

**I**

A microscopic image of tissue, likely a histological section, showing various cells and structures. The image is overlaid with a central text box containing the text "Veterinary Pathology!". The background shows a complex arrangement of cells, some with prominent nuclei, and some with a pinkish hue, possibly indicating a specific tissue type or staining.

# Veterinary Pathology!



-Veterinary pathology is the study of disease  
-It is broken into two branches: Clinical and anatomic pathology



-Pathologists use blood, urine, and samples of organs to determine why an animal is sick and what caused the sickness

**If you are squeamish or don't want to see "gross" images, do not continue**

-Both branches use microscopes to see things at the cellular level. This is called cytology in clinical pathology and histopathology in the anatomic branch.



-This presentation shows images of real life diseases and defects in real animals and their organs



# POLYCEPHALY

(from greek meaning “many heads”)

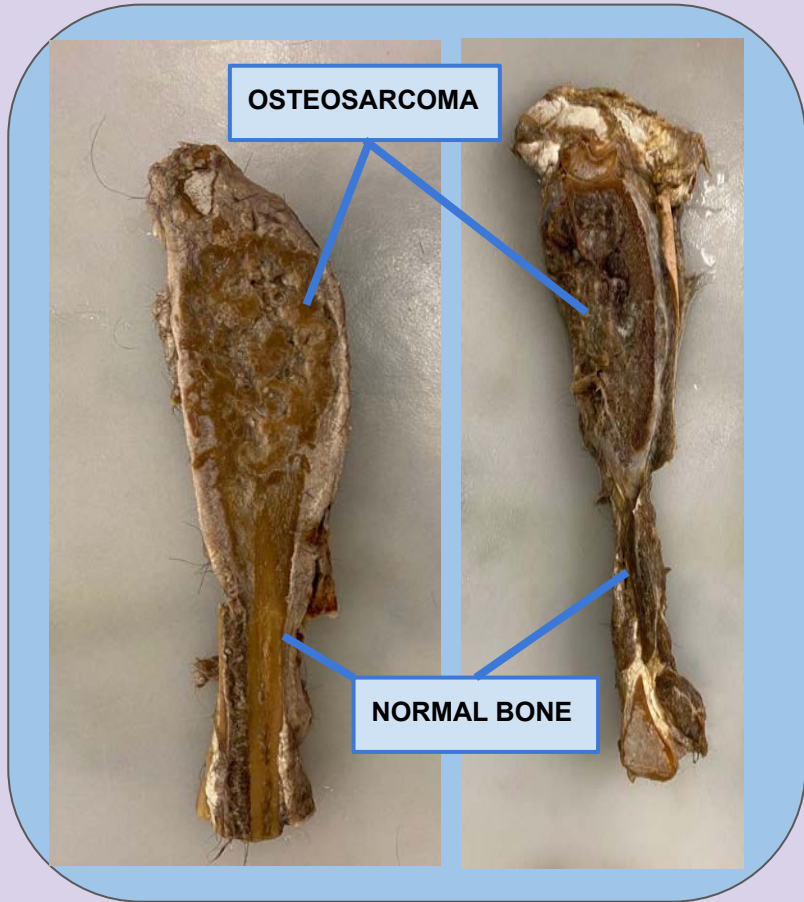
A single fertilized egg begins to split as it would to become identical twins, but never completely separates. This animal was left with two faces, sharing a body and one ear.

Polycephaly can occur due to a defect in DNA, or as a random occurrence.

Some animals live with this condition well into adulthood. It occurs in many species, from reptiles to mammals -- even humans!



# ← OSTEOSARCOMA



This is an aggressive cancer of the bone, which can be proliferative (making extra bone) or destructive (eating the bone away). Osteosarcoma is common in large breed dogs.

Osteosarcoma is a painful condition to have, and amputation of the limb is typically the first step of treatment.

# TRICHOBEZOAR

Trichobezoars (known as “hairballs”) are most common in cats and rabbits. Fur is swallowed as they groom themselves and builds up in the stomach.

