

1. Which of the following is considered a statistically significant prognostic parameter for evaluation of feline mammary carcinoma?

- A. Clinical staging
- B. Tumor subtype
- C. Tumor grade
- D. Estrogen receptor expression

2. Which of the following cells has been documented to produce Tenascin-C in low grade canine mammary carcinomas?

- A. Myoepithelial cells
- B. Neoplastic epithelial cells
- C. Stromal fibroblasts
- D. Non-neoplastic ductular epithelium

3. What is the most common genetic disorder in domestic rabbits?

- A. Congenital glaucoma
- B. Ocular cataracts
- C. Malocclusion
- D. Polycystic kidney disease

4. In comparison to feline spongiform encephalopathy (FSE), prion protein accumulation and lesion severity is more severe in which region of the brain in feline chronic wasting disease?

- A. Caudate nucleus
- B. Cerebellar granular layer
- C. Hippocampus
- D. Corpus callosum

5. Fatal infection with *Parastrongylus dujardini* in callitrichids causes lesions most commonly in which organ?

- A. Spleen
- B. Kidney
- C. Brain
- D. Lung

6. What is a common concurrent lesion of clouded leopards with pheochromocytoma?

- A. Retinal degeneration
- B. Myocardial fibrosis
- C. Retinal rosettes
- D. Myocardial hemorrhage

7. Which of the following hepatic lesions has been found to be most common in captive non domestic felids?

- A. Hepatic stellate cell hypertrophy
- B. Biliary hyperplasia
- C. Lymphoplasmacytic portal hepatitis
- D. Hepatocellular vacuolar change

8. In the acute stages of bovine *Besnoitia besnoiti* infection, tachyzoites proliferate predominantly in which of the following cell types?

- A. Macrophage
- B. Fibroblast
- C. Basal epithelium in follicle or epidermis
- D. Endothelium

9. Which of the following lesions is a common feature of Porcine Periweaning failure to thrive syndrome?

- A. Vasculitis in multiple organs
- B. Intestinal crypt hypertrophy
- C. Hemorrhagic gastritis
- D. Thymic atrophy

10. Which of the following lesions is seen in Pheochromocytoma induced cardiomyopathy in dogs?

- A. Contraction bands
- B. Fatty myocardial infiltration
- C. Myofiber disarray
- D. Endocardial fibrosis

11. Which of the following vascular lesions is most commonly described in porcine circovirus type-2 systemic disease?

- A. Renal arterial thrombosis
- B. Lymphohistiocytic lymphangitis
- C. Thrombosis in pulmonary capillaries
- D. Granulomatous and necrotizing phlebitis

12. The pathogenesis of bacillary hemoglobinuria in cattle is associated with which of the following?

- A. Production of Epsilon toxin
- B. Infection with *Clostridium novyi*
- C. Fascioliasis in all cases
- D. Acute renal tubular necrosis

13. Which of the following myocardial lesions may be seen in rabbits infected with rabies virus?

- A. Cytoplasmic inclusions in ventricular myocytes
- B. Myocardial lesions present in absence of brain lesions
- C. Interstitial hemorrhage with capillary thrombi
- D. Multifocal interstitial fibrosis

14. In which of the following prostatic lesions would you expect to find an increased expression of PECAM-1?

- A. Prostatic carcinoma
- B. Benign prostatic hyperplasia
- C. Prostatic cyst
- D. All of the above

15. Which of the following is a primary finding most often associated with wooded breast myopathy of broiler chickens?

- A. Decreased dietary selenium
- B. Abundant fibrosis
- C. Lymphocytic vasculitis
- D. Multifocal infarctions

16. Which of the following additional lesions may be expected in chronic *Erysipelothrix rhusiopathiae* infection in lambs?

- A. Brainstem infarcts
- B. Hepatic amyloidosis
- C. Neutrophilic adrenalitis
- D. Lymphohistiocytic myocarditis

17. Cephalohematoma formation in non-human primates is most commonly associated with which of the following?

- A. Factor VIII deficiency
- B. Bacillus anthracis infection
- C. Absence of L- gulonolactone oxidase
- D. Absence of 1-alpha hydroxylase

18. Which of the following is the most common vascular lesion documented in wild urban rats?

- A. Aortic tunica media mineralization
- B. Hypertrophy in pulmonary arterioles
- C. Atherosclerosis
- D. Multifocal mesenteric arteritis

19. Which of the following factors may help differentiate intestinal lymphoma from inflammatory bowel disease (IBD) in the dog with intestinal biopsy samples?

