

Small Group Activity—Cell Wall Structures and Antibiotic Action

You have recently been hired as an Assistant Professor where your research deals with isolating novel antibiotics to aid in the growing problem of antibiotic resistance. In your first months of work, you have isolated several interesting antimicrobial compounds which show real promise. Unfortunately, late one night you did not label the tubes clearly. Now your promising work needs to be pieced back together with only a few scraps of information scribbled on a napkin from that night. Good luck!

Deciphered napkin scribblings...

Antibiotic A: 0.5 kDa protein, targets peptidoglycan 983-7554 cutie from Castaways

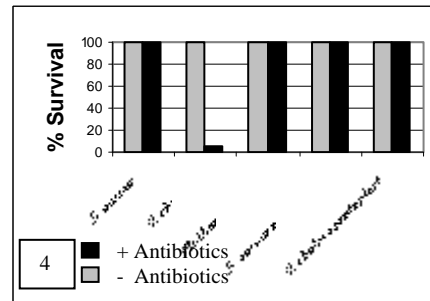
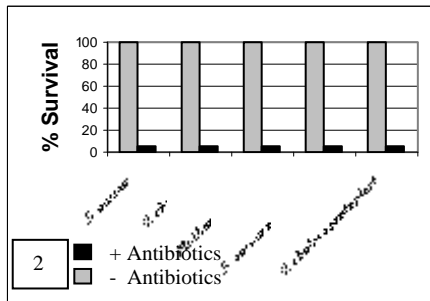
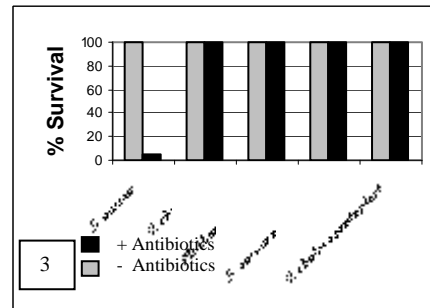
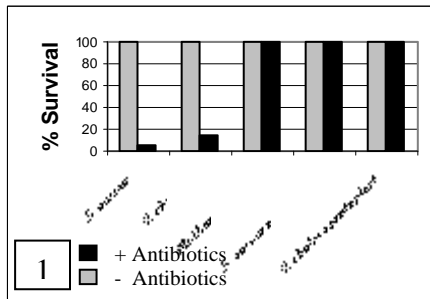
Antibiotic B: 20 kDa protein, targets peptidoglycan

Antibiotic C: Cationic antimicrobial peptide get!! milk, bread, cheese, stamps

Antibiotic D: Targets lipopolysaccharide Bus #81 comes at 7:10

With some more searching, you found these results in your notebook. Unfortunately they are not labeled either. These graphs represent percentage of survival of bacteria or protoplasts after treatment with the antibiotics.

Samples with antibiotic added (black bars); controls with no antibiotic added (grey bars)



Helpful background information

Staphylococcus aureus: gram-positive bacterium *Vibrio cholera*: gram-negative bacterium

Methanosarcina: an archaean bacterium

Cationic antimicrobial peptides (CAMPs): these positively charged antibiotics are attracted to the negatively charged cell wall and membrane. They are hydrophobic, and they insert into the membranes to create pores.

Small Group Activity—Cell Wall Structures and Antibiotic Action Writing Assignment

Your name:

Your instructor's name:

Complete the following questions, limiting your answers to the spaces provided.

- 1. Using the information on the previous page, match each antibiotic with an experiment. Fill in the blanks below and briefly discuss the results observed for each experiment, making sure to include the predicted mode of action for each antibiotic. (9 points)**

Experiment #1 is Antibiotic _____

Experiment #2 is Antibiotic _____

Experiment #3 is Antibiotic _____

Experiment #4 is Antibiotic _____

- 2. Pick one of the antibiotics above (A–D) and describe how a bacterial cell could become resistant to that antibiotic, i.e., what in the cell would have to change to make a bacterium resistant? (1 point)**