

Abstract Submitted
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The influence of cell crawling onto cell–cell chemical signaling ROLAND BOUFFANAIS, Singapore University of Technology and Design — Chemotactic cells such as amoebae and leukocytes are able to aggregate and self-organize by means of local cell–cell chemical signaling. The chemical cAMP, which is produced by the cell, diffuses through the fluid from the emitting cell’s membrane and binds to the neighboring cells’ chemoreceptors. Such a purely diffusive view of this chemical signaling process fails to account for the fact that the cell’s membrane constantly undergoes motions in relation with the specific motile behavior of these cells, namely crawling. We investigate the influence of cell motion/crawling onto the effectiveness of short-range chemical signaling. Our model is built on the study of an advection-diffusion process at the microscale of a cell for which diffusion is relatively “fast,” and the flow generated by the cell while crawling is an incompressible Stokes flow given the smallness of the Reynolds number. A particular emphasis is placed on the effects of advection onto the generation of a steeper chemical gradient which can have a significant impact onto the chemosensing effectiveness.

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