



Feline URT disease

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“Snuffles/Cat Flu”

- ❖ **Feline upper respiratory disease and conjunctivitis**
 - **FHV-1 (rhinotracheitis virus)**
 - **FCV**
 - **Chlamydia felis**
 - **Bordetella bronchiseptica**
 - **Avian (bird) influenza virus (strain H5N1)**



Feline herpesvirus (FHV-1)

- ❖ DNA virus, low mutation rate, labile
- ❖ All isolates genetically similar
- ❖ Most cats infected as kittens
- ❖ Direct transmission, indirect possible
- ❖ Targets epithelia of URT & conjunctiva
- ❖ 80-100% of acute infections become latent in trigeminal ganglia
- ❖ Hides from immune system



Feline herpesvirus (FHV-1)

- ❖ Lifelong carriers
- ❖ Shed virus intermittently
- ❖ Virus shedding – 1w after
 - Stress
 - Corticosteroid treatment
 - Cyclosporin A treatment
- ❖ Shedding lasts a few hours to 1-2w
- ❖ Often asymptomatic



Examples of stress in cats

- ❖ Being rehomed
- ❖ Moving house
- ❖ New additions to house
- ❖ Too many cats in 1 house (>6)
- ❖ Going into cattery
- ❖ Surgery / trauma
- ❖ Intercurrent illness
- ❖ Pregnancy/parturition/lactation



FHV-1 – Clinical signs

- ❖ 1. Cat flu
- ❖ 2. Fading kittens
- ❖ 3. Ocular signs
- ❖ 4. Chronic rhinitis
- ❖ 5. Ulcerative dermatitis (face/body)

