Syllabus

VETERINARY PATHOLOGY, AFIP

WEDNESDAY SLIDE CONFERENCE

1978-1979

ARMED FORCES INSTITUTE OF PATHOLOGY
Washington, D.C. 20306

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VETERINARY PATHOLOGY DEPARTMENT, AFIP

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100 microslides

3 2x2 lantern slides

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ARMED FORCES INSTITUTE OF PATHOLOGY

Washington, D.C. 20306

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PREFACE

The Department of Veterinary Pathology, Armed Forces Institute of Pathology, has conducted the annual Wednesday Slide Conference for more than two decades. The cases presented each Wednesday throughout the academic year are also distributed to over 90 active participants, including military and civilian veterinary pathologists throughout the United States and Canada, as well as several foreign countries. The list of active contributors continues to grow. The diagnosis for each case and a synopsis of the discussion for most cases are forwarded to participants weekly.

This study set has been assembled in an effort to make the material presented at our weekly conferences available to a wider range of interested pathologists and other scientists. Discussion and comments are abbreviated in some cases in this syllabus for succinctness.

A selection of 96 cases, including 100 microslides and 3 2x2 lantern slides, has been made from the 120 cases studied during the 1978-1979 conferences.

We wish to thank each contributor for his or her participation and for the permission to use cases in this study set.

LIST OF SLIDES

Slide number	Animal	Tissue	Diagnosis
1	Dog	Liver & Kidney	Infectious canine hepatitis and toxoplasmosis
2	Horse	Brain	Meningitis (*Salmonella typhimurium*)
3	Rat	Brain	Oligodendroglioma
4,5	Cow	Mammary gland	Prototheca mastitis
6	Sheep	Nasal turbinate	Nasal adenocarcinoma
7	Guinea pig	Heart	Rhabdomyomatosis
8	Chimpanzee	Colon	Balantidiasis
9	Cow	Liver	Hepatitis (*Hemophilus somnus*)
10	Pig	Lung	Pneumonia (*Hemophilus parahaemolitious*)
11,12	Horse	Lung	Pneumonia (*Pneumocystis carinii*)
13	Dog	Spinal cord	Afghan myelomalacia
14	Monkey	Kidney	"Foot process nephrosis"
15	Chicken	Lung	Aspergillosis (brooder pneumonia)

16	Dog	Heart	Trypanosomiasis (Chagas' disease)
17	Pig	Intestines	Coccidiosis and colibacillosis
18,19	Chimpanzee	Skin	Leprosy
20	Mouse	Lung	Pneumonia (Sendai virus)
21	Dog	Stomach	Uremic gastropathy
22	Dog	Pancreas	Pancreatic hypoplasia (Juvenile atrophy)
23	Monkey	Lung	Pneumonia (Coxiella burnetti)
24	Mastomys	Stomach	Carcinoid
25	Cat	Skin	Dermatitis (Mycobacterium fortuitum)
26	Dog	Mass	Myxosarcoma
27	Dog	Brain	Telangiectasia (congenital)
28	Monkey	Skin	Xanthomatosis
29	Cow	Lung	Pneumonia (Aspergillus sp)
30	Rabbit	Heart	Cardiomyopathy (secondary to anaphylactic shock)
31	Rat	Skin	Leishmaniasis
32	Chicken	Heart	Atherosclerosis
33	Horse	Muscle	Paralytic myoglobinuria
34	Hamster	Peritoneum	Histoplasma capsulatum var. duboisii

35	Horse	Liver	Serum hepatitis
36	Rhinoceros	Lung	Tuberculosis (Mycobacterium bovis)
37	Dog	Brain	Granulomatous meningo-encephalomyelitis
38	Dog	Lung	Pneumonia (Mesocestoides)
39	Monkey	Kidney	DIC, blood transfusion incompatibility reaction
40	Mouse	Liver	Storage disease
41	Marmoset	Intestines	Enteritis and peritonitis (Prosteneorchis elegans)
42	Finch	Liver	Erythroblastosis
43	Dog	Spleen	Paecilomycosis
44	Cow	Brain	Rabies
45	Cow	Thymus and Brain	Epizootic bovine abortion
46	Dog	Brainstem	Histoplasmosis
47	Horse	Intestines	Equine granulomatous enteritis
48	Whale	Artery	Verminous arteritis (Crassicauda crassicauda)
49	Chicken	Bursa	Cryptosporidiosis and Infectious bursa disease
50	Horse	Kidney	Foal septicemia (Actinobacillus equuli)

51	Hamster	Mass	Myelolipoma
52	Baboon	Colon	Oesophagostomiasis
53	Horse	Lung	Foreign body pneumonia (mineral oil)
54	Dog	Mass	Calcinosis circumscripta
55	Cat	Pancreas	Toxoplasmosis
56	Pig	Brain	Salt toxicity
57	Dog	Heart	Parvovirus myocarditis
58	Dog	Urinary bladder	Rhabdomyosarcoma
59	Dog	Liver	Tyzzer's disease and canine distemper
60	Lamb	Thyroid	Colloid involution of hyperplastic goiter
61	Monkey	Lung	Pneumonia (simian adenovirus)
62	Cow	Brain	Polioencephalomalacia (traumatic)
63	Dog	Mass	Liposarcoma
64	Elk	Thyroid	Locoweed toxicity
65	Dog	Foot	Maduromycosis
66	Caiman	Skin	Pox virus
67	Mouse	Colon	Hyperplastic colitis (*Citrobacter freundii*)
68	Dog	Brain	Medulloblastoma

69	Eel	Muscle	*Plistophora* sp. infection
70	Pig	Liver (fetal)	Pseudorabies abortion
71	Sheep	Lung	Marsh's progressive pneumonia
72	Dog	Spleen	Nodular lymphoid hyperplasia
73	Cat	Spleen, Liver and Marrow	Erythremic myelosis
74	Lamb	Lung	Pneumonitis (bovine respiratory syncytial virus)
75,76	Pig & Mouse	Heart & Brain	Myocarditis & encephalitis (Encephalomyocarditis virus)
77	Guinea pig	Liver & Spleen	Salmonellosis
78	Mouse	Kidney, plus kodachromes (2)	Polycystic kidneys
79	Dog	Skin	Mycosis fungoides
80	Pig	Kidney	Pigweed poisoning (*Amaranthus retroflexus*)
81	Horse	Brain	Leukoencephalomalacia
82	Snake	Kidney	Gentamicin toxicity
83	Cat	Intestine	Globular leukocyte tumor
84	Cow	Skin	*Onchocerca lienalis*
85	Monkey	Colon	Schistosomiasis
86	Lamb	Brain	Phalaris toxicity
87	Monkey	Liver	Yellow fever

88	Horse	Kidney	*Klossiella equi*
89	Horse	Brain	Eastern equine encephalomyelitis
90	Dog	Lung	Pulmonary granulomas with PAS-positive bodies
91	Chicken	Liver	Histomoniasis
92	Horse	Brain	*Micronema deletrix*
93	Cat	Bone	Osteoclastoma
94	Rat	Liver	*Capillaria hepatica*
95	Lamb	Liver & Kidney	Blue-green algae toxicity
96	Goat	Brain	Suppurative meningitis (*Chlamydia* and *E. coli*)
97	Dog	Liver	Tuberculosis
98	Cat	Liver	Feline infectious peritonitis (FIP)
99	Mouse	Mass, plus Kodachrome (1)	Plasma cell tumor
100	Fish	Skin	Epidermal papillomatosis (parasitic - amoebae)

COMMENTARY ON SLIDES

Slide 1

History. This tissue is from a 3-1/2 month old female German shepherd. The dog had been feverish, lethargic, anemic, and jaundiced for three days prior to death.

Diagnosis. Infectious canine hepatitis (ICH) and toxoplasmosis.

Comment. Intranuclear adenovirus-like inclusions were present within glomeruli and associated with necrotic foci in the liver. Additionally, random clusters of intracytoplasmic protozoal organisms, compatible with *Toxoplasma gondii*, were evident in the liver. Canine adenovirus was isolated on tissue culture.

Contributor. British Columbia Department of Agriculture, Abbotsford, British Columbia, Canada.

Slide 2

History. This 27-day-old, female equine exhibited clinical signs of circling to the left, tachycardia, and cyanosis of the mucous membranes before dying.

Diagnosis. Purulent meningitis, caused by *Salmonella typhimurium*.

Comment. *Salmonella typhimurium* was cultured from the brain, intestines, and spleen of this animal.

Contributor. Department of Food & Agriculture, Veterinary Laboratory Service, San Gabriel, California.

Slide 3

History. At necropsy gross observation revealed a tan, vaguely circumscribed mass in the right cerebral hemisphere of this 7-month-old, male, CBy rat.

Diagnosis. Oligodendroglioma.

Comment. Some attendees preferred to call this a mixed glioma based on a palisading astroglial pattern exhibited in some areas of the tumor. However, the overwhelming prominence of a honeycomb pattern with lymphocytic-like nuclei surrounded by a halo is characteristic for an oligodendroglioma. Additionally, some morphological diversity is acceptable in this tumor.

Suggested reading.

Fitzgerald, J. E., Schardein, J. L. and Kurtz, S. M.: Spontaneous tumors of the nervous system in albino rats. J. Nat'l. Cancer Inst. 52: 265, 1974.

Mennel, H. D., and Zulch, K. J.: Pathology of Tumors in Laboratory Animals, Vol. I, Part 2, 1976, p. 295.

Contributor. Comparative Pathology Section, NIH, Bethesda, Maryland.

Slide 4 and 5

History. This tissue is from a dairy cow which died shortly after being admitted to a hospital for treatment of mastitis. Slide 5 is stained with periodic acid Schiff (PAS).

Diagnosis. Mastitis, caused by Prototheca species.

Comment. Histologically mammary tissue shows prothecal cells densely packed in the acini with minimal inflammation. Organisms are present in two

forms, single cells before and after daughter cell division. Culturing yielded Prototheca species and mixed bacterial growth.

Suggested reading. Migaki, G., Garner, F. M., and Imes, G. D., Jr.: Bovine protothecosis, a report of three cases. Path. Vet. 6: 444-453, 1969.

