Francisella tularensis

Francisella tularensis is a gram-negative, intracellular, coccobacillus zoonotic bacteria which is the cause of the disease tularemia. The disease often presents with fever and lymphadenopathy. An ulcerative lesion may be present near the site of infection, usually a tick bite. It is transmitted by the Dermacentor wood tick or the deer fly. Common situations which can predispose patients to this bacteria are skinning a rabbit or close contact with deer. Treatment involves aminoglycoside antibiotics like streptomycin or gentamicin.

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Mechanism

Contact with Infected Animals

Rabbit

Human infection may occur following animal contact, such as through the practice of handling live or dead animals infected with tularemia. This organism may also be carried by hamsters and prairie dogs.

Dermacentor Wood Tick

D-tick with Demon-tail on Wood

Dermacentor wood tick is another transmitter of the disease, and this tick is often found on rabbits. A tick bite therefore is a common route of infection. Important to note, Centers for Disease Control and Prevention (CDC), has classified tularemia as an agent used for potential bioterrorism exposure due to its ease of ability to spread.

Deer Fly

Deer Fly

The deer fly, often found on deer, is a common transmitter of the disease. Therefore, close contact with deer can predispose an individual to tularemia.

Characteristics

Gram-Negative

Graham-cracker-Negative-devil

This bacteria stains gram negative which helps with identification.

Coccobacilli

Cock-eyed-rod

This organism has an intermediate shape between a cocci (sphere) and bacilli (rod), hence the descriptor coccobacilli.

Facultative Intracellular

In-a-cell

Francisella tularensis is an intracellular pathogen that can survive and replicate within host macrophages, but may also infect many other cell types.

Charcoal Yeast Agar with Cysteine and Iron

Chocolate in Sink with Iron and Sistine

Francisella can be cultured using charcoal yeast agar with cysteine and iron for diagnosis.

Signs and Symptoms

Ulceration

Ulcer Volcano

Ulceration may occur at the point of entry of the bacteria. This is usually the site of the tick or fly bite. It often presents as a papule progressing to an ulcer at the site of infection.

Fever

Fever-beaver

Fever is a presenting symptom of tularemia. The fever may resolve for a few days but eventually returns.

Painful Lymphadenopathy

Lymph-lime-add (+)

Lymphadenopathy is a common symptom of tularemia. It is common in ulceroglandular tularemia which presents with an ulcerative lesion at the site of the tick bite, with tender draining lymph nodes.

Caseating Granulomas

Cheese-eating Granny-llama

Granulomas may form and occasionally caseate, imitating tuberculosis. F. tularensis may remain alive in tissues for some time, despite this host reaction.

Treatment

Streptomycin

Stripper-mouse

In most cases aminoglycoside antibiotics like streptomycin or gentamicin, are effective in treating the infection. Streptomycin being the drug of choice. Usually administered intramuscularly every 12 hours from 7–14 days. Please note, treatment will depend on the severity of infection.