



Respiratory System

1) A 65-year-old male presents to his family physician with a rapid onset fever, chest pain and cough productive of rusty-yellow sputum. Chest X-ray shows focal lobar infiltrates. A Gram stain of a sputum sample contained many polymorphonuclear leukocytes and extracellular gram-positive diplococci. Capsule-specific antibodies bound to the diplococci resulted in a positive Quellung reaction. Which of the following is the most likely pathogen?

- A. *Streptococcus pneumoniae*
- B. *Enterococcus faecium*
- C. *Streptococcus pyogenes*
- D. *Streptococcus agalactiae*
- E. *Enterococcus faecalis*

Correct answer = A. The most common cause of community acquired pneumonia in this age group is *Streptococcus pneumoniae*. The X-ray and microbiological findings are most consistent with a diagnosis of pneumococcal pneumonia.

2) A 45-year-old cattle rancher presents to his physician with a wound on his forearm that resembles a large scab. Samples collected from the wound were cultured and examined. The bacteria recovered were Gram positive, nonmotile rods with square ends. The cultured bacteria formed irregularly shaped, non-hemolytic colonies on blood agar plates and individual cells from the plates had a centrally located spore. What is the most likely cause of this infection?

- A. *Listeria monocytogenes*
- B. *Staphylococcus aureus*
- C. *Legionella pneumophila*
- D. *Corynebacterium diphtheriae*
- E. *Bacillus anthracis*

Correct answer = E. This cattle rancher is suffering from cutaneous anthrax, which is an occupational hazard. The scab like wound is called an eschar and results from localized edema and tissue destruction caused by the two toxins produced by *Bacillus anthracis*. The microbiological characteristics of the organism are consistent with a diagnosis of *B. anthracis* infection. The other microorganisms do not have the characteristics described.



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3) A male older adult, hospitalized and recovering from cardiac bypass surgery, develops pneumonia. Sputum culture reveals a gram-negative rod that produces a green pigment but does not ferment carbohydrates.

The most likely organism is:

- A. *Klebsiella pneumoniae*.
- B. *Serratia* species.
- C. *Proteus* species.
- D. *Enterobacter* species.
- E. *Pseudomonas aeruginosa*.

Correct answer = E.. *Pseudomonas aeruginosa* is an obligate aerobe that uses respiratory pathways exclusively. Production of green pyocyanin pigment regularly occurs.

4) An older, alcoholic male develops severe, necrotizing lobar pneumonia. The organism is Lact and produces a luxuriant capsule. The most likely agent is:

- A. *Klebsiella pneumoniae*.
- B. *Serratia* species.
- C. *Yersinia pseudotuberculosis*.
- D. *Pseudomonas aeruginosa*.
- E. *Campylobacter fetus*.

Correct answer =A

5) A 22-year-old Hispanic man worked for a company that processed animal products and provided no medical coverage benefits. One week after working with wool imported from a Caribbean island, he developed a small lesion on his arm resembling an insect bite. One week later, the lesion was 2.5 cm in diameter with a central, black sloughed-skin area. Two weeks later, he presented at an emergency room with early stages of sepsis. Which of the following microbes is responsible for the infection?

- (A) *Bacillus anthracis*
- (B) *Bacteroides melanogenicus*
- (C) *Hemophilus ducreyi*
- (D) *M. scrofulaceum*
- (E) *Treponema pallidum*

Correct answer =A



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1) A 56-year-old Indian woman with a chronic cough, night sweats, and weight loss for 4 months goes to a pharmacy for a medication. In addition to a cough suppressant, the medicine she can buy over-the-counter in her country contains isoniazid. Her symptoms initially improve dramatically, but return in a few weeks and her illness continues to progress. What is the most likely diagnosis?

- (A) Asthmatic reaction to the medication
- (B) Chronic bronchitis
- (C) Mycoplasma pneumonia
- (D) Pneumococcal pneumonia
- (E) Tuberculosis

The answer is E: Tuberculosis..

2) Which one of the following is characteristic of mycobacteria?

- A. They contain mycolic acids.
- B. They are resistant to inactivation by heat.
- C. They grow extracellularly.
- D. They are anaerobic.
- E. They are spore forming.

Correct choice

A. Mycobacteria are unique in that their cell walls contain high concentrations of mycolic acids. Mycobacteria are not particularly heat resistant, as witnessed by their susceptibility to pasteurization. They are aerobic, intracellular organisms that do not form spores.

3) The treatment of tuberculosis

- A. is initiated with a single "first-line" drug.
- B. is initiated after the results of sensitivity testing is available.
- C. is most effective in patients with chronic or arrested tubercles.
- D. may last 2 to 3 weeks.
- E. should be directly observed whenever possible.

Correct answer = E. Where directly observed therapy used, the incidence of new cases falls dramatically and success of therapy is much more likely. The standard procedure is to begin treatment with two or more drugs to prevent emergence of resistant strains. Sensitivity tests are an important guide to modifying treatment, but sensitivity data are not required to initiate therapy. In chronic or arrested tubercles, the organisms are nonproliferating, and therefore are not susceptible to many antimicrobial agents.