



### Causative agent

Tularemia (also known as rabbit fever and deerfly fever) is caused by the bacterium *F*. The bacterium is a gram-negative coccobacillus. It is classified as a facultative (it can survive under a variety of conditions), intracellular (lives within the cells of the host) bacterium, but there is scientific evidence that it may be an obligate intracellular bacterium (that can only grow within host cells) in mammalian hosts.

The bacterium was first identified in 1911 by McCoy from infected ground squirrels in Tulare County, California. The first described human case of tularemia occurred in a restaurant worker in Cincinnati in 1914.

Five subspecies of *F.* have been identified, (n)Tj10.98 0 0 10.98 175.21637 471.30113 Tm(to 2 subpopulatio

of the American dog tick (*D. varians*) and the Lone Star tick (*A. americanum*), whereas the A.II. subpopulation is associated with the Rocky Mountain wood tick (*D. andersoni*) and the deerfly (*C. venustus*). *F. tularensis* subsp. *holarctica* infections tend to occur along major waterways or in areas of high rainfall. Disease associated with type A.II (A-west) infections may be less severe than type A.I. (A-east) or subspecies infections.

With the exception of the Iberian Peninsula, tularemia is distributed throughout Europe and Mediterranean Africa, and has been identified in Bulgaria, China, Iran, Israel, Japan, Korea, Norway, the former Soviet Union, Sweden, and Turkey.

The bacteria can survive in mud, so



Tularemia is generally a postmortem diagnosis in wild animals. For sheep, clinical confirmation is through serology or isolation of the etiologic agent. For humans, a presumptive diagnosis is based on clinical signs and a history of exposure. In nonendemic areas (areas where the bacteria are not considered to be established), a single serum titer of 1:160 or greater is considered diagnostic. In endemic areas (areas where the bacteria are established), a 4-fold increase in antibody levels between samples obtained 2 to 4 weeks apart is considered to be diagnostic.

### Prevention

For humans and other animals, tick control is an important part of prevention. The use of insect repellants containing DEET is recommended. Contact with untreated water should be avoided when contamination with *F. tularensis* is suspected, and wild game should be thoroughly cooked before consumption. In endemic areas, handling of dead and dying animals should be avoided. Gloves should be worn when handling wild game, their skins, and carcasses. Equipment used in the diagnosis, care, or collection of animals suspected or known to be infected should be properly disposed of (contaminated medical waste) or disinfected. Because many landscaping activities can produce aerosolization of the bacteria from the soil, landscapers in endemic areas may be at higher risk of respiratory exposure and pulmonary tularemia; the use of respiratory protection is recommended in endemic areas.

A vaccine is currently being evaluated by the Food and Drug Administration, but it is not currently available and its effectiveness is unknown at this time. The United States Department of Defense has developed an experimental tularemia vaccine for laboratory and other high-risk workers, but it is not available to the public.

### Treatment

**T a e a a e a b e d e a e e U e d S a e**. State or Federal animal health officials should be notified immediately if tularemia is suspected. Streptomycin and tetracyclines (especially doxycycline) are the antibiotics of choice for treating wild and domestic animals. For humans, streptomycin has been preferred, with doxycycline, gentamicin, and chloramphenicol as alternatives. Fluoroquinolones, such as gatifloxacin and moxifloxacin, have also shown promise in the treatment of tularemia. Chloramphenicol has been used to treat associated meningitis.

### Infection control

Healthcare professionals assisting animal and human patients should wear personal protective clothing (e.g., gowns, gloves, and face masks). Because *F. tularensis* is a highly infectious organism, diagnostic laboratories should be notified that tularemia is on the list of differential diagnoses when specimens are submitted. Biological safety level II is recommended for diagnostic work on suspect material; biological safety level III is required for culture. The simple act of opening a culture plate of *F. tularensis* can produce infection by aerosolized bacteria.

### Use of tularemia as a biological weapon

*F. tularensis* is classified as a Category A agent of bioterrorism because of its high infectivity, ease of spread, and its potential to cause severe disease. Possible mechanisms for spreading the bacteria include contamination of food or water and aerosolization.