Contributor. School of Veterinary Medicine, Auburn University, Alabama.

Slide 6

History. The tissue specimen is from a mass from the left nasal cavity of an adult sheep manifesting breathing difficulty.

Diagnosis. Adenocarcinoma.

Comment. The tumor consisted of well-differentiated epithelial cells forming glandular acini and papillae. This differentiation and lack of malignant parameters in some sections caused several attendees to prefer a more benign designation of adenopapilloma. Some stromal invasion was, however, present in many other sections. Recent studies have demonstrated a possible visna-maedi-like virus to be present in these tumor cells.

Suggested reading.

Duncan, J. R., Tyler, D. E., Van Der Maaten, M. J., et al.: Enzootic nasal adenocarcinoma in sheep. JAVMA 151: 732-734, 1967.

Yoneshichi, H., Ohgi, T., Fujimoto, Y., et al.: Intranasal tumor of the ethmoid olfactory mucosa in sheep. Am. J. Vet. Res. 39 (10): 1599-1606, 1978.

Contributor. Department of Pathology, Clement Associates, Inc., Washington, D. C.

Slide 7

History. This tissue is from an 8-month-old, control, male guinea pig (Hartley strain).

Diagnosis. Rhabdomyomatosis.

Comment. The multifocal vacuolar change within the myocardium is consistent with that described for rhabdomyomatosis in guinea pigs. Periodic acid Schiff positive granules are reportedly present within these vacuoles. This could not be clearly demonstrated in this case, but should not obviate the diagnosis as the granules frequently wash out during processing.

Suggested reading. Wagner, J. E., and Manning, P. J. (Eds): The Biology of the Guinea Pig, Academic Press, New York, 1967.

Contributor. Bio/Dynamics, Inc., East Millstone, New Jersey.

Slide 8

History. This tissue is a section of large intestine from a chimpanzee (Pan troglodytes) that collapsed and died following several days illness of vomiting and diarrhea. At necropsy, the entire colon was thickened and the mucosa appeared to have a gray-white membranous surface.

Diagnosis. Balantidiasis.

Comment. This animal had a severe necrotizing colitis. Protozoal invasion with extensive necrosis and ulceration is present in the mucosa, submucosa, and Peyer's patches of the colon. These protozoa are compatible with Balantidium coli. Although the evidence in this case suggests that this is a primary balantidiasis, this organism is a freqent incidental finding or

secondary invaders; and the possible presence of a primary etiologic agent should not be overlooked.

Contributor. Delta Regional Primate Center, Covington, Louisiana.

Slide 9

History. This tissue is from a feedlot ox, one of 4 animals that died after an illness characterized by recumbency, fever, nervous signs, and a course of 1-3 days.

Diagnosis. Necrotizing hepatitis, with vasculitis and thrombosis, caused by Hemophilus somnus.

Comment. Other lesions in this bovine included a fibrinous polyarthritis, necrotic laryngitis, and hemorrhagic malacia of the brain. Hemophilus somnus was cultured from several organs. Differential diagnosis included Clostridium and Pasteurella infection, and "sawdust" lesions. Morphologically, however, the presence of vasculitis and thrombosis was considered significant in incriminating Hemophilus over the other bacteria.

Suggested reading.

Panciera, R. J., Dahlgren, R. R. and Rinker, H. B.: Observations on septicemia of cattle caused by a Haemophilus-like organism. Path. Vet. 5: 212, 1968.

Smith, B. P., and Biberstein, E. L.: Septicemia and meningoencephalitis in pastural cattle caused by a Haemophilus-like organism ("Haemophilus somnus"). Cornell Vet. 67: 327, 1977.

Contributor. College of Veterinary Medicine, Oklahoma State University, Stillwater, Oklahoma.

Slide 10

History. This tissue is from a feeder pig, one of over 700 3-6 month old feeder pigs which exhibited symptoms of anorexia, high fever, labored respiration, epistaxis, and cyanosis. The mortality rate was high.

Diagnosis. Fibrino-hemorrhagic pneumonia, caused by Hemophilus parahemoliticus.

Comment. A severe fibrinous pleuritis is also present. The marked fibrinous exudate and predominately mononuclear inflammatory cell infiltrate (lymphocytes and macrophages) within alveoli is fairly characteristic for infection with this organism. Hemophilus parahemolyticus serotype K17 was isolated from pulmonary exudate, lung, and pulmonary lymph nodes. Fluorescent antibody tests were also positive for this organism.

Suggested reading.

Hsu, F. S. et al.: Pathogenicity of Hemophilus parahemolyticus for swine. Proc. Internat'l Pig Vet. Soc., Ames, Iowa, 1976.

Little, T. W. A and Harding, J. D. J.: The comparative pathogenicity of two porcine Hemophilus species. Vet. Rec. 88: 540-545, 1971.

Contributor. Pig Research Institute of Taiwan, Republic of China.

Slide 11 and 12

History. This tissue is from a 3-month-old standardbred foal which died of pneumonia. Slide 12 is stained with Gomori methenamine silver (GMS).

Diagnosis. Protozoal pneumonia, caused by Pneumocystis carinii.

Comment. The microscopic lesion is characteristic for Pneumocystis carinii infection, alveoli filled with foamy eosinophilic material containing

organisms and alveolar macrophages. The immune status of this foal was undetermined.

Suggested reading. Shively, J. N., Dellers, R. W., Buergelt, C. D., et al.: Pneumocystis carinii in two foals. JAVMA 162: 648-652, 1973.

Contributor. Animal Pathology Laboratory, Quebec Dept. of Agriculture, St. Hyacinthe, Quebec, Canada.

Slide 13

History. This tissue is from a 4-month-old Afghan dog, one of an entire litter affected with progressive tetraparesis.

Diagnosis. Afghan myelomalacia.

Comment. The exact pathogenesis of this lesion has not been clearly defined. The apparent preservation of many axons in affected areas tends to incriminate a primary myelinopathy rather than a primary nerve degeneration or necrotizing process. Hence, a microscopic morphologic diagnosis of demyelination or myelopathy was preferred over malacia.

Suggested reading. Cummings, J. F. and deLahunta, A.: Hereditary myelopathy of Afghan hounds, a myelinolytic disease. Acta Neuropath (Berl.) 42: 173-181, 1978.

Contributor. Department of Veterinary Pathobiology, The Ohio State University, Columbus, Ohio.

Slide 14

History. This is from a rhesus monkey on a chronic toxicity study of the semisynthetic antibiotic rifampin. Clinical signs included proteinuria, hypoproteinemia, hypoalbuminemia, and uremia.

Diagnosis. Nephrotic syndrome "foot process nephrosis."

Comment. Light microscopic changes are minimal, consisting of mildly dilated tubules containing sporadic proteinaceous casts, hyaline droplets in some epithelial cells, and mildly hypercellular glomeruli. Ultrastructural examination would show widespread fusion of the podocytes of the glomerular visceral epithelium. Although tested in a number of animal species and used for treatment of tuberculosis in man, renal toxicity of this type with rifampin has been observed only in the rhesus monkey.

Suggested reading. Andrews, P. M.: A scanning and transmission electron microscopic comparison of puromycin aminonucleoside-induced nephrosis to hyperalbuminemia-induced proteinuria with emphasis on kidney podocyte pedicel loss. Lab. Invest. 36 (2): 183-197, 1977.

Contributor. Dow Chemical Company, Indianapolis, Indiana.

Slide 15

History. This tissue is from a 2-day-old chicken which was experiencing severe dyspnea.

Diagnosis. Granulomatous pneumonia, caused by Aspergillus sp. (brooder pneumonia).

Contributor. School of Veterinary Medicine, University of Pennsylvania, Philadelphia, Pennsylvania.

Slide 16

History. This tissue is from an 8-week-old male miniature poodle which was active and playful in the morning but became severely depressed and died acutely in the afternoon of the same day.

Diagnosis. Granulomatous myocarditis, caused by Trypanosoma cruzi (Chagas' disease).

Comment. Toxoplasmosis, leishmaniasis, and histoplasmosis were considered in the differential diagnosis. The presence of a kinetoplast within the organism is characteristic for T. cruzi as well as for Leishmania donovani. L. donovani (visceral leishmaniasis) organisms, however, are found within reticuloendothelial cells. Transmission of T. cruzi via its intermediate hosts (triatomids) is through contamination of infective feces or ingestion of the beetle, and not via the insect's bite itself. Congenital infections, milk transmission, and transmission via blood transfusions have also been reported.

Suggested reading.

Koeberle, F.: Chagas' disease and Chagas' syndrome: The pathology of American trypanosomiasis. Adv. in Parasitol. 6: 63-166, 1968.

Williams, G. D., Adams, G. L., and Yaeger, R. G., et al.: Naturally occurring trypanosomiasis (Chagas' disease) in dogs. JAVMA 171: 171-177, 1977.

Contributor. College of Veterinary Medicine, Texas A&M University, College Station, Texas.

Slide 17

History. Diarrhea occurred in 23 piglets from 4 litters aged 7-10 days. Affected pigs dehydrated rapidly, and occasional pigs were observed to vomit and tremble. The sows remained healthy. This tissue is from an infected pig.

Diagnosis. Coccidiosis and colibacillosis.

Comment. A subacute, segmental enteritis, with blunting and mild necrosis of villi is present. Lesions also mimmic porcine rotavirus or coronavirus (TGE) infection, although virus testing was negative in this case. This case was considered to be an atypical form of most colibacilloses, which usually are hypersecretory disease with minimal microscopic changes. Synergism with the coccidial infection may account for the marked pathological changes.

Suggested reading. Sangster, L. T., Stuart, B. P., Williams, D. J. et al.: Coccidiosis associated with scours in baby pigs. VM/SAC 73: 1317-1319, 1978.

Contributor. Department of Veterinary Science, South Dakota State University, Brookings, South Dakota.

Slide 18 and 19

History. The submitted specimen is from a 6-year-old male chimpanzee imported into this country. Slide 19 is an acid-fast stain.

Diagnosis. Granulomatous dermatitis, neuritis, and hepatitis, caused by Mycobacterium leprae (leprosy).