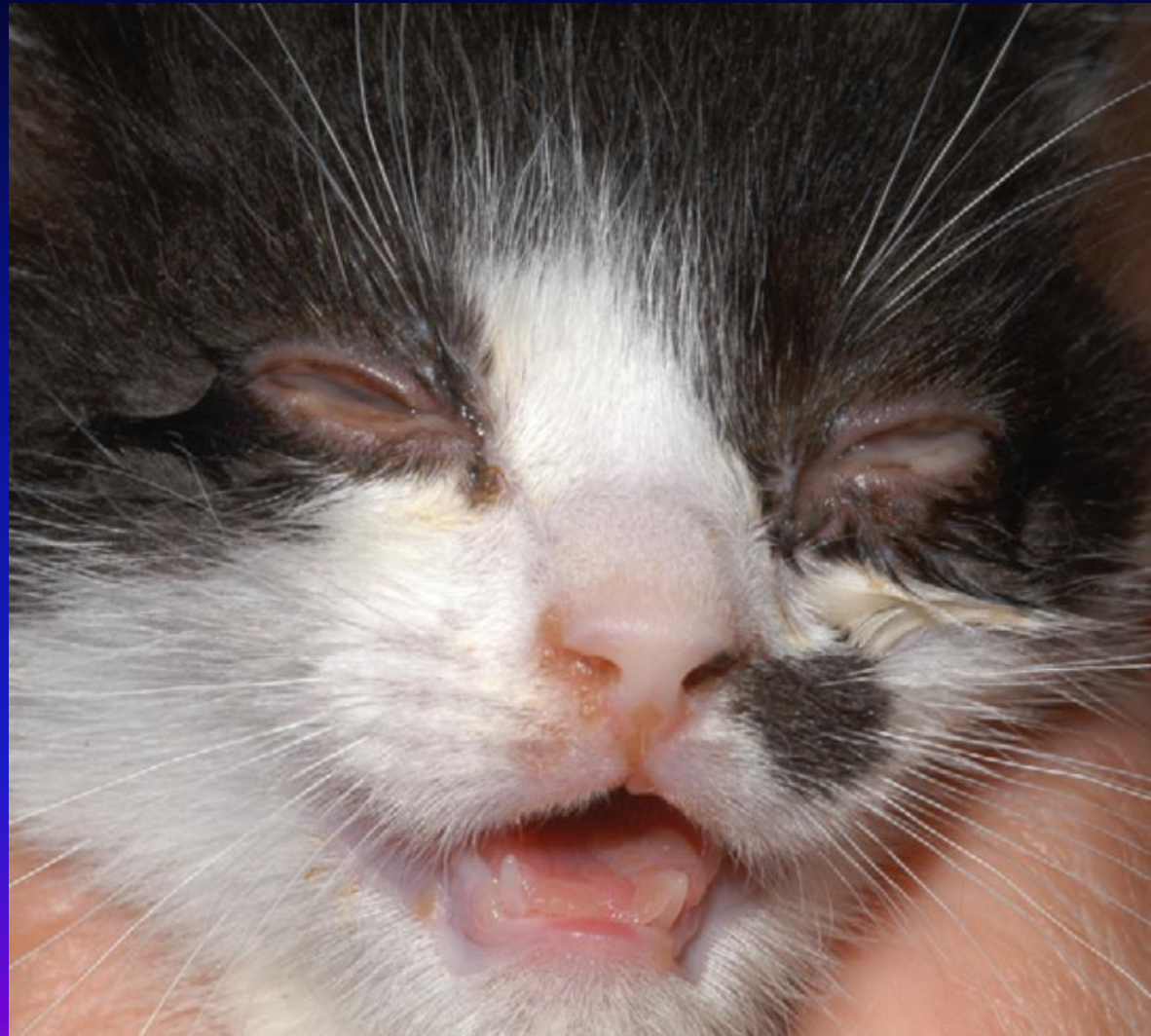


1.FHV “Cat flu” signs

- ❖ Oculonasal discharges, sneezing, conjunctivitis & hypersalivation
- ❖ Pneumonia and death
- ❖ Kittens (14d) – swollen eyes with corneal ulceration/rupture under closed eyelids
- ❖ Infected kittens can develop chronic rhinitis/sinusitis into adulthood
 - Osteolytic changes in turbinates



FHV-1 infection



FHV-1 infection



2. Fading kittens

- ❖ Major cause of fading in very young kittens
 - Stop eating, lose weight, die
- ❖ PM-pneumonia, thymic atrophy, underweight for age
- ❖ HP- acidophilic intranuclear inclusion bodies



