

## Category A and Brucella Biological Agents Online Course

### Content, Instructional Level and Audience

This intermediate level web-based course is designed for the LRN Sentinel laboratorian.

Basic knowledge of biosafety principles and packaging and shipping of infectious and diagnostic specimens is required prior to taking this course.

Content for this course is provided by the CDC, the ASM and the WHO. Exams and challenges are provided by the CDPHE.

### Objectives

Upon completion of this course, the participant will be able to:

- 1) Describe laboratory protocols and distinguishing characteristics for ruling out or referring *Bacillus anthracis*, *Yersinia pestis*, *Francisella tularensis* and *Brucella spp.*
- 2) Identify acceptable specimens for testing for *B. anthracis*, *Y. pestis*, *F. tularensis* and *Brucella spp.*
- 3) Demonstrate the ability to communicate the proper report to the physician when a specimen is referred for additional confirmatory testing.
- 4) Demonstrate a basic understanding of a State laboratory's confirmatory testing and how rapidly a confirmatory result is generated.
- 5) Explain the Sentinel laboratory's role and biosafety principles in testing for *Clostridium botulinum* toxin, Smallpox and Viral Hemorrhagic Fevers.

### Successful Completion of the Course

Pre- and post-module assessments are autograded and returned with valuable feedback via e-mail. A score of 80% on the final exam is required to pass the course and receive a certificate of completion.

### Continuing Education

CDPHE is an approved provider through the ASCLS P.A.C.E.® Program. This self-study online course is approved for 12.0 contact hours. P.A.C.E.® credits are accepted for continuing education requirements for maintaining certification by NCA & ASCP-BOR and for maintaining the licensure of laboratory professionals in the states of LA, MT, NV, RI and TN. [CA and FL approval for the Colorado Department of Public Health and Environment is pending]

See an inside look into  
the course on the next page

### Student Comments

*"I thoroughly enjoyed this course! It is obvious that a lot of work went into this presentation. The pre- and post-testing was informative. It was fun to see how much I didn't know and how much more informed I was in the end. Please invite me back."*

- Kathy Watts  
Microbiology Supervisor,  
Denver District FDA

*"I think this on-line training is very well presented, and I am finding the information very useful. In fact, I am printing it so I can keep copies at my plate-reading bench. Thank you for a job well done."*

- Gini Mansfield, MT (ASCP)  
Quest Diagnostics Microbiology

*"This course is superior. It is also very informative and the test is not easy. It does require a lot of thinking and reading of the material."*

- Carmen Ramirez,  
Branch Operations Coordinator  
(former Deputy Lab Director),  
Investigations Branch,  
Denver District FDA

*"I just finished the Anthrax course and it is terrific. The pictures and video clips are fantastic."*

- Amery Ray, MT (ASCP)  
Clinical Microbiologist  
Sky Ridge Medical Center

*"Thank you very much for this online course, I learned a lot from it!"*

- Pauline Schmidt,, MT (ASCP)  
CU-Wardenburg Clinic

*"Thanks for this class. It was informative and well organized."*

- Marlene L. Loos, M.S., MT (ASCP)  
Microbiology Supervisor,  
Sky Ridge Medical Center

ANTHRAX MENU ▾

Laboratory Preparedness Online: Category A Biological Agents

COURSE HOME ANTHRAX PLAGUE TULAREMIA BOTULISM SMALLPOX VHF BRUCELLA

Pre-Assessment

Lesson 1: General Information Overview

Lesson 2: Specimens

Lesson 3: Laboratory Testing & Biosafety


Lesson 4: Identification Criteria

Lesson 5: Flowchart & Reporting Procedures

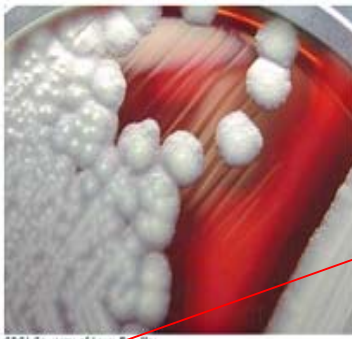
Credits

Post-Assessment

Colonies of *B. anthracis* are **non-hemolytic**. However, weak hemolysis may be observed under areas of confluent growth in aging cultures and should not be confused with beta-hemolysis. (See Figure 8 and 9)



