

Abstract Submitted
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Chemotaxis and Target Finding using Chemical Echolocation¹

TOM CHOU, Department of Biomathematics and Mathematics, University of California, Los Angeles, AJAY GOPINATHAN, School of Natural Sciences, University of California, Merced — Chemotaxis is usually modeled by cellular responses to an imposed, exogenous chemoattractant gradient. Here, we consider a scenario in which a single agent releases a chemical that diffuses and is converted to, or signals the production of another chemical upon contact with a target. This secondary chemical can diffuse back to the agent, which uses it as a chemoattractant. We show that this mechanism has interesting features depending on how the probe chemical is produced, and how the product chemoattractant is sensed. Although involving more steps than conventional chemotaxis that relies on a single chemoattractant, we show that this chemical “pinging” mechanism can provide cells with flexibility in regulating behavior and finding different targets.

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