Fading kittens



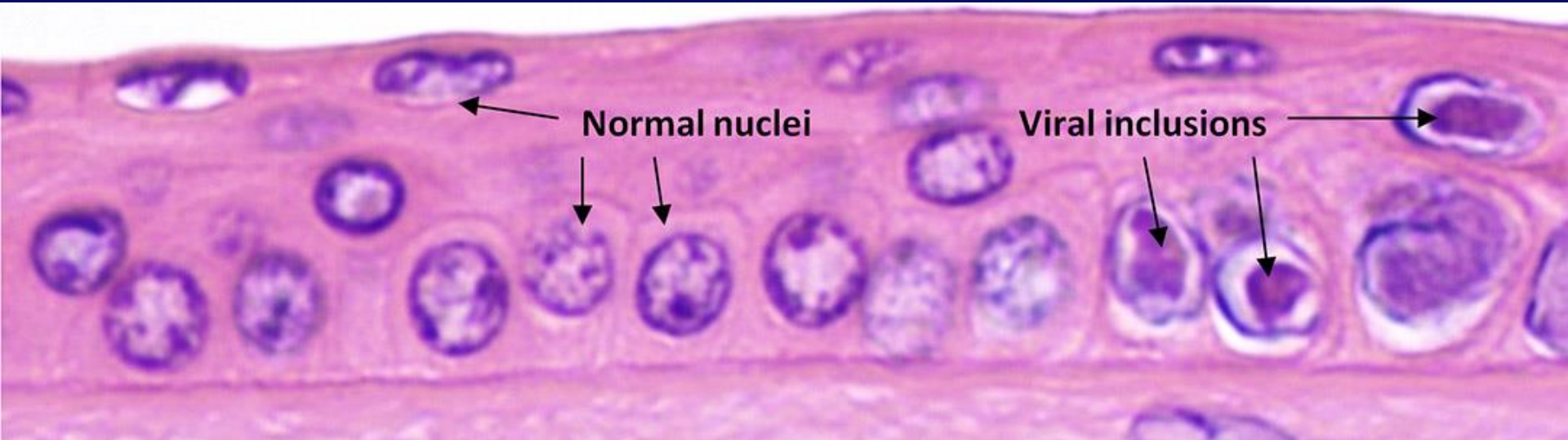
Post Mortem



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FHV-1 Histopathology

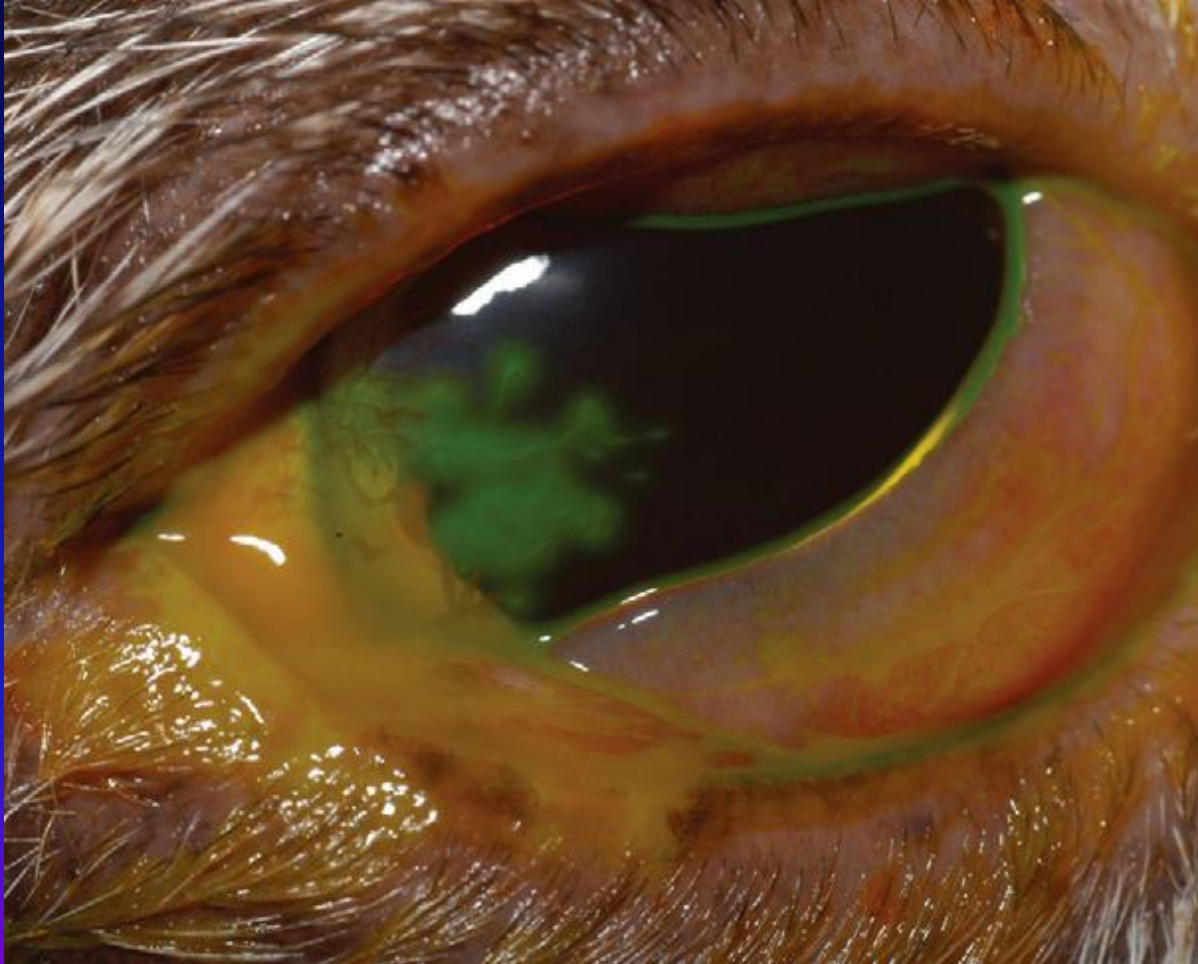


3.Ocular signs

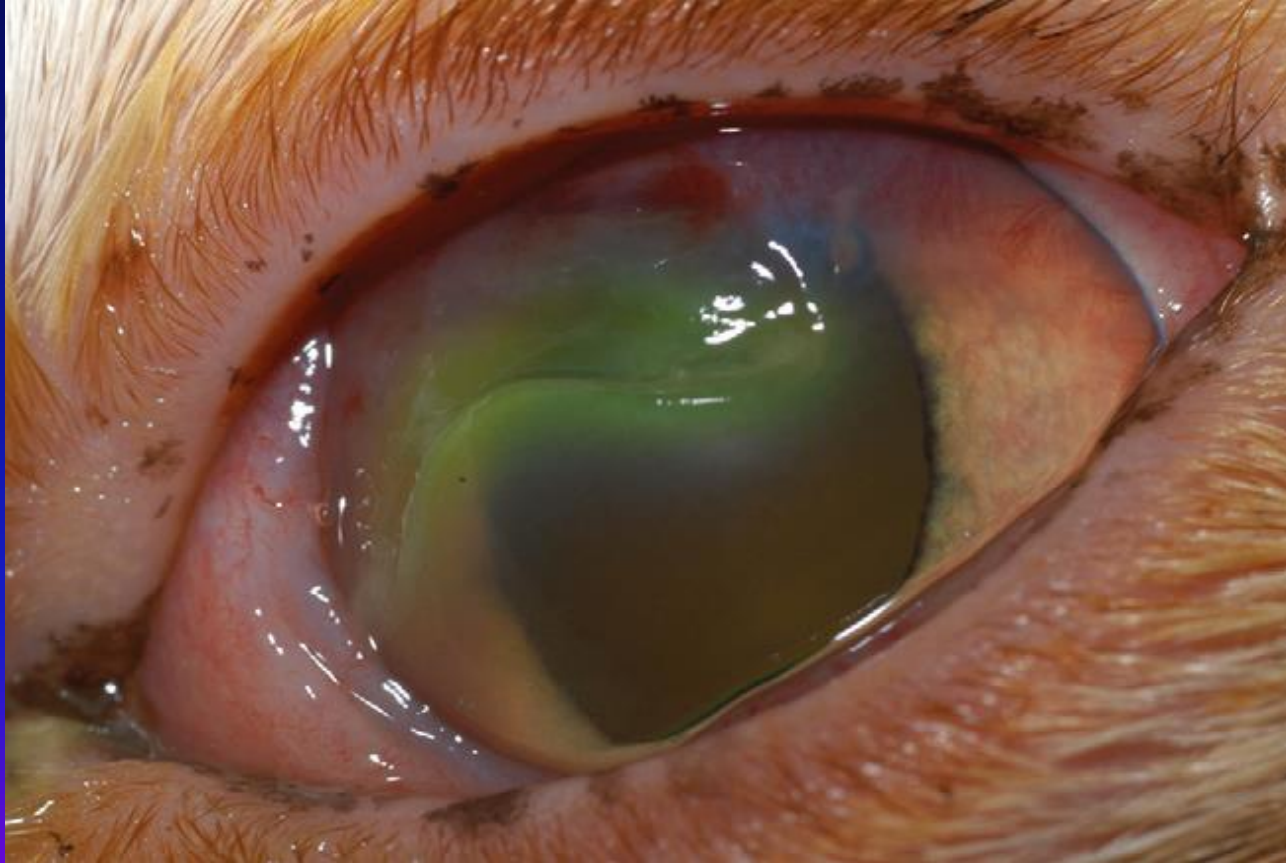
- ❖ **Most common cause of feline ocular disease!**
- ❖ **Chronic/recurrent conjunctivitis**
- ❖ **Corneal ulceration**
- ❖ **Ruptured eyeball**
- ❖ **Distortion of eyes due to adhesions**
- ❖ **Stromal keratitis - blindness**



