

# HAEMOPHILUS

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# General characteristics:

- *Haemophilus* species are small, pleomorphic, Gram-negative rods
- Often appear coccobacillary (occasionally in short filaments)
- Motile; Facultative anaerobes
- variable reactions in *catalase and oxidase tests*
- do not grow on MacConkey agar

# General characteristics:

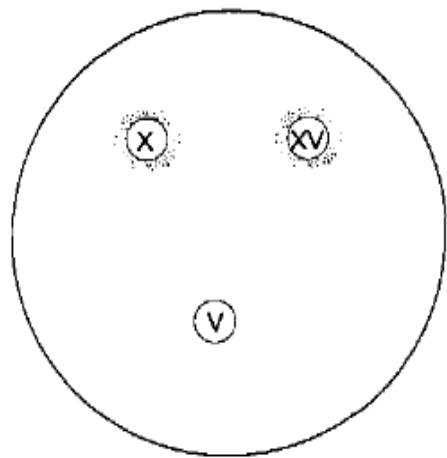
- They are *fastidious bacteria*
- requiring one or both of the growth factors:
  - ***X (haemin) and***
  - ***V (nicotinamide adenine dinucleotide, NAD)***
- Optimal growth ***-5-10% CO2 on chocolate agar***
- Small, transparent, dewdrop-like colonies after incubation for 48 hours

## Usual habitat:

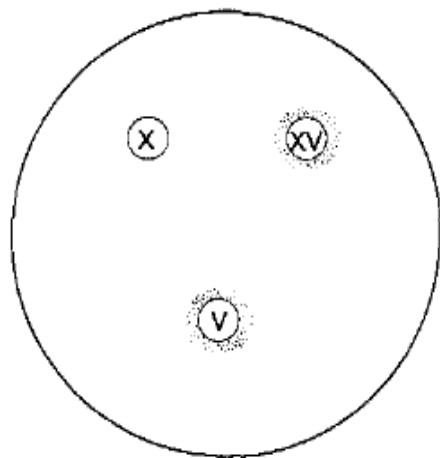
- *Haemophilus* species are commensals
- Mucous membranes of the upper respiratory tract
- They are susceptible to desiccation
- Do not survive for long periods away from their hosts

# X and V factors:

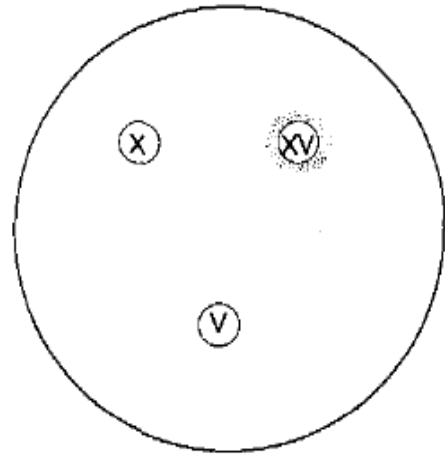
- X factor is hemin; *heat stable*
- V factor is – NAD
- *heat-labile* is susceptible to NADases in plasma
- **Satellitism** -*Staphylococcus aureus* growing on blood agar releases V factor into the medium
- Colonies of *Haemophilus* species which require V factor grow close to the *S.aureus* colony
- **Porphyrin test** – To test the requirement of X factor



X factor required for growth



V factor required for growth



X and V factors required for growth

# Important species:

| Formerly (Species)         | Host                 | Species name                   |
|----------------------------|----------------------|--------------------------------|
| <i>Haemophilus somnus</i>  | <i>Cattle, Sheep</i> | <i>Histophilus somnus</i>      |
| Haemophilus parasuis       | Pig                  | Haemophilus parasuis           |
| Haemophilus paragallinarum | Poultry              | Avibacterium<br>paragallinarum |

# *Histophilus somnus*:

- formerly k/a *Haemophilus somnus*
- common inhabitant of the genital tracts of male and female cattle
- *Histophilus somni* also infects sheep:
  - strains differ between cattle and sheep so that cross-infection between species does not occur



