Erysipelothrix rhusiopathiae

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• Erysipelothrix rhusiopathiae is a non-motile, Gram positive, facultative anaerobe. It is catalase-negative, oxidase-negative; resistant to high salt concentrations and grows in the temperature range 5°C to 42°C and in the pH range of 6.7 to 9.2. Isolates from animals with acute infections form smooth colonies while isolates from chronically infected animals form rough colonies. Smears from smooth colonies yield slender rods (0.2 to 0.4 x 0.8 to 2.5pm) whereas rough colonies are usually composed of short filaments which decolorize readily. The bacterium grows on nutrient agar but growth is improved in media containing blood or serum.

Erysipelothrix rhusiopathiae



http://www.vetbact.org/popup/image.php?imgtable=vetbact_images&imgid=312&lang=en

• *Erysipelothrix rhusiopathiae* causes erysipelas in pigs and turkeys worldwide. Sheep and other domestic animals are occasionally infected. The bacterium also causes erysipeloid, a localized cellulitis, in humans. Several serotypes of E. rhusiopathiae have been reclassified as a new species, E. tonsillarum, using DNA-DNA hybridization studies. This species appears to be non-pathogenic for pigs but causes endocarditis in dogs.

Usual habitat

• It is claimed that up to 50% of healthy pigs harbor *E*. *rhusiopathiae* in tonsillar tissues. Carrier pigs excrete the organism in feces and in oronasal secretions. The bacterium has also been isolated from sheep, cattle, horses dogs, cats, poultry and from 50 species of wild mammals and over 30 species of wild birds. Although soil and surface water can become contaminated with *E. rhusiopathiae*, survival time in soil probably does not exceed 35 days under optimal conditions. The bacterium is often present in the slime layer of fish, a potential source of human infection.

Definitive identification of *Erysipelothrix rhusiopathiae*

Colonial morphology and hemolytic activity

- Non-hemolytic, pin-point colonies appear after incubation for 24 hours and, after 48 hours, a narrow zone of greenish, incomplete hemolysis develops around the colonies. At this stage differences in colony morphology are evident. Smooth colonies are up to 1.5 mm in diameter, convex and circular with even edges while rough colonies are slightly larger, flat and opaque with irregular edges.
- A bottle-brush type of growth is characteristic of rough isolates when they are stab inoculated into nutrient gelatin and incubated at room temperature for **up** to 5 days.



https://en.wikipedia.org/wiki/Erysipelothrix_rhusiopathiae

• Biochemical reactions

Commercially-available biochemical test kits can be used for definitive identification. Reactions for presumptive identification include:

-Catalase-negative

-Coagulase-positive. Few pathogens produce this enzyme apart from **some** staphylococci . -**H2S** production is detected by a thin, black central line in triple sugar iron (TSI) agar when this medium is stab-inoculated.

- @Serotyping for epidemiological studies. A heat-stable peptidoglycan extracted from the cell wall is used for serotyping in precipitation reactions. Twenty-three serotypes have been identified. In affected pigs, the serotypes most commonly involved are la, l b and 2. @Virulence testing in laboratory animals isolates of *E. rhusiopathiae* vary considerably in virulence. If necessary, the virulence can be confirmed by intraperitoneal inoculation of mice or pigeons.
 - @ A PCR-based method for the detection of virulent *E. rhusiopathiae* isolates.

Pathogenesis and pathogenicity

Infection is usually acquired by ingestion of material contaminated by pig feces. Entry may occur through the tonsils, skin or mucous membranes. Virulence factors include a capsule which protects the organism against phagocytosis, the ability to adhere to endothelial cells and the production of neuraminidase, an enzyme which may enhance cell penetration.

In the septicemic form of the disease, vascular damage is characterized by swelling of endothelial cells, adherence of monocytes to vascular walls and widespread hyaline microthrombus formation. Localization of the bacteria in joint synovia and on heart valves during hematogenous spread, accounts for the development of chronic lesions at these sites. Long-term articular damage may result from an immune response to persistent bacterial antigens. Viable *E. rhusiopathiae* are rarely isolated from chronically affected joints.

Clinical infections

Infections with *E. rhusiopathiae* are encountered in pigs, turkeys and sheep.

• Clinical manifestations of *Erysipelothrix rhusiopaihiae* infection in domestic animals. Pigs (swine erysipelas)

-septicemia

-'diamond skin' lesions

- -chronic arthritis
- -chronic valvular endocarditis

-abortion

Sheep

-polyarthritis in lambs
-post-dipping lameness
-pneumonia
-valvular endocarditis **Turkeys (turkey erysipelas)**-septicemia
-arthritis

-valvular endocarditis



arthritis



'diamond skin' lesions

Infections in sheep

Non-suppurative polyarthritis of lambs may result from entry of organisms through the navel or, more commonly, through docking or castration wounds. Post-dipping lameness, which affects older lambs and adult sheep, is due to cellulitis and laminitis. The organism enters through skin abrasions in the region of the hoof from heavily contaminated dipping solutions. Valvular endocarditis and pneumonia in ewes, associated with E. *rhusiopathiae*, have also been reported.



Bright yellow joint fluid

http://www.flockandherd.net.au/sheep/reader/mortalities-lambs.html

Human erysipeloid

Many human infections with *E. rhusiopathiae* are occupational in origin. Workers engaged in the fish and poultry industries and other agriculturally-based occupations may be at risk of acquiring infection. Organisms enter through minor skin abrasions causing a localized cellulitis referred to as erysipeloid. Rarely, extension by hematogenous spread in untreated patients can lead to joint and heart involvement.

Erysipeloid hand- Characteristic, violaceous, sharply marginated lesion is composed of macules and plaques. The lesions are slightly tender and warm but not hot.



http://www.lagazzettadellekoi.it/nishikigoi/la-salute-delle-koi/principi-precauzione/zoonosi-ittiche-trasmissibili-all-uomo/

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