. Cyclin D-CDK6**

6. All are ligands for toll-like receptor 2 (TLR2) EXCEPT: (2007 ACVP question)

- A. Zymosan
- B. Peptidoglycan
- C. Lipoarabinomannan
- D. Double-stranded RNA**
- E. Phosphatidylinositol dimannoside

7. T lymphocyte anergy can be mediated by blocking IL-2 production when B7 is bound by which molecule?

- A. CTLA-4**
- B. CD28
- C. CD3
- D. CCL2
- E. SHPS-1

8. Which inflammatory cell is considered part of the first line of defense against cancer cells?

- A. Dendritic cells
- B. CD8 T lymphocytes
- C. CD4 T lymphocytes
- D. Natural Killer (NK) cells**
- E. B lymphocytes

9. Glanzmann's thrombasthenia is caused by mutation of a Ca^{+2} - binding domain of:

- A. GPIb
- B. GPIa
- C. GPIIb**
- D. GPIIa
- E. GPIIIb

10. All are true for platelet activating factor (PAF) EXCEPT:

- A. Produced by mast cells
- B. Inhibited by PAF acetylhydrolase
- C. Is a product of cyclooxygenase enzymes**
- D. Lysophosphatidylcholine is an intermediate form
- E. Is derived from cytoplasmic phospholipase A2 activity

11. All are free radical scavengers EXCEPT:

- A. Superoxide dismutase
- B. Ceruloplasmin
- C. Vitamin C
- D. Catalase
- E. Iron**

12. Which increases in sepsis?

- A. Plasminogen-activator inhibitor 1**
- B. Tissue factor-pathway inhibitor
- C. Antithrombin III
- D. Protein C
- E. Protein S

13. All of the following help induce endothelial proliferation except:

- A. Hypoxia
- B. TGF- β
- C. PDGF
- D. Endostatin**
- E. TGF- α

Robbins and Cotran, 8th ed., p. 100 Table 3-3; 102, 1st col., 1st paragraph

14. Which of the following point within the cell cycle is responsible for monitoring the integrity of DNA prior to replication:

- A. G0 phase
- B. G1/S checkpoint**
- C. G2
- D. G2/M checkpoint
- E. M phase

Robbins and Cotran, 8th ed., p. 86 Figure 3-7; p. 87 1st col.; 2nd paragraph

15. Which of the following is the correct sequence for the leukocyte adhesion cascade:

- A. Tethering > Margination > Rolling > Slow rolling > Activation by chemokines > Firm adhesion > migration through endothelium
- B. Tethering > Margination > Rolling > Slow rolling > Firm adhesion > Activation by chemokines > migration through endothelium

C. Margination > Tethering > Rolling > Slow rolling > Activation by chemokines > Firm adhesion > migration through endothelium

D. Margination > Tethering > Rolling > Activation by chemokines > Slow rolling > Firm adhesion > migration through endothelium

E. Margination > Tethering > Activation by chemokines > Rolling > Slow rolling > Firm adhesion > migration through endothelium

(McGavin and Zachary, Ch. 3, p. 111)

16. Basophils lack which of the following:

A. Heparin

B. Histamine

C. LTC₄

D. LTD₄

E. LTE₄

McGavin and Zachary p118 1st col., 3rd paragraph, p146, p148

17. All of the following are true concerning Delta-like ligand 4, EXCEPT:

A. It is expressed in arteries

B. It is expressed in capillaries

C. It is expressed in veins

D. It interacts with NOTCH

E. Blockade of Delta-like ligand 4 results in increased vessel sprouting

Robbins and Cotran, 8th ed., p. 100, col. 2, 2nd paragraph

18. Superantigens are:

A. Monoclonal T-lymphocyte activators

B. Polyclonal T-lymphocyte activators

C. Monoclonal B-lymphocyte activators

D. Polyclonal B-lymphocyte activators

E. Monoclonal T- and B-lymphocyte activators

Robbins and Cotran, 8th ed., p. 132, col. 1, 3rd paragraph

19. The alternative pathway within the complement cascade is activated by:

A. IgG

B. IgM

C. IgE

D. Mannose-binding lectin

E. LPS

McGavin and Zachary, p. 125.

