ICVP Board Certification Examination

SAMPLE QUESTIONS

ICVP Examination Format

Sr. No.	Part No. & Name	Description
1.	Part I: General Pathology	100 marks; 1.5 hr, 100 MCQs
2.	Part II: Veterinary Clinical Pathology	100 marks; 1.5 hr, 100 MCQs (Hemat: 30; CC: 30; Cyto: 10, SurgiPath: 10; Other: 20) %
3.	Part III: Veterinary Pathology	200 marks; 3 hr, 200 MCQs (Farm: 30; Companion: 15; Avian: 20; Lab: 10; Expt & TxP:10) %
4.	Part IV: Gross Pathology (Practical)	150 marks; 2 hr, 75 projections
5.	Part V: Histopathology & Ultrastructural Pathology (Practical)	150 marks; 2 hr, 50 projections (Routine: 90; Histochemistry, Ultrastructural path: 10) %
6.	Part VI: Veterinary Pathology Practice (Practical)	100 marks, 2 hr, 10-12 Case studies (glass slides) descriptive answers.

Part I: General Pathology

1. ‘Weibel-Palade’ bodies are found scattered in the cytoplasm of endothelial cells of

a) Arteries

b) Veins

c) Capillaries

d) Endocardium

e) Lymphatic vessels

f) a, b, c & e only

g) a, b, c & d only

Part I: General Pathology (Continued…)

2. …… mediate the initial weak interaction between leukocytes and endothelium.

a) Integrins

b) VCAM

c) ICAM

d) Selectins

e) MAdCAM-1

f) a, b & e only

g) c & d only

Part I: General Pathology (Continued…)

3. Which of the following mediator(s) of acute inflammation are derived from the plasma?

a) Complement

b) Kinin

c) Histamine

d) Leukotriene

e) Cytokines

f) a and b

g) all of them

Part I: General Pathology (Continued…)

4. “Psammoma bodies” are known to be associated with ……

a) Dystrophic calcification

b) Metastatic calcification

c) Hyaline change

d) Amyloidosis

e) Hyperplasia

f) None of the above

g) c & d only

Part I: General Pathology (Continued…)

5. Type IV hypersensitivity (delayed-type hypersensitivity) is mediated by which the following?

a) tissue bound antibody

b) circulating antigen-antibody complexes

c) cytotoxic and helper T cells in conjunction with macrophages

d) cross linking of IgE on mast cells

e) cross-reactive antigens on leukocytes and red blood cells

Part I: General Pathology (Continued…)

6. Which of the following features of the inflammatory response is affected by aspirin?

a) Vasodilation

b) Chemotaxis

c) Phagocytosis

d) Emigration of leukocytes

e) Release of leukocytes from the bone marrow

f) Pavementation of leucocytes

Part I: General Pathology (Continued…)

7. Which of the following is considered a biomarker for osteoclasts (bone resorption)?

a) serum ALP

b) cathepsin K

c) osteocalcin

d) procollagen I C – terminal extension peptide (PICP)

e) Serum creatinine kinase

f) both b & c

Part I: General Pathology (Continued…)

8. Which cell is responsible for irritation and production of collagen in hepatic fibrosis?

a) Hepatocytes

b) Kupffer cell

c) Ito cells

d) Sinusoidal endothelial cells

e) Bile duct epithelium

f) Oval cells

g) Pit cells

Part I: General Pathology (Continued…)

9. Which of the following is an “anaphylotoxin”?

a) C3b

b) C5a

c) C5a-9

d) Histamine

e) Bradykinin

f) Leucotriene

g) Substance-P

Part I: General Pathology (Continued…)

10. Scavenging lipoproteins, secretion of cytokines, prostanoids, nitric oxide and endothelins are the functions of following cells.

a) Hepatocytes

b) Biliary epithelium

c) Endothelial cells

d) Kupffer cells

e) Stem cells

f) a & c

g) c & d

Part I: General Pathology (Continued…)

11. Which of the following correctly describe histomorphological characteristics of Anaplastic nuclei?

a) Hyperchromatic in nature

b) Disproportionately large relative to cell size

c) Decreased nuclear to cytoplasmic ratio

d) Prominent or multiple nucleoli

e) a, b & d only

f) a, b & c only

g) a, b, c & d

Part I: General Pathology (Continued…)

12. Which of the following statements are true about cellular senescence?

a) Senescence is mediated by activation of p53 pathways

b) Senescence is mediated by activation of retinoblastoma pathways

c) Senescence is mediated by activation of BCl-2 & NFK-β pathways

d) Senescent cells often express senescence-associated β-galactosidase.

e) a & b only

f) a, b & d only

g) a, b & c only

Part I: General Pathology (Continued…)

13. ……. are extracellular fibrillar networks that concentrate anti-microbial substances at sites of infection and prevent the spread of the microbes by trapping them in the fibrils.

a) **Neutrophil extracellular traps (NETs)**
b) Monocyte extracellular traps (MoETs)
c) Dendritic cell extracellular traps (DCETs)
d) Phagocyte extracellular traps (PETs)
e) Macrophage extracellular traps (MaETs)

Part I: General Pathology (Continued…)

14. Which of the following statements are true for ‘lipoxins’?

a) Lipoxins are generated from arachidonic acid by lipoxygenase pathway

b) Lipoxins suppress inflammation by inhibiting recruitment of leucocytes

c) Leukocytes particularly neutrophils produce intermediates in lipoxins synthesis

d) Lipoxins inhibit neutrophil chemotaxis and adhesion to endothelium

e) All of the above

Part I: General Pathology (Continued…)

15. Which of the following act as ‘opsonins’ and promote phagocytosis?

a) C3b

b) iC3b

c) C5a

d) C3a

e) a & b only

f) a, b & d only

g) a, b & c only

Part II: Veterinary Clinical Pathology

1. During peripheral blood smear examination, macrocytic erythrocytes were found to be non-polychromatophilic. To which of the following species that blood smear might belong?

a) Pig

b) Buffalo

c) Horse

d) Sheep

e) Dog

f) Iguana

Part II: Veterinary Clinical Pathology (Continued…)

2. Kidney Injury Molecule-1 (KIM-1), a specific and sensitive biomarker of acute kidney injury is expressed in which of the following segment of nephron?

a) Collecting duct

b) Ascending loop of Henle

c) Macula densa

d) Distal convoluted tubule

e) Proximal convoluted tubule

f) Glomerulus

Part II: Veterinary Clinical Pathology (Continued…)

3. Following biomarkers from serum protein will be help in monitoring myocellular necrosis.

a) Cardiac troponins

b) Creatine kinase

c) Myoglobin

d) Fatty acid binding protein

e) a and b

f) all of above

Part II: Veterinary Clinical Pathology (Continued…)

4. Which of the following changes are indicators of cholestasis?

a) Increased serum and urine bilirubin

b) Increased serum bile acids

c) Increased serum alkaline phosphatase (ALP) and GGT

d) Increased Leucine aminopeptidase

e) Increased 5-nucleotidase

f) a & b & c

g) a & b & c & e

h) all of the above

Part II: Veterinary Clinical Pathology (Continued…)

5. Hepatocytes that are specialized for oxidative liver functions such as gluconeogenesis, b-oxidation of fatty acids, and cholesterol synthesis are …….

a) Periportal hepatocytes (zone 1)

b) Transitional / midzonal hepatocytes (zone 2)

c) Centrilobular hepatocytes (zone 3)

d) All of the above

Part II: Veterinary Clinical Pathology (Continued…)

6. Which of the below statement is NOT CORRECT about drug induced hepatic cholestasis

a) Common in rats

b) alpha-naphthylisothicaynate (ANIT) damages/destroys biliary epithelium

c) Common in dogs, monkeys and humans

d) Circulatory alkaline phosphatase and gamma glutamyl transaminase are good biomarker

e) Glucuronidated ethinyl estradiol-induced cholestasis by inhibition of BSEP

Part II: Veterinary Clinical Pathology (Continued…)

7. Increase in size of pancreas in laboratory animals is observed with ……..

a) Phenbarbitone

b) Cholecystokinin

c) Pentagastrin

d) Both b & c

e) All of above

Part II: Veterinary Clinical Pathology (Continued…)

8. Clinical chemistry profiles that show large increases in alanine aminotransferase (ALT), sorbitol dehydrogenase (SDH) and aspartate aminotransferase (AST) activities commonly occur as?

a) relatively non-specific indicators of kidney toxicity

b) specific to tubule necrosis in the kidney

c) general toxicity to intestinal epithelium

d) common response to a liver toxicant

e) represent leakage of enzymes from damaged blood cells into the plasma

Part II: Veterinary Clinical Pathology (Continued…)

9. Diffuse pancreatic acinar cell atrophy is reported with ……..

a) Hypothyroidism

b) Prolonged fasting, starvation, treatment related chronically reduced food consumption

c) Iron deficiency

d) Feeding with Vitamin E in protein-deficient diets

Part II: Veterinary Clinical Pathology (Continued…)

10. Administration of erythropoietin to rats will induce which of the following changes?

a) Erythroid hyperplasia in the bone marrow

b) Extramedullary erythropoiesis in the spleen

c) Myelofibrosis

d) Both a & b

e) All of the above

Part II: Veterinary Clinical Pathology (Continued…)

11. Match the following

1. Pancreas	I) Aldosterone
2. Adrenals	II) Thyroxine
3. Liver	III) Thyroid stimulating hormone
4. Pituitary	IV) Insulin
5. Thyroid gland	V) Vitamin D

a) 1-IV, 2-I, 3-V, 4-II, 5-III

b) 1-IV, 2-I, 3-V, 4-III, 5-II

Part II: Veterinary Clinical Pathology (Continued…)

12. Which of the following substances is completely excreted and not reabsorbed by the kidneys?

a) Glucose

b) Bicarbonate

c) Creatinine

d) Water

e) Urea

Part II: Veterinary Clinical Pathology (Continued…)

13. Animals treated with a chemical developed anemia characterized by decreased RBC's, Hematocrit, MCH, MCHC and increased MCV. This anemia can best be characterized as

a) Aplastic anemia

b) Macrocytic, hyperchromic anemia

c) Microcytic, hypochromic anemia

d) Macrocytic, hypochromic anemia

e) None of the above

Part II: Veterinary Clinical Pathology (Continued…)

14. Which of the following type of cells is the least sensitive to radiation?

a) Eosinophils

b) Spermotogonial cells

c) Polymorphonuclear leucocytes

d) Lymphocytes

e) Erythrocytes

Part II: Veterinary Clinical Pathology (Continued…)

15. The test item is expected to cause haemolysis in a 28 day rat repeat dose toxicity.

    All of the following clinical pathology changes are correct EXCEPT……..

a) Decrease in PCV

b) Decrease in Bile acids

c) Increase in AST, LDH

d) Increase in bilirubin

e) Increase in potassium

Part III: Veterinary Pathology

1. Which of the following statements describing ‘Siderofibrotic Plaques’ are correct?

a) Siderofibrotic plaques are also known as Gamna-Gandy bodies.

b) Siderofibrotic plaques are extremely common in young puppies.