Hairballs can be especially dangerous for rabbits, as they cannot vomit them up. They must be treated swiftly so that the rabbit is comfortable to eat and drink normally.

Through history, people (incorrectly) believed bezoars functioned as an antidote to any poison-- in fact, the word “bezoar” is derived from the Persian word meaning ‘antidote’.



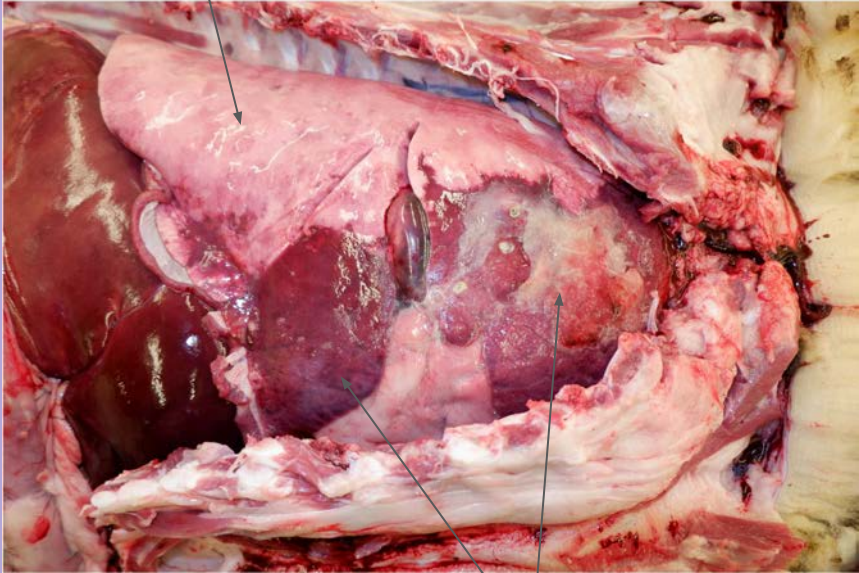
**DOG**



**RABBIT**

# ← BRONCHOPNEUMONIA

Healthy lung



Pneumonia

Pneumonia is inflammation in the lungs. It can be caused by inhaling dust, water, dirt, food or it can be caused by a bacterial infection.

Bronchopneumonia means the infection is in the bronchi.

Healthy lung should be pink and spongy!

# HEPATIC LIPIDOSIS

(fatty liver syndrome)

This condition is common in cats but can also occur in dogs. It usually happens when an overweight cat misses a few meals.

The liver moves fat where it is needed, and without energy from food, the cat uses a lot of stored fat. When the liver is overwhelmed like this, vessels and bile ducts can start to clog. Since the liver can't get enough blood, it can't do any of its important jobs, like make proteins and hormones, store vitamins and energy, and eliminate toxic compounds.



Healthy liver should like red/pink



# ◀ VEGETATIVE ENDOCARDITIS



**These “lumps” are clumps of bacteria that have gotten stuck on the heart valves**

Food animals and dogs may have bacteria in their blood from an infection, which can get caught on the valves of the heart and start multiplying. These colonies of bacteria prevent the valves from closing correctly, which makes the heart work harder to pump blood efficiently.

If the animal is not treated, vegetative endocarditis can lead to heart failure.



\*The bacterial clusters resemble vegetables like cauliflower

# CYCLOPEAN

## OFFSPRING

This is most common in sheep but can happen in cattle, horses, and other mammals. If the mother eats a plant called False Hellebore (*Veratrum californicum*) during pregnancy, it can cause developmental defects such as deformed facial bones. Most offspring with this condition are born dead or die soon after birth, as the nose and mouth often fail to develop correctly.



SINGLE EYE AND EAR



PIGLET

# HYDROCEPHALUS

“water on the brain”

Hydrocephalus is a developmental defect that happens before the baby is born. It can be caused by many things, such as copper deficiency, viral infection, trauma, or anything that causes too much fluid in or around the brain.



