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Infectious diseases of horses

A clinical approach: Diarrhoea and Anaemia

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Diarrhoea in the adult horse...

- What **contagious** diseases should I be most concerned about?
 - **Bacterial:** Salmonellosis, Enteric Clostridiosis



Salmonellosis

- *Salmonella typhimurium* (+ *newport*)
- Non-host adapted
- **Enterocolitis and diarrhoea**
- Subclinical; mild infection; severe acute diarrhoea; septicaemia.
- **Zoonotic!**
- Faecal-oral route
- Many natural barriers to infection



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My horse has salmonella...

- Where could he have caught it from?



Contaminated environment



Contact with contaminated hands/ clothes



Contact with shedding livestock/ horses

Sources of Salmonella spp infection of horses



Contaminated water supply



Ingestion of faeces of mice/birds



Contaminated feed supply



How can I diagnose Salmonella?

- Clinical signs (diarrhoea, pyrexia, abdominal pain) and clinical pathology (neutropaenia, hypoalbuminaemia) are suggestive.
- **Post mortem** specimens: bacterial culture
 - Eg. intestinal contents, mesenteric lymph nodes
- **Bacterial isolation:** faeces (sequential samples)
 - False positives: passive shedding
 - False negatives: low concentration in faeces at some stages of disease
- **PCR:** faeces. CARE False positive results.



What advice should I give while awaiting a definitive diagnosis?

- **Isolate + barrier nurse** any animal fulfilling 2 of 3 criteria:
 - Pyrexia
 - Low systemic white cell count
 - Diarrhoea
- Remember *Salmonella* is a **zoonotic disease**:
 - Ensure your clients are aware of this possibility
- **Multiple** animals affected?:
 - Attempt to segregate affected animals, in-contact animals and unaffected animals
 - Stop movement on and off premises
- Instigate **biosecurity** procedures:
 - Remember you and your car are a fomite!



I've heard you shouldn't treat Salmonella?

- Use of antibiotics is **controversial**:

- Not proven to eliminate carrier state
- Thought **not to alter the course** of enterocolitis or duration of shedding in faeces.
- Encourages development of **antibiotic resistance**
- **Perhaps** justified in some patients: eg severe neutropaenia, persistent pyrexia, signs of endotoxaemia.
- **Enrofloxacin** (5-10mg/kg IV q24hrs): good intracellular penetration, bactericidal, minimal effect on anaerobic intestinal flora). DO NOT give to foals.

- Supportive therapy is **vital**:

- Maintain **hydration**/circulating plasma volume: Fluids
- Manage **endotoxaemia**: Fluids, NSAIDs (flunixin meglumine)
- **Nursing**: Keep clean (bag tail; vaseline over back legs)



How do I try and prevent my horse **WorldHorseWelfare** contracting *Salmonella*? the new name for the ILPH

- **Minimise exposure**

- Quarantine new horses
- Keep premises clean
- Keep feed away from rodent/ bird contamination

- **Ensure optimum immune resistance**

- General **health**: feeding, worming, dental care etc
- Avoid stressors: eg overgrazing, overworking, lameness, other disease.

There is **no vaccine** for horses at the current time.



Enteric Clostridiosis

- *Clostridia difficile*: faecal-oral infection (+ *C perfringens*)
- **Zoonotic!**
- Risk factor: Antimicrobial therapy
 - Especially: Penicillin, cephalosporins, fluoroquinolones

Clinical signs

- Acute colitis: diarrhoea, depression, dehydration, colic, anorexia, pyrexia (endotoxaemia)
- Variable presentation: mild diarrhoea to peracute necrohaemorrhagic colitis (death can occur before diarrhoea occurs)



Managing an outbreak

- **Diagnosis:**
 - **Faeces** sample: Detection of Toxin A and/ or B (Immunoassays)
- **Treatment:**
 - **Supportive** treatment! : Fluids, NSAIDs etc
 - Prevent bacterial translocation: antibiotics? Is this necessary?
Can exacerbate.
 - Severe neutropaenia, persistent pyrexia, haemorrhagic diarrhoea
 - Metronidazole 15mg/kg TID
- **Biosecurity:**
 - **Zoonotic:** Make your clients aware
 - **Isolate** and instigate **barrier nursing**



The anaemic horse....

