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Modelling Rho GTPase biochemistry to predict collective cell migration BRIAN MERCHANT, JAMES FENG, Univ British Columbia — The collective migration of cells, due to individual cell polarization and intercellular contact inhibition of locomotion, features prominently in embryogenesis and metastatic cancers. Existing methods for modelling collectively migrating cells tend to rely either on highly abstracted agent-based models, or on continuum approximations of the group. Both of these frameworks represent intercellular interactions such as contact inhibition of locomotion as hard-coded rules defining model cells. In contrast, we present a vertex-dynamics framework which predicts polarization and contact inhibition of locomotion naturally from an underlying model of Rho GTPase biochemistry and cortical mechanics. We simulate the interaction between many such model cells, and study how modulating Rho GTPases affects migratory characteristics of the group, in the context of long-distance collective migration of neural crest cells during embryogenesis.

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