

University Medicine

Name: _____ Score: _____

1. Why do Gram-negative bacteria stain pink?
 - ☐ Their thin peptidoglycan cannot hold the crystal violet–iodine complex after decolourising
 - ☐ They are always dead
 - ☐ They have no cell wall at all
 - ☐ They absorb the counterstain faster
2. What is endotoxin?
 - ☐ The bacterial capsule
 - ☐ A protein secreted by Gram-positive bacteria
 - ☐ The lipopolysaccharide of the Gram-negative outer membrane
 - ☐ Diphtheria toxin
3. Which step do neuraminidase inhibitors such as oseltamivir block?
 - ☐ Uncoating
 - ☐ Release of new particles from the cell
 - ☐ Copying of the genome
 - ☐ Attachment to the receptor
4. A patient with very low neutrophils after chemotherapy develops a lung infection with branching hyphae. Which fungus is most likely?
 - ☐ Candida in the mouth only
 - ☐ Pneumocystis
 - ☐ Histoplasma yeast
 - ☐ Aspergillus
5. A reservoir of infection must be a person who is ill.
 - ☐ True ☐ False
6. Why do β -lactam drugs spare human cells?
 - ☐ They cannot enter the blood
 - ☐ Human cells have no peptidoglycan wall for them to block
 - ☐ Human cells pump them out
 - ☐ Human ribosomes are protected

7. Disinfection kills bacterial spores.

☐ True ☐ False

8. A positive PCR shows that the organism is alive and tells you which antibiotics will work.

☐ True ☐ False

9. A bacterium doubles every 20 minutes. Starting from one cell, how many cells are there after 4 hours?

_____ cells

10. Alcohol hand gel works as well against norovirus as against enveloped viruses.

☐ True ☐ False

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1. Their thin peptidoglycan cannot hold the crystal violet–iodine complex after decolourising

The decolouriser removes the complex from thin-walled cells, which then take up the counterstain.

2. The lipopolysaccharide of the Gram-negative outer membrane

Endotoxin is part of the wall and is released when Gram-negative bacteria die.

3. Release of new particles from the cell

Neuraminidase cuts new influenza particles free from the cell surface; blocking it traps them.

4. Aspergillus

Neutrophil failure lets moulds such as *Aspergillus* invade.

5. False

Healthy carriers, animals, food and surfaces can all be reservoirs.

6. Human cells have no peptidoglycan wall for them to block

Penicillin-binding proteins build the bacterial wall; human cells have nothing equivalent.

7. False

Spores survive most disinfectants; only sterilisation reliably kills them.

8. False

PCR detects DNA, which dead organisms also leave behind; drug testing needs a living culture.

9. 4096 cells

4 hours = 240 minutes = 12 generations, and $2^{12} = 4096$.

10. False

Norovirus has no envelope for alcohol to destroy, so soap and water are better.