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Effect of an Antimicrobial Compound on Different Processes within the Oscillation of Min Proteins in E. coli Bacterial Cells MAXIMILIANO GIULIANI, JOHN DUTCHER, Department of Physics, University of Guelph — A key step in the life of a bacterium is its division into two daughter cells of equal size. This process is carefully controlled and regulated so that equal partitioning of the cellular machinery is obtained. In E. coli, this regulation is accomplished, in part, by the Min protein system. The Min proteins undergo an oscillation between the poles of rod-shaped E. coli bacteria. We use high magnification, time-resolved total internal reflection fluorescence microscopy to characterize the temporal distributions of different processes within the oscillation: the MinD-MinE interaction time, the residence time for membrane bound MinD, and the recruitment time for MinD to be observed at the opposite pole. We also characterize the change in each of these processes in the presence of the antimicrobial compound polymyxin B (PMB). We show that the times corresponding to the removal of MinD from one pole and the recruitment of MinD at the opposite pole are correlated. We explain this correlation through the existence of a concentration threshold. The effect of PMB on the concentration threshold is used to identify which process within the oscillation is most affected.

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