

**Potential Exposure to
Attenuated Vaccine Strain
Brucella abortus RB51 During
a Laboratory Proficiency Test**

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**Case Study Brucellosis: 2001
& 2002**

- Diagnostic Lab 1:
 - Nov 2001, New York
 - 57 year old female clinical laboratory worker
 - Malaise, vomiting, headache, lower leg cramping, anorexia, and fever
 - After multiple hospital admissions, remained undiagnosed

**Case Study Brucellosis: 2001
& 2002**

- Diagnostic Lab 1:
 - 5 weeks after symptoms, lab again drew blood for culture
 - 5 day incubation, gram-variable coccobacilli, identified as *Brucella* spp.
 - Clinical sample processed on open bench in BSL-2 lab

**Case Study Brucellosis: 2001
& 2002**

- Diagnostic lab 2:
 - Jan 2002, New York
 - 48 year old female laboratory worker
 - temperature spikes to 40°C, chills, drenching sweats, and weight loss

**Case Study Brucellosis: 2001
& 2002**

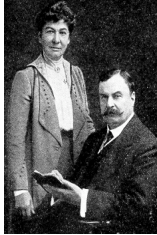
- Diagnostic lab 2:
 - Clinical sample from subject patient blood Lab worker from (Dx Lab #1) was subcultured in BSC, but biochemical tests done on open bench (catalase)
 - Technician contracted *B. melitensis*

Brucellosis

- Most commonly transmitted laboratory infection
- Staff unfamiliar with brucella because rarely encountered
- Lab worker #2 did not tell physician where she worked

Overview:

- A clinical laboratory submitted an isolate to a State Public Health laboratory for definitive identification
- Upon subsequent testing, results were discordant with submitted paper work (Corynebacterium-like)
- Isolate identified as *Brucella* sp.



Sir David and Lady Bruce

Objectives:

- Brucella overview
 - History
 - Laboratory Testing
- RB51 situation
 - CDC notification
 - Biosafety review
 - Recommendations

Brucellosis

- A zoonotic disease caused by any of 4 *Brucella* sp.: *melitensis*, *suis*, *abortus*, (and *canis*)
- A systemic infection characterized by an undulant fever pattern
- But relatively rare in the U.S. with approximately 100 cases/yr

Brucellosis: Transmission

- Unpasteurized dairy products
 - The most common mode of transmission
- Direct skin contact
 - Occupational hazard for farmers, butchers, veterinarians, and laboratory personnel
- Aerosols
 - Highly infectious

Brucellosis

- Infective dose = 10 -100 organisms
- Incubation period = 5 days - > 6 months
- Duration of illness = weeks to months
- Fever, profuse sweating, malaise, headache and muscle/back pain.
- Person to person transmission = no
- Mortality = <5%
- Persistence of organism = very stable

Brucella spp. Biosafety Alert

- *Brucellosis* is THE most commonly reported laboratory-associated bacterial infection
- Cases have occurred in clinical laboratory settings by “sniffing” cultures, direct skin contact with cultures, and aerosol generating procedures

Clinical Laboratory Tests *Brucella* spp.

- Colonial morphology on SBA***
- Gram stain morphology
- Oxidase
- Urea hydrolysis
- BSL 3

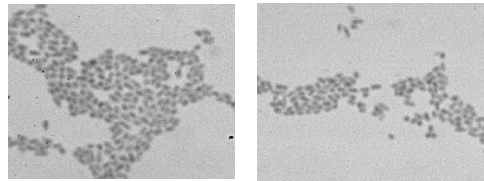
Brucella spp. Key Clinical Lab Tests

- Colonial morphology on SBA
 - Fastidious
 - Visible growth may take 48 - 72 hrs
 - Small (0.5-1.0mm), convex, glistening
 - Non-hemolytic and non-pigmented

Brucella spp. Gram-stain Morphology

- Gram Stain Morphology
 - Tiny (very)
 - Faintly staining
 - Gram-negative coccobacilli
 - 0.5 - 0.7 μ x 0.6 - 1.5 μ
- Technical Hints
 - *B. melitensis*: the most coccal (rarely >1 μ)
 - *B. abortus*: may be rod-like (2 - 3 μ)

B. abortus, gram stain, (x3200)



Laboratory Preparedness Survey (LPS)

- CAP, APHL, CDC proficiency test since 2003
- Simulate “BT scenario” to test:
 - LRN rule-out & referral protocols
 - Notification of State Public Health labs

Laboratory Preparedness Survey (LPS)

- Oct-Nov 2007 LPS
 - 1316 participating labs – US and Canada
 - Included attenuated agent strains (e.g. RB51)
 - Written instructions – work under Class II BSC with BSL-3 primary barriers and safety equipment.

Initial Incident - CDC Notification

- LPS-RB51 sample mislabeled sent to NYS state bacteriology lab
 - Manipulated on open bench
 - 24 laboratorians potentially exposed
- Further NYS investigation of LPS-labs
 - 17 labs reported handling samples in a manner placing lab workers at potential risk of exposure
- CDC notified

LPS Biosafety Practice Review – United States December 2007

- CDC recommended States reviewed LPS biosafety practices with participating labs
- Exposure to LPS-RB51 sample determined if
 - Not handled in a Class II BSC *and* with BSL-3 primary barriers and safety equipment

LPS Biosafety Practice Review – United States December 2007

- High-risk exposure
 - Performed high-exposure practice (e.g. sniff plate)
 - Persons < 5 feet of any manipulations of RB51 on the bench
 - All in lab during aerosol-generating activity (e.g. vortexing)

Results

- Assessment conducted at state-level
- Voluntary reporting to CDC
 - 39 states and D.C. provided information
 - 254 laboratories had 1 or more exposures

Results

- 916 persons identified with potential exposure (679 with high-risk)
- No cases of brucellosis related to these exposures report to CDC
- Reported event in CDC MMWR

Recommendations

- Ensure laboratories adhere to establish diagnostic protocols (e.g. AMS) while handling and testing specimens including PT samples
- Review protocols annually
- Train laboratorians on characteristics of particular agents
- Clinician should alert laboratorians with clinical suspicions