CDC/ Courtesy of Lenny Swaffler, Oregon State Public Health Laboratory (2002)  
Figure 8



CDC/ Courtesy of Lenny Swaffler, Oregon State Public Health Laboratory (2002)  
Figure 9

**Motility\***  
*B. anthracis* is non-motile. Working in a biological safety cabinet (BSC) with gloves, prepare routine **wet mount** and observe microscopically. Alternatively, **motility test medium** may be used.

Video Clip: Example of motility: *Bacillus halodentificans*  
Video Clip: Example of Brownian Motion

Print option available

7 Comprehensive Modules

Color photos & Video Clips

Pass Final Exam with an 80% to receive 12 P.A.C.E. credits

8 Interactive Case Studies

ANTHRAX MENU ▾

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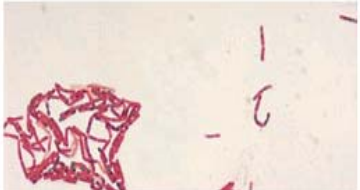
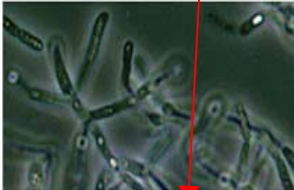
Post-Assessment

**Identification Criteria**

**Stains and Smears:**

**Gram Stain**  
Perform routine Gram staining procedure for observation of bacterial micromorphology. *B. anthracis* is a large gram positive rod (1-1.5 X 3-5 μm). It is important to note that as the colonies of *B. anthracis* grow older in age, the bacterial cells can become decolorized.

**Blood and impression smears:**  
Vegetative cells seen on Gram stain of blood and impression smears are in short chains of 2-4 cells that are encapsulated, which may be seen on the Gram stain as clear zones around the bacilli. Spores are not present in clinical samples unless exposed to low CO<sub>2</sub> levels, such as those found in ambient atmosphere; higher CO<sub>2</sub> levels within the body inhibit sporulation. The presence of large encapsulated gram-positive rods in the blood is strongly presumptive for *B. anthracis* identification.

Challenging pre- and post-assessments provide instant feedback

Key Learning Points highlighted

\*This course is free to Colorado labs for the first 16-weeks. (Registration beyond the first 16 weeks may have a fee attached.)

Contact Suzanne Kelley, M.Ed, MT (ASCP)  
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Check with your Public Health Laboratory  
State Training Coordinator  
for course availability.

A 45-year old man working for an overnight package delivery service during the previous day developed a low-grade headache, a dry cough, and unusual weariness. He did not sleep well and woke up this morning with a low-grade fever and intermittent chills. He passed this off as a mild case of the "flu" and resumed his duties.

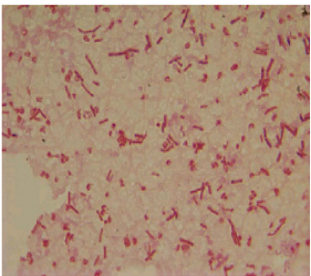
In the course of the morning his cough became worse and he was having difficulty finding the addresses for delivery, even though he was on his customary route. He became concerned when he experienced two episodes of shortness of breath and voluntarily sought medical care.

On hospital admission, his temperature was 39.1 °C, pulse rate 110/min, and blood pressure was 108/60. Because of obvious confusion and mild stiffness of the neck, a spinal tap was performed. The CSF specimen, along with blood samples and right- and left-arm blood cultures, were sent to the laboratory.

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A cerebrospinal fluid specimen, together with a pair of blood cultures, were received in a hospital laboratory. The blood cultures were placed in a 35°C incubator.

Below is a photo of a direct gram stain prepared from the spun CSF sediment.



Based upon the observation of the CSF gram stain (above), the most appropriate preliminary report would be:  
(mouse click on your answer choice from the list below)