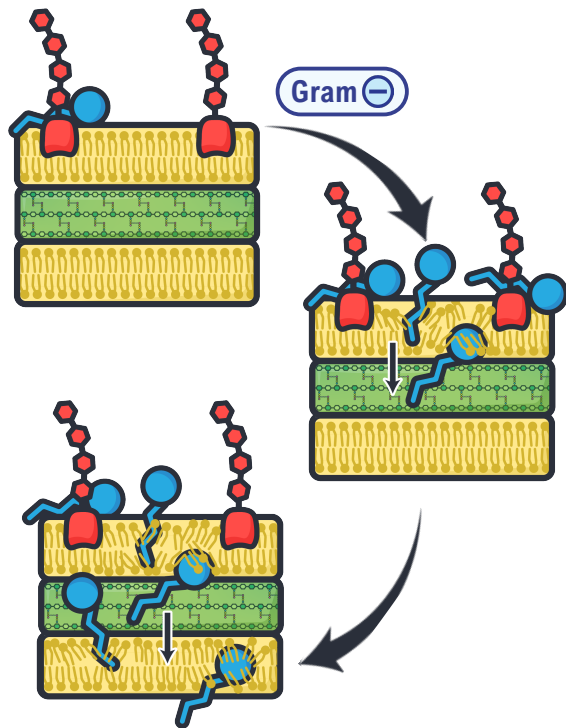


TOPIC: DISRUPTORS OF CELL MEMBRANES

Disruptors of Cell Membranes

- ◆ *Recall:* bacterial cell membranes contain different _____ that antibiotics can target.
- ◆ **Lipopeptides:** drugs that bind to and _____ cell membranes.



- ◆ **Polymyxin B:** topical antibiotic for _____ infections.

- Often part of _____ antibiotic ointments.

Gram (+) _____ **Gram (-)** _____

B is for _____ use.

- ◆ **Polymyxin E:** (colistin): _____ - _____ drug against Gram ____.

- ◆ Restricted use → _____ toxicity & resistance.

Gram (+) _____ **Gram (-)** _____

E is for _____ use.

PRACTICE

William has a bacterial infection from a cut on his leg, and his doctor has identified the cause as a Gram-negative strain of bacteria. Which of the following would be the most appropriate antimicrobial for the doctor to recommend to William?

- Polymyxin B, because it is typically used as a topical treatment for a broad range of Gram-negative bacteria.
- Polymyxin E, because it will be more effective for a skin infection than polymyxin B.
- A combination of both polymyxin B & polymyxin E should be used, as they are synergistic.
- Neither polymyxin B nor polymyxin E would be appropriate for a Gram-negative skin infection.

TOPIC: DISRUPTORS OF CELL MEMBRANES

PRACTICE

Some types of Gram-negative bacteria are less susceptible to polymyxin B and polymyxin E. Which of the following could explain why that is the case?

- a) Unlike other Gram-negative bacteria, these bacteria do not have an outer cell membrane.
- b) These bacteria have lipopolysaccharides that do not bind to polymyxin B or polymyxin E as efficiently.
- c) These bacteria have a cell wall that uses a unique mechanism to cross-link peptidoglycan strands.
- d) These bacteria have a unique porin structure that reduces the amount of antibiotic that can enter the cell.

PRACTICE

Many first-aid antibiotic ointments, such as the brand-name product Neosporin®, contain bacitracin, neomycin (an aminoglycoside), and polymyxin B. Based on your knowledge of these drugs, which of the following answer choices best completes the statement below?

Together, these drugs can be expected to:

- a) Be very broad-spectrum, as bacitracin is effective against Gram-positive bacteria, neomycin is broad-spectrum, and polymyxin B is effective against Gram-negative bacteria.
- b) Be more effective since they act on multiple cellular targets: bacitracin targets the ribosome, neomycin targets the cell wall, and polymyxin B targets the cell membrane.
- c) Work synergistically, as all three drugs target the same cellular pathway but at different steps.
- d) Work synergistically, as all three drugs have similar spectrums, allowing them to target the same bacteria.