20. Gradual cooling of the cadaver is referred to as:

A. Livor mortis

B. Algor mortis

C. Rigor mortis

D. Softening

E. Anthropogenic cooling

21. All of the following are cytomorphologic changes characteristic of irreversible cell injury except:

A. Plasma membrane damage

B. Calcium entry into the cell

C. Detachment of ribosomes

D. Mitochondrial swelling and vacuolization

E. Large amorphous densities in the mitochondria

F. Lysosomal swelling

22. All of the following are major cytosolic antioxidants except:

A. Catalase

B. Superoxide dismutase (SOD)

- C. Vitamin C
- D. Glutathione peroxidase
- E. Ceruloplasmin

23. Which of the following is NOT a procoagulant mediator in hemostasis?

- A. Thromboxane A₂
- B. Tissue Factor Pathway Inhibitor**
- C. Adenosine Diphosphate (ADP)
- D. von Willebrand's factor
- E. Plasminogen activator inhibitor-1 (PAI-1)

24. Antithrombin III degrades all of the following activated coagulation factors except:

- A. Factor X
- B. Factor XII
- C. Factor II
- D. Factor VII**
- E. Factor III

25. Which of the following is an initiator caspase?

- A. Caspase 6
- B. Caspase 9**
- C. Caspase 1
- D. Caspase 7
- E. Caspase 3

26. All of the following are proapoptotic except:

- A. Cytochrome c
- B. Tumor Necrosis Factor (TNF)
- C. Mcl-1**
- D. Bax
- E. Bak

27. Which of the following cytokines does NOT contribute significantly to acute inflammation?

- A. Tumor Necrosis Factor (TNF)
- B. IL-1
- C. IL-17**
- D. IL-6
- E. C5a

28. Which of the following is classified as a CX3C chemokine?

- A. Lymphotactin
- B. Fractalkine**
- C. Eotaxin
- D. RANTES
- E. Monocyte chemoattractant protein (MCP-1)

29. Which of the following tissues does not have fenestrated capillaries?

- A. Liver**
- B. Intestinal villi
- C. Choroid plexus
- D. Ciliary body
- E. Glomeruli

30. Which of the following is able to pass freely through endothelial pores?

- A. Complement molecules
- B. Albumin
- C. Amino acids**

- D. Kinin molecules
- E. Coagulation proteins

31. Which of the following is not an increased hydrostatic pressure mechanism of edema?

- A. Portal hypertension
- B. Lymphatic obstruction**
- C. Left sided heart failure
- D. Visceral torsion
- E. Iatrogenic fluid overload

32. Which of the following coagulation factors is not part of the interdependent contact group?

- A. Factor IX**
- B. Factor XI
- C. Factor XII
- D. Prekallikrein
- E. HMWK

33. Platelet binding to which of the following forms the strongest bond?

- A. Collagen
- B. GpIb/VWF**
- C. Fibronectin
- D. Glycoprotein
- E. Proteoglycan

34. As tumors progress to malignancy, macrophages facilitate tumor progression by which of the following:

- A. Stimulate angiogenesis
- B. Enhance tumor cell migration, invasion, and intravasation
- C. Suppress antitumor immunity
- D. Potentiate seeding and establishment of metastatic cells
- E. All of the above** (Cell 141, Macrophage Diversity Enhances Tumor Progression and Metastasis, review article, 2 April 2010, pg 39)

35. Cytokines produced by tumor-infiltrating immune cells predominately activate which of the following key transcriptions factors:

- A. c-Myc
- B. Bcl-6
- C. STAT3** (Cell 140, Immunity, Inflammation, and Cancer, review article, 19 March 2010, pg 889)
- D. STAT5
- E. l-Myc

36. All of the following are considered classes of the Pattern Recognition Receptors(PRR) family EXCEPT:

- A. Toll-like receptors (TLR)
- B. C-type lectin receptors (CLR)
- C. Retinoic acid-inducible gene like receptors (RLRS)
- D. F-type lectin receptors (FLR)** (Cell 140, Pattern Recognition Receptors and Inflammation, review article, 19 March 2010, pg 805)
- E. NOD-like receptors (NLRs)