Comment. Specific identification of the acid-fast organisms as M. laprae was based upon numerous tests. This is the first documented case of leprosy in a nonhuman primate.

Suggested reading. Leininger, J. R., Donham, K. J., and Rubino, M. J.: Leprosy in a chimpanzee. Vet. Path. 15: 339-346, 1978.

Contributor. Institute of Agricultural Medicine & Environmental Health, University of Iowa, Oakdale, Iowa.

Slide 20

History. This tissue is from one of several 8-week-old CBA/J mice that were lethargic and had rough hair coats.

Diagnosis. Necrotizing bronchiolitis, caused by Sendai virus infection.

Comment. This case represents an early stage of a progressive lesion with Sendai virus infection in mice. With progression there is pronounced hyperplasia of type II epithelial cells around the affected airways and into adjacent alveoli. Also, perivascular and peribronchial lymphocytic cuffs develop.

Suggested reading.

Ward, J. M.: Naturally occurring Sendai virus disease of mice. Lab. Anim. Sci. 24: 938-942, 1974.

Ward, J. M., Houchans, D. P., Collins, M. J. et al.: Naturally occurring Sendai virus infection of athymic nude mice. Vet. Path. 13: 36-46, 1976.

Contributor. Experimental Pathology Department, Naval Medical Research Institute, Bethesda, Maryland.

Slide 21

History. The tissue specimen is from a 12-year-old female Pomeranian with anorexia, lethargy, and reluctance to move. Dyspnea was noted and there were foci of necrosis with ulceration on the tongue. Significant laboratory results included a creatinine level of 12 mg/100 ml.

Diagnosis. Uremic gastropathy.

Comment. Gastric lesions in canine uremia are due to a combination of diffuse vascular disease, local electrolyte imbalance (chiefly in H^+ secretion), and abnormal calcium metabolism. All of these probably relate to circulation of an uncharacterized toxic polypeptide that occurs in uremia. Vascular lesions are complicated by thrombosis which is associated with defective fibrinogen polymerization.

Suggested reading. Cheville, N. F.: Uremic gastropathy in the dog. Vet. Path. 16 (3): 292-309, 1979.

Contributor. USDA/ARS, National Animal Disease Laboratory, Ames, Iowa.

Slide 22

History. This specimen is from a 6-month-old female Doberman pinscher which was unthrifty and stopped gaining weight at about 3 months of age despite a voracious appetite and voluminous stools.

Diagnosis. Pancreatic hypoplasia (juvenile atrophy).

Comment. The morphologic distinction between atrophy and hypoplasia in this case is unclear. Randomly scattered inflammatory cells in the interstitium prompted some conference attendees to feel this was a degenerative process. Pancreatic islets in the tissue are considered normal.

Contributor. Diagnostic Laboratory, Kentucky Department of Agriculture, Hopkinsville, Kentucky.

Slide 23

History. This tissue is from a cynomolgus monkey which was infected with an experimental agent via small particle aerosol 14 days prior to death.

Diagnosis. Interstitial pneumonia, caused by Coxiella burnetii.

Comment. Frozen sections of this monkey's lung were positive for Coxiella burnetii using the indirect fluorescent antibody test. This animal was sacrificed as clinically it exhibited only mild "flu-like" signs. In addition to the interstitial pneumonia most sections contain a focal foreign body granuloma on the pleural surface and numerous small perivascular and peribronchial accumulations of macrophages containing a black granular pigment compatible with Pneumonyssus simicola infection.

Contributor. U.S. Army Medical Research Institute of Infectious Disease, Fort Detrick, Maryland.

Slide 24

History. This tissue is from a 29-month-old female mastomys (Praomys natalensis) raised under standard conditions.

Diagnosis. Gastric carcinoid.

Suggested reading. Hosoda, S., NaKamura, W., Snell, K. C., et al.: Histamine production by transplantable argyrophilic gastric carcinoid of Praomys (Mastomys) natalensis. Science 170: 454-455, 1970.

Contributor. Department of Pathology, The Johns Hopkins Hospital, Baltimore, Maryland.

Slide 25

History. This tissue is from a recurrent skin mass from the abdomen of a 3-year-old castrated male domestic shorthaired cat.

Diagnosis. Pyogranulomatous dermatitis, caused by Mycobacterium fortuitum.

Comment. Special stains demonstrated acid-fast bacilli in the lesion. The organism was identified as M. fortuitum by culture.

Suggested reading. Wilkinson, G. T., Kelly, W. R., and O'Boyle, D.: Cutaneous granulomas associated with Mycobacterium fortuitum infection in a cat. J. Sm. Anim. Pract. 19: 357-362, 1978.

Contributor. Experimental Pathology Laboratories, Herndon, Virginia.

Slide 26

History. This tissue is from a massive, subcutaneous swelling on the dorsal neck of an 8-year-old male boxer breed canine.

Diagnois. Myxosarcoma.

Contributor. Division of Comparative Pathology, College of Veterinary Medicine, University of Florida, Gainesville, Florida.

Slide 27

History. This tissue is from the brain of an 8-year-old dog which had been exhibiting progressively worsening neurological signs.

Diagnosis. Telangiectasia.

Comment. This vascular anomaly was believed to be incidental and probably congenital in this dog. Elsewhere in the brain there were lesions (not submitted) typical of "old dog encephalitis."

Contributor. Comparative Medical & Veterinary Services, Los Angeles County Department of Health Service, Downey, California.

Slide 28

History. This tissue section of skin is from the pinna of the ear from an adult male Macaca fascicularis.

Diagnosis. Xanthomatosis.

Comment. This animal was on an experimental atherogenesis study and was fed a high cholesterol diet. Grossly, the skin of the extremities was thickened, rough and yellow, and these changes decreased in severity proximally toward the knees and elbows. Similar skin changes were present in the ears and forehead. Severe atherosclerosis and lipid loading of lymph nodes were also present in this animal.

Contributor School of Aerospace Medicine, VSP, Brooks AFB, Texas.

Slide 29

History. This lung tissue was obtained from a 3-week-old bovine with a history of respiratory and enteric problems.

Diagnosis. Necrotiring bronchopneumonia, caused by Aspergillus sp.

Comment. Varying combinations of atelectasis. bronchiolitis, and bronchopneumonia were evident among the different examined slides from this case. Exudative plugs in bronchi and bronchioles containing branching fungi were evident in most sections. These fungi were felt to be morphologically compatible with Aspergillus species.

Contributor. Maryland Department of Agriculture, Animal Health Laboratory, College Park, Maryland.

Slide 30

History. This tissue is from a New Zealand white rabbit which was injected intra-arterially with ground aortic atherosclerotic plaque suspension. This rabbit had been used in a similar experiment two weeks previously. The animal was found dead the morning following the second injection.

Diagnosis. Cardiomyopathy, secondary to anaphylactic shock.

Comment. This severe myocardial degeneration represents a lesion associated with anaphylaxis in the rabbit. Arthus described three hypersensitivity reactions in the rabbit: the Arthus reaction that we are so familiar with; the acute anaphylaxis with rapid death; and a third reaction known as Arthus cachexia. This reaction occurred in those rabbits surviving the acute syndrome, but eventually succumbing to right heart failure. This heart lesion occurs as a result of the extremely high resistance to flow in the pulmonary vessels during anaphylaxis. The heart, per se, is not the target organ of anaphylaxis.

Suggested reading.

Coca, A. F.: The mechanism of the anaphylaxis reaction in the rabbit. J. Immunol. 4(4): 219-232, 1919.

Drinker, C. K., and Bronfenbrenner, J.: The pulmonary circulation in anaphylactic shock. J. Immunol. 9: 387-406, 1924.

Contributor. University of Texas Health Science Center, Houston, Texas.

Slide 31

History. This tissue is from an African white-tailed rat, Mystromys albicaudatus, experimentally infected with an infectious agent.

Diagnosis. Granulomatous dermatitis, caused by Leishmania mexicana texana (cutaneous leishmaniasis).

Comment. Large numbers of amastigotes are readily visible within vacuolated macrophages. The parasites appear as small, membrane-bound spheres containing a nucleus and rod-shaped kinetoplast. Mystromys albicaudatus, related to the cotton rat and hamster, is of interest because of its apparent ability to reproduce the human disease of cutaneous leishmaniasis when infected with Leishmania tropica, L. braziliensis, and L. mexicana.

Suggested reading.

Connor, D. H., and Neafie, R. C.: Cutaneous leishmaniasis. Chapt 3, IN Pathology of Tropical & Extraordinary Diseases, an Atlas, Vol. 1, Binford & Connor (eds), AFIP, 1976, pp 258-264.

McKinney, L., and Hendricks, L. D.: Experimental infection of Mystromys albicaudatus with Leishmania braziliensis: Pathology. Am. J. Trop. Med. & Hyg. 29(5): 753-760, 1980.

Contributor. Division of Veterinary Pathology, Walter Reed Army Institute of Research, Washington, D. C.

Slide 32

History. This tissue is from a white leghorn male chicken.

Diagnosis. Atherosclerosis.

Comment. This bird was on a high fat, 1% cholesterol diet from the age of

12 weeks to 28 weeks, when the necropsy was performed. The diffuse involvement of the media in many affected coronary arteries contrasts somewhat with atherosclerosis in humans where medial involvement is usually only secondary to severe intimal lesions. Although some lymphoid cells are present within the myocardium of this bird, it is not significant enough to diagnose a lymphoid neoplasm.

Suggested reading. Clarkson, T. B., Prichard, R. W., Bullock, B. C., et al.: Pathogenesis of atherosclerosis: Some advances from using animal models. Exptl. & Molec. Pathol. 24: 264-286, 1976.

Contributor. Department of Veterinary Microbiology & Pathology, Washington State University, Pullman, Washington.

Slide 33

History. This tissue is from a 3-year-old, female standardbred equine which became ataxic and collapsed immediately after running one morning. She died within 12 hours.

Diagnosis. Acute degenerative myopathy (paralytic myoglobinuria).

Comment. Grossly, muscles of the lumbar region, gluteal region, and thighs were very hard, and contained large, poorly defined pale areas. Mucous membranes were "muddy", and the urine was dark brown.