Ocular signs – Corneal ulceration



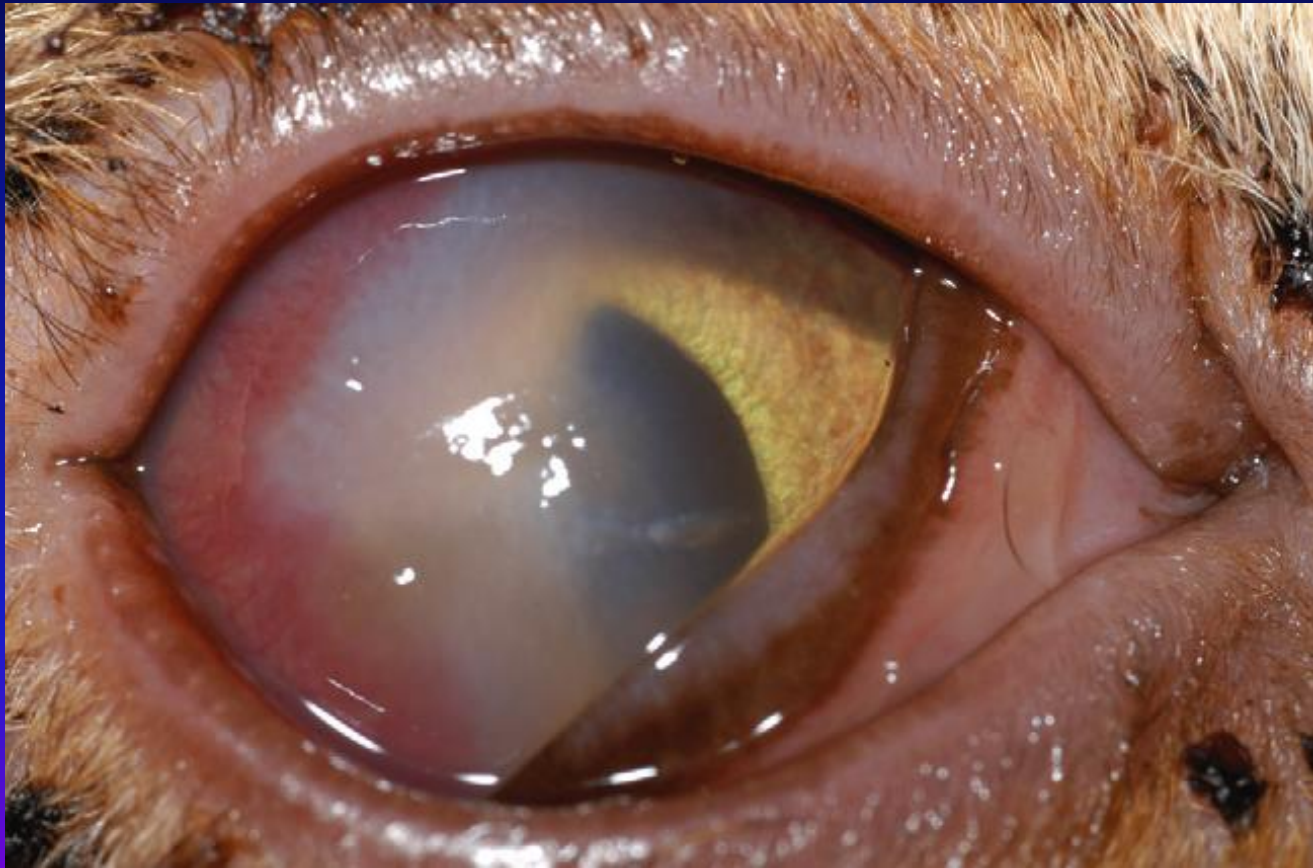
Ocular Signs – Corneal ulceration



Ocular signs - Adhesions



Ocular signs – Stromal keratitis



4. Chronic rhinitis

❖ **Some kittens who survive FHV go into adulthood with chronic rhinitis/sinusitis**

- Breathing more audible than normal
- Snore when asleep
- Permanent/recurrent mucopurulent nasal discharge & sneezing
- Distortion of bone & cartilage



5. Ulcerative dermatitis



Diagnosis

- ❖ **Always suspect FHV with recurrent conjunctivitis/ulcers/chronic sinusitis**
- ❖ **Serology not useful - 97% cats sero+ (natural/vaccination)**
- ❖ **Virus isolation (OP) or PCR (MDS)**
 - Oropharyngeal swab
 - Conjunctival swab
 - Lung from dead kitten (HP & VI)



Diagnosis

❖ FHV shedding is intermittent:

- + result: Positive carrier
- - result: May have missed the shedding time

❖ Perform swabs when

- Clinical signs first appear
- Few days to week after stress



Treatment

❖ Supportive care

- Tempt to eat
- Steamy bathroom (1hr/day)
- Vicks/Eucalyptus oil
- Clean with warm cloth & keep warm
- Clean eyes 3/4x daily with saline



Specific treatment

❖ Topical (ocular) antivirals

- **Trifluridine, vidaribine, and idoxuridine**
 - Virostatic, apply often (q4hrs)
- **0.5% cidofovir solution BID**
 - Clinical improvement, ↓ viral shedding
 - Promising studies



❖ Systemic antivirals

- **Hu drugs, not approved for cats**
- **Often toxic (BM ↓) – acyclovir (Zovirax)**
- **Famciclovir (Famvir) – promising**
 - 62.5mg PO BID for 14d



Specific treatment

❖ Feline interferon omega (Virbagen Omega,[®] Virbac) – not in SA

- Used topically in eye drops for FHV
- ? Efficacy

❖ L-Lysine

- May reduce viral replication?
- May reduce viral shedding?
- 250mg PO QID/BID for 6 weeks, then 2x weekly
- Conflicting studies



Specific treatment



Polyprenyl Immunostimulant in Feline Rhinotracheitis: Randomized Placebo-Controlled Experimental and Field Safety Studies

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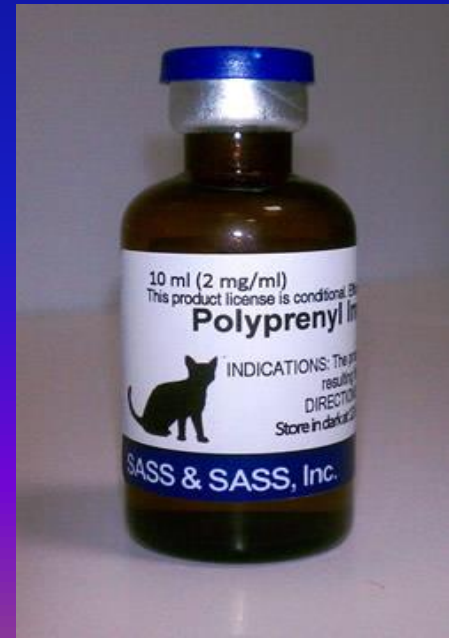
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Feline rhinotracheitis is a ubiquitous disease caused by feline herpesvirus type 1 (FHV-1). The disease is easily transmissible and common in multi-cat environments where even vaccinated cats can develop clinical signs of respiratory or ocular disease or both when

Specific treatment

❖ Polyprenyl immunostimulant (PI)

- Immunomodulatory veterinary biologic
- Stimulates cell-mediated immunity
- First USDA approved Rx for FHV-1
- Shown to ↓ severity of respiratory & ocular disease with FHV-1
- ↓ development of chronic rhinitis/sinusitis
- Safe to use as young as 8w old
- Dose: 0.5mg/kg PO BID for 15d



