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Residence and transit times of MinD in *E. coli* bacterial cells MAXIMILIANO GIULIANI, COREY KELLY, JOHN DUTCHER, University of Guelph — A key step in the life of a bacterial cell is its division into two daughters cells of equal size. This process is carefully controlled and regulated so that an equal partitioning of the main cell components is obtained, which is critical for the viability of the daughter cells. In *E. coli* this regulation is accomplished in part by the Min protein system, that determines the localization of the division machinery. Of particular interest is the MinD protein that exhibits an oscillation between the poles in the rod shaped bacteria. The oscillation relies on a ATP mediated dimerization of the MinD protein that allows its insertion into the inner membrane at one of the poles of the cell, followed by an interaction with the MinE protein, which releases the MinD from the membrane, allowing it to travel to the other pole of the cell where the cycle is repeated. We have studied the spatio-temporal characteristics of the MinD oscillation from which we extract the average times for the two main processes that determine the oscillation period: the residence time in the membrane and the transit time to travel the length of the cell. Additionally, we explore how these two timescales are affected by stresses on the bacterial cells due to unfavorable physiological conditions.

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