Suggested reading.

Hadlow, W. J.: Myopathies of animals. IN The Striated Muscle, Pearson, C. M. and Mostofi, F. K. (eds), Williams & Wilkins Co., Baltimore, 1973, pp 710-713.

Gleiser, D. R.: The azoturia in tying-up syndrome. VM/SAC, 710-713, June 1975.

Contributor. Veterinary Diagnostic Laboratory, College of Veterinary Medicine, University of Illinois, Urbana, Illinois.

Slide 34

History. This tissue is from an abdominal mass from a Syrian hamster that was inoculated intraperitoneally with exudate taken from multiple skin abscesses in a recently imported African baboon. Specimen is stained with Gomori methenamine silver and hematoxylin-eosin counterstain (GMS/HE).

Diagnosis. Granulomatous peritonitis, caused by Histoplasma capsulatum var. duboisii (African histoplasmosis).

Comment. Differing from the more common organisms of H. capsulatum, H. capsulatum var. duboisii are large, ovoid, and 10-15 microns in diameter. They have thick walls and contain numerous fat globules. They are largely intracellular, as are the more common "small forms" seen in animal tissue with histoplasmosis in other parts of the world. Because of their similarity in size, the tissue form cells of H. capsulatum var. duboisii may be mistaken for Blastomyces dermatitidis. However, the former buds by a much narrower base, with typical "hourglass" and "double" cell forms. Each cell of H. capsulatum var. duboisii is usually uninucleate whereas B. dermatitidis cells contain multiple nuclei.

Suggested reading. Emmons, C. W., Binford, C. H., Utz, J. P., et al.: Medical Mycology, Lea & Febiger, Philadelphia, 1977, pp 305-341.

Contributor. Pathology Division, Bureau of Laboratories, Center for Disease Control, Atlanta, Georgia.

Slide 35

History. This tissue is from a 10-year-old quarterhorse gelding, which suddenly developed clinical signs of icterus, depression, hemoglobinuria, polyuria, and polydypsia. It died within 3 days.

Diagnosis. Necrotizing hepatitis, compatible with serum hepatitis.

Comment. Although a detailed history was not available, this horse apparently received "routine" vaccinations some weeks earlier. Generally, a suitable history of the horse receiving a parenteral biological of equine origin in the preceding several weeks to months is considered a prerequisite for the diagnosis of serum hepatitis.

Contributor. Department of Pathlogy, College of Veterinary Medicine, Fort Collins, Colorado.

Slide 36

History. This tissue is from a 2-year-old female African black rhinoceros which resided at the National Zoo for 17 years.

Diagnosis. Granulomatous pneumonia, caused by Mycobacterium bovis (tuberculosis).

Suggested reading. Montali, R. J. (ed): Mycobacterial Infections of Zoo Animals, Smithsonian Institution Press, P. O Box 1579, Washington, D. C., 1978.

Contributor. National Zoological Park, Washington, D. C.

Slide 37

History. This tissue is from a 6-year-old dog which exhibited signs of progressive loss of coordination of front and rear legs.

Diagnosis. Granulomatous meningoencephalomyelitis.

Comment. The etiology(s) of this condition is(are) undetermined. Special stains failed to demonstrate any microorganism. Some authors feel this syndrome and inflammatory reticulosis are the same condition.

Suggested reading.

Brand, K. G., Vandevek, M., Walker, T. L., et al.: Granulomatous meningoencephalomyelitis. J. Amer. Vet. Med. Assoc. 172: 1195-1200, 1978.

Cordy, D. R.: Canine granulomatous meningoencephalomyelitis. Vet. Pathol. 16: 325-333, 1979.

Russo, M. E.: Primary reticulosis of the central nervous system in dogs. J. Am. Vet. Med. Assoc. 174: 492-500, 1979.

Contributor. Veterinary Diagnostic & Investigational Laboratory, University of Georgia, Tifton, Georgia.

Slide 38

History. This tissue is from a 5-year-old female poodle with a chronic debilitating illness which was initially diagnosed and treated as Cushing's Syndrome.

Diagnosis. Pyogranulomatous pneumonia, caused by Mesocestoides larval forms (tetrathyridia).

Comment. Parasitic lesions were disseminated in most tissues in the body. Host inflammatory response varied from minimal in lesions with few

larva to pronounced in tissues such as the lung and liver. Vascular thromboses, noted in the lung, were considered to be secondary to the surrounding intense inflammatory reaction. As only larvae were present (even in the intestines), the species of Mesocestoides could not be determined.

Suggested reading. Williams, J. F., Westheimer, J., and Banman, W. R.: Mesocestoides infection in the dog. J. Am. Vet. Med. Assoc. 166: 996-998, 1975.

Contributor. Letterman Army Institute of Research, San Francisco, California.

Slide 39

History. This tissue is from an adult female rhesus monkey being utilized in a maxilla reconstruction experiment. She died shortly after a second anesthetic procedure. One unit of O negative human red blood cells had been administered to the animal during both anesthetic procedures.

Diagnosis. Thrombosis of renal interstitial and glomerular capillaries, compatible with disseminated intravascular coagulation (DIC).

Comment. The thrombi in the capillaries are a histologic expression of DIC induced by an incompatible blood transfusion. It is not possible to ascertain with certainty if the second transfusion was the inciting agent or if the animal was already having a consumptive coagulopathy prior to the second transfusion. Diffuse cortical degeneration is present, but may represent autolysis rather than necrosis.

Suggested reading. Lopas, H., and Birnlorf, H. I.: Haemolysis and intravascular coagulation due to incompatible red cell transfusion in

isoimmunized monkeys. Brit. J. Haematol. 21: 399-411, 1971.

Contributor. Department of Comparative Medicine, University of Texas, Dallas, Texas.

Slide 40

History. This tissue is from a 77-day-old female BALB/c mouse that demonstrated incoordination of movement and weighed 13.4 grams when euthanatized in a comatose state.

Diagnosis. Storage disease.

Comment. The microscopic lesions of reticuloendothelial cells laden with stored material were detected throughout the R-E system of the body and there was vacuolation of neurons and the loss of the cerebellar Purkinje cells. A tenfold increase in free cholesterol was noted in the liver, thus lending support for a diagnosis of "lipid storage" disease. The metabolic defect in this mouse model has not been determined.

Suggested reading.

Boothe, A. D., Bhuvaneswaren, C., Morris, M. D., et al.: Tissue cholesterol storage disorder in BALB/c mice: Histologic findings. Fed. Proc. (Abstract No. 4692) 30(3): 1158, 1977.

Morris, M. D., Bhuvaneswaren, C., and Boothe, A. D.: Tissue cholesterol storage disorder in BALB/c mice. Fed. Proc. (Abstract No. 4691) 30(3): 1158, 1977.

Contributor. National Center for Toxicological Research, Jefferson, Arkansas.

Slide 41

History. This tissue is from a Mystax marmoset (Saguinus mystax).

Diagnosis. Pyogranulomatous enteritis and peritonitis, caused by Prosthenorchis elegans.

Comment. Prosthenorchis elegans is a common parasite of South American primates, especially marmosets. The parasite usually lives in harmony with the host. Captive animals are frequently diagnosed as dying from peritonitis due to penetration of the intestinal serosa by the parasite. There is probably, however, an underlying change in environment or nutrition that causes the parasite to migrate.

Suggested reading. Hunt, R. D.: Spontaneous infectious diseases of marmosets. IN Marmosets in Experimental Medicine: Proc. Conference on Marmosets in Experimental Medicine, Nazareth Gengozian and Friedrich Deinhardt (Eds.), Karger, 1978, pp 239-253.

Contributor. Bureau of Biologics, FDA, Bethesda, Maryland.

Slide 42

History. This tissue is from a tri-colored parrot finch.

Diagnosis. Erythroblastosis.

Comment. The sinusoids of the liver are diffusely infiltrated with large, blastic hematopoietic cells. They morphologically appear most compatible with erythroid cells, although more definitive cell identification could be obtained from fresh peripheral blood smears. The multifocal hepatocellular necrosis is probably the result of ischemia due to hemostasis.

Erythroblastosis has been recognized in a number of different avian species,

including Bourke parakeets, lovebirds, red-eared finshes, budgerigars, and domestic poultry.

Suggested reading. Cavill, J. P.: Viral diseases. IN Diseases of Cage and Aviary Birds, Petrak, M. L. (Ed.), Lea & Febiger, 1969, p. 380.

Contributor. Veterinary Laboratory Services, San Gabriel, California.

Slide 43

History. This tissue is from a 9-year-old, female Vizsla presented for cachexia and weakness.

Diagnosis. Pyogranulomatous splenitis, caused by Paecilomyces sp. fungi.

Comment. Lytic bone lesions were present in several vertebrae of this dog. Fresh tissue was not available for culture; the diagnosis was made on the basis of histopathologic findings and systemic signs. Morphologically, the fungal forms are compatible with Paecilomyces sp.

Suggested reading. Patnaik, A. K., Liu, Si-Kwang, Wilkins, R. J., et al.: Paecilomycosis in a dog. J. Am. Vet. Med. Assoc. 161(7): 806-813, 1972.

Contributor. Veterinary Diagnostic Center, University of Nebraska, Lincoln, Nebraska.

Slide 44

History. This tissue is from a 2-year-old bovine exhibiting unusual behavior.

Diagnosis. Encephalitis, with neuronal intracytoplasmic eosinophilic inclusions; etiology--rabies.

Comment. Fluourescent antibody tests on the brain was positive for rabies.

Contributor. Veterinary Diagnostic & Investigational Laboratory, Tifton, Georgia.

Slide 45

History. This tissue is from an aborted 8-month-old fetal ox.

Diagnosis. Meningitis and thymitis, caused by epizootic bovine abortion (EBA).

Comment. The lesions are consistent with those described for epizootic bovine abortion. Although a chlamydial agent is most often cited as the etiological agent of EBA, its demonstration or isolation in most cases is unrewarding, and additional agents have been theorized to contribute to this disease. Additionally, a tick has been shown to be a natural vector of this disease.

Suggested reading.

