

Abstract Submitted
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Interstitial flows promote an amoeboid cell phenotype and motility of breast cancer cells¹ CHIH-KUAN TUNG, YU LING HUANG, ANGELA ZHENG, MINGMING WU, Department of Biological and Environmental Engineering, Cornell University — Lymph nodes, the drainage systems for interstitial flows, are clinically known to be the first metastatic sites of many cancer types including breast and prostate cancers. Here, we demonstrate that breast cancer cell morphology and motility is modulated by interstitial flows in a cell-ECM adhesion dependent manner. The average aspect ratios of the cells are significantly lower (or are more amoeboid like) in the presence of the flow in comparison to the case when the flow is absent. The addition of exogenous adhesion molecules within the extracellular matrix (type I collagen) enhances the overall aspect ratio (or are more mesenchymal like) of the cell population. Using measured cell trajectories, we find that the persistence of the amoeboid cells (aspect ratio less than 2.0) is shorter than that of mesenchymal cells. However, the maximum speed of the amoeboid cells is larger than that of mesenchymal cells. Together these findings provide the novel insight that interstitial flows promote amoeboid cell morphology and motility and highlight the plasticity of tumor cell motility in response to its biophysical environment.

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