Disease of Mustelids II

Mink Viral Enteritis

- **Mink enteritis virus** (MEV) is a strain of *Carnivore protoparvovirus 1* that infects mink and causes enteritis

Mink Viral Enteritis

- Clinical signs include anorexia, vomiting and severe diarrhea.
- Stools of affected animals usually contain large quantities of mucus and intestinal casts or "plugs" composed of fibrin, mucus and dead cells from intestinal mucosa.

Shaking Mink (Astrovirus)

- Astroviruses are small, nonenveloped, single-stranded RNA viruses

Shaking Mink (Astrovirus)

- An apparently novel neurological disease clinically characterized by
- shaking,
- tremors,
- seizures,
- staggering gait,
- ataxia

was first observed.

Shaking Mink (Astrovirus)

- Lymphoplasmacytic encephalomyelitis was found in the affected kits.
- The lesions were most severe in the brainstem and cerebellum and consisted of
- neuronal degeneration and necrosis,
- neuronophagia,
- focal and diffuse gliosis,
- perivascular cuffs formed by lymphocytes, plasma cells and macrophages, and
- segmental loss of Purkinje cells.

Transmissible Mink Encephalopathy

- Transmissible mink encephalopathy (TME) is a progressive and fatal neurodegenerative disease that affects ranched mink (Neovison (Mustela) vison).
- Most or all of the adult animals on a ranch may be affected, and once an animal becomes symptomatic, death is inevitable.
- This disease is still poorly understood.

Transmissible Mink Encephalopathy

- TME is a member of the transmissible spongiform encephalopathies (TSEs), a group of neurodegenerative disorders caused by prions, infectious proteins that appear to replicate by converting a normal cellular protein into copies of the prion.

Transmissible Mink Encephalopathy

- Mink seem to acquire the TME prion when they eat contaminated feed, but the origin of this agent is still uncertain. TME could be caused by the scrapie prion, an agent found in sheep and goats, although this currently seems unlikely.

Transmissible Mink Encephalopathy

- TME has been reported only in ranched mink; however, experimental infections can be established in other species.
- Raccoons are readily infected by oral as well as parenteral inoculation. Species that have been infected by intracerebral inoculation include striped skunks, ferrets, American pine marten, beech marten, cattle, sheep, goats, hamsters and various nonhuman primates, such as rhesus macaques, cynomolgus macaques, stump-tailed macaques (Macaca arctoides) and squirrel monkeys.

- Vitamin E Deficiency
- Gastric Erosions or Bleeding Mucosal Ulcers
- Adrenal-Associated Endocrinopathy
- Urolithiasis
- Mycobacterium, Staphylococcus, pseudomonas,…

Xenarthra, Erinaceomorph Some Afrotheri and Phlidota

- Order Xenarthra includes armadillos, sloths, and anteaters.
- The Order Erinacoemorpha includes moonrats and hedgehogs (*Atelerix sp*., *Erinaceus sp*., and others). Aardvarks (Order: Tubuloedentata), hyraxes (Order: Hyracoidea), tenrec and golden moles (Order: Afrosoricida), elephant shrews (Order: Macroscelidea), pangolins (Order: Pholidota, previously Xenarthra) and tree shrews (Order: Scandentia)

- Common (and defining) in Xenarthra, are some unique features that can confuse the prosector.
- Included among these are multiple bony variations, such as additional lumbar vertebral joints, fusion of the ischium to caudal vertebra, a secondary scapular spinous process, and ossified sternal ribs.

- Cardiovascular variations include prominent rete mirabile in the limbs and paired venae cavae in the posterior abdomen.
- All Xenarthrans have reduced homodont teeth.
- Anteaters and tamandua lack teeth entirely.

- Armadillos have a hardened carapace that is composed of dense ossified dermal tissue with overlying epidermal scales. The digestive tract of the sloth is complex with multiple chambers in which fermentation by commensal bacteria allow the breakdown of otherwise indigestible vegetation.

Thiamine deficiency

- **General:** Poor growth, weight loss, paresis (partial paralysis), muscle weakness, recumbency and exhaustion in juvenile hand-reared ***Erinaceus europaeus* - West European Hedgehog**.
- **Musculoskeletal:**
  - Hind leg paresis progressed to paralysis of the feet, crossing over of the hind feet, outward rolling of the front feet and splaying of the legs. ("flipper feet") in juvenile hand-reared ***Erinaceus europaeus* - West European Hedgehog**.
  - Leg problems, with the hind legs crossing over, and in some animals "pop-off" syndrome. Deaths of affected animals have been reported (deaths of all those in which the "pop-off" stage was reached) in juvenile hand-reared ***Erinaceus europaeus* - West European Hedgehog**.
  - Gradual loss of balance and loss of the use of the legs in pet *Atelerix* hedgehogs in USA and Canada.
- **A demyelination disorder**

Wobbly hedgehog syndrome (WHS)

- A progressive degenerative neurological disease of African and European hedgehogs sometimes referred to as progressive paresis/paralysis.
- It slowly degrades the animal's muscle control perhaps similar to that of MS in humans.
- The cause at this time is unknown although it is believed to be genetic. A possible dietary role has been suggested.

Wobbly hedgehog syndrome (WHS)

- Most commonly shows up between 2 and 3 years of age but younger and older animals have also become affected.
- Males and females are equally affected.
- It often starts with ataxia (loss of full control) or paresis (muscular weakness caused by nerve damage or disease) in the hind legs.
- WHS is most evident initially by the "wobble" the hedgehog has when it is trying to stand still.

Wobbly hedgehog syndrome (WHS)

- It gradually progresses from the hind end and starts to affect the front of the body leading to tetraplegia or quadriplegia (partial or total loss of use of all limbs and torso).
- The muscles will atrophy or lose mass and strength leading to progressive weakness.
- Most affected hedgehogs will slowly lose weight. Occasionally the progression will be as quick as a few days.

Wobbly hedgehog syndrome (WHS)

- Histologically, **extensive vacuolization** of the white matter is seen in the *cerebrum*, *cere*bellum, and throughout the length of the *spinal cord*.
- Myelin likely degenerates first, then secondary **degeneration and loss of the axons** with subsequent **neuronal degeneration and necrosis**.
- *The corona radiata* of the cerebrum is often the most pronounced area of **demyelination**.

- Foot-and-Mouth Disease (FMD)
- Canine Distemper Virus
- …