Jubb, K. V. F., and Kennedy, P. C.: Pathology of Domestic Animals, 2nd Ed., Vol. I, Academic Press, 1970, pp 536-539.

McKercher, D. G., Theis, J. H., Wada, E. C. et al.: Recent studies on epizootic bovine abortion. Theriogenology 6(2-3): 251-261, 1976.

Contributor. College of Veterinary Medicine, Oklahoma State University, Stillwater, Oklahoma.

Slide 46

History. This tissue is from a 2-year-old female cocker spaniel which was presented because of head tilt, circling to the right, and posterior paresis.

Diagnosis. Granulomatous meningoencephalitis, caused by Histoplasma capsulatum.

Comment. Central nervous system involvement with histoplasmosis is unusual. Within macrophages in this section of brainstem are yeast forms typical of H. capsulatum. They appear as small dots surrounded by a halo approximately 2-4 microns in diameter.

Contributor. Department of Pathobiology, College of Veterinary Medicine, University of Tennessee, Knoxville, Tennessee.

Slide 47

History. This tissue is from a 4-year-old quarterhorse stallion with anorexia, lethargy, anemia, and fever.

Diagnosis. Equine granulomatous enteritis.

Comment. The etiology of this condition is undetermined. Special stains failed to demonstrate an etiological agent. Splenic tissue and adrenal gland, on the same slide, are essentially normal.

Suggested reading. Merritt, A. M., Cimprich, R. E., and Beech, J.: Granulomatous enteritis in nine horses. J. Am. Vet. Med. Assoc. 169(6): 603-609, 1976.

Contributor. Department of Veterinary Medicine, Oregon State University, Corvallis, Oregon.

Slide 48

History. This tissue is from a beached fin whale.

Diagnosis. Pyogranulomatous inflammation, caused by Crassicauda crassicaude.

Comment. From the slide the tissue could not be positively identified. According to the contributor the parasite is within an artery, producing a verminous arteritis. This spirurid nematode, Crassicauda crassicauda, has been reported to occur in the penis and clitoris of blue and fin whales as well as from the major vessels.

Suggested reading. Gibson, D. I.: Some blue whale nematodes. Parasitol. 67(2): VIII-IX, 1973.

Contributor. Pfizer, Inc., Medical Research Labs, Groton, Connecticut.

Slide 49

History. This tissue is from an unthrifty 5-week-old male broiler from a flock in which a few losses have been seen in the winter months.

Diagnosis. Bursitis, caused by Cryptosporidium sp. and probable infectious bursa disease virus.

Comment. The lesion in this bursa of Fabricius is severe lymphoid depletion, reticuloendothelial hyperplasia, and marked lymphocytolysis, which is more extensive than should occur with only cryptosporidiosis. Thus, a primary pathogen, probably infectious bursa disease virus, initially infected the bursa, decreased host resistance, and allowed establishment of the protozoal infestation.

Suggested reading. Fletcher, O. J., Munnell, J. F., and Page, R. K.: Cryptosporidiosis of the bursa of chickens. Avian Dis. 19: 630-639, 1975.

Contributor. Rollins Animal Disease Diagnostic Laboratory, via National Institute of Occupational Safety and Health, Pathology Section, Cincinnati, Ohio.

Slide 50

History. This tissue is from a 36-hour-old Arabian foal.

Diagnosis. Embolic, suppurative nephritis, caused by Actinobacillus equuli (foal septicemia).

Contributor. Department of Veterinary Science, University of Arizona, Tucson, Arizona.

Slide 51

History. This tissue is from a solitary subcutaneous mass surgically removed from an adult male Syrian hamster.

Diagnosis. Myelolipoma.

Comment. Myelolipomas are benign, bone marrow-like masses. They have been recorded in man and various domestic and wild animals, and seem to be more common in some feline species. Common sites are the adrenals of man and the liver and spleen of cats.

Contributor. Department of Comparative Medicine, The Medical Center, University of Alabama, Birmingham, Alabama.

Slide 52

History. This tissue is from a baboon (Papio papio).

Diagnosis. Multiple parasitic granulomas in the colon and focal granulomatous peritonitis, caused by Oesophagostomum sp.

Comment. Oesophagostomum is the most common nematode parasite of Old World nonhuman primates. Clinical signs generally occur only in severe infestations or with the advent of secondary infection. Histologically, the

lesions are granulomas containig developing larvae surrounded by an intense host inflammatory response. Larvae entrapped within nodules do not return to the lumen of the large intestine. Such entrapped parasites may eventually result in caseous lesions which can persist for a long time.

Suggested reading. Shadduck, J. A. and Pakes, S. P.: Protozoal and metazoal diseases. Chapt. 17, IN Pathology of Laboratory Animals, Benirschke, et al. (Eds), Springer-Verlag, New York, 1978, pp 1648-1649.

Contributor. Department of Comparative Medicine, The Milton S. Hershey Medical Center, Hershey, Pennsylvania.

Slide 53

History. A 15-year-old Arabian mare was presented with intermittent colic which progressively worsened. The animal died the following day after receiving supportive treatment. Necropsy revealed a torsion of the large colon, a ruptured stomach, and several firm yellow-white masses located in the right cardiac lobe of the lung.

Diagnosis. Granulomatous pneumonia, sclerosing, caused by a lipid foreign body.

Comment. Special stains, including sudans, oil-red-O, and osmium tetraoxide, demonstrated a saturated lipid material within most of the vacuoles within the lesion. Chemical extraction yielded a non-saponifiable, transparent, faintly-yellow liquid material that was identified by infrared spectrophotometry as a paraffin hydrocarbon. In view of the universal use of mineral oil as a therapeutic agent in the treatment of digestive disorders in

horses and the fact that mineral oil is a saturated paraffin hydrocarbon, it is most probable that mineral oil was the etiological agent.

Contributor. Department of Veterinary Pathology, Armed Forces Institute of Pathology, Washington, D. C.

Slide 54

History. This section of tissue is from a mass removed from the elbow of a one-year-old spayed female German shepherd.

Diagnosis. Calcinosis circumscripta.

Suggested reading. Howell, J. McC. and Ishmael, J.: Calcinosis circumscripta in the dog with particular reference to lingual lesions. Path. Vet. 5: 75-80, 1968.

Contributor. Comparative Pathology & Surgical Branch, Aberdeen Proving Ground, Maryland.

Slide 55

History. This tissue is from a one-year-old female spayed domestic shorthaired cat which was treated unsuccessfully for a febrile condition. Exploratory surgery revealed an enlarged pancreas from which a biopsy was taken.

Dignosis. Necrotizing pancreatitis, chronic-active, caused by Toxoplasma gondii.

Comment. Numerous protozoal organisms are distributed throughout the pancreatic tissue. Most appear to be within cytoplasmic vacuoles varying from a few to many within each vacuole. The fibrosis within the tissue attests to

the chronicity of the inflammatory reaction. Necrotic and saponified fat is also present within the lesion. This cat had a serum titer to T. gondii of 1:128.

Contributor. Department of Pathobiology, College of Veterinary Medicine, University of Tennessee, Knoxville, Tennessee.

Slide 56

History. This tissue is from a 6-month-old mixed Hampshire pig which suddenly developed nervous symptoms and vomition.

Diagnosis. Cortical laminer necrosis, with edema and perivascular eosinophilic infiltrates, caused by salt poisoning.

Comment. This lesion is considered extremely characteristic for salt toxicity in swine, and most frequently has been called an eosinophilic meningoencephalitis. Limitation of water intake is generally considered necessary for this disease to occur naturally in swine.

Suggested reading. Done, J. T., Harding, J. D. J., and Lloyd, M. K.: Meningoencephalitis eosinophilica of swine. II. Studies on the experimental reproduction of the lesions by feeding sodium chloride and urea. Vet. Rec. 71(5): 92-96, 1959.

Contributor. Department of Veterinary Pathology, Tuskegee Institute, Tuskegee, Alabama.

Slide 57

History. This tissue is from a 5-1/2 week old rottweiler puppy.

Diagnosis. Myocarditis, with basophilic intranuclear inclusions, caused by canine parvovirus.

Comment. Clinically significant infection with canine parvovirus is generally manifested as an enteric syndrome, which clinically and pathologically is very similar to feline panleukopenia. Myocarditis caused by this same virus occurs principally in young puppies. Parvovirus was identified within basophilic intranuclear inclusion in the heart of this case by electron microscopy.

Suggested reading.

Nelson, O. T., Eustis, S. L., McAdaragh, J. P. et al.: Lesions of spontaneous canine viral enteritis. Vet. Pathol. 16 (6): 680-686, 1979.

Robinson, W. F., Huxtable, C. R., and Pass, D. A.: Canine parvoviral myocarditis: A morphologic description of the natural disease. Vet. Pathol. 17(3): 282-293, 1980.

Contributor. Angell Memorial Animal Hospital, Boston, Massachusetts.

Slide 58

History. This tissue is from a young male Doberman pinscher with hematuria of 3-4 months duration.

Diagnosis. Rhabdomyosarcoma of the urinary bladder.

Comment. Cross-striations in the cytoplasms of the neoplastic cells are not readily apparent on the H&E stained sections, but were demonstrated in some cells with a phosphotungstic acid hematoxylin (PTAH) stain.

Suggested reading. Kelly, D. F.: Rhabdomyosarcoma of the urinary bladder in dogs. Vet. Pathol. 10: 375-384, 1973.

Contributor. School of Veterinary Medicine, University of Pennsylvania, Philadelphia, Pennsylvania.

Slide 59

History. This tissue is from a 6-week-old Doberman pinscher puppy.

Diagnosis. Necrotizing hepatitis, caused by Bacillus piliformis (Tyzzer's disease), and canine distemper.

Comment. Faint, intracytoplasmic, filamentous forms are visible in the hepatocytes immediately surrounding the necrotic foci in the liver, and are characteristic for Bacillus piliformis infection (Tyzzer's disease). The organism can be more clearly demonstrated with a silver stain such as the Warthin-Starry stain. In addition to the necrotizing liver lesion, intracytoplasmic and intranuclear eosinophilic inclusion bodies characteristic of canine distemper are abundant in epithelial cells of the biliary tract.