c) Siderofibrotic plaques are grey-white to yellowish firm encrustations on splenic capsule.

d) Plaques are composed on FCT, hemosiderin and hematoidin pigments and minerals.

e) Usually extensively found along margins of spleen

f) a, b, c & d only

g) a, c, d & e only

h) All of the above (a, b, c, d and e)

Part III: Veterinary Pathology (Continued…)

2. Xanthomas are asymptomatic yellow to white nodules, plaques or dermal papules histologically characterized by presence of ……

a) Touton giant cells

b) Langerhans giant cells

c) Foreign body giant cells

d) a & c only

e) b & c only

f) a, b & c

Part III: Veterinary Pathology (Continued…)

3. Fibrous osteodystrophy occurs in ……..

a) chronic renal failure

b) hyperparathyroidism

c) long term hydrochlorothiazide treatment

d) all of the above

Part III: Veterinary Pathology (Continued…)

4. Following tissue/s are least affected during hypoxic cell injury ……

a) Adipose tissue

b) Neurons

c) PCT of kidney

d) Myocardial cells

e) Olfactory epithelium of nasal mucosa

Part III: Veterinary Pathology (Continued…)

5. The classical histologic findings in bronchial asthma are ……..

a) Infiltration of Eosinophils

b) Smooth muscle hyperplasia

c) Increased Mucous

d) Inflammation

e) Bronchial narrowing

f) All of the above

Part III: Veterinary Pathology (Continued…)

6. Which species is resistant to systemic administration of non-steroidal anti-inflammatory (NSAIDS) drug induced gastric erosion/ulcer?

a) Rat

b) Mouse

c) Dog

d) Monkey

e) Humans

Part III: Veterinary Pathology (Continued…)

7. Which one among the following doesn't originate from neuroectoderm?

a) Neurons

b) Astrocytes

c) Oligodendrocytes

d) All the above

e) Microglia

f) None of the above

Part III: Veterinary Pathology (Continued…)

8. …….. is a disorder of enamel formation that leads to inadequate mineralization of enamel and usually yellow discoloration of teeth.

a) Amelogenesis imperfecta

b) Congenital erythropoietic porphyria

c) Osteogenesis imperfecta

d) Odontodysplacia cystica congenitalia

e) Pseudopolyodontia

Part III: Veterinary Pathology (Continued…)

9. Anodontia, Oligodontia, Polydontia, Pseudopolydontia and Heterotopic polyodontia are developmental anomalies of which organ?

a) Bones

b) Cartilage

c) Teeth

d) Hair

e) Hooves

f) None of the above

Part III: Veterinary Pathology (Continued…)

10. Winter dysentery is a syndrome in adult cattle has been associated with which of the following organism?

a) Bovine epidemic diarrhoea virus

b) Bovine adenovirus

c) Bovine rotavirus

d) Bovine coronavirus

e) None of the above

Part III: Veterinary Pathology (Continued…)

11. Which of the following statements are true regarding ‘Fumonisin’?

a) Produced by certain strains fusarium verticillioides & fusarium proliferatum

b) Induces pulmonary edema syndrome and hepatotoxicity in pigs

c) Induces hepatocellular carcinoma and leucoencephalomalacia in laboratory rats

d) Induces hepatotoxicity in horses and sheep

e) All of the above

Part III: Veterinary Pathology (Continued…)

12. Constellation of tubular changes extending from papilla to cortex caused by effects in the lower urinary tract, including increased urine reflux, partial or transient obstruction, increased pressure, or ascending infection are seen in?

a) Retrograde nephropathy

b) Obstructive nephropathy

c) Chronic progressive nephropathy

d) Chronic nephritis

Part III: Veterinary Pathology (Continued…)

13. Non-steroidal anti-inflammatory drugs (NSAIDs), which inhibit cyclo-oxygenases, which leads to papillary necrosis because of ……

a) inhibition the formation of vasodilator prostaglandins by papillary interstitial cells

b) inhibition the formation of vasoconstrictor prostaglandins by papillary interstitial cells

c) increase the formation of vasodilator prostaglandins by papillary interstitial cells

d) increase the formation of vasoconstrictor prostaglandins by papillary interstitial cells

Part III: Veterinary Pathology (Continued…)

14. Basement membrane thickening as a result of antibodies directed against glomerular basement membrane antigen along with mesangial cell proliferation are seen during

a) Membrano-proliferative glomerulonephritis

b) Crescentric glomerulonephritis

c) Both of the above

d) Hyaline glomerulopathy

Part III: Veterinary Pathology (Continued…)

15. ……. in the nasal cavity is rich in cytochrome P450 monoxygenases which are essential for biotransformation activity to inhaled or ingested toxins?

a) Transitional epithelium

b) Ciliated respiratory epithelium

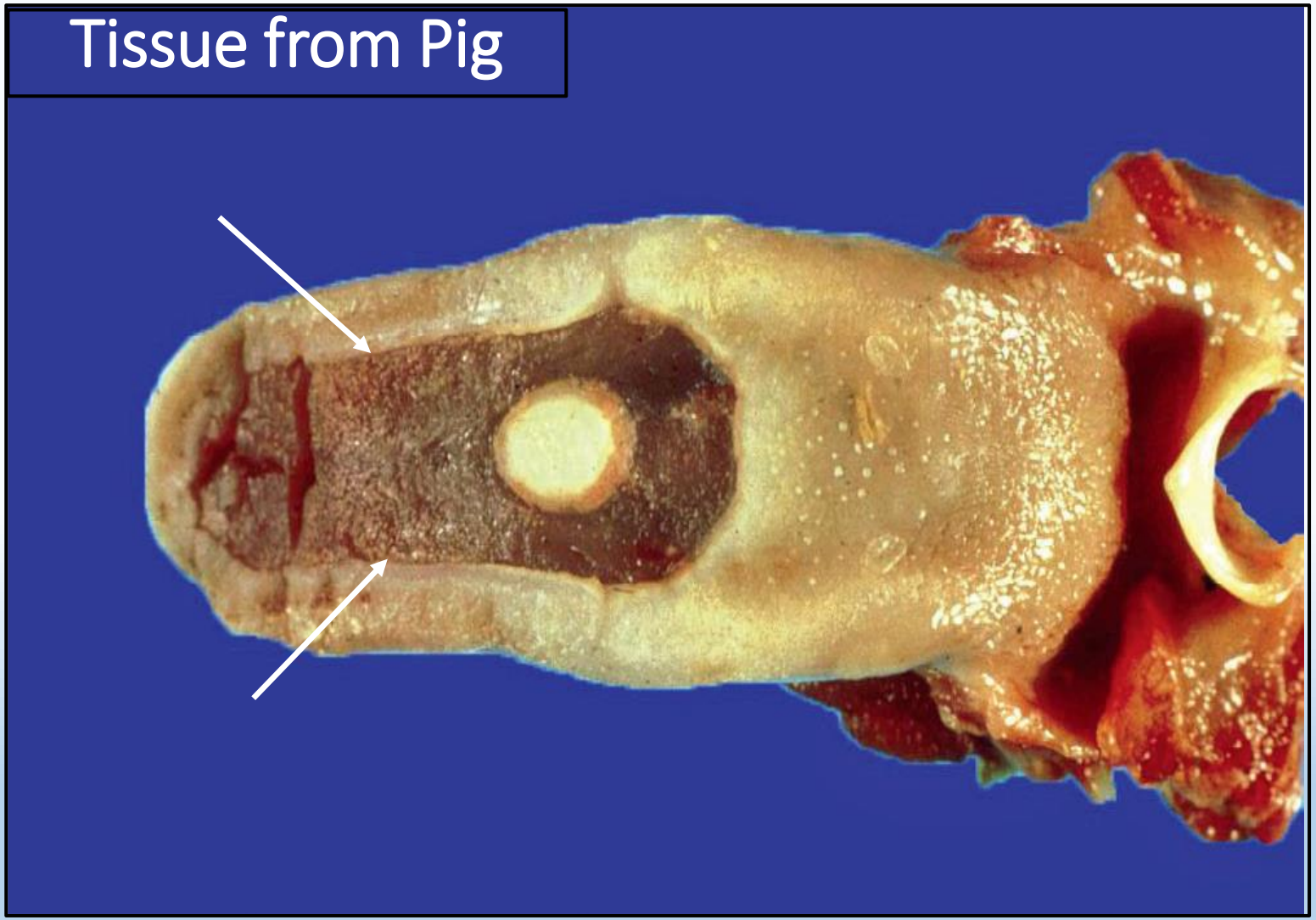
c) Olfactory epithelium

d) Stratified squamous epithelium

e) a & b only

f) b & c only

Part IV: Gross Pathology Projections: Case-1

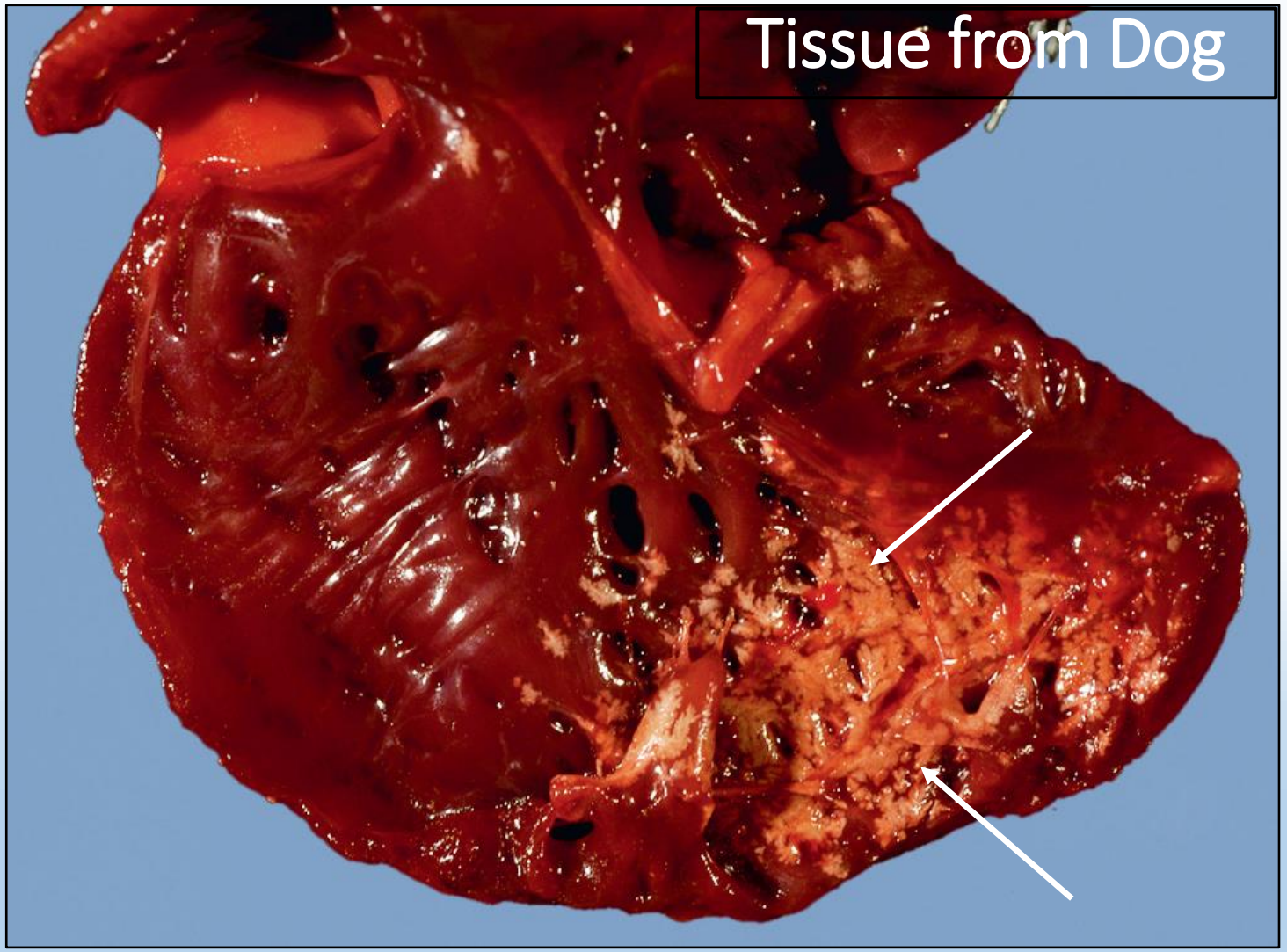


- Identify the lesion
- Describe gross morphology of lesion and probable etiology