37. Pyroptosis is mediated by which of the following caspases:

- A. Caspase 6

B. Caspase 9

C. Caspase 3

D. Caspase 1 (NEJM 361:16, Cell Death, 15 October 2009, supplemental material to article)

E. Caspase 11

38. The inflammasome's primary role involves cytokine processing and regulation of inflammation via cleavage and activation of which of the following:

A. IL-3 and IL-15

B. IL-1C and IL-22

C. IL-1B and IL-18 (NEJM 361:16, Cell Death, 15 October 2009, supplemental material to article)

D. IL-3 and IL- 6

E. IL-4 and IL-10

39. Loss of function in which of the following is necessary for epithelial-to-mesenchymal transition:

A. Epidermal growth factor receptor

B. Insulin-like growth factor

C. SRC kinases

D. E-Cadherin (NEJM 359:26, Molecular Basis of Metastasis, 25 December 2008, pg 2816)

E. Vascular endothelial growth factor

40. All TLR family members use the MYD88 EXCEPT:

A. TLR5

B. TLR3 (Nature Rev Immunology 9 August 2009, A cell biological view of toll-like receptor function: regulation through compartmentalization, review article, Box 1)

C. TLR9

D. TLR7

E. TLR4

41. Which of the following is a recently described type of cell death that is considered non-apoptotic and has been reported to occur in neurodegenerative diseases and is characterized by extensive cytoplasmic vacuolization and progressive swelling of mitochondria and ER?

A. Entosis

B. Anoikis

C. Pyroptosis

D. Paraptosis

E. Autophagy (NEJM 361:16, NEJM 361:16, Cell Death, 15 October 2009, supplemental material to article)

42. In the biogenesis of miRNA which of the following is the correct general sequence of events:

A. Transcription>Exportin 5>pre-miRNA>Drosha>Dicer>miRNPs with AGO>repress protein synthesis

B. Transcription>pre-miRNA>Drosha>Exportin5>Dicer>miRNPs with AGO>repress protein synthesis (AJP, 174, No.4, April 2009, Keynote Lecture: miRNAs and Cancer, figure 1, pg 1132)

C. Transcription>pre-miRNA>Exportin 5>Drosha>Dicer>miRNPs with AGO >repress protein synthesis

D. Transcription>Drosha>pre-miRNA>Dicer>Exportin 5>miRNPs with AGO>stimulate protein synthesis

E. Transcription>Dicer>pre-miRNA>Drosha>Exportin5>miRNPs with AGO>stimulate protein synthesis

43. Which of the following illustrations of stepwise tumor development is correct:

A. Initiation (Irreversible), Promotion (Reversible), Progression (McGavin – Ch. 6, Pg. 267 – diagram)

B. Initiation (Reversible), Promotion (Reversible), Progression

C. Promotion (Reversible), Progression, Initiation(Irreversible)

- D. Initiation (Irreversible), Progression, Promotion (Irreversible)
- E. Initiation (Irreversible), Progression, Promotion (Reversible)

44. All of the following are types of genetic alteration in cancer cells EXCEPT:

- A. Translocation
- B. Mutation
- C. Deletion

D. DNA Methylation (McGavin – Pg.283-284 – DNA methylation is a type of “epigenetic” change)

- E. Amplification

45. All of the following are components of innate immunity EXCEPT:

A. Lymphocytes (Pg. 184 – R&C – 8th Edition)

- B. Neutrophils
- C. Macrophages
- D. Dendritic cells
- E. Natural killer cells

46. All of the following are surface molecules present on naïve B lymphocytes EXCEPT:

- A. IgM
- B. IgD
- C. CD21
- D. CD40

E. CD28 (CD 28 is present on T cells – Signal 2)

47. All of the following statements are true regarding natural killer cells EXCEPT:

- A. They are active in antibody dependent cell-mediated cytotoxicity(ADCC)
- B. Natural killer cells require exposure to antigen via MHC II molecules** (R&C Ch. 6, pg. 188)
- C. CD 16 and CD 56 are two of the cell surface molecules
- D. They are also know as large granular lymphocytes because of their abundant azurophilic granules
- E. Natural killer cells are important in defense against tumor cells