- A. Significantly higher Ki67 index
- B. Predominantly monomorphic lymphocytic infiltrate
- C. Presence of intraepithelial lymphocytes
- D. All of the above

20. Aleutian Disease Virus typically causes which type of inflammation in the spleen of striped skunks?

- A. Plasmacytic
- B. Histiocytic
- C. Eosinophilic
- D. Lymphohistiocytic

21. Which of the following characteristics most accurately describes osteochondrosis as it occurs in horses?

- A. May lead to subchondral bone cyst formation
- B. Occurs secondary to a defect in Fibroblast growth factor 3
- C. Earliest lesion involves cartilage necrosis in the deep growth cartilage
- D. May involve vasculitis in epiphyseal growth cartilage

22. What is the most common lesion in California sea lions infected with hypervirulent *Klebsiella pneumoniae*?

- A. Necrotizing rhinitis
- B. Necrosuppurative interstitial pneumonia
- C. Suppurative bronchopneumonia
- D. Pyothorax

23. Which of the following findings is most likely in a sheep with osteogenesis imperfecta?

- A. Brachygnathia inferior
- B. Physeal thickening
- C. Bruising of the skin
- D. Pink teeth

24. Which of the following is considered one of the most common histologic bone lesions in equine vertebral stenotic myelopathy?

- A. Osteopenia and cortical thinning
- B. Retained cartilage matrix spicules
- C. Trabecular microfractures
- D. Articular facet arthritis

25. Which of the following histologic changes is most commonly seen in equine laminitis?

- A. Epidermal lamellar spongiosis
- B. Increased medullary adipose tissue in P3/distal phalanx
- C. Periosteal proliferation of bone in P3/distal phalanx
- D. Epidermal lamellar necrosis

26. Contagious equine metritis, a venereal disease of mares, is caused by?

- A. *Klebsiella pneumoniae*
- B. *E. coli*
- C. *Taylorella equigenitalis*
- D. *Staphylococcus aureus*

27. Fibropapillomatosis has been associated with what virus in Hawaiian green sea turtles?

- A. Chelonid herpesvirus 1
- B. Chelonid herpesvirus 3
- C. Chelonid herpesvirus 5
- D. Chelonid herpesvirus 7

28. What is the hallmark finding in cats with chronic Vitamin A toxicity?

- A. Fibrous osteodystrophy of the skull bones
- B. Extensive exostoses and ankyloses of cervical vertebrae
- C. Squamous epithelial hyperkeratosis of haired skin
- D. Squamous metaplasia of Parotid salivary gland duct epithelium

29. Extraskelatal chordomas in zebrafish may be found in which of the following anatomic locations most commonly?

- A. Esophagus
- B. Swim bladder
- C. Intestine
- D. Kidney

30. Which of the following agents is commonly associated with mastitis in rabbits?

- A. *Pasteurella multocida*
- B. *Staphylococcus aureus*
- C. *E. Coli*
- D. *Streptococcus agalactiae*

31. Merkel cell tumors in the cat have which of the following characteristics?

- A. Polygonal cells arranged in chords histologically
- B. Low N:C ratio on cytology
- C. Positive for CK20
- D. Negative for p63

32. Which of the following factors is highly expressed in the majority of canine perivascular wall tumors?

- A. Ki67
- B. PDGFB
- C. TGF β 1
- D. COX-2

33. Feeding a diet high in spinach to *Rana sylvatica* tadpoles causes what lesion?

- A. Goiter
- B. Oxalate nephrosis
- C. Metabolic bone disease
- D. Encephalomalacia of the brainstem

34. In the equine neurologic condition “Shivers” which of the following most accurately describes spheroids within Purkinje cell axons located in the deep cerebellar nuclei?

- A. Calretinin positive
- B. Calbindin negative
- C. Glutamic acid decarboxylase positive
- D. Non phosphorylated neurofilament positive

35. Perostin expression in canine skin in cases of atopic dermatitis is most intense at what location?

- A. Dermal – epidermal junction
- B. Stratum basale
- C. Around hair follicles
- D. Outer root sheath epithelium

36. Which of the following pancreatic lesions is commonly encountered in callitrichid species (ie marmosets and tamarins)?

- A. Exocrine lobular hyperplasia
- B. Islet hyperplasia
- C. Insulinoma
- D. Lobular atrophy

37. Which of the following mucins is not normally found in the pig colon, but is produced in cases of swine dysentery, resulting in an overall increase in mucin production?

- A. Mucin 4
- B. Mucin 3AB
- C. Mucin 2
- D. Mucin 5AC

38. Serosal colonization and intravascular bacteria in the small intestine of cats is most common in which of the following conditions?