Part IV: Gross Pathology Projections: Case-1 (Continued…)

- Lesion: “Epitheliogenesis imperfecta”
- Etiology: Congenital Anomaly
- It’s a recessive congenital anomaly that causes widespread defects in cutaneous epithelium and also affects lining of the oral cavity, especially the tongue.
- Lesion characterized by irregular, well demarcated, red-areas from which epithelium of oral mucosa is absent.

Part IV: Gross Pathology Projections: Case-2

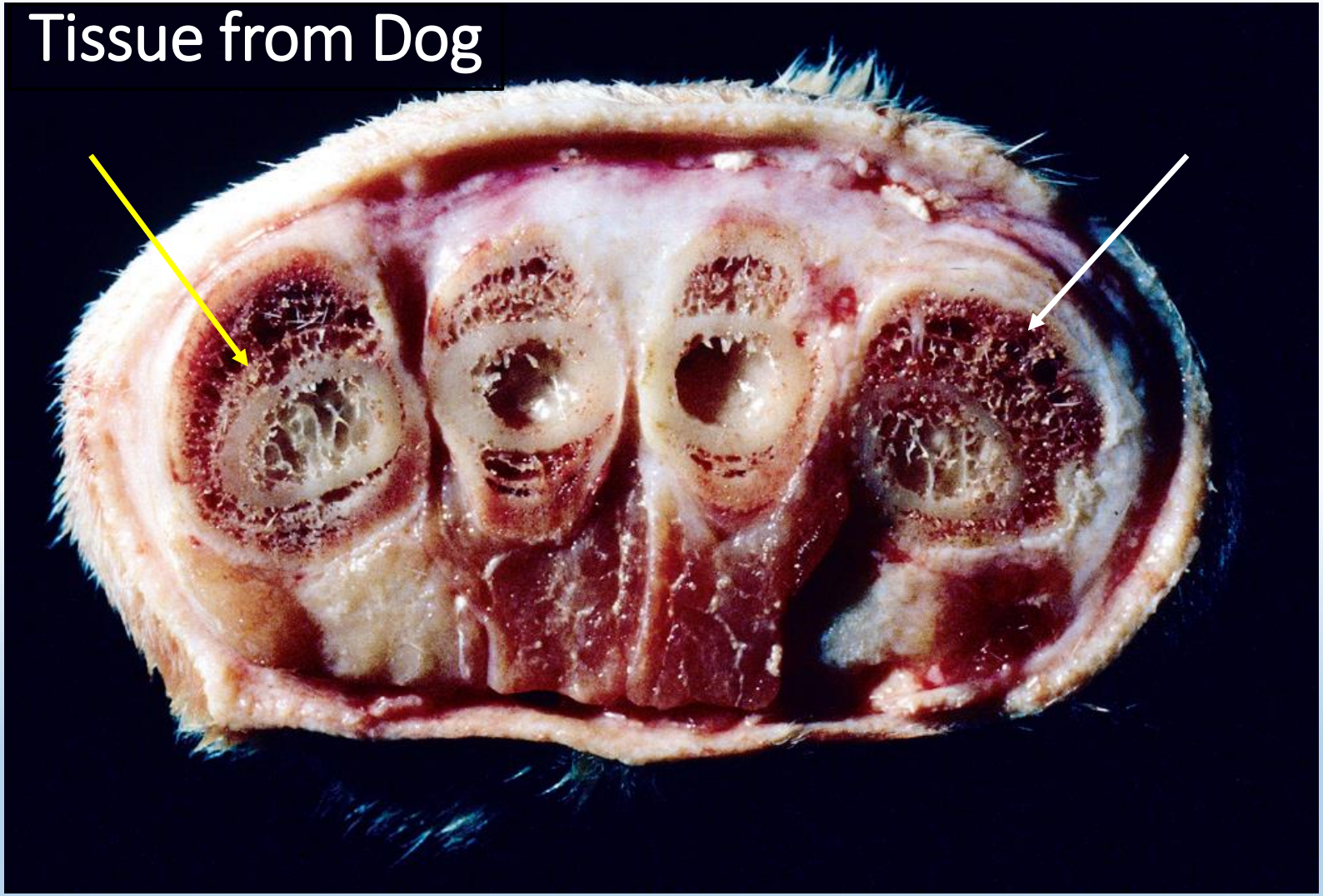


- Identify the lesion
- Describe gross morphology of lesion and probable etiology

Part IV: Gross Pathology Projections: Case-2 (Continued…)

- Lesion: “Precipitation of barbiturate salts on endocardium of heart”
- Etiology: euthanasia by overdose of barbiturates
- Animals euthanized by overdose of barbiturates by intravenous route, showed precipitation of barbiturate salts on endocardium of right ventricle of the heart
- Lesion characterized by precipitation of multifocal to coalescing, gray-tan colored, gritty plaques of barbiturate salts deposited on the endocardial wall.

Part IV: Gross Pathology Projections: Case-3



- Identify the lesion
- Describe etiology and gross morphology of lesion

Part IV: Gross Pathology Projections: Case-3 (Continued…)

- Lesion: “Hypertrophic osteopathy of metacarpal bones also known as hypertrophic pulmonary osteopathy”
- Etiology: Chronic inflammatory or neoplastic lesion usually in thoracic cavity or botryoid rhabdomyosarcoma of urinary bladder in dogs
- Eccentric periosteal bone formation that avoids adjacent bones.
- Lesion characterized by eccentric periosteal bone formation especially in more distal limb bones which are affected initially.

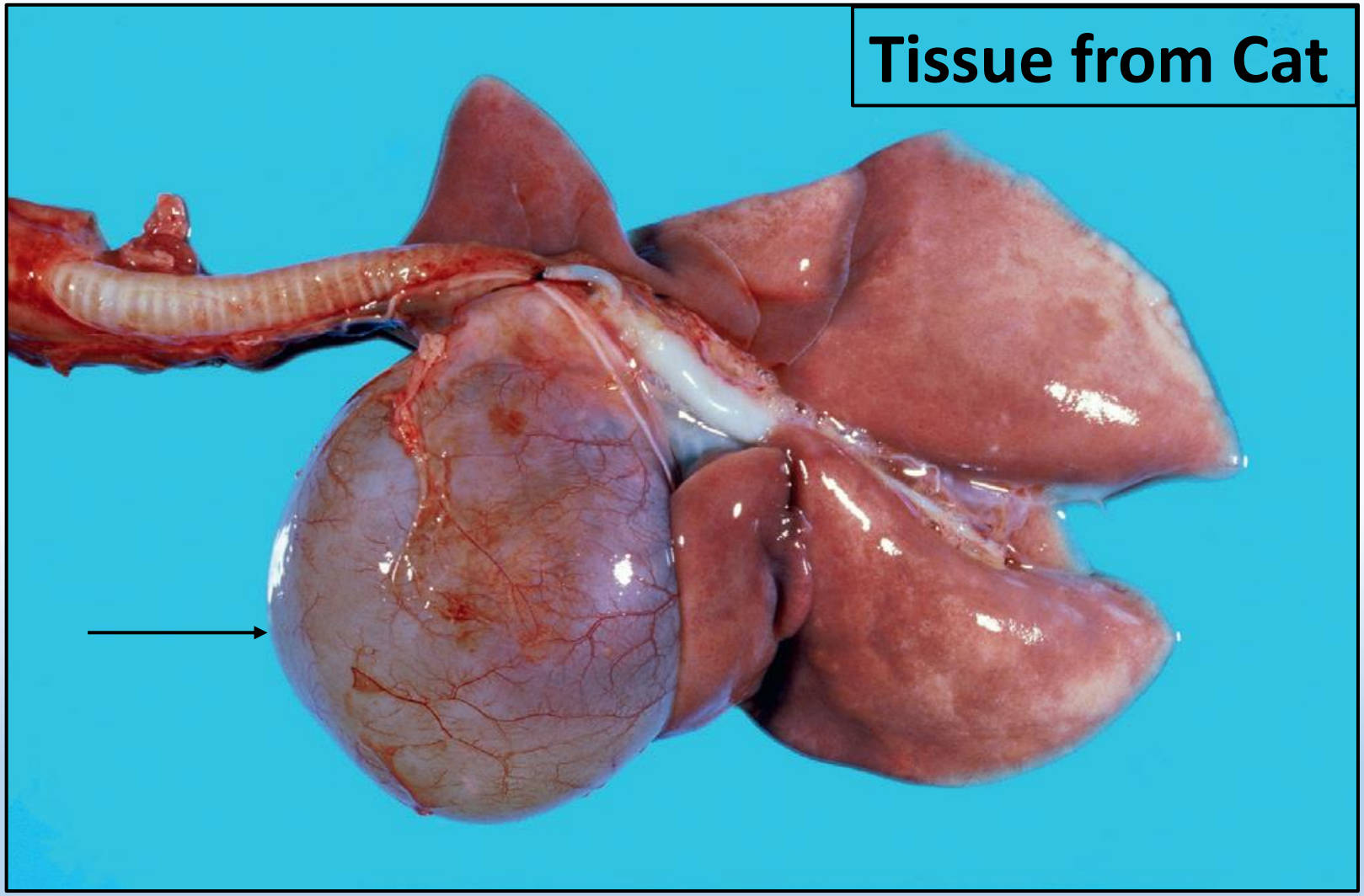
Part IV: Gross Pathology Projections: Case-4

- Identify the lesion
- Describe etiology and gross morphology & pathogenesis

Part IV: Gross Pathology Projections: Case-4 (Continued…)

- Lesion: “Black Leg (Black quarter) in a Cow”
- Etiology: *Clostridium septicum, Clostridium chauvoei, Clostridium perfringens, Clostridium novyi*
- Muscle necrosis is accompanied with edema, hemorrhage and gas production
- Pathogenesis: Clostridial infection is acquired through ingestion of spores or traumatic injury (bruising or perforation). Spores are distributed to tissues including muscles and germinate with local events such as traumatic injury or local muscle hypoxia. Tissue damage and systemic illness is due to production of bacterial exotoxins.