48. Which caspase is activated by the Fas-associated death domain?

- A. Caspase 3
- B. Caspase 6

C. Caspase 8 (PBVD pg 30)

- D. Caspase 9
- E. Caspase 10

49. Which of the following is an executioner Caspase?

- A. Caspase 8
- B. Caspase 9
- C. Caspase 10

D. Caspase 3 (PBVD pg 31)

- E. C and D

50. Which of the following is a mechanism for hepatic lipidosis:

- A. Decreased β -oxidation of fatty acids
- B. Impaired apoprotein synthesis
- C. Excessive free fatty acid delivery
- D. Impaired lipoprotein release
- E. All of the above** (PBVD pg 40)

Miniboard Exam 2011 Veterinary Pathology - Laboratory Animal

1. Which of the following is NOT a feature of Histiocytic Sarcoma in Mice:
 - A. Composed of round, fusiform, or mixed cell types
 - B. F4/80 immunohistochemically positive neoplastic cells
 - C. Mac-2 immunohistochemically positive neoplastic cells
 - D. PAX5 immunohistochemically positive neoplastic cells** (Vet Path 2010 pg. 434)
 - E. Exhibition of only germline JH band with Southern blot analyses

2. Which of the following is NOT a characteristic of the monogenic form of Diabetes Mellitus in vervet monkeys:
 - A. Persistent fasting hyperglycemia
 - B. Hyper triglyceridemia
 - C. Islet amyloidosis** (Vet Path 2010 pg. 713)
 - D. Normal islet insulin immunostaining
 - E. An autosomal dominant or mitochondrial inheritance pattern

3. Which of the following is NOT a characteristic of small intestinal carcinoma in common marmosets?
 - A. Loss of polarity within neoplastic cells
 - B. Increased membranous expression of E-cadherin and β -catenin** (Vet Path 2010 pg. 969)
 - C. Lymphatic invasion and metastasis
 - D. Proliferation of neoplastic cells along the crypt to midvillous interface
 - E. Lack of Helicobacter organisms in areas of neoplastic transformation

4. All of the following are characteristics of congenital generalized lipodystrophy in *Agat2*^{-/-} mice EXCEPT:
 - A. Presence of metabolically active visceral and subcutaneous adipose tissue** (Vet Path 2010 online article- Pathology of congenital generalized lipodystrophy in *Agat2*^{-/-} mice)
 - B. Insulin resistance
 - C. Hypertriglyceridemia
 - D. Hepatic steatosis
 - E. Massive pancreatic islet hypertrophy

5. Which of the following is true concerning endometrial neoplasms in rabbits?
 - A. Papillary adenocarcinomas are predominantly ER-alpha positive and PR negative
 - B. Tubular adenocarcinomas are predominantly ER-alpha negative and PR negative
 - C. Papillary adenocarcinomas are predominantly ER-alpha negative and PR positive
 - D. Tubular adenocarcinomas are predominantly ER-alpha positive and PR positive** (The Immunohistochemical Evaluation of Estrogen Receptor- α and Progesterone Receptors of Normal, Hyperplastic, and Neoplastic Endometrium in 88 Pet Rabbits VP 45:217-225(2008))
 - E. All of the above are false

6. With experimental Nipah viral infection in Guinea pigs which of the following tissues was LEAST affected?
 - A. Lung** (Histopathologic and Immunohistochemical Characterization of Nipah Virus Infection in the Guinea Pig VP 45:576-585(2008))
 - B. Spleen
 - C. Lymph nodes
 - D. Brain
 - E. Uterus

7. Which of the following mouse strains is most susceptible to development of adrenocortical carcinomas?
 - A. FVB
 - B. C57BL
 - C. DBA

D. CE/J (REVIEW PAPER: Origin and Molecular Pathology of Adrenocortical Neoplasms
VP 46:194-210(2009))
E. NU/J

8. In the guinea pig, suppurative lymphadenitis is usually associated with infection by:

- A. *Streptococcus pneumoniae*
- B. *Streptococcus pyogenes*
- C. *Streptococcus zooepidemicus*** (Percy & Barthold, p. 229)
- D. *Staphylococcus aureus*
- E. *Corynebacterium kutscheri*

