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Chemotaxing and haptotaxing random walkers having directional persistence TAE GOO KWON, Korea Univ, KYOUNGJIN LEE TEAM, TAE-SEOK DANIEL YANG TEAM — Biological cell crawling is a rather complex process involving various bio-chemical and bio-mechanical processes, many of which are still not well understood. The difficulties in understanding the crawling are originating not just from cell-intrinsic factors but from their complex social interactions, cell-to-substrate interactions and nonlinear responses toward extrinsic factors. Here, in this report we investigate chemotactic behavior of mathematical model cells that naturally have directional persistence. A cell density is measured as a function of time and space, then the resulting steady state is compared with that of the well-known Keller-Segal model, which describes a population of chemotactic random walker. Then, we add a cell-to-cell interaction, mimicking a "haptotaxis" mediated interaction, to the model and access its role as for altering the steady-state cell density profile. This mathematical model system, which we have developed and considered in this work, can be quite relevant to the chemotactic responses of interacting immune cells, like microglia, moving toward and around a site of wound, as for an example. We conclude by discussing some relevant recent experimental findings.

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