Part IV: Gross Pathology Projections: Case-5

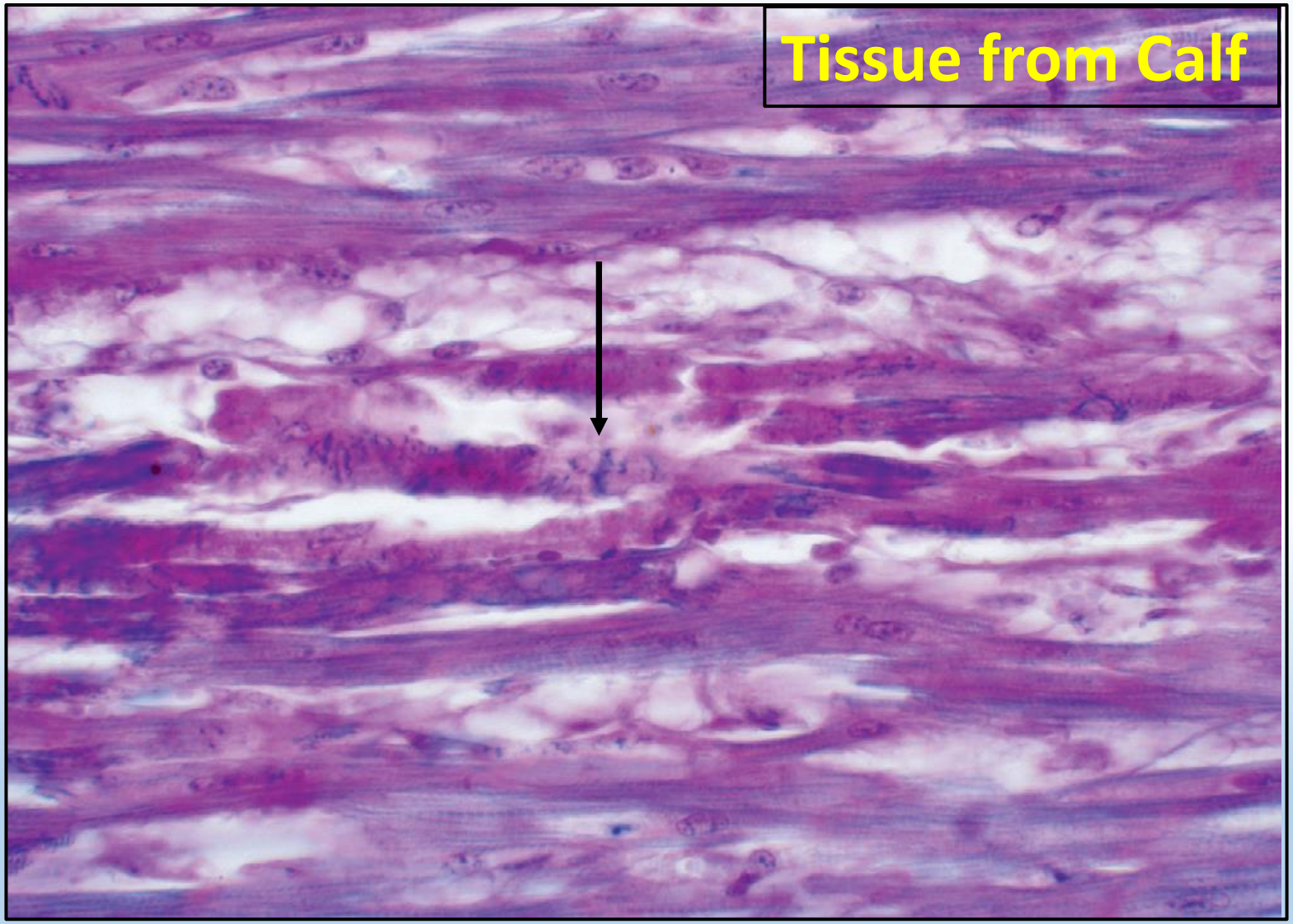


- Identify the lesion
- Describe gross morphology of lesion and probable etiology

Part IV: Gross Pathology Projections: Case-5 (Continued…)

- Lesion: “Hydropericardium”
- Etiology: Hypoproteinemia
- Hydropericardium is seen in many cachectic illness, may be due to hypoalbuminemia.
- Pericardial sac is ballooned with clear, straw-colored fluid almost concealing the heart.
- Cachectia associated with congestive heart failure, chronic kidney disease, neoplasia etc.

Part V: Histopathology & Ultrastructural Pathology: Case-1

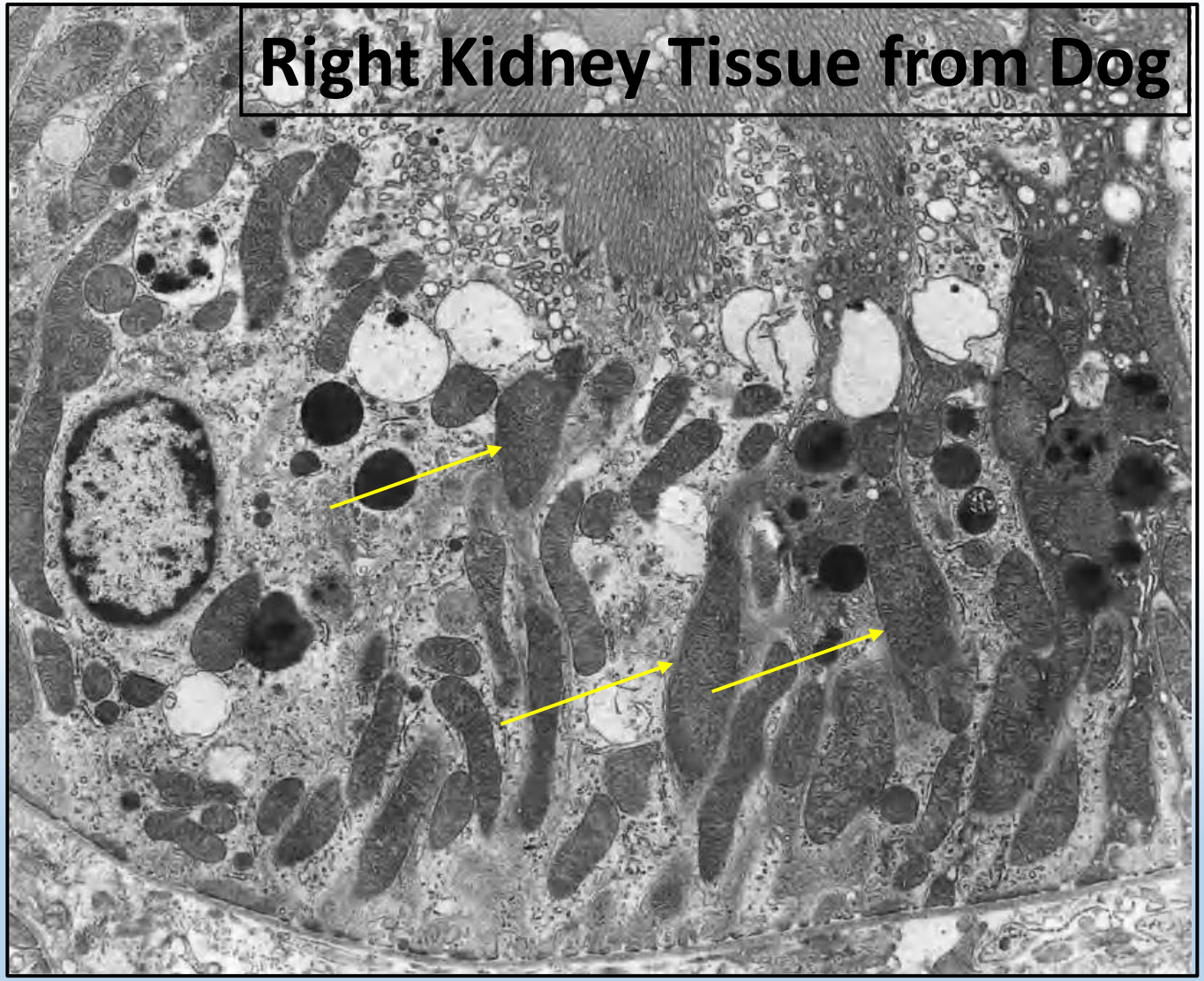


- Identify the Organ/Tissue and Staining method
- Describe microscopic findings of lesion and probable etiology

Part V: Histopathology & Ultrastructural Pathology: Case-1 (Continued…)

- Organ/Tissue: Heart, Myocardial necrosis
- Staining Method: Phosphotungstic acid Hematoxylin (PTAH)
- Etiology: Selenium-Vitamin E deficiency, myocarditis due to FMD virus infection, etc.
- Arrow showing necrotic (coagulative myocytolysis) cardiac myocytes. It is characterized by presence of thick, irregular, eosinophilic bands of cardiomyocytes with loss of striations.
- PTAH staining emphasizes presence of contraction bands (collapsed sarcomeres).
- Normal cardiomyocytes having fine cross striations of normal sarcomeres are present above and below necrotic cardiomyocytes.