- What infectious diseases could this horse have?
 - Virus: **Equine Infectious Anaemia**
 - Parasitic (Protozoal): Piroplasmosis (Babesiosis), (Granulocytic ehrlichiosis, Dourine, Surra)



Equine Infectious Anaemia

- 'Swamp Fever'- Lentivirus

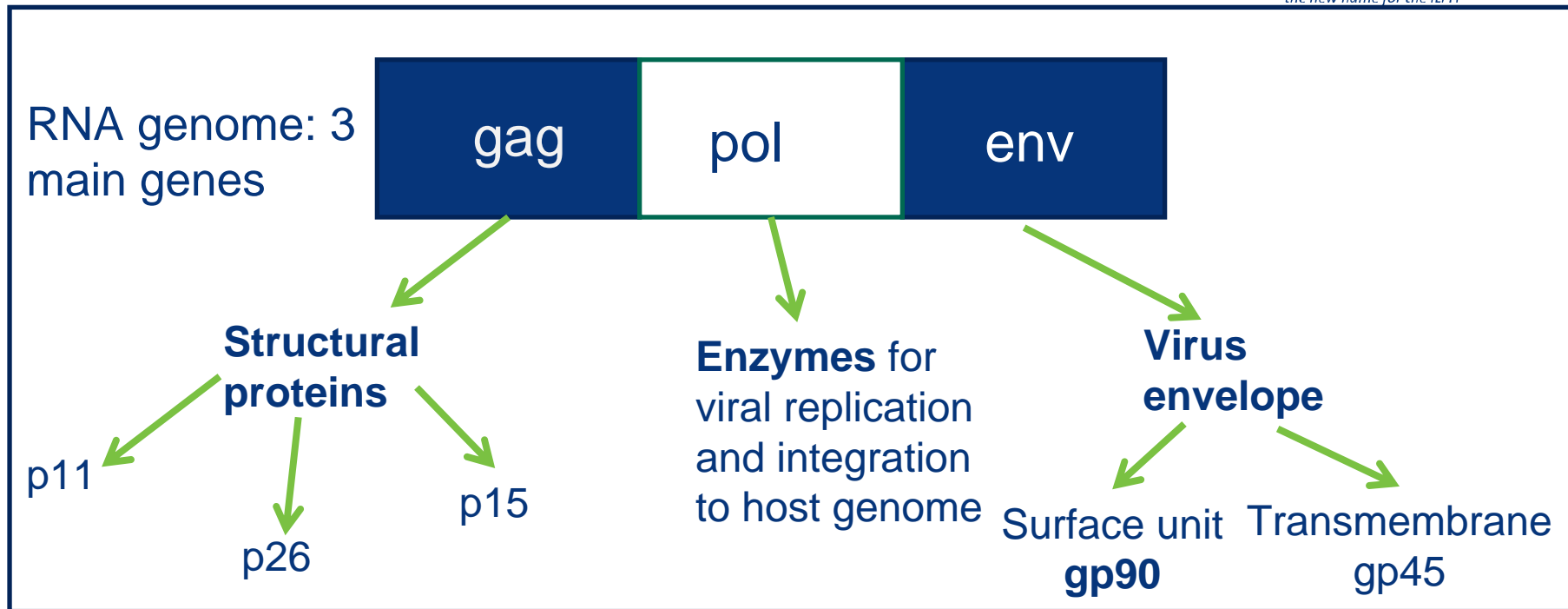
Clinical signs: Pyrexia, lethargy, inappetence, anaemia and thrombocytopenia.

