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Research interests include:

- **Traveling waves of chemotaxis and applications, multi-scale modeling and analysis of chemotaxis**

On-going GRF project

Traveling waves of chemotaxis models with application

Abstract

Chemotaxis, the directed migration of cells along the external chemical concentration gradient, is a leading mechanism to account for the morphogenesis and self-organization of many biological coherent structures and propagating waveforms. The purpose of this project is to study the traveling wave solutions of an integrated Keller-Segel type model which includes the chemical diffusion and describes three distinct biological processes: bacteria chemotactic movement, initiation of angiogenesis and reinforced random walks by assigning appropriate values to the model parameters. Specifically we establish the existence and non-existence of traveling wave solutions under different parameter spaces, examine the zero diffusion limits of traveling wave solutions, and perform numerical simulation to confirm our analytical results and to interpret the relevant biological processes. Our study will be a significant step toward the comprehensive study of traveling waves for the full chemotaxis models. It will provide new insights of interpreting the existing experimental findings and pave the road for the future studies.