Part V: Histopathology & Ultrastructural Pathology: Case-2



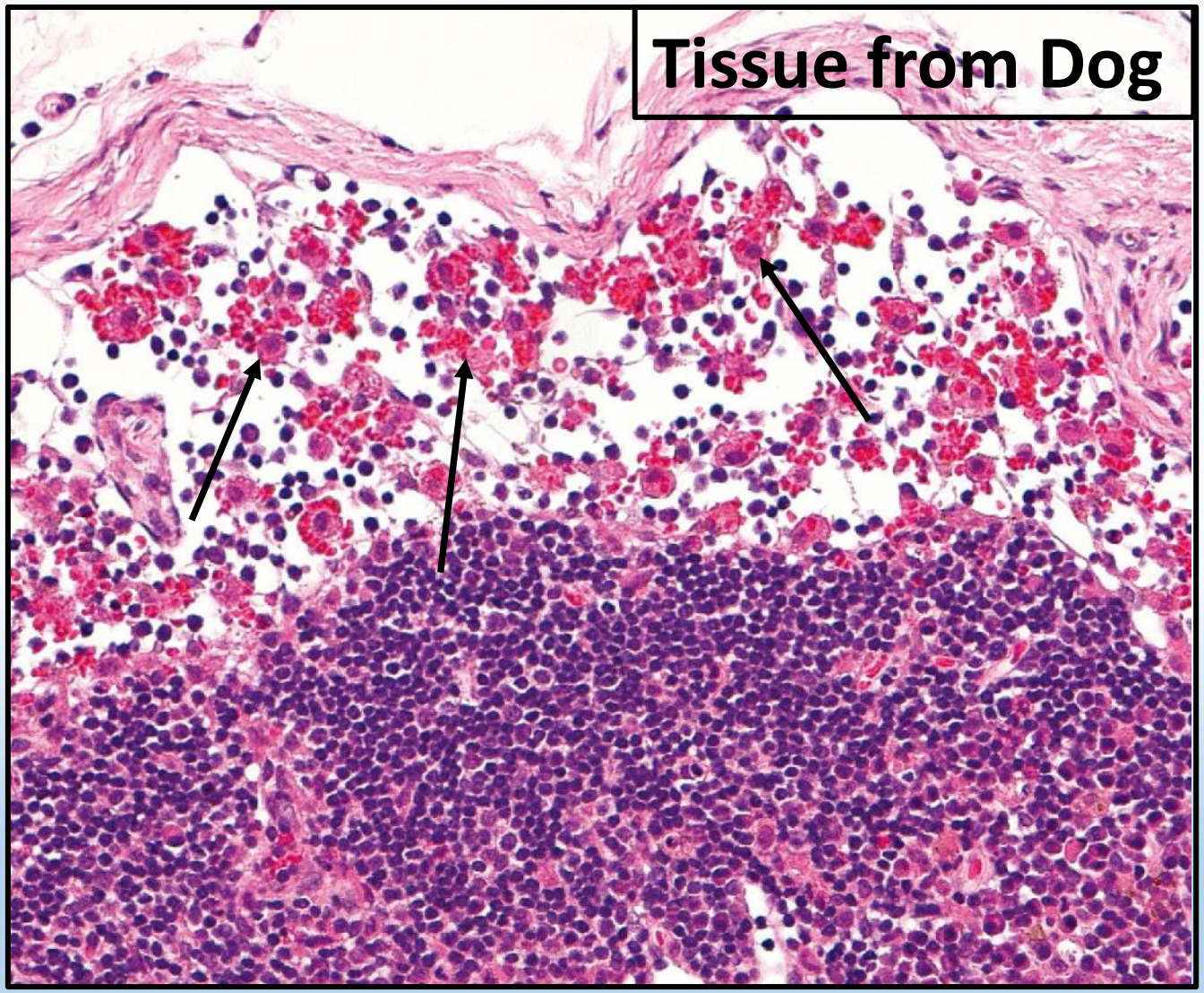
- History: Unilateral (left) nephrectomy of kidney in dog.

- Identify the organelle shown by arrow and associated condition
- What could be the reason for this change?

Part V: Histopathology & Ultrastructural Pathology: Case-2 (Continued…)

- Organelle: Mitochondria
- Condition: Marked enlargement of mitochondria.
- Organ/Tissue: Kidney (epithelial cell of nephron)
- Etiology: Increased metabolic load, compensatory hypertrophy, unilateral nephrectomy etc.
- Right kidney: Epithelial cell from a nephron showing marked enlargement of mitochondria indicating compensatory hypertrophy denoting increased metabolic load on right kidney after unilateral nephrectomy of left kidney.

Part V: Histopathology & Ultrastructural Pathology: Case-3

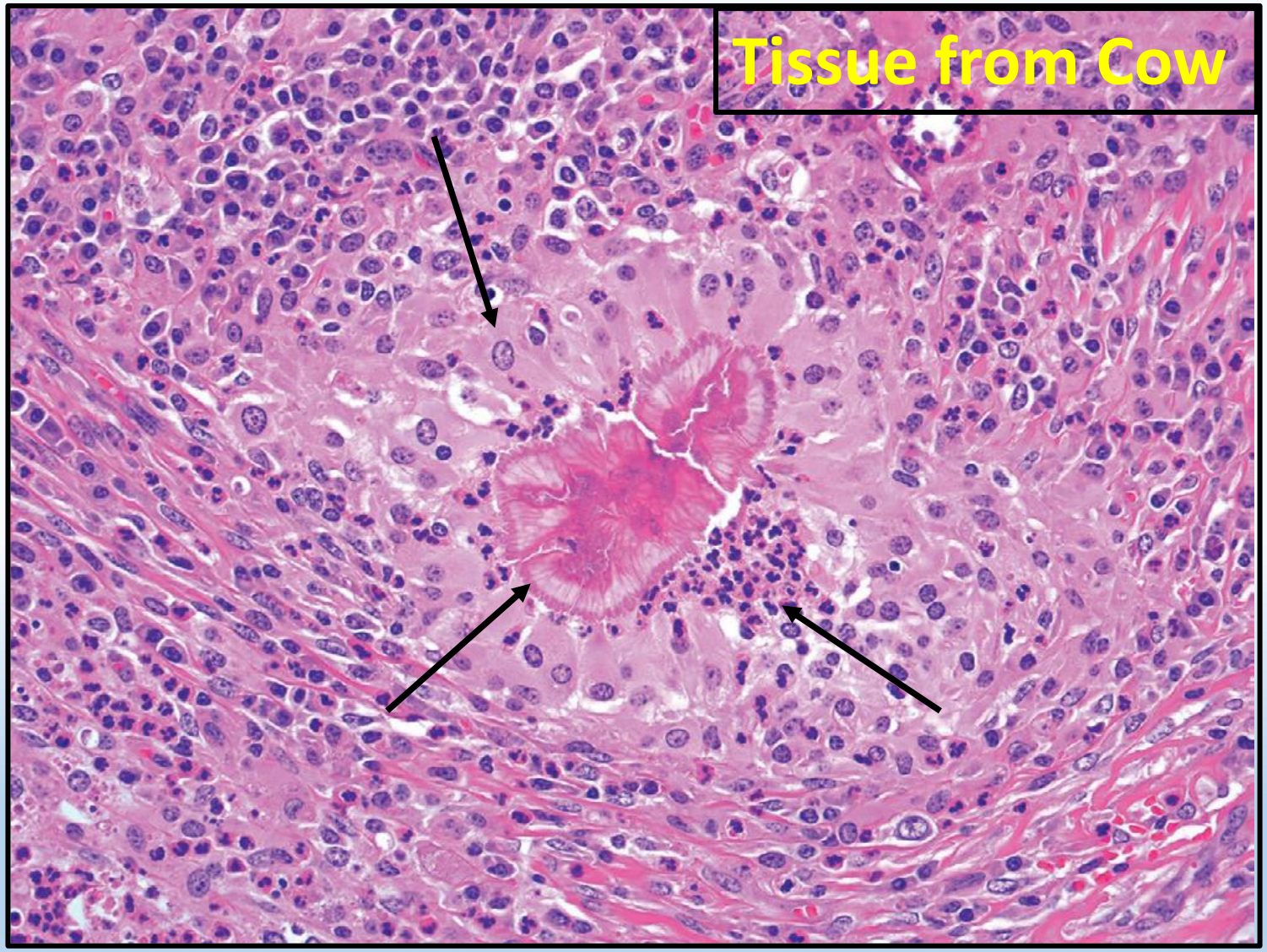


- Identify the Organ/Tissue and the histopathological change
- Describe microscopic findings of lesion and probable etiology

Part V: Histopathology & Ultrastructural Pathology: Case-3 (Continued…)

- Organ/Tissue: Lymph node, mesenteric
- Histopathological change: Erythrophagocytosis (by macrophages, RES)
- Etiology: Agonal change during euthanasia, effete RBCs engulfed by macrophages
- Microscopic Findings:
  - Arrows showing erythrocytes being engulfed by macrophages.
  - Lymphatic sinus (cortical sinus) is a common place where this change is prominently seen.
- Commonly this change is seen in dogs subjected to euthanasia or active draining mesenteric lymph nodes where effete RBCs are cleared by RES macrophages.

Part V: Histopathology & Ultrastructural Pathology: Case-4

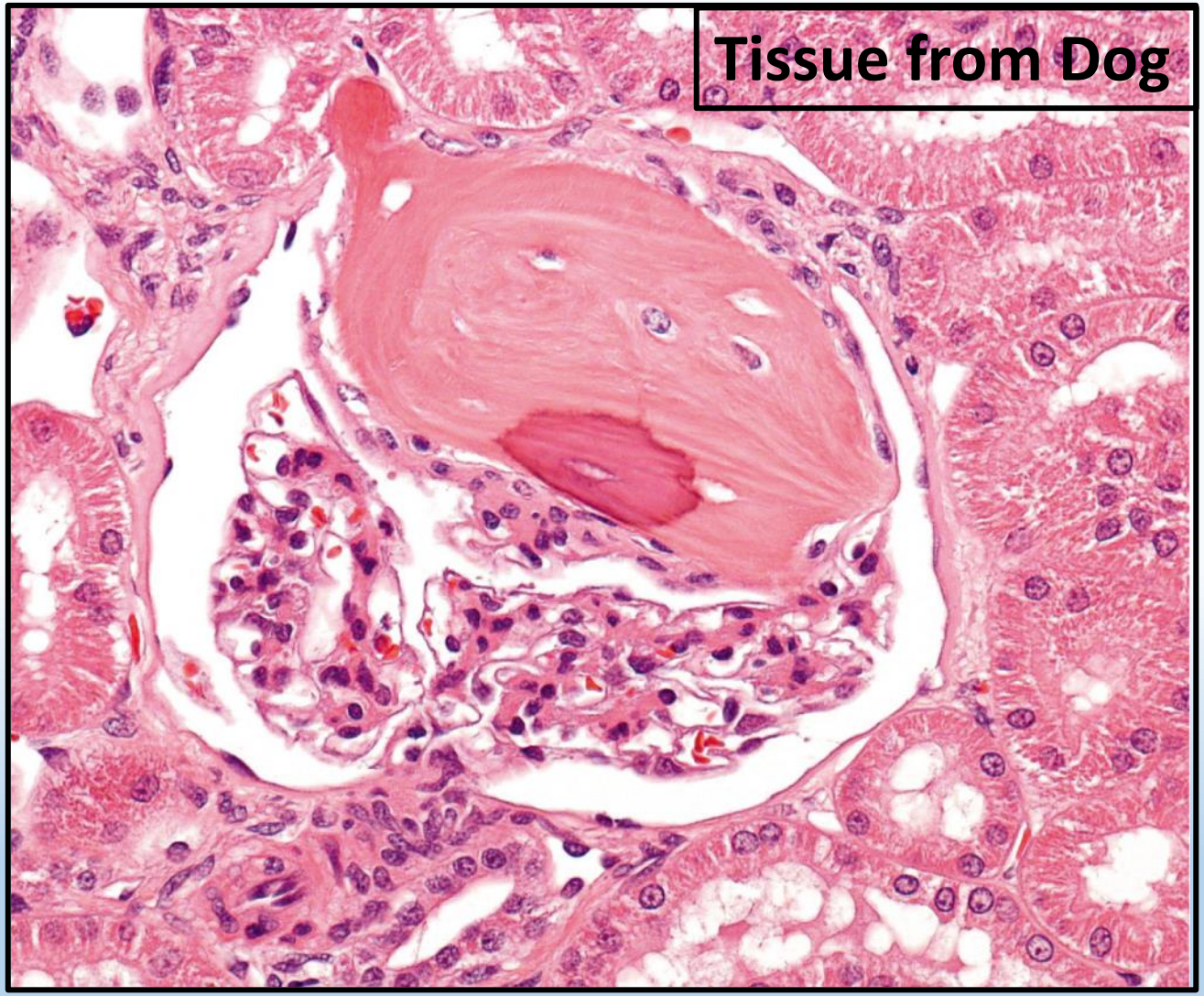


- Identify the lesion and micro-organism involved.
- Describe microscopic findings of lesion.

