

1067-35-1948

Zhigang Zhang* (zgzhang@math.uh.edu), Department of Mathematics, University of Houston, Houston, TX 77004. *Positioning the Z-ring near the mid-cell via the spatio-temporal oscillation of the Min system.*

The division of many bacterial cells like *E. coli* cells involves the assembly and eventual contraction of a ring structure at the middle of the cell, which is mostly composed of FtsZ proteins. The positioning of the Z-ring is crucial, and is regulated partially by the Min-protein system. The spatio-temporal oscillation produced by the Min proteins results in a low average of MinD protein concentration near the cell center. On the membrane, FtsZ proteins near the poles, where the MinD concentration is high, are more likely to reenter the cytoplasm, while they congregate at the center and form a Z-ring. Lateral association between FtsZ filaments is also important for the establishment of the Z-ring and other superstructures, while MinD proteins promote the dissociation of lateral associations between FtsZ filaments. We built a one dimensional diffusion-advection-reaction model for the Min-proteins and FtsZ filaments. A convolution is used to estimate the movement of FtsZ molecules caused by the alignment of the FtsZ filament. Simulation results are consistent with experiments. (Received September 22, 2010)