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A computational investigation of the role of behavioral heterogeneities on cell cluster motion KATHERINE COPENHAGEN, Univ of California - Merced, NIR GOV, Weizmann Institute, AJAY GOPINATHAN, Univ of California - Merced — Collective motion of cells is a common occurence in many biological systems, including tissue develope- ment and repair, and tumor formation. Recent experiments have shown that malignant B and T lymphocytes form clusters in a chemical gradient of CCL19 which display three different phases: translational, rotational, and random. Could these phases be due to interactions between cells as well as chemotaxis of individuals? If so what types of local interactions can lead to the three phases seen in experiment? We model cell clusters with a continuous two dimensional agent based model. To form a single cell cluster which displays all three of the phases described above, cells interact with a Vicsek alignment interaction, a Lennard-Jones collision- avoidance and cohesiveness interaction, and a long range spring interaction to prevent fracture. By changing the behaviors of individual cells depending on the number of cells they are contacting, we are able to create clusters that occupy these phases with varying likelihood. Our results show that heterogeneous behaviors of individuals based on local environment can lead to novel phases seen in experiments.

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