

SOLUTIONS

Unit 10: Infectious disease

10.1: Infectious diseases

- D**
Mycobacterium bovis is a species of bacteria that causes tuberculosis, particularly in cattle, but can also infect humans, leading to a form of tuberculosis.
- D**
Injections of antigens from *Bordetella pertussis* bacteria stimulate the immune system to produce a lasting immune response, providing active immunity and reducing the chance of future infections.
- A**
Gram-positive bacteria have a thick peptidoglycan layer without an outer membrane, making them more vulnerable to penicillin, which targets the synthesis of this layer. Gram-negative bacteria are less susceptible due to their protective outer membrane.
- A**
The percentage decrease is calculated by the formula:
$$\left(\frac{5.3-3.2}{5.3} \right) \times 100 = 39.6\%$$

Thus, the correct answer is 39.6%.
- D**
TB can be transmitted from animals (statement 4) and by ingestion (statement 5). HIV / AIDS worsens TB infections (statement 3), and multi-drug resistance (statement 6) occurs due to improper treatment.
- B**
The image shows a scanning electron micrograph, as it provides a 3D view of lung squamous epithelium and red blood cells, which is consistent with option B.
- C**
Two mutations are needed for teixobactin resistance (1 correct), mutations do not affect lipids (2 incorrect), and conserved lipids prevent resistance evolution (3 correct).
- D**
Infectious diseases are caused by pathogens such as bacteria, viruses, fungi, or protists, making option D the correct definition.
- D**
Plasmodium vivax, the causative agent of malaria, is a protist. It infects humans and is transmitted by Anopheles mosquitoes.
- D**
HIV, TB, Malaria, and Cholera are four significant infectious diseases with different transmission routes:
 - HIV is primarily spread through sexual contact, sharing of needles, and mother-to-child transmission during childbirth or breastfeeding.
 - TB is an airborne disease, transmitted through respiratory droplets when an infected person coughs or sneezes.