Suggested reading. Qureshi, S. R., Carlton, W. W., and Olander, H. J.: Tyzzer's disease in a dog. J. Am. Vet. Med. Assoc. 168(7): 602-604, 1976.

Contributor. Diagnostic Laboratory, Kentucky Department of Agriculture, Hopkinsville, Kentucky.

Slide 60

History. This tissue is from a 4-month-old lamb that had a moderately firm swelling in the ventral cervical region.

Diagnosis. Colloid involution of diffuse hyperplastic goiter, thyroid gland.

Comment. This lamb was one of about 25 lambs, most of which died within three days of birth and all had extensive hyperplastic goiter. The etiology was unrelated to the dietary iodine intake of the ewes, but rather to an inherited defect in the ability of the lamb's thyroid follicular cells to synthesize thyroglobulin. In this one surviving lamb there appeared to be an incomplete penetrance of the enzymatic defect that permitted the lamb to progressively increase the amount of thyroid hormone synthesized and return blood levels to normal. The apparent reduction in TSH levels resulted in the colloid involution in the previously hyperplastic thyroid gland.

Suggested reading.

Falconer, I. R., Raitt, I. M., Seamark, R. F., et al.: Studies of the congenitally goitrous sheep, iodoproteins of the goitre. Biochem. J. 117: 117-424, 1970.

Rae, R., Hill, G. N., and Pain, R. W.: Congenital goitre in Merino sheep due to an inherited defect in the biosynthesis of thyroid hormone. Res. Vet. Sci. 9: 209-223, 1968.

Contributor. Department of Pathobiology, The Ohio State University, College of Veterinary Medicine, Columbus, Ohio.

Slide 61

History. This tissue is from a 7-year-old male rhesus monkey.

Diagnosis. Interstitial pneumonia, caused by simian adenovirus.

Comment. The distribution of the pneumonic lesion varied somewhat among slides with some demonstrating predominantly a bronchopneumonia and others having pleural involvement. All demonstrated sporadic alveolar cells containing basophilic intranuclear inclusions consistent with adenoviral inclusions.

Suggested reading. Boyce, J. R., Gliddons, M. E., and Valerio, M.: Simian adenoviral pneumonia. Am. J. Pathol. 91: 259-276, 1978.

Contributor. Department of Comparative Medicine, The Medical Center, University of Alabama, Birmingham, Alabama.

Slide 62

History. This tissue is from a calf exhibiting severe neurological symptoms.

Diagnosis. Necrosis (encephalomalacia), subacute, cerebrum.

Comment. Complete clinical history and necropsy results indicated this lesion was traumatically induced by trampling from other calves within the pen. The frontal bones were fractured and the cerebrum was herniated into the frontal sinus. The hemosiderin-containing macrophages in the meninges were an important point of differentiation between this case and a hemorrhagic infarction. In addition, the focal-multifocal distribution of neuronal necrosis aids in eliminating thiamine responsive poliioencephalomalacia and lead poisoning from the possible differential diagnoses.

Contributor. School of Veterinary Medicine, University of Pennsylvania, New Bolton Center, Pennsylwania.

Slide 63

History. This tissue is from a large, cranial abdominal mass in a dog.

Diagnosis. Liposarcoma.

Suggested reading. Zwicker, G. M.: Liposarcoma in a dog. Path. Vet. 7: 145-147, 1970.

Contributor. Department of Pathology and Parasitology, School of Veterinary Medicine, Auburn University, Auburn, Alabama.

Slide 64

History. This tissue is from a free-ranging elk in Colorado which was emaciated and showing signs of posterior paresis. Gross pathological findings included verminous pneumonia (Dictyocaulus spp.) and pyometra.

Diagnosis. Vacuolation of thyroid cells, caused by locoweed (Astragalus spp.) toxicity.

Comment. Extensive cellular vacuolation was also found in liver, kidney, adrenal medulla, pancreas, corpus luteum, lymph nodes, macrophages, and neurons of the CNS and peripheral ganglia.

Suggested reading.

Adcock, J. L., and Keiss, R. E.: Locoism in elk. Bull. Wildlife Assoc. 5: 121-124, 1969.

Van Kampen, K., and James, L. F.: Pathology of locoism in sheep. Path. Vet. 6: 413-423, 1969.

Contributor. Department of Pathology, College of Veterinary Medicine, Colorado State University, Fort Collins, Colorado.

Slide 65

History. This tissue is from a biopsy specimen from the left fore-foot of a canine.

Diagnosis. Pyogranulomatous dermatitis - maduromycosis.

Comment. Microscopic examination of the tissue reveals multiple pyogranulomas within the dermis and subcutis characterized by central suppurative foci containing brown, spherical chlamydiospores (5-40 microns in diameter) and branching, septate hyphae surrounded by a peripheral reaction comprised of macrophages, plasma cells, and lymphocytes. The histologic findings are characteristic of maduromycosis. Allescheria and Curvularia species of fungi are stated to be commonly isolated fungi from maduromycotic lesions. This particular case was not cultured.

Contributor. Veterinary Diagnostic Laboratory, University of Illinois, Urbana, Illinois.

Slide 66

History. This tissue is from a caiman (Crocadylius sclerops) approximately 4-5 months old, presented with numerous, discrete, gray-white splotches over the entire body.

Diagnosis. Dermatitis, caused by a pox virus.

Comment. Ballooning degeneration of epidermal cells, acanthosis, parakeratosis, and hyperkeratosis characterizes the lesion. An inflammatory cell infiltrate is not evident. Eosinophilic inclusion within epidermal cells are compatible with viral inclusions. Electron microscopic examination of the

lesion revealed numerous vaccinia-like particles within the nucleus and cytoplasm of affected cells.

Contributor. Department of Laboratory and Wildlife Medicine, College of Veterinary Medicine, University of Florida, Gainesville, Florida.

Slide 67

History. The two transverse sections of descending colon on the slide are from two adult, male NSB/N mice. One section is from a normal germfree mouse.

Diagnosis. Hyperplastic colitis, caused by Citrobacter freundii.

Comment. Significant histologic features include diffuse mucosal hyperplasia, multifocal necrosis and ulceration, and transmural inflammatory infiltrates. The necrosis and acute inflammatory reaction is suggestive of secondary bacterial infection as it has not been described in primary Citrobacter infection.

Suggested reading. Barthold, S. W., Coleman, G. L., Jacoby, R. O., et al.: Transmissible murine colonic hyperplasia. Vet. Pathol. 15: 223-236, 1978.

Contributor. Comparative Pathology Section, Veterinary Resources Branch, DRS, NIH, Bethesda, Maryland.

Slide 68

History. This tissue is from a 4-year-old spayed female Great Dane dog experiencing neurological signs.

Diagnosis. Medulloblastoma.

Comment. This is a rarely reported neoplasm in the dog. This involved significant portions of the vermis and had extended laterally through the parenchyma and into the meninges.

Contributor. Department of Pathology, The Johns Hopkins University School of Medicine, Baltimore, Maryland.

Slide 69

History. This tissue is from a growing eel (Anguilla japanica).

Diagnosis. Necrotizing myositis, caused by Plistophora sp. protozoa.

Comment. Infection caused by the Microsporidia, Plistophora sp. (Pleistophora) is common in cultivated eels in Taiwan and Japan. Grossly, the affected muscle was atrophied and appeared soft to flabby in consistency, greyish in color, and some milky material could be squeezed out of the cut surfaces. Histologically, numerous pansporoblasts which were filled with sporoblasts (from 4 to 32) were present in affected muscle fibers. The fibers showed various degrees of changes, including degeneration, necrosis, and hemorrhage.

Suggested reading.

Rogers, W. A., and Gaines, J. L. Jr.: Lesions of protozoan diseases in fish. Chapt. 3, IN The Pathology of Fishes, Ribelin & Migaki (Eds), Univ. of Wisconsin Press, 1975.

Toshikazu Hoshina: On a new microsporidia, Plistophora anguillarum, from the muscle of the eel, Anguilla japanica. J. Tokyo Univ. of Fisheries 38: 35-49, 1951.

Contributor. Pig Research Institute of Taiwan, Republic of China.

Slide 70

History. This tissue is from an aborted porcine fetus.

Diagnosis. Hepatic necrosis, caused by pseudorabies virus infection.

Comment. Large eosinophilic intranuclear inclusions are present within hepatocytes surrounding the necrotic foci in the liver. An appreciable inflammatory cell response is lacking. Pseudorabies virus was isolated from this case.

Suggested reading. Mohlenbruth, K., Leslie, P. F., Reed, D. E., et al.: Pseudorabies virus associated with abortion in swine. J. Am. Vet. Med. Assoc. 172(4): 478-479, 1978.

Contributor. Department of Veterinary Science, South Dakota State University, Brookings, South Dakota.

Slide 71

History. This tissue is from an aged ewe exhibiting respiratory distress.

Diagnosis. Interstitial pneumonia (ovine progressive pneumonia).

Comment. A retrovirus, showing cytopathologic effect compatible with Marsh's (ovine) progressive pneumonia was isolated from this lung. This virus, classified as a Lentivirus of the Retroviridae family, produces identical disease as the maedi virus and differs structurally, apparently only in some internal antigens. Lymphoid nodular hyperplasia in the lung is a characteristic feature of the chronic pulmonary lesion.

Suggested reading.

Outlip, R. C., Jackson, T. A., and Lehmkuhl, H. D.: Diagnostic features of ovine progressive pneumonia. J. Am. Vet. Med. Assoc. 173(12): 1578-79, 1978.

Outlip, R. D., Jackson, T. A. and Lehmkuhl, H. D.: Lesion of ovine progressive pneumonia: Interstitial pneumonitis. Am. J. Vet. Res. 40(10): 1370-1374, 1979.

Contributor. Department of Veterinary Microbiology & Pathology, Washington State University, Pullman, Washington.

Slide 72

History. This tissue is from a 7-year-old female beagle.

Diagnosis. Nodular lymphoid hyperplasia of the spleen.

Comment. This is a common lesion in aged dogs. There may be great variation in the size and in the cellular components of these hyperplastic splenic lesions. Some are primarily lymphoid, as in this case, while others contain principally extramedullary hematopoietic tissue. Others, still, appear essentially as a nodular expansion of severely congested sinusoids. In these heavily congested lesions multiple sections and careful examination must be made to rule out a vascular neoplasm.