# ◀ LAMINITIS

Horse foot bones are suspended by many folds of connective tissue called laminae. When these get inflamed, they break down and the coffin bone (last digit) rotates. This causes the horse great pain.



Bones in a Horse's foot

# ENTEROLITHS

(Intestine Stones)

Enteroliths are most common in horses. Layers of mineral can build up around something like a seed or pebble in the intestine, which may not cause a problem if it stays small. If it gets too big, the stone can block the intestine, causing pressure, pain or twisting of the intestine.





# LIPOMA



Lipomas are a benign overgrowth of adipose (fat) tissue, and are found just below the skin or in visceral fat around internal organs.

They are common in older animals, especially dogs and humans. They can also occur in cattle and horses but are rare in cats and pigs.

As they are usually painless, treatment may not be required. However, visceral lipomas can sometimes get tangled in intestines and block blood flow. This is called a strangulating lipoma, which are common in horses. They can wrap tightly around other organs and kill tissues inducing shock and necrotizing enteritis (dead, inflamed intestines).

# CIRRHOSIS

Also known as End-Stage Liver

Cirrhosis happens when the liver undergoes continuous injury, resulting in scarring that leads to liver failure.

The liver becomes lumpy because it is trying to heal, so it makes new liver cells over the old liver cells, but the new cells don't function well enough.



Healthy liver should look red/pink



Wart-like lesions on the  
bird's head



## AVIPOX

Only infects birds

Can be transmitted by mosquitoes

Affects the bird's respiratory tract and parts of the skin that are featherless.



# Hardware Disease (Traumatic Reticulopericarditis)

This occurs when cows eat pieces of metal (like nails), and the metal pokes a hole through the stomach and diaphragm into the heart.

This causes the body to respond by creating a material called fibrin, a protein produced during blood clotting that creates a mesh disrupting normal heart function.



**Fibrin**



# Which hip is abnormal?

A



B



## Normal hips

Note how the head of the femur fits well into the acetabulum, or hip socket

Note that the head of the femur is smooth and round-not flattened.

# A



# B



## Hip dysplasia

The femoral head does not fit into the acetabulum, or hip socket, as well as it should. This is called subluxation.

The acetabulum becomes shallow as the condition worsens.

The femoral head flattens out and becomes rough in appearance.

The femoral neck thickens.

Joint soft tissue fibrosis occurs.

Femoral Head

There is a registry called OFA that certifies breeding animals are free of hip dysplasia.

**WHY?**



There is a registry called OFA that certifies breeding animals are free of hip dysplasia.

**WHY?**



**HIP DYSPLASIA HAS A GENETIC COMPONENT!**

# Canine hip dysplasia

Canine hip dysplasia (CHD) is the loose or instability of the hip joint. CHD is common in large breed dogs like German Shepherds but can also be found in small breed dogs like pugs.

There are many factors that can contribute to canine hip dysplasia:

- Genetics
- Rapid growth and weight gain
- Trauma

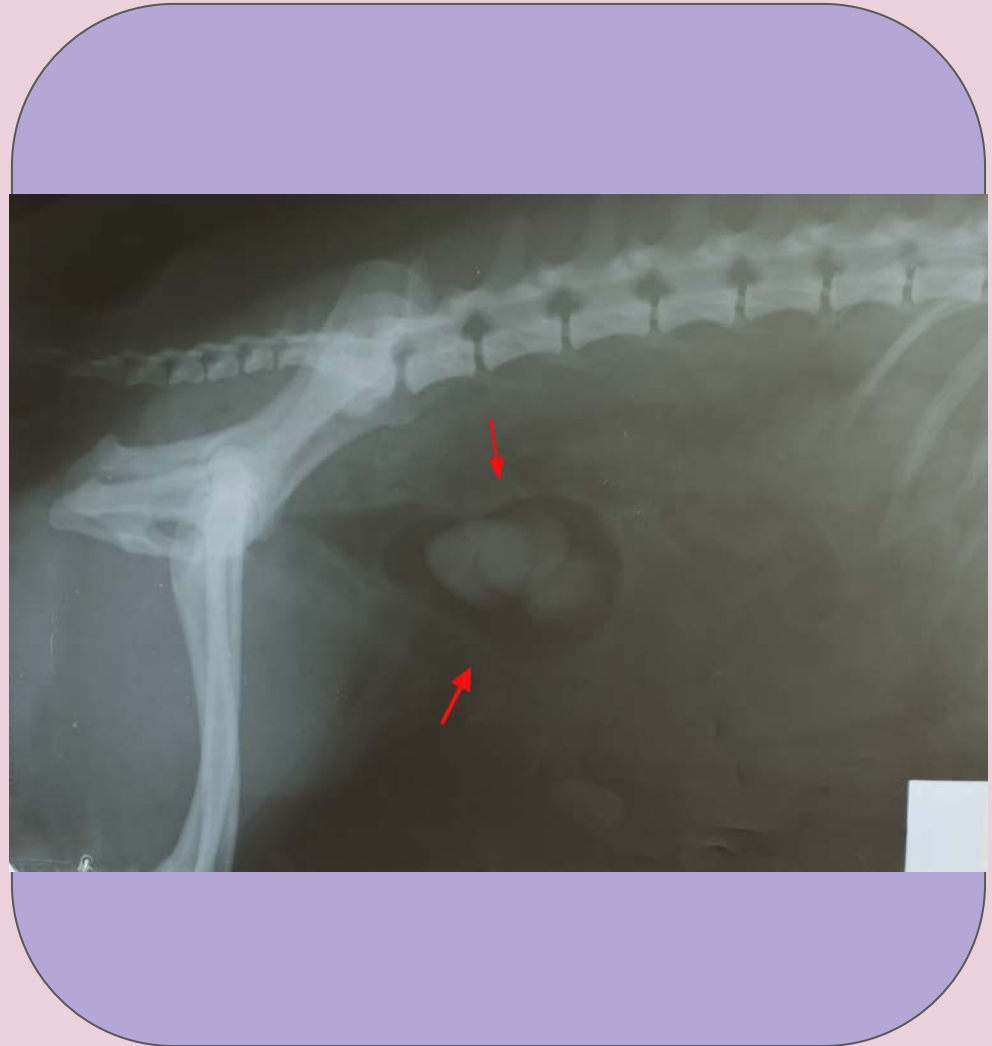


# Bladder stones (uroliths)

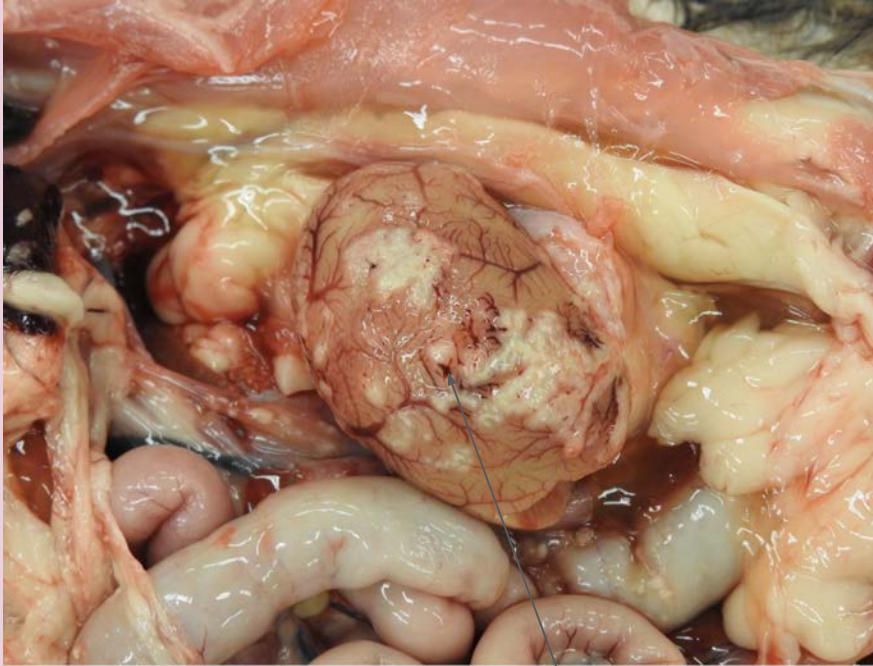
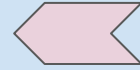


