Mannheimia and Pasteurella

- Milkweed
  - *Asclepius* spp.
    - rod of …
    - Daughters
  - Hygiene
  - Medicine
  - Healing
  - Healthy Glow
  - Universal Remedy

Phenotype/Habitat/Clinical Manifestations

- G-ve, facultative anaerobes, rod/coccobacilli, bipolar staining
- Indole reaction (*Mannheimia* -ve; *Pasteurella* +ve)
- Habitat/Epidemiology
  - Frequently oropharyngeal (GI) commensals in healthy mammals, birds and reptiles
  - Primary or secondary pathogens

- *Mannheimia* – BRDC (cattle)
- *Pasteurella* – septicemia, respiratory, bite wounds
Mannheimia (Pasteurella) haemolytica

- Bovine Respiratory Disease Complex (BRDC)
  - $500 million to 1 billion (US)
  - Shipping- Fever, pneumonic pasteurellosis, mannheimiosis, enzootic pneumonia
- *M. haemolytica* – leading role but BRDC multifactorial

- Predisposing factors:
  - Viruses – BHV-1, BVDV
  - Noninfectious factors: shipping, source, size, dehorning, castration etc.
  - Compromise mucociliary apparatus → *M. haemolytica* penetration and replication in trachea/lung
  - Supporting cast: *Mycoplasma bovis, P. multocida, Histophilus somni, A. pyogenes*

M. haemolytica cont’d

- Signs (Shipping Fever): 1-2 wks post-stress
  - pyrexia, nasal discharge, anorexia, soft moist cough
  - dyspnea (open-mouth breathing), septicemia, death
  - Death → lethal fever, hypoxemia (hemorrhagic/fibrinous debris in bronchi, alveoli)
  - Survivors chronic “poor-doers”

  - Fibrinous, hemorrhagic pleuro/bronchopneumonia (anteroventral)

  - PMN/MØ/ platelet ← **leukotoxin,** LPS, capsule, pili
  - **Neuraminidase** (compromises integrity resp. mucus)
Figure 99-63. Fibrinous bronchopneumonia (pleuropneumonia), pneumonic mannheimiosis (*Mannheimia haemolytica*), right lung, steer. Note the cranioventral pneumonia involving approximately 85% of the lung parenchyma. The lung is firm and swollen, and the pleura is covered with a thick layer of fibrin. (Courtesy College of Veterinary Medicine, University of Illinois.)

**M. haemolytica**

- **Diagnosis and Treatment (Shipping Fever)**
  - Blood smears (septicemia)
  - Culture tracheal aspirates, lung lesion at necropsy, milk (mastitis) – no growth on MAC, Indole -ve
  - Management
    - “Preconditioning” - vaccination, similar age, etc.
    - Quarantine, cull
  - Vaccines can be efficacious
    - capsular antigens (serotypes A1, 6 and 2)
    - leukotoxin (toxoid)
    - Presponse® (Wyeth Animal Health), PNEUMO-STAR® (Novartis)
  - Abx: Resistance is issue
    - Ampicillin-Sulbactam, Ceftiofur, Florfenicol, Tulathromycin (Draxxin)
Other manifestations

- Blue bag: acute, gangrenous mastitis - sheep
- Bovine mastitis – trauma

- *Bibersteinia trehalosi* (2007)
  - T-biotype of *M. haemolytica*
  - Septicemia, pneumonia in 2-12 month old lambs (Europe, NA)?
  - BRDC emerging?