Prevention - Vaccination

- ❖ **Essentially only 1 serotype (FHV-1)**
- ❖ **Core vaccine component**
- ❖ **Reduces clinical signs, but does not**
 - Prevent infection
 - Prevent development of latency
 - Prevent induction of a carrier state (even without clinical signs)
- ❖ **Vaccinate 2x as kitten, then booster 1yr later, then every 3 years**



Vaccination

- ❖ **Intranasal vaccine (Ultranasal, Heska)**
 - Multicat situations with endemic FHV-1
 - Kittens from 2-3w old
 - No interference with maternal Ab
 - Preferred route for kittens at high risk
 - Can induce transient mild sneezing/
coughing
 - Rapid onset of protection
(2-3d)

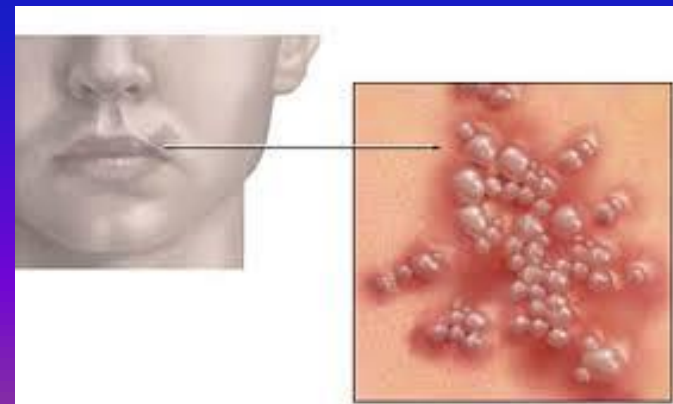


Vaccination



FHV-1 risk to other species

- ❖ **Completely different to Hu or Ca herpesvirus infections**
- ❖ **No risk to other species**
- ❖ **People with cold sores – no risk to cats**



Feline Calicivirus (FCV)

- ❖ **Less severe, but more common than FHV-1**
- ❖ **Frequently found in cats with chronic gingivostomatitis**
- ❖ **Limping syndrome**
 - Shifting lameness in many limbs
 - Often post-vaccinal reaction
 - Febrile, resolves within 3-4d
- ❖ **RNA virus – prone to mutation**
- ❖ **Variation of strains in larger groups of cats**



Transmission

- ❖ **Direct & indirect contact**
- ❖ **Highly contagious**
- ❖ **↑↑ virus in saliva, tears & nasal secretions**
- ❖ **Sneezed droplets travel 1-2m**
- ❖ **FCV also in urine & faeces**
- ❖ **Spread:**
 - **Cats sniffing & grooming each other**
 - **Sharing food bowls/litter trays**
 - **People, cages**



Transmission

❖ Source of virus:

- Acutely infected cats
- Clinically recovered carrier cats

❖ Asymptomatic carrier cats

- Shed virus continuously
- Usually few weeks-months
- Reinfection possible

❖ Hardy virus - lasts >1w in environment



Clinical signs

- ❖ 1. Cat flu
- ❖ 2. Fading kittens
- ❖ 3. Acute virulent FCV infection



1. Cat flu

- ❖ Sneezing, hypersalivation
- ❖ Ocular & nasal discharges
- ❖ Painful ulcers on tongue & in mouth
- ❖ Conjunctivitis – milder than FHV-1
- ❖ No corneal ulcers



2.Fading kittens

- ❖ Kittens stop eating & die within 1-4w
- ❖ Even in fully vaccinated households
- ❖ PM: Thymic atrophy & pneumonia
- ❖ HP: Differentiate between FCV&FHV
 - Lung HP: alveolar epithelialisation
- ❖ Lung sample in virus transport medium for VI/HP



3. Acute virulent systemic FCV

- ❖ Reported in USA, UK & Germany
- ❖ Each outbreak caused by different strain
- ❖ Vasculitis & multi-organ failure
 - Ulceration of ears, face & paws
 - Sloughing of foot pads
 - Oedema, jaundice, pyrexia
 - Up to 60% mortality
- ❖ Vaccination does not protect against these strains



Acute virulent FCV



Diagnosis

- ❖ Serology not useful (most cats sero+)
- ❖ FCV continuously shed (self-limiting)
- ❖ Sample at onset of clinical signs
- ❖ **Virus isolation (OP)** – most sensitive
 - Oropharyngeal swab in virus transport medium
- ❖ VI can differentiate Fe Poxvirus (ulcers)
- ❖ **RT-PCR (MDS)** – detects viral RNA
 - Less sensitive, strains vary genetically
 - Some strains can be missed (false –ve)
 - May also detect vaccine strains



Treatment

- ❖ **No antiviral Rx for RNA**
- ❖ **Symptomatic**
 - **Good nursing**
 - **Encourage eating – aromatic foods**
 - **Oesophagostomy feeding tube**
 - **Nebulisation**
- ❖ **Broad spectrum antibiotics (2^o inf)**
- ❖ **Fe interferon omega given SC**
 - **Not in SA**