Uroliths are accumulations of mineral crystals that occur anywhere in the urinary tract. Nutritional imbalances, infection, liver disease or genetic conditions can all lead to the formation of these stones.

Signs of a urinary stone can include straining to urinate, blood in urine or not being able to urinate. Most stones require surgical removal by a veterinarian and are considered to be an emergency.



# Feline Infectious Peritonitis (Kidney)



Kidney with wet  
form of FIP

Feline Infectious Peritonitis (FIP) is an immune response to Feline Coronavirus (FCoV). This response can be seen in tissues in the kidneys, abdomen and the brain. It occurs more commonly in kittens.

There are two forms of FIP: wet and dry. Typical symptoms of FIP are weight loss, respiratory distress, fever, and diarrhea. With wet FIP, you will see an accumulation of fluid in the abdomen but in dry FIP, there is no accumulation of fluid.



# Large Colon Torsion

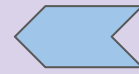
Large colon torsions can occur when there is excessive gas in the intestines. This excessive gas then raises the intestines and causes them to twist on themselves.

The twisting of these loops causes a loss of blood flow to the colon. Limited or decreased blood supply can cause intestinal death.

Healthy intestines



Intestines with torsion that is “dead”

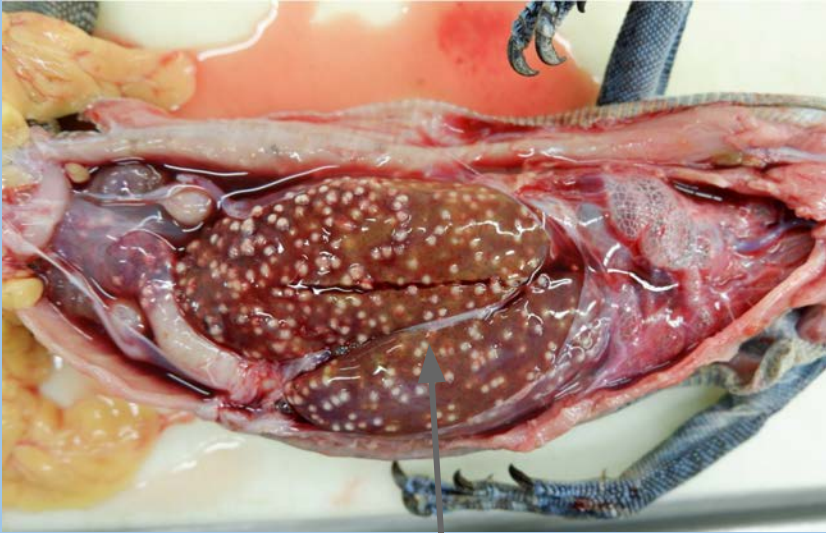


# Listeriosis (Monitor Lizard)

Listeriosis is a bacterial infection caused by an ingestion of the bacteria *Listeria monocytogenes*.

While Listeriosis is commonly found in mammals and humans, Listeriosis can also occur in reptiles.

The three main forms of listeriosis include late abortion (miscarriage), encephalitis and gastrointestinal sepsis with liver damage.



Liver infected with  
Listeriosis

# Lumbosacral chondrosarcoma dog

A chondrosarcoma is a cancer that occur in the cartilage.

