Kinetic models for bacterial waves

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The Keller-Segel model has been widely proposed to describe bacterial waves driven by chemotactic processes. Current experiments on {\em Escherichia coli} have shown precise structure of these traveling waves. Here, we present a kinetic description of the bacterial population at the mesoscopic scale. Following Alt and co-authors, this model describes accurately the run-and-tumble process performed by bacteria. We obtain very good agreements with the experimental observations. We also give some hints concerning the analysis of the kinetic model at various scales.

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