

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

- ☐ 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

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.