

Francisella tularensis

LEVEL A LABORATORY GUIDELINES

Safety

F. tularensis is highly infectious! Once this organism is suspected on the basis of clinical and/or laboratory information, do not perform additional testing except within an approved biosafety cabinet and wearing appropriate personal protective equipment!

1. Biosafety level 2 practices for specimen processing.
2. Biosafety level 3 practices for all activities involving manipulations of cultures.

Colony Characteristics

1. Fastidious, requires cysteine, usually not visible at 24 hours.
2. Grows poorly on SBA. 1-2 mm, grey-white, non-hemolytic at 48-72 h.
3. Cysteine Heart Agar colonies 2-4 mm, smooth, entire, greenish-white, butyrous with opalescent sheen at 48-72 h.



F. tularensis on cysteine heart agar (72 hours)

4. Chocolate, Martin Lewis or Thayer-Martin medium colonies 1-3 mm, grey-white at 48-72 h.
5. Growth in thioglycollate broth is slow, with denser band near top, diffusing with age.

Microscopic Characteristics

1. Poorly staining, **very tiny gram-negative coccobacillus** (0.2-0.7 μm), seen mostly as single cells. Bipolar staining is not a distinctive feature.

Key Characteristics (perform all testing within biosafety cabinet)

1. Growth: Grows slowly at 35-37 C, and poorly if at all at 25-28 C, does not require CO₂.
2. Gram stain: Gram-negative, tiny coccobacillus.
3. Catalase: Weakly Catalase Positive or negative.
4. Motility: Non-motile.
5. Oxidase: Negative.
6. Urease: Negative.
7. Beta-lactamase: Positive
8. X and V factors: Neither is required.

Note: *F. tularensis* may or may not grow on heart infusion agar (HIA). If growth occurs, it will not be limited to the space around the XV disk. However, *Haemophilus influenzae* will grow on HIA and growth will be limited to the space around the XV disk.

If a biosafety cabinet is available for testing, oxidase, urease and XV factor testing may be very useful in differentiating *F. tularensis* from the phenotypically similar *Yersinia pestis*, *Brucella*, *Haemophilus*, *Bordetella*, *Acinetobacter*, *Pasteurella*, *Moraxella* and *Oligella* (*Moraxella urethralis*).

Isolates with the above characteristics should be reported to the patient's physician and forwarded to the
South Dakota State Public Health Laboratory for additional testing.
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