

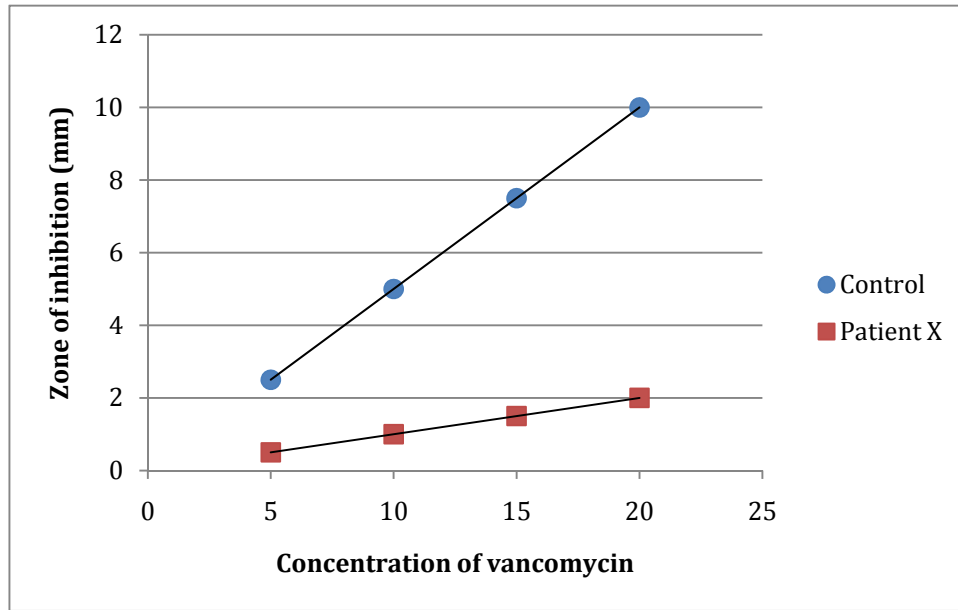
MiSP Evolution / Bacterial Resistance Assessment L2

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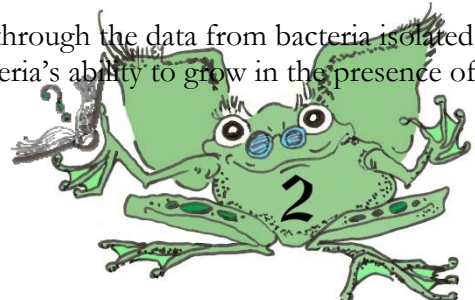
EVOLUTION BY NATURAL SELECTION / BACTERIAL RESISTANCE

At a large urban hospital, a number of patients developed staph (*Staphylococcus aureus*) infections. The bacteria were found to be resistant to vancomycin, the antibiotic of choice for this particular bacterial infection. A microbiologist who was investigating the extent of this resistance decided to test the response to vancomycin in bacteria from cultures isolated from infected patients and in control bacteria from her research stocks. The microbiologist used the disk-diffusion method in her experiment. The bacteria were spread on plates, and disks soaked in vancomycin ranging in concentration from 5 to 20 micrograms vancomycin/milliliter were placed in the center of the plates. The zone of inhibition was measured in mm. The graph from one comparison is shown below.



1. Explain and interpret the data represented by the graph. Compare the data from the control bacteria and the bacteria isolated from patient X.

2. The line through the control data is steeper than the line through the data from bacteria isolated from patient X. What does this mean in terms of the bacteria's ability to grow in the presence of vancomycin?



3. Draw a line on the graph that would represent the response of bacteria that were less resistant to vancomycin than the bacteria isolated from patient X, but more resistant than the control bacteria.
4. What is the unit rate of change in the zone of inhibition for the control? Show the formula for the unit rate of change, your substitutions, and the answer.