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**Pasteurella multocida**

- Serotypes (capsule Ags) – Type A,B,D,E and F
- Somatic subtypes (A1, A2..) based on LPS (O-Antigen)

- **SEPTICEMIA** – bacteria in blood, organs
  - **Fowl Cholera** (Type A): Global, in NA (Notifiable)
    - Wild ducks/geese → domestic avian (turkeys>>chickens)
    - Virulence variable, highly contagious (resp., oral transmission)
    - Primarily **acute**: sudden death, multi-organ hemorrhage/ necrotic foci
    - Chronic occurs – post-septicemic or low virulent strain
      - swollen joints, footpads, conjunctivitis, resp. signs
**P. multocida cont’d**

- Septicemia cont’d
  - Hemorrhagic Septicemia (H.S.) – cattle, water buffalo, American Bison (Notifiable) others
    - Type B:2 (Asia), Type E:2 (Africa) acute, highly fatal (50 - 100% mortality) – 6-48 hrs post-exposure
    - Stress (weather, nutritional, crowding)
    - Peracute - sudden death
    - Acute - pyrexia, salivation + serous nasal, subQ edema at throat/brisket, anorexia, mucosal hemorrhage, death
    - Subclinical Carriers

**P. multocida cont’d**

- **Respiratory Disease**
  - Rabbits – most common Resp. infect’ns
  - Capsular Type A
  - Snuffles (rhinosinusitis) → pneumonia → septicemia
    - Nasal discharge, sneezing, conjunctivitis, epiphora, coughing
    - +/- pneumonia, +/- septicemia → death
  - Abscesses, metritis, otitis
- Cattle, sheep (Type A:3)
- Swine (PRDC) Types A and D
**P. multocida**

**P. multocida** con’t

- **Progressive Atrophic Rhinitis (PAR)**
- 1-8 wk piglets (global problem)
  - *P. multocida* Type D
  - +/- *Bordetella bronchiseptica*
  - toxigenic strains: capsule, dermonecrototoxin (osteoblast/clast destruction)
  - Signs: epistaxis, ↓’d weight gain, facial/snout distortion due to hypoplasia/destruction nasal turbinates

**Nonprogressive Atrophic Rhinitis (NPAR)**
- AR-toxigenic *B. bronchiseptica* is only pathogen involved – subclinical to mild turbinate changes, little to no impact on ADG (average daily gain)

**P. multocida**

- **Cats/Dogs (not respiratory)**
  - P.m. cats/P. canis (dogs)
  - wound sites (bite, trauma → licking)
  - **Polymicrobial infection**
    - *Pasteurella* spp.
    - Staph, Strep, Enterococci Coryneforms
    - Anaerobes (*Porphyromonas, Fusobacterium, Prevotella* spp)
  - feline pyothorax
  - septicemia rarely
**P. multocida**

- **Diagnosis**
  - Direct Blood smear
    - septicemia (H.S., Fowl Cholera)
  - Culture (BA/MAC)
  - No growth on MAC
  - Indole +ve, +/- serotyping

**M. haemolytica + P. multocida**

Don’t call me MAC Mann!! That’s in the Past!
**P. multocida**

- **Treatment**
  - Hemorrhagic Septicemia (H.S.)
    - Vaccination (B:2 or E:2) in endemic areas
    - Oxytet and sulfonamides for treatment
    - Elephants (carriers) can be vaccinated
  - Pneumonia (Cattle and Swine)
    - Vaccines available – variable efficacy
    - Presponse® HM (killed P.m. and M.h toxoid)
    - As per Mannheimia haemolytica (BRDC)

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**P. multocida**

- **Treatment cont’d**
  - Fowl cholera
    - Live (Avichol®) and killed (Pabac®) vaccines available, Pen, Tet, Sulfonamide
  - Rabbits
    - Management, culture and i.d.,
    - Abx → Chloramphenicol, Tet
  - AR in swine
    - Management, MEW, Abx in feed, Pen/Strep or TMS during outbreak.
    - Vaccines (P. m D + B. bronchiseptica) – Ingelvac® AR4
  - Cats/Dogs – Sx drainage, Clavamox
  - Public Health – occasional bite wound infections
Other *Pasteurella* spp.

- *Pasteurella pneumotropica*
  - Rodents – opportunistic infections
  - Dyspnea, wt. loss, cutaneous abscesses, reproductive signs

One measly bite….. I can’t believe they left me here!!