Prevention - Vaccination

- ❖ Prevents disease, but not infection/carrier state
- ❖ Core vaccine component
- ❖ Four FCV strains in vaccines:
 - F9, 225, G1, 431 (single/combo) – Fel-o-vax, Eclipse
 - F9 older – concern re efficacy against many field isolates – Feligen, Felocell, Nobivac, Purevax (SA)
 - Purevax R (Europe) may be superior - 2 new strains
- ❖ Give vacc 2x as kitten (3-4w apart), then booster 1yr later, then every 3 years
- ❖ Vaccine containing VS-FCV (Calicivax, BI) in USA – efficacy?



Control-Management measures

- ❖ **Aim to prevent spread of virus**
- ❖ **NB in multicat situations**
 - rescue shelters & boarding catteries
- ❖ **Cats housed individually, sneeze barriers**
- ❖ **Good hygiene & disinfection procedures**
 - **FeHV:**
 - Persist <24hr in environment
 - Killed by detergents & disinfectants
 - **FCV:**
 - Persist several weeks in environment
 - Not inactivated by detergents
 - Disinfection NB – NaOCl (bleach)



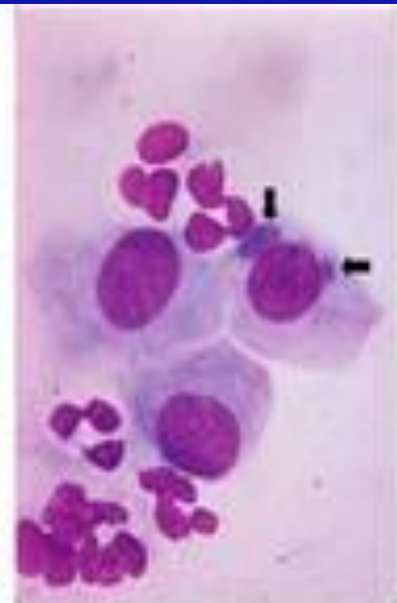
Control-Breeding colonies

- ❖ **Young kittens at most risk (lose MDA)**
- ❖ **Avoid overcrowding**
- ❖ **Aim to keep cats stress-free**
- ❖ **Queens should kitten in isolation and/or**
- ❖ **Early weaning of kittens or**
- ❖ **Earlier vaccination schedules should be implemented**



Chlamydia felis

- ❖ **Obligate intracellular Gram-negative rod-shaped coccoid bacterium**
- ❖ **Major cause of conjunctivitis in cats**
- ❖ **Most infected cats <2 years old**



Clinical signs

❖ Conjunctivitis!

- Unilateral, becomes bilateral
- Eyes painful-conjunctival hyperaemia, chemosis, blepharospasm
- Discharge serous to mucopurulent
- Usually no keratitis/corneal ulcers or systemic illness (unlike FHV-1)



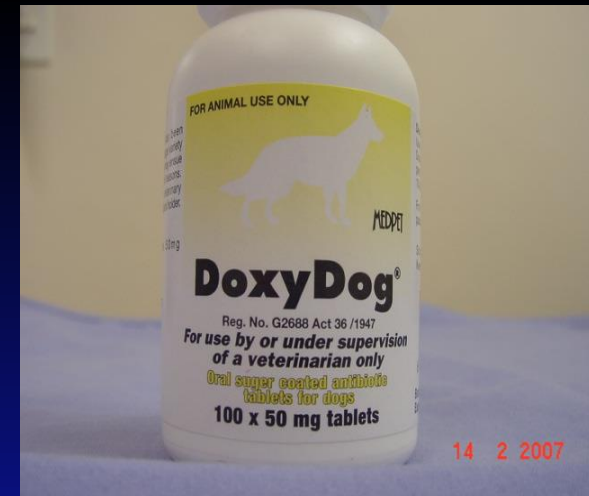
Diagnosis

- ❖ **PCR is best (MDS labs)**
- ❖ **Samples to submit:**
 - **Conjunctival swab**
 - **Faeces / faecal swab**
- ❖ **Serology – high antibody titres may imply a role in rarer cases of chronic ocular disease**



Treatment

- ❖ **Doxycycline (Mildox/Doxydog)**
 - 10mg/kg OID for 4 weeks, or
 - 10mg/kg OID until 2w past end of clinical signs
- ❖ **Stops shedding 9-25 days after onset of treatment**
- ❖ **Treat all the cats in household**
- ❖ **Contraindicated in pregnant cats**
- ❖ **Careful use in kittens < 6 months**
 - **Discolouring of teeth**



Treatment

- ❖ **Chlortetracycline eye ointment**
 - Apply 4x daily for 4 weeks, or
 - Apply 4x daily until 2w past end of clinical signs
- ❖ **Stops shedding 14-25 days after onset of treatment**
- ❖ **Availability?**



Treatment

❖ Not effective

- Fucithalamic ointment
- Synulox
- Penicillins
- Sulphonamides

❖ Enrofloxacin effective, care in kittens

❖ Azithromycin resolves clinical signs, but does not clear infection



Prevention - Vaccination

- ❖ Not core vaccines
- ❖ Purevax R, Eclipse 4 – inactivated
- ❖ More vaccine reactions if included?
- ❖ Does not prevent
 - Infection
 - Shedding
- ❖ May even predispose to carrier state
- ❖ Is it ever indicated?



