

Abstract

During division, bacterial cells must equally partition their contents. However, due to their small size these cells do not possess complex machinery to help with division, instead biochemical reactions must be used to guide the spatial and temporal separation of cell components. Here we present a whole cell stochastic mathematical model that captures the spatial and temporal localization of proteins involved in the division of *Caulobacter Crescentus* bacteria in a realistic cell model that incorporates important geometrical effects. We show that these species can be used to equally separate bacterial genetic material during division.