- **Acute** phase followed by recurrent clinical disease episodes (majority eventually subside).
- Become **persistently infected**, lifelong carriers. Reservoirs of disease.
- If clinical disease is more frequent and severe the horse develops **chronic** EIA: additional signs of weight loss, dependent oedema and petechiation.

Pathogenesis



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- Gp90 binds to a receptor on the target host cell surface (**macrophages**)
- The envelope binds to the host cell membrane, the virion enters the cell, uncoats and replicates.
- It creates **viral DNA** (by reverse transcriptase) which is inserted into the host cell DNA creating a **provirus**.
- This allows the virus to multiply and **persist**.



My horse has EIA...

- **When** did my horse get infected?
 - Acute EIA occurs **5-30 days** after exposure.
- How can I definitively **diagnose** this condition?
 - EIAV is a persistent virus that is not cleared by the host so a **positive serologic result** indicates infection.
 - **Coggins Test** (agar gel immunodiffusion which detects antibodies against gag p26) is most commonly used.
 - Early diagnosis difficult: until horse has seroconverted (most by **45 days** post infection).



Can EIA spread between horses?

- **Mechanical Vectors:**

- Transfer of blood from an infected to a susceptible horse by **blood feeding insects** (Horseflies and Deerflies)
- **Iatrogenic** blood transfer!

- **Aerosol: Ireland 2006**

- **Vertical transmission**

- In utero, at partuition, ingestion of infected colostrum/milk.



As a vet how can I limit spread of EIA?

- **Any horse** you visit may be persistently infected with EIA without showing any clinical signs.
- **Biosecurity:** Needles, surgical instruments, dental equipment, stomach tubes. Can survive up to 4days on contaminated needles!
- **Transfusion** of whole blood, plasma or platelets: should only be taken from animals with **-ve Coggins Test.**



Can I treat EIA?

- No specific treatment: **supportive** therapy.
- **Do not move** affected animals (to limit spread of disease)
- **Isolate** from other animals.
- EIA positive animals **should not be exported**.
- **Prevention** is preferable: Ideally infected animals should be removed from the population to help reduce the reservoir of infection. In areas of endemic disease this is difficult.
- **Fly control** may limit disease spread.



Equine Piroplasmosis

- **Tick-borne** protozoal disease
- **Iatrogenic** transfer: needles, blood transfer etc
- Acute haemolytic anaemia
- **Babesia equi**: carrier for life
- **Babesia caballi**: self limiting? But may relapse.
- Endemic regions: most horses infected in first year of life: mortality 5-10%



What clinical signs would I see with Piroplasmosis?

- **Carriers:** reservoirs of infection; can relapse; impaired athletic ability; abortion (last trimester)
- Peracute (rare), **acute**, **subacute** and **chronic**

Clinical signs: Pyrexia, anorexia, recumbency, dehydration, anaemia, tachypnea, tachycardia, limb oedema, weight loss, haemoglobinuria



How can I differentiate this from EIA?

- **Blood smear:**
 - Stain with 10% Giemsa solution
 - Trophozoites and merozoites visible within erythrocytes.
 - Unreliable for carrier status

- **Complement Fixation Test:**
 - During reaction between specific antigen and antibody.
 - From Day 8 after infection; declines 2-3months post infection
 - Retest treated horses 4-6wks post treatment.

- **PCR:** ideal for detection of carriers.

- **Enzyme-Linked Immunosorbent Assay:** Prescribed test for international horse transport



Can I treat Piroplasmosis?

- **Aims?**
 - **Treating** acute cases
 - **Eliminating** the carrier state
- **Babesia equi:** resistant to most drugs
 - Supportive therapy: fluids, electrolytes, NSAIDs...
 - Imidocarb dipropionate (4mg/kg IM; 4 treatments 72 horse apart; close to 50% lethal dose!)
- **Babesia cabilli:** possible to eliminate
 - Imidocarb dipropionate (2.2mg/kg IM; 2 treatments 24hrs apart; toxic side effects)
 - Diminazene and Amicarbalide also recommended



Acknowledgements

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