9. In the rat, infections of *Mycoplasma pulmonis* and CAR bacillus share the following features:

- A. Chronic suppurative bronchiolitis and peribronchiolar cuffing with lymphocytes and plasma cells** (Percy & Barthold, pp.142-146)
- B. Proliferative alveolitis with syncytial cells
- C. Interstitial pneumonia with perivascular lymphocytic infiltrates and marked alveolar histiocytosis
- D. Nonsuppurative vasculitis and interstitial alveolitis with necrosis
- E. Multifocal coagulative to caseating necrosis with leukocytic infiltration

10. Kurloff cells in the guinea pig are the counterpart of _____ in other species:

- A. Macrophages
- B. Metamyelocytes
- C. Plasma cells
- D. NK cells** (Percy & Barthold, p. 218)
- E. Follicular dendritic cells

11. In mice, multifocal acute hepatic necrosis with syncytial cells is a hallmark of disease caused by:

- A. Polytopic strains of murine corona virus** (Percy & Barthold, p. 33)
- B. Sendai virus
- C. Ectromelia virus
- D. Mouse adenovirus type 1
- E. Mouse adenovirus type 2

12. Lesions of natural infection with *Theilovirus* in SCID mice include:

- A. Proliferative and necrotizing dermatitis with ballooning degeneration and eosinophilic intracytoplasmic inclusions
- B. Necrotizing hepatitis with endothelial syncytia
- C. Nonsuppurative bronchointerstitial pneumonia with epithelial syncytia
- D. Vacuolation of enterocytes at tips of villi and acidophilic intracytoplasmic inclusions
- E. Neuronal, astrocytic and oligodendroglial vacuolation and enlargement in brain stem and ventral horn of spinal cord** (Percy & Barthold, pp. 40-1)

13. In mice with situs inversus, which of the following statements is FALSE:

- A. Pkd111^{-/-} mice had hydrocephalus, sinusitis, and male infertility** (JAN 2010 VP pp. 120-131 (Abstract))
- B. Situs inversus is a left to right transposition of the thoracic and visceral organs
- C. Dped/Poll^{-/-} mice had situs inversus, hydrocephalus, sinusitis, and male infertility
- D. Situs inversus results in a ciliary motility problem
- E. Nme7^{-/-} mice had situs inversus and hydrocephalus

14. Regarding spontaneous hibernomas in rats, which of the following statements is FALSE:

A. A common strain affected is the Sprague Dawley rat

B. The genetic defect is from the UCP-1 gene, (thermogenin)

C. The abdominal cavity is the most commonly affected site (Tox Path: 2009, 37: pp. 547-552 (The THORACIC CAVITY is most affected. This makes sense with all the brown fat in the cranial mediastinal area))

D. Males get this more frequently than females

E. Hibernomas are tumors of brown fat

15. Concerning an outbreak of fatal herpesvirus infection in domestic rabbits in Alaska, lesions were found in all of the following organs except:

A. Skin

B. Heart

C. Spleen

D. Lung

E. Liver (Vet Path May, 2008 pp. 369-374 (No lesions were found within the intestines, liver, or kidney.))

16. *Baccharis pteroniodes* toxicity in hamsters causes:

A. Hemorrhagic infarcts of the liver and kidney

B. Necrotizing vasculitis of the hepatic and renal vessels

C. Cardiac necrosis

D. A, B, &C

E. A & B (JVDI, Vol 21, pg. 208-213) (I added this question because I vaguely recall this article may have been on our test as well. I also think it was on Paul's year and people freaked out about it. The residents need this article in the pile.)

17. Thyroidectomized rats have all of the following histopathologic changes EXCEPT:

A. Epidermal thinning

B. Hair follicle in the anagen phase (Vet Pathol 45:4, 2008, abstract)

C. Hair follicular atrophy

D. Hair bulb and papillae involution

E. Hair follicle atrophy involving thinning of ORS and IRS

18. The main histomorphologic feature of tumor cells in uterine granular cell tumors of B6C3F1 mice is:

A. Scattered S-100 immunoreactivity

B. Multifocal NSE immunoreactivity

C. Multifocal to Diffuse alpha smooth muscle actin immunoreactivity

D. Presence of abundant cytoplasmic PAS + eosinophilic granules (D, Vet Pathol 45:654-662 (2008))

E. Atypical multinucleated giant cells

19. In male Lewis rats administered short-term, low-dose Rotenone common lesions were in all of the following except:

A. Thalamus

B. Circle of Willis (B, Vet Pathol 46:776-782 (2009))

C. Hypothalamus

D. Medulla oblongata

E. Small arteries and arterioles of the brain

20. Large, eosinophilic, cytoplasmic inclusions are sometimes seen in Clara cells of the rat lung and are associated with administration of:

A. Inhaled polychlorinated bioamines

B. Inhaled short-term, low dose NSAID toxicity

C. Inhaled corticosteroids (Toxicol Pathol 37:315-323, 2009)

- D. Avirulent, novel rat picornavirus
- E. Repeated sevoflurane administration

21. Macaques coinfecting with Rhesus Rhadinovirus and SIV develop which of the following?

- A. Generalized lymphoid depletion
- B. Hypogammaglobulinemia

C. Marked B cell lymphocytosis (Comp Med 58:31-42 (2008) Comparative Pathobiology of Kaposi Sarcoma-associated Herpesvirus and Related Primate Rhadinoviruses)

- D. Angiofollicular lymphoid hypoplasia
- E. Oral leukoplakia

22. All of the following are true concerning Yaba pox in macaques except:

- A. Infects subcutaneous mesenchymal cells
- B. Causes benign histiocytosis
- C. Affects head and limbs

D. Infects epithelial cells

- E. Zoonotic

Vet Derm 20:145-156 (2009) Nonhuman primate dermatology: a literature review

23. Spontaneous coagulopathy in inbred WAG/RijYcb rats is due to a defect in which of the following:

A. Intrinsic system of coagulation

- B. Common pathway of coagulation
- C. Extrinsic system of coagulation
- D. Both the intrinsic and extrinsic systems
- E. None of the above

Comp Med 60:25-30 (2010) Spontaneous coagulopathy in inbred WAG/RijYcb rats

24. Which of the following is NOT true concerning spontaneous mammary tumors in Siberian hamsters?

- A. Most are immunohistochemically androgen positive

B. All are progesterone positive

- C. Estrogen positivity is variable
- D. Malignant mammary tumors are focally infiltrative with no invasion of lymphatics or blood vessels
- E. All tumors have apocrine secretion

Comp Path 140:127-131 (2009) Morphological and immunohistochemical studies of spontaneous mammary tumors in Siberian hamsters

25. Metrial glands in the female rat have all of the following features except:

- A. Located at the mesometrial triangle
- B. Contains granulated metrial gland cells
- C. Contains endometrial stromal cells
- D. Contains trophoblasts

E. Only found in the gravid uterus (TP 37, page 474, 2009)

Miniboard Exam 2011 Veterinary Pathology - Large animal

1. The most important site of primary viral replication in cattle for Foot-and-Mouth Disease Virus is:

- A. Oropharynx
- B. Lungs
- C. Trachea
- D. Tongue

E. Nasopharynx (Vet Path 2010 pg 1048)

2. The best sites for detection of Rabies virus in cattle using immunohistochemistry is:

- A. Cerebrum and hippocampus
- B. Cerebrum and cerebellum

C. Brainstem and cerebellum (Vet Path 2010 pg 630)

- D. Cerebellum and hippocampus
- E. Cerebellum and spinal cord

3. Which immunohistochemical marker is the most relevant for a diagnosis of Purkinjeoma in the pig?

- A. Vimentin

B. Protein gene product 9.5 (Vet Path 2010 pg 738)

- C. Desmin
- D. Neuron specific enolase
- E. Atrial natriuretic peptide

4. Which virulence factor of *Mannheimia hemolytica* is responsible for oxidative burst of leukocytes, the formation of transmembrane pores with subsequent oncotic necrosis, and stimulation of macrophages to release cytokines in bovine pneumonia?