- A. Small cell lymphoma
- B. Lymphocytic-plasmacytic enteritis
- C. Muroid enteropathy
- D. Large cell lymphoma

39. Viral replication of frog virus 3 (ranavirus) occurs in wood frogs most commonly in what organ?

- A. Liver
- B. Brain
- C. Heart
- D. Skin

40. What is the most common skeletal site for metastasis of urothelial carcinoma in the dog?

- A. Vertebrae
- B. Pelvis
- C. Rib
- D. Skull

41. Vasa Vasorum arteriopathy in cats is strongly associated with which of the following conditions?

- A. Hypertrophic cardiomyopathy
- B. Pulmonary artery hypertension
- C. Aortic degeneration
- D. Chronic kidney disease

42. In the pig, intestinal crypt epithelium in the medullary sinuses of mesenteric lymph nodes can be associated with?

- A. Transmissible gastroenteritis virus (TGEV)
- B. PCV 2
- C. *Lawsonia intracellularis*
- D. Shiga toxin producing *E. coli* (STEC)
- E. *Clostridium perfringens* type C

43. Canine chronic ulcerative stomatitis is characterized by which of the following histologic features?

- A. Mucosal basilar cleft formation
- B. Sub-epithelial eosinophilic stomatitis
- C. Sub-epithelial lymphoid nodules
- D. Lichenoid lymphoplasmacytic inflammation

44. Which of the following lesions is most commonly associated with Rat Parvovirus (Kilham's rat virus)?

- A. Cerebellar hemorrhage
- B. Bone marrow hypocellularity
- C. Myocarditis
- D. Dental malformations

45. Fibroblast growth factor 23 binds to the klotho receptor complex in which of the following tissues / cells, leading to a decrease in phosphorus?

- A. Thyroid gland parafollicular cells
- B. Duodenum epithelium
- C. Osteoclasts in trabecular bone
- D. Renal tubule epithelium

46. Which of the following is considered a predisposing factor for the development of chronic progressive nephropathy in rats?

- A. Dietary calcium level
- B. Adrenal cortical hypertrophy
- C. Wistar strain
- D. Prolactin level

47. What is the most frequent histologic finding of pigeon paramyxovirus infection in Eurasian collared-doves and rock pigeons?

- A. Random Hepatitis
- B. Tubulointerstitial nephritis
- C. Myocarditis
- D. Retinitis and choroiditis

48. Which of the following is considered an age associated lesion in the pancreas of rats?

- A. Islet fibrosis
- B. Islet amyloidosis
- C. Exocrine lobular hyperplasia
- D. Exocrine lobular atrophy

49. Koalas with *Chlamydia pecorum* infection frequently develop chlamydial inclusions in:

- A. Prostatic epithelium
- B. Sertoli cells
- C. Testicular germinal cells
- D. Leydig cells

50. What is considered the most common cause of non-infectious dyspnea in mice?

- A. Atrial thrombosis and heart failure
- B. High levels of pneumonia in the bedding
- C. Pulmonary thromboembolism
- D. Pulmonary adenocarcinoma

51. Fatal fasting syndrome in obese macaques is most commonly associated with which of the following lesions?

- A. Ulcerative gastritis
- B. Atherosclerosis
- C. Glomerular lipidosiis
- D. Foci of pancreatic necrosis

52. Which of the following is considered a characteristic histologic finding of canine hypertrophic gastritis?

- A. Hyperplasia of mucous cells with loss of chief and parietal cells
- B. Glassy cell change in gastric glands with mineralization
- C. Hyperplastic polypoid mucosal proliferation with a fibrovascular core
- D. Hyperplasia in gastric pits with marked granulomatous inflammation

53. Which of the following lesions is most commonly seen in naturally occurring highly pathogenic avian influenza outbreak on commercial turkey farms?

- A. Lymphocytic hepatitis with necrosis
- B. Bilateral anterior uveitis and conjunctivitis
- C. Marked splenomegaly with hemorrhage
- D. Cecal tonsil mucosal necrosis

54. Kenogen refers to which of the following stages of hair follicle development?

- A. Growth phase
- B. Quiescent phase with club hair absent
- C. Regression phase with club hair absent
- D. Regression phase with club hair present

55. What is the most likely predictor of metastasis for cutaneous chromatophoromas in snakes?

- A. Nuclear atypia
- B. Lymphatic invasion
- C. Mitotic count
- D. Ulceration

56. Which of the following is NOT a primary location of PCV2 antigen in pigs with granulomatous and necrotizing myositis?