Part V: Histopathology & Ultrastructural Pathology: Case-4 (Continued…)

- Histopathological change: “Pyogranulomatous inflammation of tongue”
- Micro-organism: *Actinobacillus lignieresii* (Wooden Tongue)
- Microscopic Findings:
  - colonies of coccobacilli surrounded by radiating eosinophilic clubs of immune complexes known as ‘club colonies’
  - club colonies are infiltrated by neutrophils and surrounded by epitheloid macrophages and giant cells imparting classical granulomatous appearance
  - Lympho-plasmacytic infiltrate is observed in surrounding stroma

Part V: Histopathology & Ultrastructural Pathology: Case-5

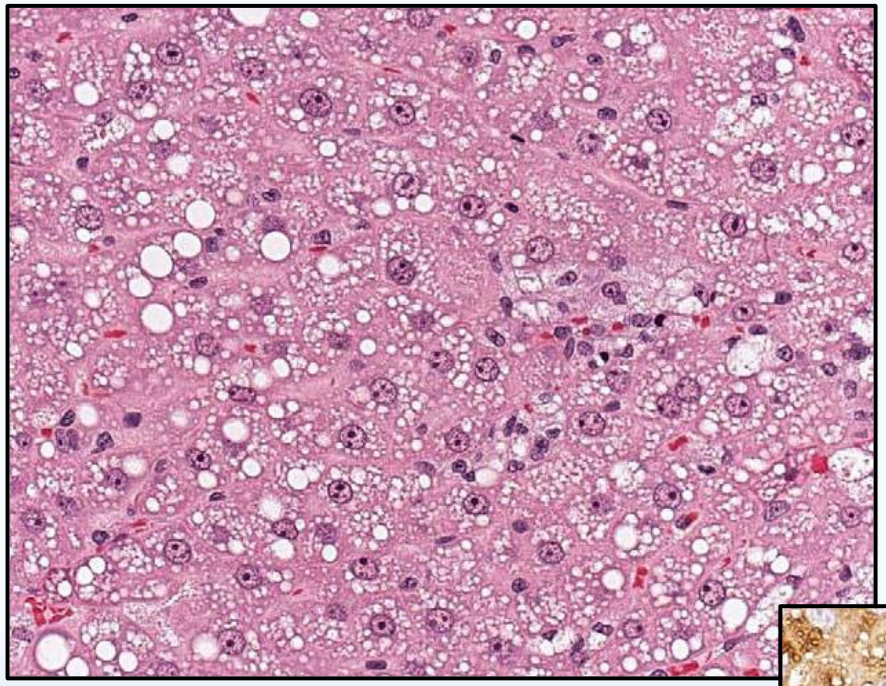


- Identify the Organ/Tissue and lesion
- Describe microscopic findings of lesion.

Part V: Histopathology & Ultrastructural Pathology: Case-5 (Continued…)

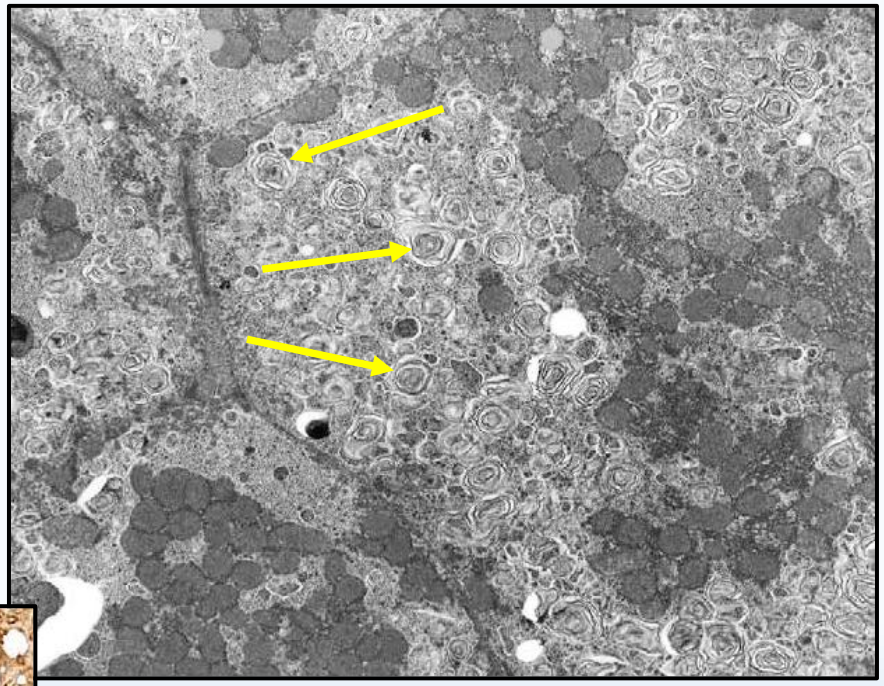
- Histopathological Lesion: “Osseous Metaplasia” of glomerulus
- Tissue/Organ: Kidney
- Microscopic Findings:
  - Glomerular mesangial cells, matrix, podocytes and capillary network has been replaced by mature osseous tissue formation.
  - Lesion dosen’t involve any inflammatory reaction.
  - Osseous metaplasia of glomerulus is a very rare and spontaneous finding in laboratory beagle dogs.

Part VI: Veterinary Pathology Practice: Case Study-1

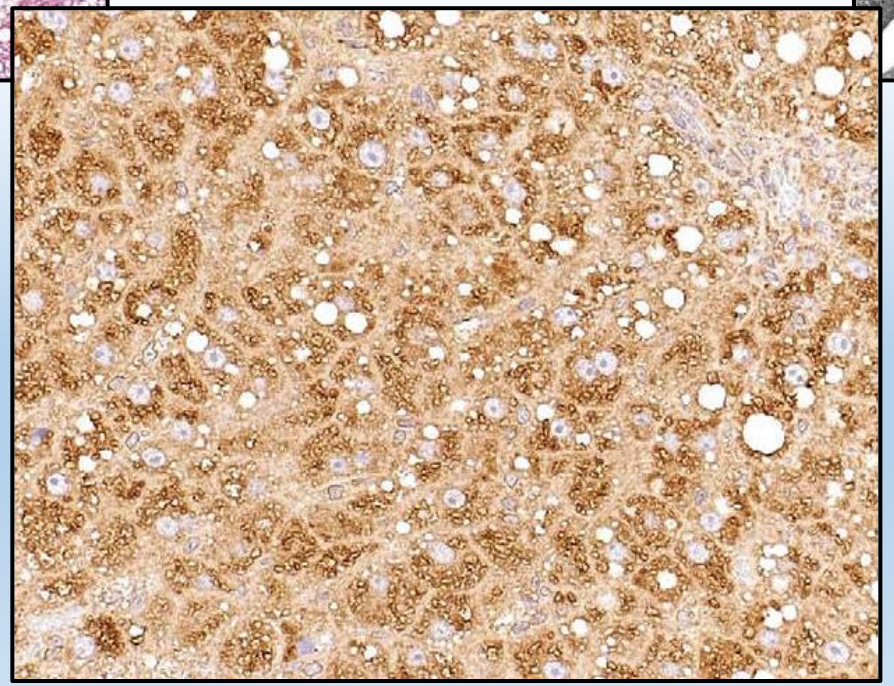


Case Study-1

- Organ/tissue from a Wistar rat from a 90-day toxicity study administered with a cationic amphophilic compound.
- Based on slides shared answer the following:



- Identify the organ/tissue
- Identify the lesion
- Write descriptive morphology for the lesion
- Identify the IHC staining



- Identify the lesion in TEM
- Identify the subcellular organelle involved

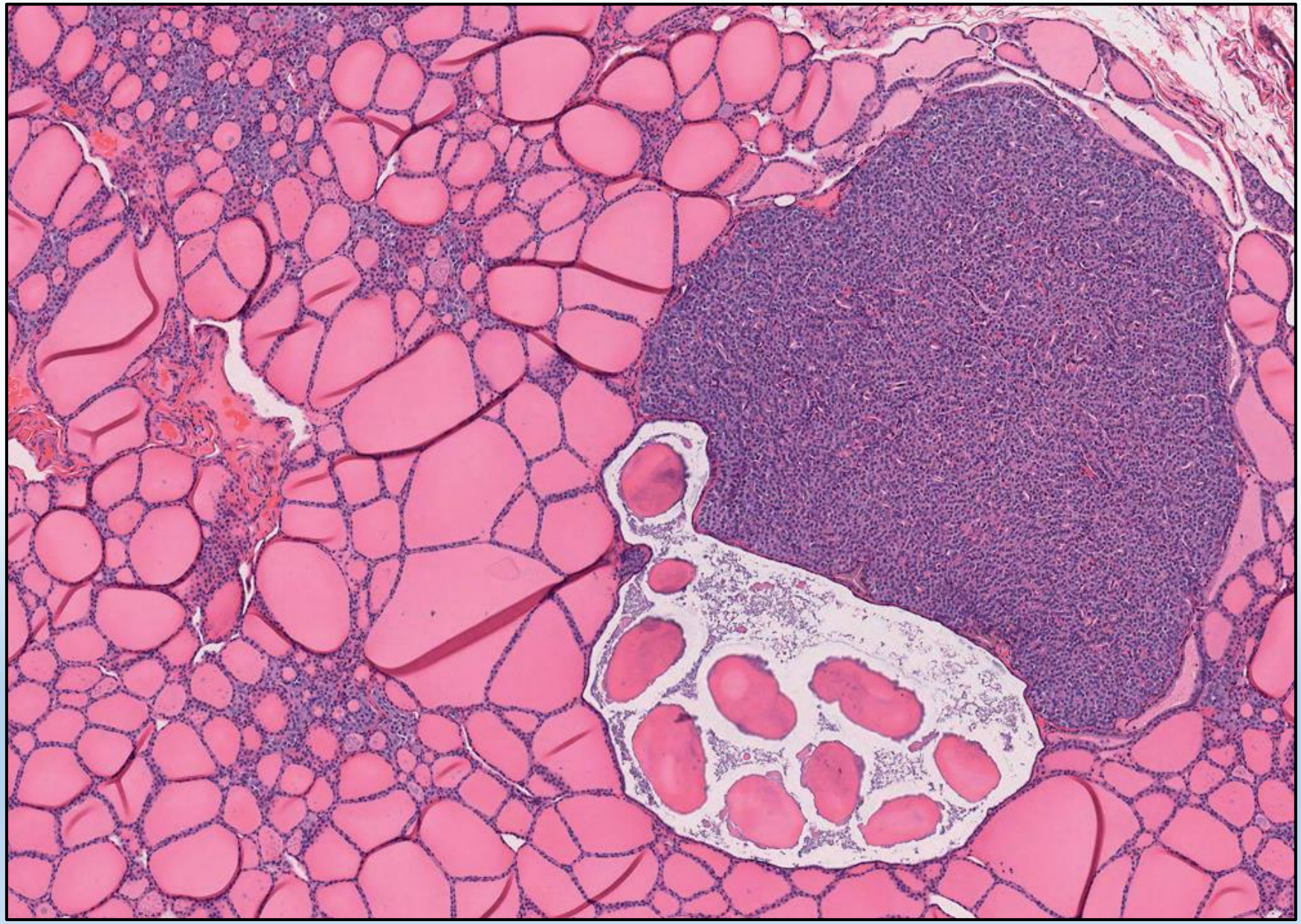
Part VI: Veterinary Pathology Practice: Case Study-1 (Continued…)

- Histopathology: Organ/Tissue: Liver
- Lesion: Cytoplasmic vacuolation, hepatocellular (Phospholipidosis)
- Descriptive Morphology: multiple irregular (macro/micro-vesicular) to round clear membrane-bound vacuoles.
- IHC Staining: Cytoplasmic microvesiculation located centrally in hepatocytes positive for LAMP-2 (Lysosome associated membrane protein-2) immunostaining.
- TEM: Concentric membrane bound lysosomal myeloid bodies/multi-lamellar bodies indicative of accumulation of phosopholipids. Organelle involved: Lysosome.
- Overall Diagnosis: Phospholipidosis caused by administration of cationic amphophilic compound.

