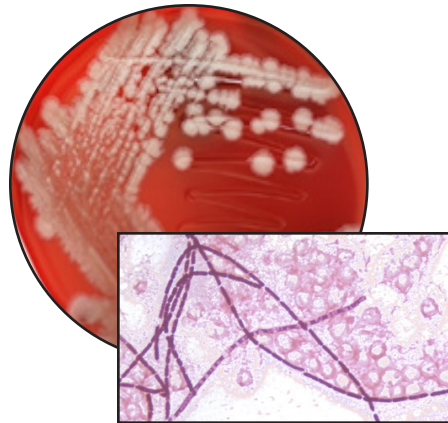
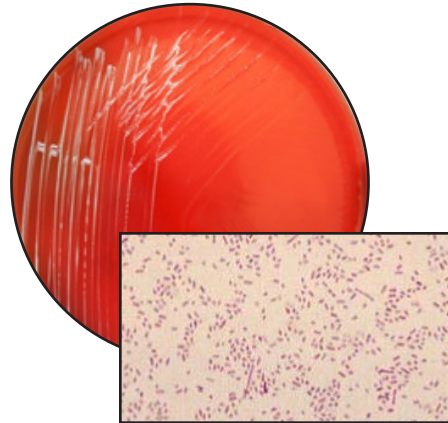


# BIOTHREAT AGENTS



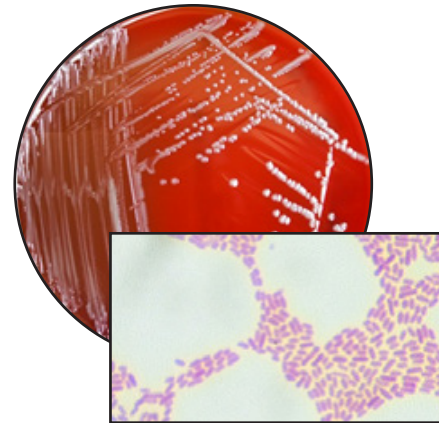
**ANTHRAX**  
*Bacillus anthracis*

- Large Gram positive rods (1-1.5  $\mu\text{m}$  x 3-5  $\mu\text{m}$ )
- Smears of clinical specimens:
  - Short chains (2-4 cells)
  - Capsule present, no spores
- Smears from BAP and CHOC culture:
  - Long chains, no capsule
  - Spores in older cultures; oval, central to subterminal, no swelling of cell wall
- Grows well on BAP and CHOC
- No growth on MAC and EMB
- Ground-glass colonies, 2-5 mm on BAP and CHOC at 24h
- Aerobic growth as early as 4-8h
- Flat or slightly convex with irregular edges that may have comma-like projections
- Non-hemolytic on BAP
- Tenacious, sticky colonies, adheres to agar surface
- Catalase positive
- Non-motile



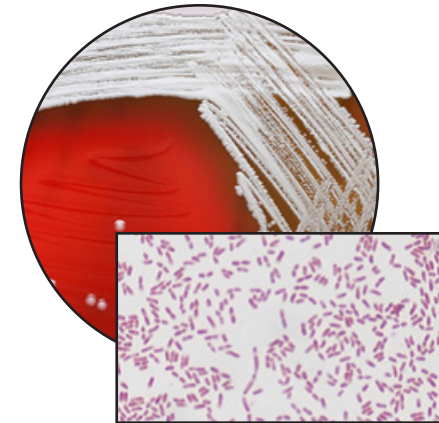
**BRUCELLOSIS**  
*Brucella* spp.

- Tiny, faintly staining, non-clustered, Gram negative coccobacilli (0.4  $\mu\text{m}$ -0.8  $\mu\text{m}$ )
- Pinpoint colonies at 24h, and 0.5-1.0 mm after 48h
- Non-hemolytic
- Non-mucoid
- Aerobic growth on BAP and CHOC (CO<sub>2</sub> may be required by some strains)
- No growth on MAC or EMB
- Catalase, oxidase, urea: positive (Oxidase may be variable)
- X and V factor (satellite test) negative (not required)
- Non-motile (although motility testing not recommended for suspect *Brucella* spp.)