Chondrosarcomas are the second most common bone tumors in dogs.

Depending on the location of the chondrosarcoma, the best treatment option for chondrosarcoma is surgery in order to remove it.



## Neuroblastoma (dog-main mass)



Neuroblastoma is a type of cancer that arises in nerve tissue. There can be neuroblastomas of central (brain/spinal cord) or peripheral (nerves from the spinal cord) origin. In dogs, peripheral neuroblastomas are rare.

In dogs, peripheral neuroblastomas tend to occur in the abdominal cavity, adrenal gland and mandibular pharyngeal area. In some cases, it can occur in organs like the kidneys and liver.

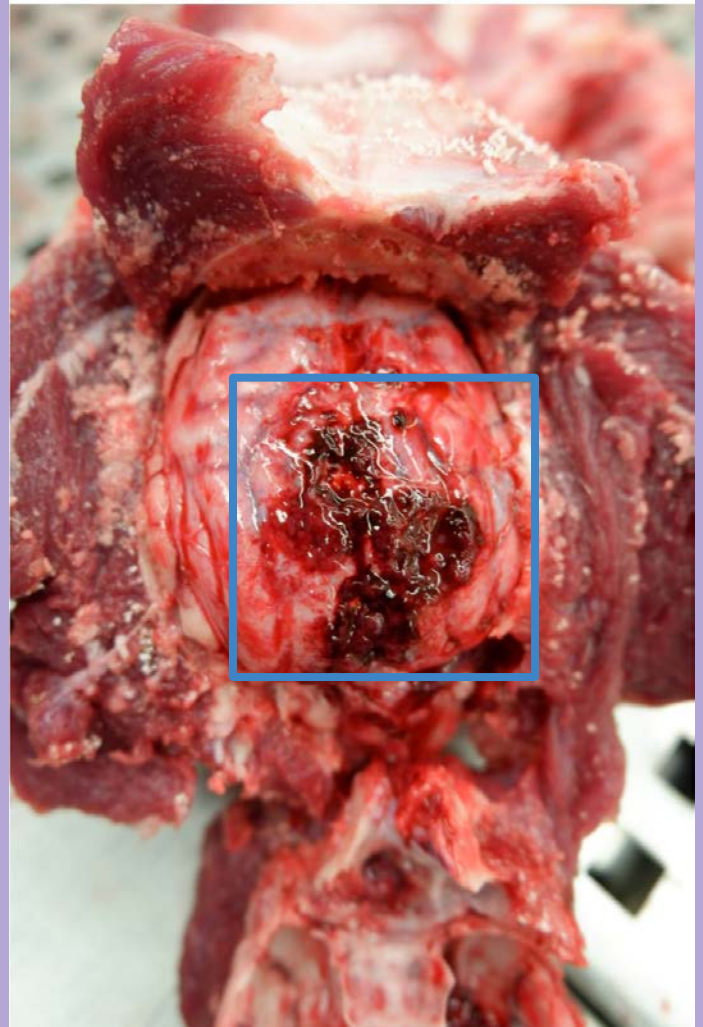
# Neuroblastoma

## (dog-brain metastasis)

Here is a Neuroblastoma metastasis in a dog's brain.

Metastatic cancer is cancer that has spread from where it originally formed. While the metastasis is in a different location, the metastasis is the same type of cancer as the primary tumor.

Metastases can spread to the rest of the body through the lymphatic system.





## ← Neuroblastoma (dog-bone metastasis)

Neuroblastoma metastases are rare in dogs but common in humans.

To determine if there is a spread of the cancer, x-rays or CT scans can be done to see if other masses can be found throughout the body.

# Neuroblastoma (dog-vertebral metastasis)



Surgery is one treatment option for a neuroblastoma. Surgical treatment requires the removal of not only the tumor but even areas surrounding the tumor in order to ensure that the cancer cells are removed. In some cases, surgery may not be a viable option especially if there are metastases to other parts of the body.