Part VI: Veterinary Pathology Practice: Case Study-2

Case Study-2

- Tissue from a dog with chronic renal failure
- Identify the organ/tissue
- Identify the lesion
- Write descriptive morphology of lesion
- Write in brief pathogenesis of the lesion/disease state



Part VI: Veterinary Pathology Practice: Case Study-2 (Continued…)

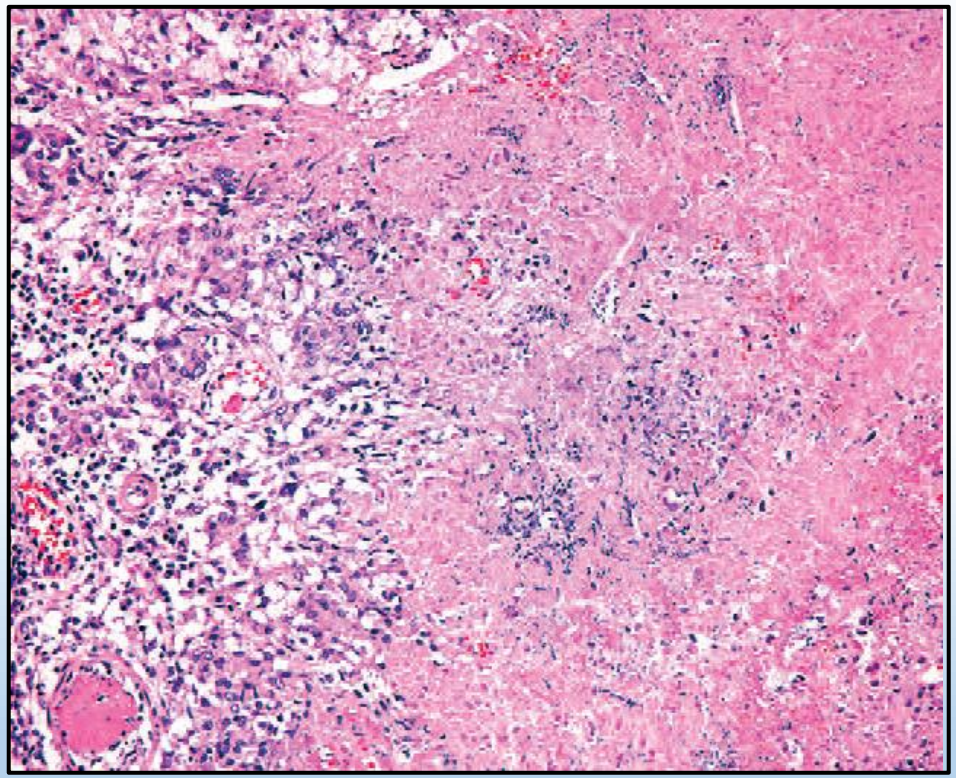
- Histopathology: Organ/Tissue: Parathyroid and Thyroid gland
- Lesion: Hypertrophy/Hyperplasia, C-cells, parathyroid gland with Kursteiner's cyst
- Descriptive Morphology: enlarged parathyroid gland with hypertrophy/hyperplasia of c-cells, marked basophilic and hyperplastic c-cells. *Kursteiner's cyst* - congenital lesion.
- Pathogenesis: In Chronic Kidney Disease (CKD), decreased phosphate excretion and hyperphosphatemia results in increased secretion of fibroblast growth factor-23 (FGF23) from osteocytes and osteoblasts. FGF23 from bone cells and loss of nephrons decreases renal calcitriol production. Decreased serum calcitriol stimulates parathyroid hormone (PTH) synthesis and secretion and subsequent parathyroid chief cell hypertrophy and/or hyperplasia.

Part VI: Veterinary Pathology Practice: Case Study-3

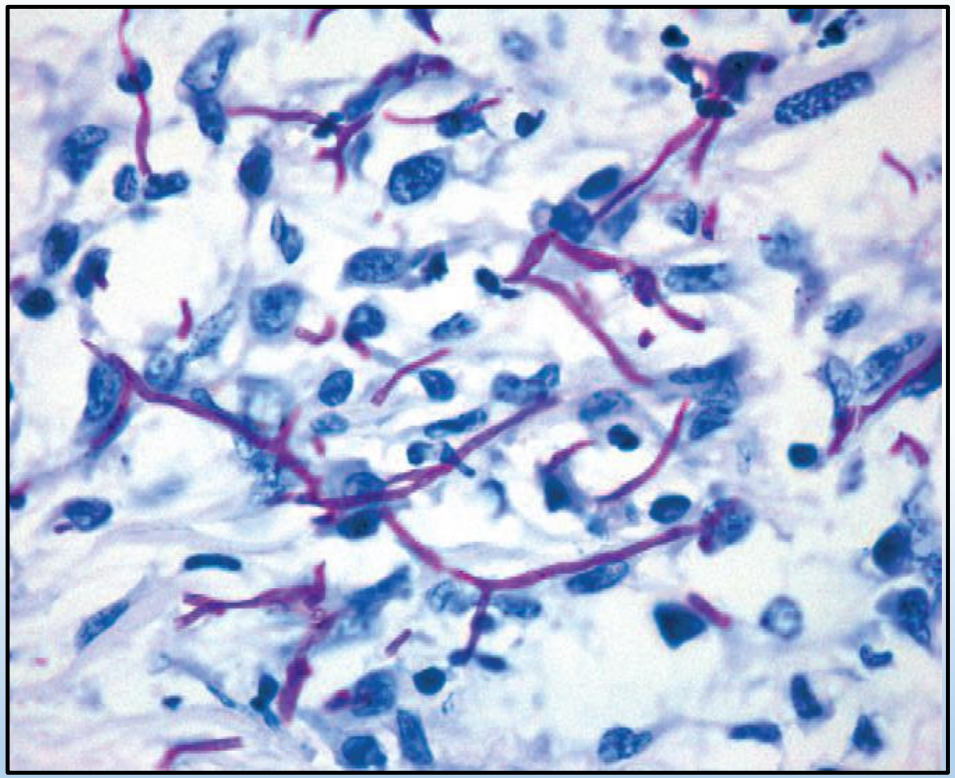
- Case History:
  - A 9-year-old, neutered, female, German Shepherd Dog was presented for evaluation of a three-day history of anorexia, lethargy, and signs of rapidly progressive central nervous system disease.
  - The dog was unable to stand or walk without support and circled to the left.
  - Treated for a 3-week history of presumptive back pain with NSAID drugs. After the onset of therapy, the owner reported a decreased appetite and intermittent vomiting.
  - Upon presentation, the dog was obtunded with a left-sided head tilt and had non-ambulatory tetraparesis, with reduced or absent postural reflexes in the forelimbs and hind limbs, respectively.
  - Abnormal hematologic findings included mild leukocytosis and a mild normochromic, normocytic anemia.
  - With magnetic resonance imaging of the brain, poorly defined foci of contrast enhancement were seen in the right frontal lobe and both parietal lobes of the cerebrum and in the left cerebellum.
  - Cerebrospinal fluid (CSF), collected from the cerebellomedullary cistern, had mildly elevated total protein (35.5 mg/dl; reference value, <28 mg/dl) and a moderate increase in leukocytes (70/ml; reference value, <8/ml).

Part VI: Veterinary Pathology Practice: Case Study-3 (Continued)

- Cytologic impression was mixed pleocytosis, with a predominance of monocytes and neutrophils. Some neutrophils had toxic changes, with less condensed chromatin. No organisms were observed.