Prevention



❖ Hygiene NB when treating infected cats & preventative Rx of asymptomatic cats

- Wash hands carefully between handling cats
- Handle asymptomatic cats first
- Each cat should have own ointment (labelled)



Risk to other species

- ❖ **C. felis different to human C.trachomatis**
- ❖ **Some reports of human infection from infected cats**
 - Caution when handling infected cats
 - Avoid touching own eyes after handling
- ❖ **Cats (and Hu) may become infected by birds (psittacosis)**
- ❖ **Cats unlikely to be infected by human / porcine / ovine Chlamydia**



Bordetella bronchiseptica

- ❖ **Aerobic gram –ve coccobacillus**
- ❖ **Isolated from 11% of 740 cats in UK**
- ❖ **Prevalence: 19.5% rescue catteries, 9% breeding catteries, 0% household**
- ❖ **Transmission: infected dogs / cats**
- ❖ **History of infected cat:**
 - **Visit to rescue / boarding cattery**
 - **Contact with a dog with kennel cough**



Clinical signs

- ❖ **Proven primary pathogen in cats**
- ❖ **Harsh productive/unproductive cough**
 - Cat is otherwise well
 - Signs usually resolve in 10days
- ❖ **Mild URT signs: Fever, sneezing, oculonasal discharge, enlarged submand Inn**
- ❖ **Severe fatal bronchopneumonia**
 - Kittens up to 8w old
 - Dyspnoea, cyanosis, death



Clinical Signs



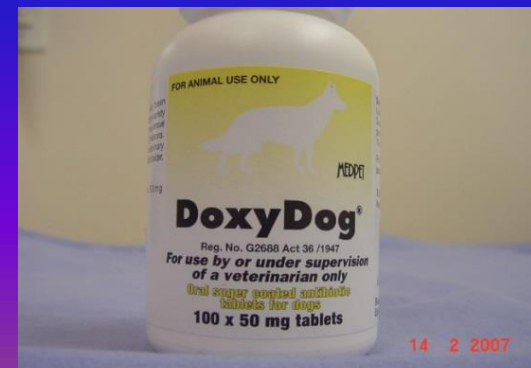
Diagnosis

- ❖ **Bacterial culture at reliable lab / PCR**
- ❖ **Samples in bacterial transport medium**
 - Oropharyngeal / nasal swab
 - Tracheal wash
 - Sample of pneumonic lung
- ❖ **May be difficult to isolate from carrier cats**
 - Low numbers of organisms shed
 - Easily overgrown by other flora



Treatment

- ❖ **Doxycycline: 10mg/kg OLD for 10d**
- ❖ **Trimethoprim-sulfadiazine (Purbac): 20mg/kg OLD for 5-7d**
 - Cats salivate excessively
 - Do not use in cats < 1kg
- ❖ **Not susceptible to penicillins!**



Prevention - Vaccination

- ❖ **Intranasal vaccine (Nobivac Bb, Merck)**
- ❖ **Use from 4w age**
- ❖ **Vaccinate ALL cats going into:**
 - **Rescue catteries**
 - **Boarding catteries**
 - **Some breeding catteries**
- ❖ **Vaccinate in-contact dogs (Nobivac KC)**



Vaccination



Risk to other species

- ❖ **Primarily infection of dogs – kennel cough**
- ❖ **Fatal pneumonia in Hu with AIDS**
 - **No contact with dogs/cats**
 - **Not infected by pets**
- ❖ **Fatal pneumonia of guinea pigs**
- ❖ **“Snuffles” in rabbits**



Avian influenza virus (H5N1)

- ❖ Asia where H5N1 endemic in poultry
- ❖ Outbreaks in cats with high mortality
- ❖ Ingestion of contaminated poultry meat
- ❖ Horizontal also possible
- ❖ Now proven that cats can be infected with wide range of zoonotic influenza viruses
- ❖ No clear evidence of cats infecting Hu



Questions?

As the two friends wandered through the snow on their way home, Piglet grinned to himself, thinking how lucky he was to have a best friend like Pooh.



Pooh thought to himself:
"If the pig sneezes,
he's ***** 'dead."