- A. LPS
- B. Adhesins
- C. Capsule
- D. Outer membrane proteins

E. LKT (Vet Path 2010 electronic online- *Mannheimia hemolytica*: Bacterial-Host Interactions in Bo Pneu)

5. The target tissue of *Brachyspira mudochii* infection in pigs is:

- A. Duodenum
- B. Jejunum
- C. Ileum
- D. Cecum

E. Colon (Vet Path 2010 pg. 334-338)

6. Which statement concerning the binding of Jaagsiekte sheep retrovirus (JSRV) is correct:

A. The SU subunit of the Env glycoprotein binds to host cell hyaluronidase 2 (Hyal2) (Journal of Comp Path 2010 pp. 267-8)

- B. The TM subunit of the Env glycoprotein binds to host cell hyaluronidase 2 (Hyal2)
- C. The MA subunit of the GAG protein binds to host cell hyaluronidase 2 (Hyal2)
- D. The SU subunit of the Env glycoprotein binds to host cell TLR 2
- E. The TM subunit of the Env glycoprotein binds to host cell TLR 2

7. Which of the following is true concerning arterial calcification in race horses?

- A. Pathology was noted primarily in the tunica intima of the carotid arteries

- B. Pathology was noted in the tunica medica of femoral arteries
- C. Pathology was noted in the tunica intima of pulmonary arteries
- D. Pathology was noted in the tunica intima of femoral arteries
- E. Pathology was noted primarily in the tunica media of pulmonary arteries** (Arterial Calcification in Race Horses VP 45:617-625(2008))

8. Which of the following is true concerning ovine scrapie?

- A. Animals with variant allele ARQ are most resistant
- B. Animals with variant allele AHQ are most resistant
- C. Animals with variant allele ARH are most resistant
- D. Animals with variant allele VRO are most susceptible** (Serial Passage of Sheep Scrapie Inoculum in Suffolk Sheep VP 46:39-44(2009))
- E. Animals with variant allele ARR are most susceptible

9. In which tissue is Bovine Viral Diarrhea antigen most commonly identified by immunohistochemistry in neonatal goats?

- A. Liver
- B. Placenta** (Distribution of Bovine Viral Diarrhea Virus Antigen in Aborted Fetal and Neonatal Goats by Immunohistochemistry VP 46:54-58(2009))
- C. Spleen
- D. Thyroid gland
- E. Lung

10. In the horse, massive pulmonary edema and endothelial syncytia are features of the disease caused by:

- A. African horse sickness virus
- B. Hendra virus** (JKP vol. 2, p. 630)
- C. Nipah virus
- D. Equine adenovirus
- E. Equine arteritis virus

11. Which of the following is NOT a characteristic of Rinderpest infection in the Bovid:

- A. Bronchointerstitial pneumonia with alveolar syncytial cells** (JKP vol.2, pp. 149-152)
- B. Caused by a morbillivirus
- C. Lymphoid necrosis
- D. Gastrointestinal tract ulcers
- E. Oral cavity epithelial syncytial cells with intracytoplasmic and intranuclear inclusion bodies

12. Regarding vascular urinary bladder tumors from cows with enzootic hematuria, which of the following is true:
A. p53 immunoreactivity was seen in high percentages in hemangiomas, hemangioendotheliomas and hemangiosarcomas

- B. Cyclin D1 overexpression is seen with the highest frequency in hemangiosarcomas** (Immunohistochemical Evaluation of Vascular Urinary Bladder Tumors from Cows with Enzootic Hematuria VP 46:211-221(2009))
- C. Cyclin D1 overexpression is seen with the highest frequency in hemangioendotheliomas
- D. All of the above are false
- E. A and B

13. In cattle with epithelioid cells in mediastinal lymph nodes without cancer, all of the following are true EXCEPT:

- A. There was marked disruption of lymph node architecture** (Vet Path May 2009 46:430-438 (The abstract states epithelioid cells in these bovine lymph nodes did NOT disrupt normal nodal architecture.))
- B. Epithelioid cells lacked atypia

- C. Epithelioid cells lacked mitotic figures
- D. Epithelioid cells are thought to be of mesothelial origin
- E. Epithelioid cells sometimes formed tubular structures

14. All of the following are true regarding *Trypanosoma evansi* infection in horses EXCEPT:

- A. The area of the brain most severely affected was the parietal lobe
- B. Lesions were detected in the trigeminal ganglia consisting of vacuolation within the ganglia** (Vet Path March 2009 46: 251-258 (No lesions in trigeminal ganglia – pg. 255 right column.))
- C. Gross lesions included splenomegaly
- D. Gross lesions included lymphadenomegaly
- E. Gross white matter lesions were found in cerebrum and were unilateral, yellow, gelatinous, and friable