*Histophilus somni* causes a number of syndromes in cattle

- Septicaemia
- Polyarthrititis
- Pneumonia/pleurisy
- Thrombotic meningoencephalitis (TME)**
- Reproductive disorders: - Endometritis,  
Vulvovaginitis and Cervicitis

# Thrombotic Meningoencephalitis (TME)

- Attacks vascular endothelium
- causing a septic vasculitis with thrombosis
- The parenchymal lesions of ischemic and hemorrhagic infarction in CNS
- Similar vascular lesions can occur in the lung, heart, skeletal muscle, and joints
- Death may occur acutely without evidence of neurologic signs.
- Pyrexia is present in clinically ill patients.

# Infection in Sheep:

- Normal commensal
- Present in prepuce or vagina
- Young ram- Epididymitis
- Vulvitis, reproductive disorders, Mastitis
- Other: Septicaemia, arthritis, meningitis, Pneumonia in lambs

# Glassers disease:

- Caused by *Haemophilus parasuis*
- Organism often can be isolated from the nasal cavity or tonsil of normal pigs
- *H. parasuis* is widely distributed in the swine population and not associated with disease
- Disease occurs sporadically

# Glassers disease:

- Usually observed in **3 wks to 4 month-old pigs**
- **Predisposing factors:** Weaning, transportation changes in environment, commingling, or as co-infection
- Colostral antibodies usually protect pigs from disease
- They gradually develop an active immunity by the time they are 7-8 weeks old

# Glassers disease:

- *H. parasuis* has predilection for growth on **serosal surfaces**:
  - peritoneum
  - pleura,
  - pericardium
  - joints,
  - meninges
- Anorexia, pyrexia, lameness, recumbancy, convulsion are observed
- Manifested as **polyserositis, lepto-meningitis**

## Clinical Sign and symptoms:

- Onset is usually sudden
- They may be found dead or die after a disease course of less than two days
- In most cases there is an initial, marked rise in temperature, along with anorexia and depression
- Sudden deaths may occur in any age group
- Sometimes signs suggestive of septicemia or myositis
- Morbidity usually is low but mortality is high
- Signs depend upon where the organisms localize

## Clinical Sign and symptoms:

- Signs of central nervous system (CNS) disturbance often predominate
- As a consequence of localization of *H. parasuis* in the brain, meninges and spinal cord
- Signs may then include tremors, incoordination, posterior paresis or lateral recumbency
- Often there are swollen leg joints - in some outbreaks arthritis predominates and the animal will favor an affected leg while walking
- *H. parasuis* is also commonly isolated from pneumonic lungs.



# Infectious Coryza:

- Caused by *Avibacterium paragallinarum*
- A serious bacterial disease of chickens which affects respiratory system
- Affects the upper respiratory tract and paranasal sinuses of chickens
- Economically importance - reduced egg production in laying birds
- Chronically ill birds act as reservoirs
- Transmission occurs by direct contact, by aerosols or from contaminated drinking water.
- Chickens become susceptible at about 4 of age and susceptibility increases with age

# Clinical signs:

- The mild form of disease manifests as depression, serous nasal discharge and **slight facial swelling**
- Severe cases ch/by swelling of one or both infraorbital sinuses
- Marked oedema of the surrounding tissues may extend to the wattles
- A **copious, tenacious exudate may be evident at PM in the infraorbital sinuses**
- Tracheitis, bronchitis and airsacculitis may be present



# Diagnosis:

- *Haemophilus* species are highly *fragile*
- *Specimens should be frozen in dry ice*
- Chocolate agar or blood agar with S. aureus stream may be inoculated
- Identification criteria for isolates :
  - Small, dewdrop-like colonies after 1 to 2 days
  - Enhancement of growth by CO<sub>2</sub>
  - Requirement for X and V growth factors
  - Biochemical profile
- Serological tests are of little diagnostic value
- PCR may be used

**Thanks**