

## RESPIRATORY SYSTEM L - 6

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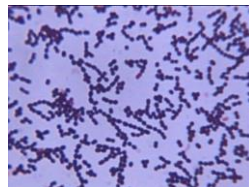
## STRANGLES



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## STRANGLES

- Distemper of horses, Shipping Fever of Horses, Infectious Adenitis
- Strangles is an acute, contagious, infectious disease of equines, caused by *Streptococcus equi*, characterized by fever, nasal discharge, swollen lymph nodes in the throat region often leading to suppuration and sometimes associated with metastatic sequellae.
- A single antigenic type has been recognized, but more than one strains may exist.
- It is susceptible to desiccation, sunlight, and disinfectants.
- Worldwide in occurrence
- Transmission:
  - Direct contact
  - Carrier horses
- The **horse** is the most susceptible, then the **mule** and then **donkey**.



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### Factors Influencing Susceptibility

- Age (Usually affects horses **1 – 5 years of age**)
  - Close housing
  - Season (fly, mosquito, breeding)
  - Husbandry
  - Stress
  - Drugs



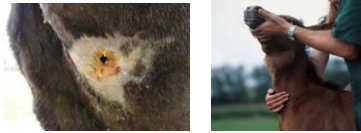
### Pathophysiology

- contaminated pastures, barns, feed troughs, stables etc.
- Incubation period is 3 to 4 days but range from **3 to 21** days
- Clinical signs of the disease are generally visible for 3-7 days, but may last up to 2 weeks.
- *Strep. equi* initially invades the **nasopharyngeal** and **oral mucosa** causing an acute **pharyngitis** and **rhinitis**.
- The organisms then spread to the regional lymph nodes and tonsils.
- The **retropharyngeal** and **sub-mandibular** lymph nodes most commonly develop abscesses that rupture and drain, either to the exterior or into the pharynx or guttural pouch.

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### STRANGLES

- In most cases, the infection remains localized and healing is uneventful once drainage of the abscess has occurred (**10 to 14 days**).
- After rupture and drainage of abscesses, *Strep. equi* is shed in the discharge for up to **four weeks**, contaminating the environment for **one year or more**.
- In some cases the infection spreads to other lymph nodes and to internal organs such as **spleen** and **liver** referred to as "**bastard strangles**".
  - In these cases, abscessation and rupture may occur with more severe consequences.
  - Some horses become sensitized to the streptococcal antigens and can develop **purpura hemorrhagica** which is an immune mediated vasculitis precipitated by the persistence of streptococcal antigens in the presence of high levels of circulating antibodies.



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- The onset occurs by **fever (99.5 101.5)**, slight **cough**
- Copious Nasal discharge (**bilateral**)
- Discharge initially is **serous**, become **catarrhal** and then changes to **purulent**.
- Catarrhal **conjunctivitis** mostly accompanies.
- Inflammatory swelling of **lymph nodes** of head and neck.
- Lymph nodes appear firm and then begin to fluctuate (liquefaction).
- Lymph nodes abscess rupture on to the skin in 1 to 3 weeks.
- Discharged pus is copious, creamy and **yellow-white** in color.
- Nasal lesions are **purulent rhinitis**.
- Large creamy yellow pus collects in folds of **turbinates**.
- Mucosa is oedematous, hyperaemic and occasionally ulcerated.

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- Morbidity may approach 100% in a previously unexposed population, although **mortality is <10%**.
- Death may result from a CNS infection, pneumonia, abscessation of viscera, or asphyxiation due to compression of the pharynx or larynx.
- Myocarditis and pericarditis may occur.

### DIAGNOSIS

- Clinical signs and symptoms
- Culture Isolation
- PCR
- Serology

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## GLANDERS

Farcy  
Equinia  
Malleus  
Droes



## The Organism

- *Burkholderia mallei*

(*Pseudomonas mallei*, *Malleomyces mallei* and *Actinomyces mallei*)

- Gram negative bacillus
- Exists primarily in infected host
- Withstands drying for 2-3 weeks
- Killed by sunlight and high temp.



## History

- 3<sup>rd</sup> Century BC
  - Described by Aristotle
- 1664: Contagious nature recognized
- 1830: Zoonotic nature suspected
- 1891: Mallein test developed
- 1900: Control programs implemented (U.S., Canada and Great Britain)

## Transmission: Humans

- Direct contact with infected animals
  - Abraded skin
  - Mucous membranes
- Inhalation
- Person-to-person (rare)
- Ingestion has never been recorded in humans

## Transmission: Animals

- Ingestion: Major route
- Inhalation: Less likely
- Direct contact: Minor route
  - Enhanced by shared food and water facilities



## Epidemiology

- Endemic
  - Parts of Africa, the Middle East and Asia
- Sporadic cases
  - South and Central America
- Once widespread, has been eradicated in many countries

## Host Range

- Affects solipeds
  - Donkeys and mules
    - Acute form
  - Horses
    - Chronic form
- Carnivores, humans and goats susceptible
- Swine and cattle resistant



[www.foxtrottersusa.com/donkey41501.jpg](http://www.foxtrottersusa.com/donkey41501.jpg)

## Who Is At Risk?

- Veterinarians
- Groomers
- Horsemen
- Butchers
- Lab workers



[www.greecefoods.com/agora/butchers.JPG](http://www.greecefoods.com/agora/butchers.JPG).