15. Which of the following areas were grossly affected in domestic sheep with usnic acid poisoning secondary to eating the lichen *Xanthoparmelia chlorochroa*:

- A. Axial skeletal muscle
- B. Tongue
- C. Diaphragm
- D. Appendicular muscles** (Vet Path JAN 2008 (19-25) Gross lesions were NOT evident in the axial skeletal muscles, tongue, or diaphragm. (I threw in cerebrum because only muscle was affected. This was not a negative foil so it maybe unfair.))
- E. Cerebrum

16. All of the following are common laboratory findings in equine associated with rattlesnake envenomation EXCEPT:

- A. Thrombocytopenia
- B. Hypoproteinemia
- C. Hyperlactatemia
- D. Hypolactatemia** (JAVMA, Vol 238, No. 5, March 1, 2011)
- E. High RBSS

17. In swine infected with Porcine Circovirus 2 intracytoplasmic amphophilic botryoid inclusion bodies were observed in all of the following EXCEPT:

- A. Bronchial glandular epithelium
- B. Bronchial epithelium
- C. Renal tubular epithelium
- D. Lymph nodes
- E. Gall bladder epithelium** (Vet Pathol 45:640–644 (2008))

18. In calves experimentally infected with *Clostridium perfringens* type D toxin the most striking histological change consisted of

- A. Multifocal, bilateral, encephalomalacia of the corpus striatum
- B. Multifocal, bilateral, thalamic necrosis
- C. Cerebellar peduncle necrosis
- D. Perivascular high protein edema in the brain and lung** (Vet Pathol 46:1213–1220 (2009))
- E. Multifocal serosal hemorrhage throughout the gastrointestinal tract

19. In female miniature pigs with uterine lesions, between 50 to 70% of the nuclei were immunoreactive for the estrogen and progesterone receptor EXCEPT:

- A. Cystic endometrial hyperplasia
- B. Adenomyosis
- C. Adenomas
- D. Smooth muscle tumors
- E. Adenocarcinomas** (Veterinary Pathology 47(5) 931-936)

20. Which of the following is the cause of White Liver Disease?

A. Cobalt deficiency (PBVD p. 440 (Ames 2010 TQ))

- B. Vitamin E imbalance
- C. Selenium deficiency
- D. Vitamin A toxicosis
- E. Vitamin B12 toxicosis

21. Which of the following protein is defective in congenital pseudomyotonia in chianina cattle?

A. SERCA1 (AJP 174:565-573 (2009) A defective SERCA1 protein is responsible for congenital pseudomyotonia in chianina cattle)

- B. Ryanadine receptor 1 (RYR1)
- C. Dystrophin
- D. Reelin
- E. Procollagen IV proteinase

22. Where is amyloid deposition most prominent in sheep?

A. Duodenum (Comp Path 140:238-246 (2009) AA Amyloidosis induced in sheep principally affects the gastrointestinal tract)

- B. Colon
- C. Tongue
- D. Jejunum
- E. Liver

23. In sheep with pulmonary adenomatosis, surfactant A (SP-A) was expressed in all of the following except:

- A. Tumor nodules
- B. Alveoli
- C. Alveolar macrophages

D. Ciliated epithelium of terminal bronchioles (Comp Path 140:43-53 (2009) Immunohistochemical Detection of Pulmonary Surfactant Proteins and Retroviral Antigens in the Lungs of Sheep with Pulmonary Adenomatosis)

- E. Clara cells

24. In pigs experimentally infected by porcine teschovirus, where does antigen appear first?

A. Spinal ganglion (Comp Path 141:223-228 (2009) Pathological changes in pigs experimentally infected by porcine teschovirus (Ames TQ 2010))

- B. Brainstem
- C. Cerebellum
- D. Ventral horn of spinal cord
- E. Cerebrum

25. The most severe form of leptospirosis in pigs typically contains which component of inflammation?

- A. Lymphocytes
- B. Plasma cells
- C. Histiocytes

D. Neutrophils (VP 46(5) pg800 Sep 2009)

- E. Eosinophils