- A. Satellite cells
- B. Macrophages
- C. Lymphocytes
- D. Multinucleated giant cells

57. A diagnostic test with 50% specificity is performed on a population of 1000 animals, and results in 600 positive and 400 negative results. There are 100 false positives. What is the true prevalence of disease in the population?

- A. 33%
- B. 50%
- C. 60%
- D. 75%
- E. 80%

58. What is the most likely diagnosis in a dog with the following laboratory findings:

- Moderately elevated ALT & AST
- Markedly elevated GGT & ALP
- Normal serum albumin and plasma ammonia
- Elevated conjugated bilirubinemia

- A. Acute massive hepatic necrosis (toxic hepatopathy)
- B. Cholangitis/cholangiohepatitis
- C. PSS
- D. Hepatic failure

59. What is agent that causes proliferative gill disease?

- A. *Loma salmonae*
- B. *Henneguya ictaluri*
- C. *Epitheliocystis*
- D. *Tetracapsuloides bryosalmonae*

60. The most commonly expressed IHC in canine liposarcoma is?

- A. Desmin
- B. alpha-SMA
- C. UCPI
- D. Myogenin

61. With retinal detachment in cats infected with FIP, what cell population in the retina commonly proliferates?

- A. Photoreceptor cells
- B. Müller cells
- C. Cells of the inner nuclear layer
- D. Cells of the outer nuclear layer
- E. Ganglion cells

62. Which of the following immunohistochemical labeling patterns is seen in Rhesus Macaques with large intestinal adenocarcinoma?

- A. Decreased P53 labeling
- B. Decreased SIRT1 labeling
- C. Loss of CK7 labeling
- D. Increased CK20 labeling

63. Clinically, *Anaplasma marginale* infection in cattle is best characterized by?

- A. Hemoglobinemia
- B. Hemoglobinuria
- C. Leukopenia
- D. Bilirubinemia

64. Which of the following agents causes “ear canker” in rabbits, characterized by obligate non-burrowing parasites that chew and pierce epidermal layers of the external ear?

- A. Cheyletiella parasitovorax
- B. Psoroptes cuniculi
- C. Psorobia lagomorpha
- D. Sarcoptes scabiei

65. What IHC marker can be used to help distinguish Acute lymphoid leukemia (ALL) from stage V leukemic lymphoma?

- A. CD3
- B. CD4
- C. CD8
- D. CD21
- E. CD34

66. In the pig, the most common cause of jowl abscesses (cervical lymphadenitis) is?

- A. *Streptococcus porcinus*
- B. *Streptococcus suis*
- C. *Staphylococcus aureus*
- D. *Pasteurella multocida*
- E. *Eubacterium suis*

67. In some cases of feline post-traumatic sarcoma, positivity for which IHCs can confirm this neoplasm is of lens epithelial origin?

- A. Vimentin and S100
- B. Vimentin and Collagen type IV
- C. Cytokeratin and vimentin
- D. Collagen type IV and Crystallin alpha A

68. Which of the following tends to be decreased in obese animals?

- A. HMW adiponectin
- B. Leptin
- C. Resistin
- D. Triglyceride

69. Which type of virus is avian nephritis virus?

- A. Arbovirus
- B. Coronavirus
- C. Adenovirus
- D. Astrovirus

70. Which of the following *decreases* synthesis of non-esterified fatty acids (NEFAs)?

- A. Corticosteroids
- B. Hormone sensitive lipase
- C. Insulin
- D. Negative energy balance

71. Which of the following would be considered one of the MOST COMMON causes of pulmonary thromboembolism?

- A. Aortic neoplasia
- B. Hypoadrenocorticism
- C. Hyperthyroidism
- D. Pancreatitis

72. All of the following *except* ____ promote glycogenolysis.

- A. Epinephrine
- B. Corticosteroids
- C. Glucagon
- D. Growth hormone

73. Which of the following is characterized by an inability of the renal tubular renal epithelial cells to secrete hydrogen ions?

- A. Fanconi-like syndrome
- B. Paradoxical aciduria
- C. Distal renal tubular acidosis
- D. Proximal renal tubular acidosis

74. The agent that causes infectious bronchitis in chickens may also characteristically cause what other lesion?

- A. Interstitial nephritis
- B. Epicardial petechiae
- C. Bursal lymphoid necrosis
- D. Multifocal hepatic necrosis

75. A urine protein:creatinine ratio in a dog of 2.0 is most consistent with:

- A. Normal
- B. Tubular disease
- C. Renal amyloidosis
- D. Glomerulonephropathy