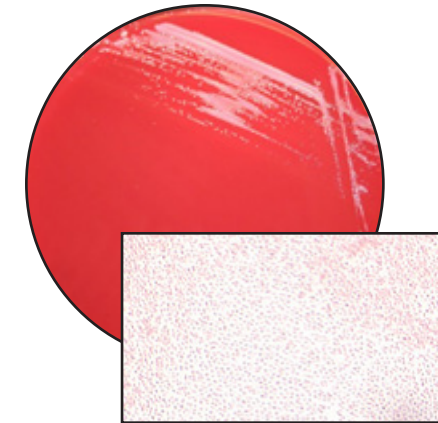
**GLANDERS**  
*Burkholderia mallei*

- Small straight, or slightly curved with rounded ends, Gram negative coccobacilli (1.5  $\mu\text{m}$ -3  $\mu\text{m}$  x 0.5-1.0  $\mu\text{m}$ )
- Cells arranged in pairs, parallel bundles, or Chinese letter form
- Aerobic
- Non-hemolytic
- No growth or pinpoint on MAC at 48h
- Catalase positive
- Oxidase variable
- Spot indole negative
- Non-motile
- No growth at 42 °C
- Polymyxin B and colistin no zone
- Penicillin resistant
- Amoxicillin-clavulanate susceptible



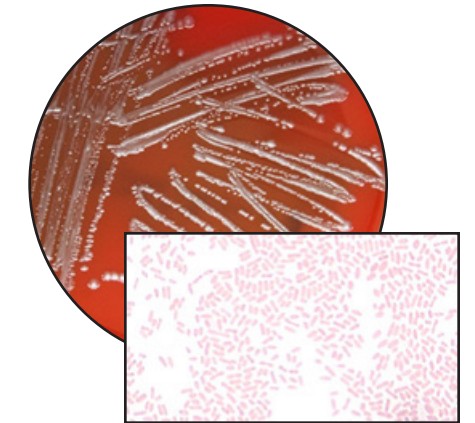
**MELIOIDOSIS**  
*Burkholderia pseudomallei*

- Straight, or slightly curved Gram negative rod (2.0-5.0  $\mu\text{m}$  x 0.4-0.8  $\mu\text{m}$ )
- Colonies may demonstrate bipolar morphology in direct specimens and peripheral staining in older cultures, which can mimic endospores
- Aerobic
- Non-hemolytic
- Growth on MAC (may uptake pink dye)
- Distinctive musty earthy odor, which is diagnostic (the odor is apparent without sniffing)
- Oxidase positive
- Spot indole negative
- Motile
- Growth at 42 °C
- Polymyxin B and colistin no zone
- Penicillin resistant
- Amoxicillin-clavulanate susceptible



**TULAREMIA**  
*Francisella tularensis*

- Tiny, Gram negative coccobacilli (0.2-0.5  $\mu\text{m}$  x 0.7-1.0  $\mu\text{m}$ )
- Poor counterstaining with safranin (basic fuchsin counterstain may increase resolution)
- Pleomorphic
- Mostly single cells
- Aerobic, fastidious
- No growth on MAC/EMB
- Scant or no growth on BAP; may grow on primary culture, not well on subculture
- Slow growing on CHOC, TM or BCYE: 1-2 mm after 48h
- Colonies are opaque, grey-white, butyrous, smooth and shiny
- Oxidase negative
- Catalase negative or weakly positive
- Satellite negative
- Beta-lactamase positive



**PLAGUE**  
*Yersinia pestis*

- Plump, Gram negative rods (0.5 x 1-2  $\mu\text{m}$ ) seen mostly as single cells or pairs, and may demonstrate short chains in liquid media
- May exhibit bipolar, "safety-pin" appearance in Giemsa stain or Wright's stain
- Facultative anaerobe
- Slow growing at 35 °C, better growth at 25-28 °C
- Grey-white, translucent pinpoint colonies at 24h, usually too small to be seen, little to no hemolysis on BAP
- At 48h, lactose non-fermenter on MAC or EMB
- Catalase positive
- Oxidase, urease (at 35 °C) and indole negative

**FOLLOW ALL LABORATORY AND BIOSAFETY PROCEDURES TO RECOGNIZE AGENTS OF BIOTERRORISM**  
**YOU ARE THE FIRST LINE OF DEFENSE — REFER TO CURRENT ASM SENTINEL LAB PROTOCOLS**