Contributor. Hazleton Laboratories, Vienna, Virginia.

Slide 73

History. These tissue are from a 4-year-old female cat that died following a prolonged illness.

Diagnosis. Erythremic myelosis.

Comment. The diffuse sinusoidal distribution of the neoplastic cells in the liver and the spleen is compatible with myeloproliferative disease; however, this case demonstrates the difficulties encountered in classifying hematologic disorders with fixed specimens of visceral organs alone. This case was positively diagnosed by examination of premortem bone marrow and peripheral smears, which demonstrated the majority of the blast cells to be erythroblasts.

Contributor. Comparative Pathology Division, Armed Forces Radiobiology Research Institute, Bethesda, Maryland.

Slide 74

History. This tissue is from a 4-week-old lamb which had been killed during clinical signs of pyrexia and rapid breathing.

Diagnosis. Pneumonitis, caused by bovine respiratory syncytial virus.

Comment. This is an experimentally infected case. The lesion involves the bronchioles, interstitium, and alveoli. The inflammatory cell response is principally mononuclear cells.

Suggested reading. Outlip, R. C., and Lehmkuhl, H. D.: Lesions in lambs experimentally infected with bovine respiratory syncytial virus. Am. J. Vet. Res. 40(10): 1479-1482, 1979.

Contributor. USDA/ARS, National Animal Disease Laboratory, Ames, Iowa.

Slide 75 and 76

History. This tissue is from a pig (slide 75) that died suddenly with lesions of congestive heart failure, and of a mouse (slide 76) that died 6 days after being fed myocardium from the pig.

Diagnosis. Myocarditis (75) and encephalitis (76), caused by encephalomyocarditis (EMC) virus infection.

Comment. EMC virus was recovered from the myocardium of the pig. This is a ubiquitous enterovirus (picornavirus), and has been isolated from numerous species of animals, including man.

Suggested reading. Acland, H. A., and Littlejohns, I. R.: Encephalomyocarditis virus infection in pigs. I. An outbreak in New South Wales. Austr. Vet. J. 51: 409-415, 1975.

Contributor. Regional Veterinary Laboratory, Department of Agriculture, Wollongbar, NSW, Australia.

Slide 77

History. This tissue is from a 4-year-old female guinea pig.

Diagnosis. Hepatitis and splenitis, caused by Salmonella sp.

Comment. These lesions, multifocal necrogranulomatous hepatitis and granulomatous splenitis, are characteristic of severe salmonellosis in guinea pigs. A fibrinous serositis may also be seen. Yersinia pseudotuberculosis and Bacillus piliformis should be considered in a differential diagnosis.

Contributor. Department of Veterinary Pathology, School of Veterinary Medicine, Louisiana State University, Baton Rouge, Louisiana.

Slide 78 and (2) 2X2 color slides

History. This tissue is from a 23-day-old, male BALB/c mouse that had marked distension of the abdomen and weighed 10.7 grams when presented for necropsy.

Diagnosis. Polycystic kidney.

Comment. Several mice in a litter were similarly affected. Evidence indicates that the condition is a non-sex-linked homozygous recessive trait.

Contributor. National Center for Toxicological Research, Jefferson, Arkansas.

Slide 79

History. This tissue is from an 8-year-old unspayed mixed cocker spaniel dog with a three-year history of pruritis that was unresponsive to treatment.

Diagnosis. Cutaneous lymphoproliferative disease, resembling mycosis fungoides.

Comment. The important histologic features are the mixed cellular dermal infiltrate, prominent focal intraepidermal collections of large, round cells, and the numerous large, round cells with irregular, deeply convoluted nuclei.

Suggested reading. Shadduck, J. A., Reedy, L., Lawton, G., et al.: A canine cutaneous lymphoproliferative disease resembling mycosis fungoides in man. Vet. Pathol. 15: 716-724, 1978.

Contributor. Division of Comparative Medicine, Department of Pathology, Southwestern Medical School, Dallas, Texas.

Slide 80

History. This tissue is from a sick pig, one out of nine from a herd of 60 that became suddenly ill. Six others died spontaneously.

Diagnosis. Toxic nephrosis, caused by pigweed (Amaranthus retroflexus) poisoning.

Comment. Grossly, severe perirenal edema was present in all affected pigs. Large numbers of pigweed seeds were identified within stomach contents.

Contributor. Animal Health Diagnostic Laboratory, Michigan State University, East Lansing, Michigan.

Slide 81

History. This tissue is from a horse exhibiting severe neurological signs.

Diagnosis. Leukoencephalomalacia, caused by moldy corn poisoning.

Comment. Fusarium moniliforme was isolated from corn being fed to this animal. This lesion, liquefactive necrosis of the white matter of the cerebrum, is characteristic for this disease in horses.

Suggested reading. Marasas, W. F. O., Kellerman, T. S., Pienaar, J. G., et al.: Leukoencephalomalacia: A mycotoxicosis of equidae caused by Fusarium moniliforme Sheldon. Onderstepoort J. Vet. Res. 43(3): 113-122, 1976.

Contributor. C. E. Kood Animal Disease Diagnostic Laboratory, Nashville, Tennessee.

Slide 82

History. This tissue is from an adult gopher snake (Pituophis melanoleukus catenifer) that was given a series of injections of an aminoglycoside antibiotic as part of an experimental protocol.

Diagnosis. Toxic nephrosis, caused by gentamicin toxicity.

Comment. Two notable lesions are present: The acute diffuse tubular necrosis caused by the gentamicin toxicity, and multiple gouty tophi. In reptiles the formation of gout tophi (uric acid) in multiple body tissues frequently follows any significant renal impairment.

Suggested reading. Montali, R. J., Bush, M., and Smeller, J. M.: The pathology of nephrotoxicity of gentamicin in snakes: A model for reptilian gout. Vet. Pathol. 16(1): 108-115, 1979.

Contributor. National Zoological Park, Washington, D. C.

Slide 83

History. This tissue is from a 12-year-old female cat. The animal was anorexic, and euthanized after palpation of an abdominal mass.

Diagnosis. Globular leukocyte tumor.

Comment. The origin and significance of the so-called "globule leukocytes" has not been totally resolved.

Suggested reading. Finn, J. P., and Schwartz, L. W.: A neoplasm of globule leukocytes in the intestine of a cat. J. Comp. Pathol. 82: 323-326, 1972.

Contributor. Department of Veterinary Medicine, Oregon State University, Corvallis, Oregon.

Slide 84

History. This tissue is from normal appearing skin taken from an adult bovine at slaughter.

Diagnosis. Dermatitis, caused by Onchocerca lienalis.

Comment. The lesion is a diffuse, mild, eosinophilic dermatitis. Variable numbers of microfilariae are present within the dermal collagen. Several features are present which suggest that these microfilariae are Onchocerca sp.: their presence within the dermal collagen, their size - approximately 4 microns in diameter, and the single row of nuclei extending into the terminal tail section.

Suggested reading. Scholtens, R. G., Adams, S. R., and Broderson, J. R.: Evidence of onchocerciasis in Georgia cattle: prevalence at slaughter. Am. J. Vet. Res. 38(7): 1093-1097, 1977.

Contributor. Research Animal and Veterinary Pathology Section, Center for Disease Control, Atlanta, Georgia.

Slide 85

History. Granulomatous colitis, caused by schistosomiasis.

Comment. This monkey was infected experimentally 8 weeks prior to sacrifice via skin contact exposure to Schistosoma mansoni cercariae. In the colon both eggs surrounded by an intense inflammatory response and eggs not eliciting a marked response are present. In some sections eggs have a lateral spine characteristic of S. mansoni. Schistosome eggs, released from adults in the pelvic circulation, work their way through the wall of the lower bowel to be passed as larvated eggs in the feces. In these tissues the eggs initially

produce microabscesses consisting of eosinophils and neutrophils, followed by a granulomatous inflammatory response.

Contributor. Experimental Pathology Department, Naval Medical Research Institute, Bethesda, Maryland.

Slide 86

History. This tissue is from a 3-month-old lamb with signs of ataxia. Bilaterally symmetrical greenish-gray discoloration was observed grossly in the midbrain, brainstem and cord, particularly in the thalamus, red nuclei, and ventral pons.

Diagnosis. Phalaris toxicity.

Comment. Neuronal pigmentation and mild multifocal gliosis are the lesions present in this case. This lamb grazed on an almost pure stand of P. tuberosa since it was 2 months old. Pigment was also observed in renal tubular epithelium and histiocytes within lymph nodes.

Suggested reading. Simpson, B. H.: Phalaris arundinacea as a cause of deaths and incoordination in sheep. New Zealand Vet. J. 17: 240, 1969.

Contributor. Veterinary Research Station, Department of Agriculture, Glenfield, N.S.W. Australia.

Slide 87

History. This tissue is from a female rhesus experimentally infected 6 days before death. Necropsy revealed a pale yellow liver and a moderate amount of black fluid in the stomach.

Diagnosis. Hepatic necrosis, caused by yellow fever virus.

Comment. Several acute viral hepatitidies, such as Rift Valley fever and Marburg virus disease should be considered differentially in this case. Hepatic necrosis in these diseases, however, is usually more focally distributed rather than the even, diffuse involvement as seen in this case. The midzonal distribution of necrosis in this monkey is fortuitous since it is more a function of when the infected tissue is prepared rather than being a consistent feature in all cases of yellow fever. Councilman bodies should not be considered definitive for yellow fever since they may be found in other viral, necrotizing hepatitidies. This rhesus had received 1 ml subcutaneously of 10 p.f.u./ml yellow fever DB strain virus.

Suggested reading.

Smetana, H. F.: The histopathology of experimental yellow fever. Virchow's Arch. Path. Anat. 335: 411-427, 1962.

Strano, A.: Yellow fever. IN Pathology of Tropical and Extraordinary Diseases, Binford & Connor (Eds), Vol. I, Chapt 1, AFIP, Wash, DC, 1976, pp 1-5.

