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### **Wave-Based Mechanisms for Contact Guidance and Collective Cell Migration**

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The migration of cells in streams, and the crossover from collective cell behavior to individual cell migration is one of the key physical steps in cancer metastasis. This migration occurs in the context of a microenvironment with specific mechanics and texture that may guide the metastatic process. Studies on cell lines indicate that an increasing metastatic potential of cells is associated not with changes in migration speed, but with a decrease in collective motion and increasing chaotic movement fields of groups of cells. I will describe how an underlying wave-like process of the cellular scaffolding that drives persistent migration contributes to the ability of cells to move collectively. I will further show that the same internal waves also allow cells to recognize and follow surface nanotopography on scales comparable to these internal waves. This facilitates contact guidance by the texture of their environment.