Staining Helps Identify an Infectious Agent Case Study

A 94-year-old woman went to her local hospital emergency department in mid-November 2001 complaining of a 5-day history of weakness, fever, nonproductive cough, and generalized myalgia (muscle aches). Otherwise, for a person her age she was fairly healthy, although she did suffer from chronic obstructive pulmonary disease, hypertension, and chronic kidney failure.

On physical examination, her heart rate was above normal and she had a fever of 102.3°F

(39.1°C). The rest of her physical examination was normal. Initial laboratory studies of blood cell count, blood chemistries, and chest X ray were also normal except for the chemical urine testing. This finding along with the fever suggested an infection, so the patient was admitted to the hospital. Samples of blood and urine were sent to the microbiology laboratory and set up appropriately.

The next day, microscopic evaluation of the urine culture revealed rod-shaped bacteria that stained red, and the blood culture revealed rods that stained purple. The liquid blood culture was then transferred to appropriate solid media. This finding in the blood was unusual, so a sample culture was sent to the state health department laboratory. Antibiotic therapy was adjusted, yet the patient’s condition deteriorated. Her most serious symptoms localized to her chest, and she was transferred to the intensive care unit. Four days after admission, the health

department announced that the bacteria found in the patient’s blood were *Bacillus anthracis.*

She was suffering from inhalation anthrax. Further testing showed these bacteria to be of the same strain that had been involved in the recent bioterrorist attack. Despite treatment, the patient died on the fifth day after admission.

* *What techniques and equipment are used when the bacteria are observed as being purple and red? How are these findings reported?*
* *What are the stages of processing a blood sample?*