Contributor. Pathology Division, U.S. Army Medical Research Institute of Infectious Disease, Fort Detrick, Maryland.

Slide 88

History. This tissue is from a 10-year-old horse that had lived most of its life in Pennsylvania.

Diagnosis. Real coccidiosis, caused by Klossiella equi.

Comment. Various stages of the sporogonic life cycle of this protozoan are visible in this section. The smallest forms, approximately 7 X 9 microns contain a single nucleus at the periphery. As these increase in size chromatin tends to marginate until the organisms attain a size of 16 X 20 microns with a border of multiple nuclei. At 35-45 microns, the parasites appear to undergo multiple budding from the periphery. The mature oocyst (50 X 20 microns up to 95 X 30 microns) consists of a thin-walled remnant of the host cell containing many ovoid spores. Klossiella does not appear to elicit a host inflammatory response. Some tubular cell degeneration and sloughing is, however, evident in parasitized tubules.

Suggested reading. Smith, Jones, and Hunt: Veterinary Pathology, 4th Ed., Lea & Febiger, 1974, p. 683.

Contributor. School of Veterinary Medicine, University of Pennsylvania, New Bolton Center, Pennsylvania.

Slide 89

History. This tissue is from a 7-year-old horse found in lateral recumbency. It was unable to get up, and died in several hours.

Diagnosis. Meningoencephalitis, caused by Eastern Equine Encephalomyllitis virus.

Comment. EEE virus was isolated in tissue culture and identified by FA techniques in this case. The pronounced neutrophilic response is well recognized to occur with the equine encephalomyelitidies, especially the Eastern variety. In this case the gray matter is most severely affected, but

numerous inflammatory foci and perivascular cuffs of inflammatory cells are also diffusely distributed in the white matter and leptomeninges.

Contributor. Veterinary Diagnostic & Investigational Laboratory, Tifton, Georgia.

Slide 90

History. This tissue is from an 8-year-old male cocker spaniel which was presented with persistent coughing, dyspnea, and hemoptysis.

Diagnosis. Pulmonary granulomas with PAS-positive bodies and interstitial pneumonia.

Comment. Two pathologic processes are present in this lung: the alveolar "heart failure" cells and interstitial fibrosis consistent with chronic cardiac insufficiency, and the focally extensive pulmonary granulomas. These granulomas consist of intra-alveolar macrophages laden with PAS-positive, diastase-resistant, AMP and alcian blue positive, birefringent material. The cause of these granulomas remains obscure. Although reported to occur predominantly in brachycephalic breeds, they also occur in other breeds of dogs.

Suggested reading. Billups, L. H., Liu, S. K., Kelly, D. F., et al.: Pulmonary granulomas associated with PAS-positive bodies in brachycephalic dogs. Vet. Pathol. 9: 294-300, 1972.

Contributor. School of Veterinary Medicine, University of Pennsylvania, Philadelphia, Pennsylvania.

Slide 91

History. This tissue is from a chicken, one of many in a flock which died acutely.

Diagnosis. Necrotizing hepatitis, caused by Histomonis meleagridis (histomoniasis).

Comment. Heavy bacterial growth is present in the lesions, and was cultured from the tissue; and, a synergistic pathologic effect may be present by the bacteria and the protozoa. Histomonas organisms are present in the lesion, but are difficult to differentiate from host cells without special stains.

Suggested reading. Reid, W. M.: Etiology and dissemination of the blackhead disease syndrome in turkeys and chickens. Exp. Parasitol. 21: 249-271, 1967.

Contributor. Animal Health Diagnostic Laboratory, East Lansing, Michigan.

Slide 92

History. This tissue is from a 6-year-old quarterhorse mare which exhibited clinical signs suggestive of viral encephalitis.

Diagnosis. Encephalitis, caused by Micronema deletrix.

Comment. The lesions have a predominant vascular or perivascular distribution. Random sections through the nematode may be seen in these areas. The key features of the Micronema parasite in histological sections are: 1) female parasites with a single reflexed ovary, 2) a rhabditiform esophagus with corpus, isthmus, and valved bulb, and 3) a body diameter averaging 27 microns.

Suggested reading. Rubin, H. L., and Woodward, J. C.: Equine infection with Micronema deletrix. J. Am. Vet. Med. Assoc. 165(3): 256-258, 1974.

Contributor. Animal Disease Diagnostic Laboratory, Purdue University, West Lafayette, Indiana.

Slide 93

History. This tissue is from a 5-year-old, male, castrated cat presented with dyspnea and a 5-6 cm mass on the right thoracic wall.

Diagnosis. Osteoclastoma (giant cell tumor of bone).

Suggested reading. Spjut, H. J., Dorfman, H. D., Fechner, R. E., et al. Tumors of Bone and Cartilage, 2nd Series, Fascicle 5, Atlas of Tumor Pathology, AFIP, Washington, D. C., 1971.

Contributor. Department of Pathology, College of Veterinary Medicine, University of Missouri, Columbia, Missouri.

Slide 94

History. This tissue is from a wild brown rat (Rattus norvegicus).

Diagnosis. Hepatic granulomas, sequelae to Capillaria hepatica infection.

Comment. Viable parasitic forms are not evident within the granulomas. The diagnosis was made circumstantially due to the high prevalence of C. hepatica infection in wild rats from the area where this rat came. Earlier lesions contain large numbers of C. hepatica eggs and worms.

Suggested reading.

Luttermoser, G. W.: An experimental study of Capillaria hepatica in the rat and the mouse. Amer. J. Hyg. 27(2): 321-340, 1938.

Flynn, R. J.: Parasites of Laboratory Animals, 1st Ed., The Iowa State University Press, Ames, 1973, pp 254-255.

Contributor. Department of Comparative Medicine, Wayne State University, Detroit, Michigan.

Slide 95

History. This tissue is from a 5-month-old Merino lamb with jaundice.

Diagnosis. Toxic hepatitis and nephritis, caused by blue-green algae (Anacystis cyanea) toxicity.

Comment. Mild biliary hyperplasia accompanies the centrilobular hepatocellular necrosis. This lamb's drinking water was heavily infested with the blue-green algae Anacystis cyanea, also called Microcystis aeruginosa. Mouse toxicity testing confirmed the diagnosis.

Suggested reading.

McBarron, E. J., and May, V.: Poisoning of sheep in New South Wales by the blue-green alga Anacystis cyanea (Kuetz) Dr. and Dail. Austr. Vet. J. 42: 449-453, 1966.

Stowe, C. M., and Monson, E.: Blue-green algae poisoning. Nebraska Vet. Extension Newsletter 5(1): Jan 1976, University of Nebraska.

Contributor. Veterinary Research Station, Department of Agriculture, New South Wales, Australia.

Slide 96

History. This tissue is from a 3-week-old caprine which developed convulsions and died following 2 weeks morbidity with pneumonia. He was nonresponsive to treatment and developed a temperature of 107°F.

Diagnosis. Meningitis, caused by Chlamydia.

Comment. Other lesions in this goat included a fibrinous pericarditis and polyarthritis. Chlamydia was identified by the contributor with Macchiavello stained sections of fibrinous exudates. Escherichia coli was also cultured from multiple tissue. A dual infection was probably present.

Contributor. Department of Food & Agriculture, Veterinary Laboratory Services, San Gabriel, California.

Slide 97

History. This tissue is from a 3-year-old male golden retriever.

Diagnosis. Granulomatous hepatitis, caused by Mycobacterium tuberculosis (tuberculosis).

Comment. This dog had a disseminated granulomatous disease involving multiple tissues. Acid-fast staining demonstrated acid-fast bacilli within the lesions. Active tuberculosis was present among this dog's family members (human).

Contributor. Department of Pathology, School of Veterinary Medicine, University of California, Davis, California.

Slide 98

History. This tissue is from a 6-month-old cat.

Diagnosis. Necrogranulomatous hepatitis, caused by feline infectious peritonitis (FIP) virus infection.

Suggested reading. Montali, R. J., and Strandberg, J. D.: Extraperitoneal lesions in feline infectious peritonitis. Vet. Pathol. 9: 109-121, 1972.

Contributor. Bureau of Biologics, FDA, NIH, Bethesda, Maryland.

Slide 99 and one 2X2 color slide

History. This tissue is from a 551-day-old, female BALB/c mouse. A large, soft, grayish mass was present in the dorsal wall of the abdominal cavity adjacent to the diaphragm, but distinct from the liver.

Diagnosis. Plasma cell tumor.

Comment. The neoplastic cells have a distinctly plasmacytoid appearance, with large, eccentric nuclei and abundant amphophilic to slightly basophilic cytoplasm containing a prominent "Golgi halo." Natural occurring plasma cell tumors are infrequent in the mouse.

Suggested reading. Ranek-Nielsen, R., and Gormsen, H.: Spontaneous and induced plasma cell neoplasia in a strain of mice. Cancer 4: 387-397, 1951.

Contributor. National Center for Toxicological Research, Jefferson, Arkansas.

Slide 100

History. This tissue is from a fin of an English sole (fish) caught in the Puget Sound. The epidermis was covered with soft, gray to black, warty nodules. There were no internal lesions and the fish appeared in good health.

Diagnosis. Epidermal papillomatosis, caused by amebae.

Comment. This lesion has long been described as a neoplastic-like lesion of unknown etiology. Recent evidence, however, has shown the "x-cells" within the proliferative epidermal lesions to be amebae, tentatively classified as Dobellina sp.

Suggested reading.

Brooks, R. E., McAin, G. E., and Wellings, S. R.: Ultrastructural observations on an unidentified cell type found in epidermal tumors of flounders. J. Nat'l. Cancer Inst. 43: 97-109, 1969.

Dawe, D. J., Bagshaw, J., and Poore, C.: Amebic pseudotumors in pseudobranchs of Pacific cod, Gadus macrocephalus. Proc. 70th Annual Meeting American Association of Cancer Research 20: 245, 1979.

Wellings, S. R., Cooper, R. A., and Chuinard, R. G.: Skin tumors of pleunectid fishes in Puget Sound, Washington. Bull. Wildlife Dis. Assoc. 2: 68, 1966.

Contributor. Monsanto Company, St. Louis, Missouri.