- H&E Staining Brain



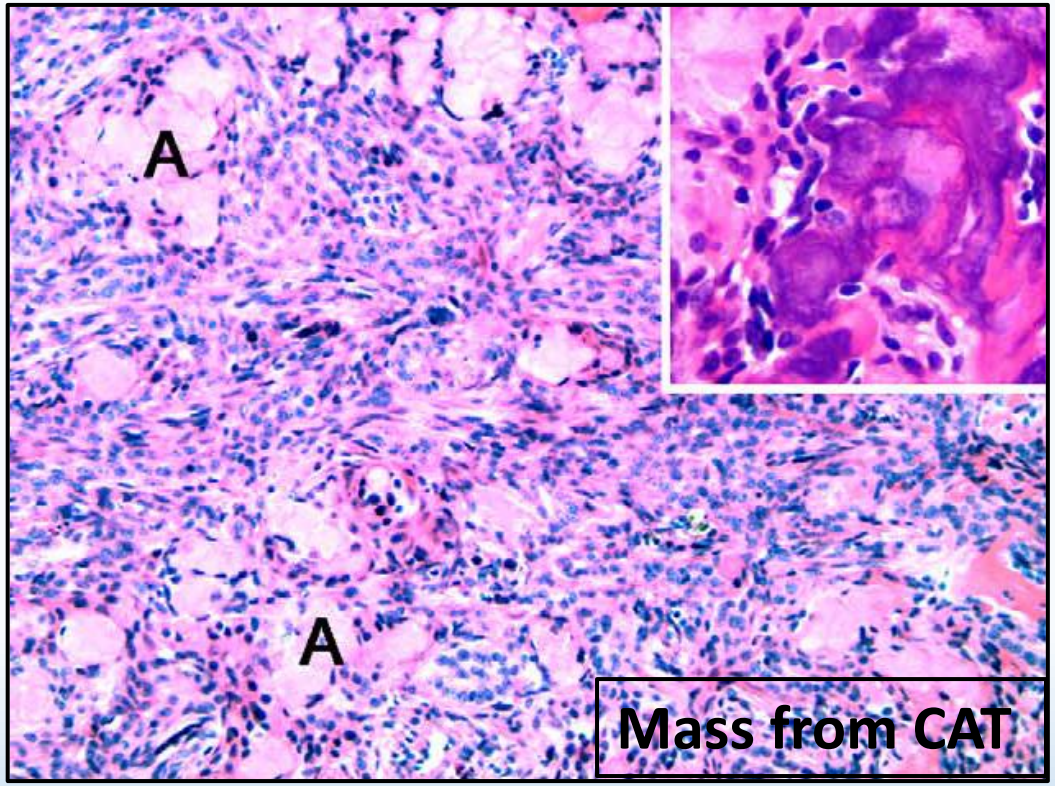
- PAS & GMS Staining Brain

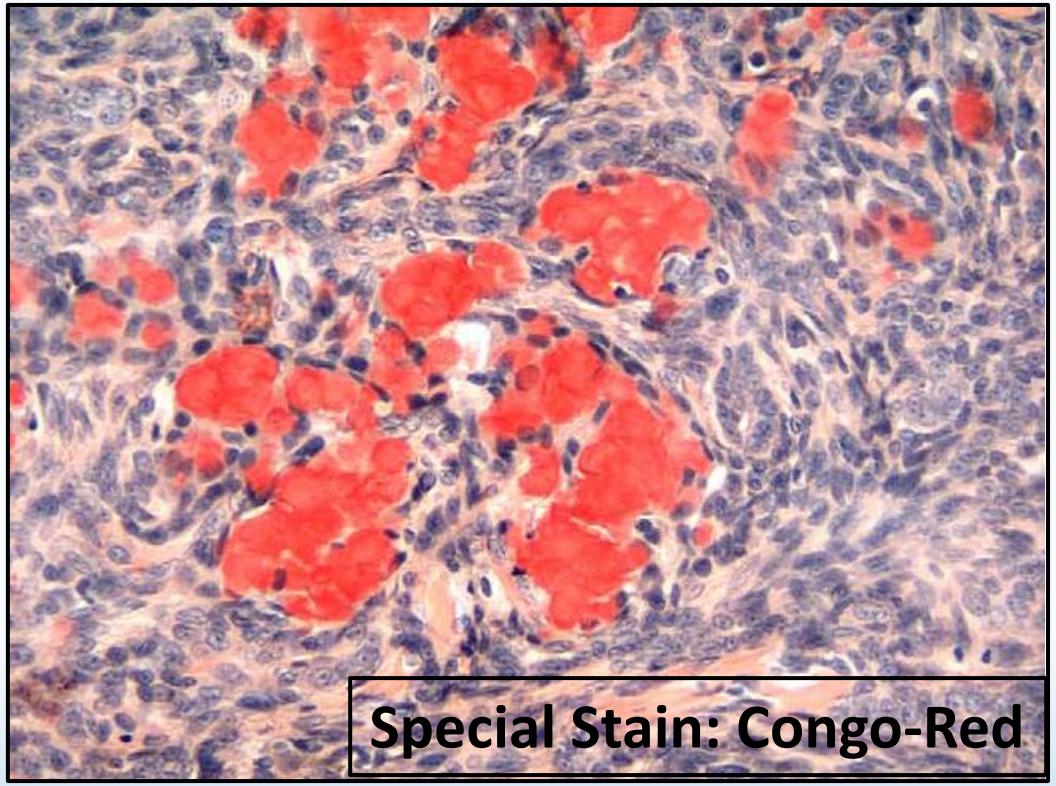
- What's your diagnosis? Describe histopathological lesion and significance of special staining method.

Part VI: Veterinary Pathology Practice: Case Study-3 (Continued)

- Diganosis: Granulomatous meningoencephalitis caused by fungal infection
  - *Sporobolomyces roseus*
- Histopathology findings:
  - inflammation, granulomatous, cerebrum, mesencephalon, rostral colliculi, multifocal, moderate
  - infiltration, epitheloid macrophages, multinucleated giant cells, multifocal, marked
  - deposition, eosinophilic granular material (containing fibrin and cellular debris), multifocal, moderate
  - astrocytosis, neuropil, multifocal, marked
- Significance of special staining:
  - Fungal hyphae were not visible with H&E stain. Periodic Acid Schiff & Grocott's methenamine silver staining intensely stained fungal hyphae. Numerous, irregularly branching septate hyphae were detected in the granuloma.

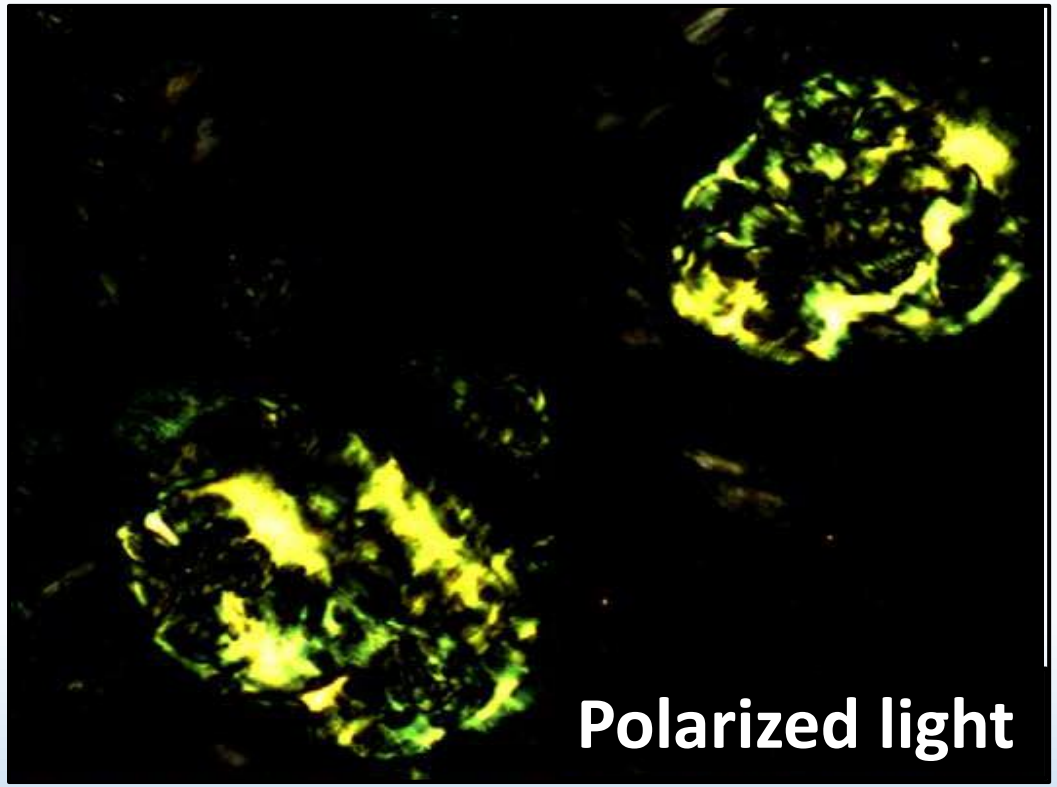
Part VI: Veterinary Pathology Practice: Case Study-4

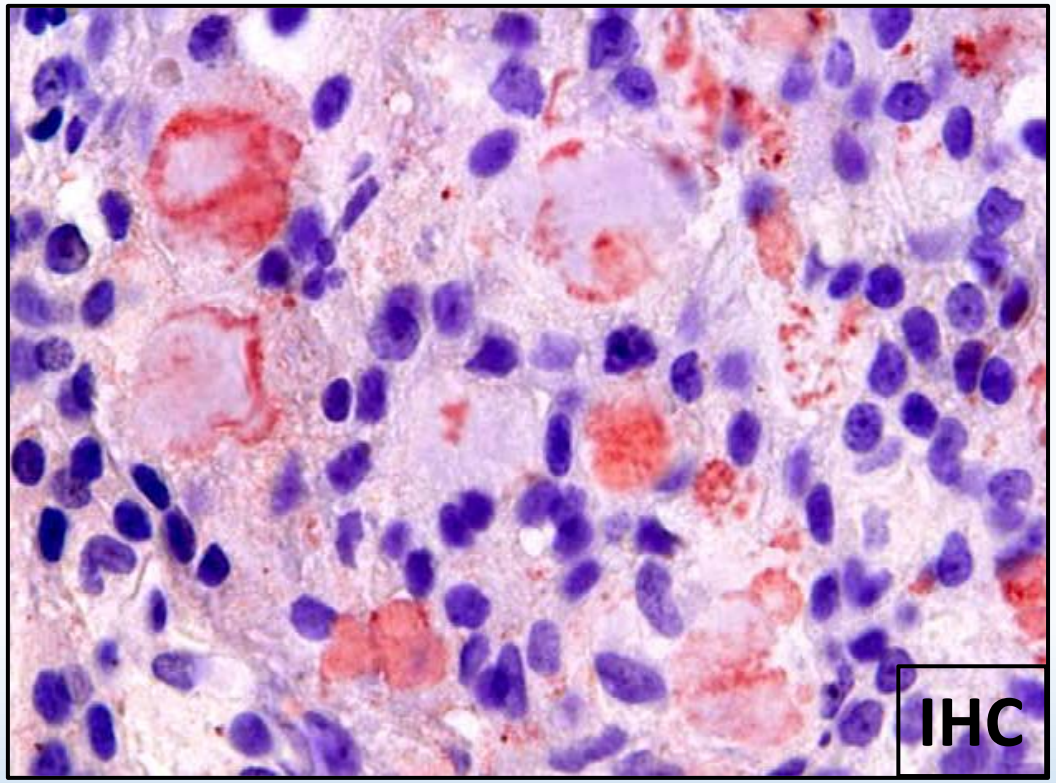




- **Case History:**
- Gingival mass at first premolar in the left mandibular region from an adult, male, neutered cat was surgically removed.
- Tissue stained positively for Amyloid (Congo-Red).

Part VI: Veterinary Pathology Practice: Case Study-4 (Continued)





- **Case History:**
- Green birefriengence of amyloid deposits under polarized light
- ICH Panel: Odontogenic ameloblast associated protein: positive

  AA Amyloid: negative; ALλ: negative; ALκ: negative
- **What's your diagnosis? Describe histological features of the mass and significance of IHC stain. Name human counterpart of this tumor.**

Part VI: Veterinary Pathology Practice: Case Study-4 (Continued)

- **Diganosis: Amyloid Producing Odontogenic Tumor (APOT)**
- **Histopathology findings:**
  - Medium sized epithelial cells with round to ovoid nuclei, 1-2 nucleoli, abundant eosinophilic cytoplasm
  - Mild anisokaryosis, mitotic index = 0-1/hpf, tumor cells arranged in nests & streams
  - Tumor cells showed dentinoid formation with prominent mineralization
  - High amount of extracellular homogenous eosinophilic material (amyloid), No inflammatory changes
- **Significance of IHC Staining:**
  - Positive staining of Odontogenic ameloblast associated protein is suggestive of epithelial (odontogenic) source of amyloid being deposited.
- **Human counterpart of APOT** is called as: **Calcifying Epithelial Odontogenic Tumor (CEOT)**

Thank You ☺