Photos: [www.fritzantiques3.homestead.com/\\_383horsevet.html](http://www.fritzantiques3.homestead.com/_383horsevet.html)  
[www.fritzantiques3.homestead.com/\\_383horsevet.htm](http://www.fritzantiques3.homestead.com/_383horsevet.htm)

## Disease in Animals

- Forms of disease not clearly distinct in humans
  - May occur simultaneously (all forms)
- Acute form (nasal form) - Donkeys
  - Fever, cough, dyspnea, thick nasal discharge, ulcers
  - Sub-maxillary Lymph node and lymph vessel of the face involved
  - Death in about 1-2 week



- Chronic form (cutaneous and pulmonary)
  - Coughing, malaise, intermittent fever, weight loss
  - Nasal discharge (often unilateral) and ulcers, skin nodules
  - Submaxillary Lymph node and lymph vessel involvement
  - Swelling of joints and leg edema
  - Nodules on the legs
- Latent form
  - May be few symptoms
  - Nasal discharge and occasional labored breathing
  - Lesions may be in lungs, liver or spleen
  - Glandorous orchitis in males is common

## GLANDERS

### Incubation Period

- In animals, glanders may appear immediately or become latent.
- The incubation period varies from a few days to many months; **6-8 weeks** is typical.

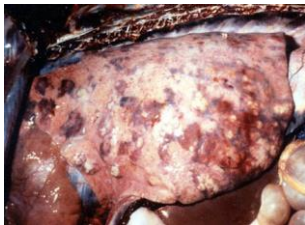
### Clinical Signs

- **Horses, donkeys and mules**
  - In equids, glanders is traditionally categorized into
    - nasal,
    - pulmonary and
    - cutaneous forms.
  - In the **nasal** form, deep ulcers and nodules occur inside the nasal passages, resulting in a thick, purulent, **yellowish** discharge.
  - This discharge may be **unilateral** or **bilateral**, and can become bloody.
  - **Nasal perforation** is possible.
  - The regional (submaxillary) lymph nodes become enlarged and indurated, and may suppurate and drain.

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## GLANDERS

- Healed ulcers become star-shaped scars.
- In the **pulmonary** form, nodules and abscesses develop in the lungs.
- Some infections are inapparent; others vary from mild dyspnea to severe respiratory disease.
- **Diarrhea** and **polyuria** may also be seen.
- Discharge from pulmonary abscesses can spread the infection to the upper respiratory tract.



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## GLANDERS

- In the **cutaneous** form, the skin contains nodules that rupture and ulcerate, discharging an oily, purulent yellow exudate.
- The **regional lymphatics** and **lymph nodes** become chronically enlarged; the lymphatics are filled with a purulent exudate (**FARCY**).
- In addition, there may be swelling of the joints and painful edema of the legs.
- Glandorous orchitis is a common symptom in males.
- Clinical cases are usually a combination of these forms, and can occur as acute, chronic or latent disease.

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**GLANDERS****Post Mortem Lesions**

- Ulcers, nodules and/or **star shaped scars** may be found in the nasal passages, trachea, pharynx and larynx.
- **Gray nodules** can also be found in other tissues, particularly the lung, liver, spleen and kidneys.
- Glanders nodules are firm, round and approximately **1 cm** in diameter, with a caseous or calcified center.
- They are usually surrounded by areas of inflammation.
- **Catarrhal bronchopneumonia** with enlarged bronchial lymph nodes may also be seen, particularly in acute disease.
- The lymph nodes may be enlarged, congested and/or fibrotic, and can contain abscesses.
- **Swollen lymphatics**, with **chains of nodules** and ulcerated nodules, may be noted in the skin.
- **Orchitis** can be seen in males.

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**Diagnostic Tests**

- **Culture Isolation** of *B. mallei*
- Direct smear microscopy.
- **PCR** can be used
- A hypersensitivity reaction to *B. mallei*, called the **mallein test**, is also used. In reactors, marked eyelid swelling occurs 1 to 2 days after **interpallebral** injection of a protein fraction of *B. mallei*.
- A variety of serologic tests may be available, but the most accurate and reliable tests in equids are **complement fixation** and **ELISA**.

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