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Role of Inflammation and Substrate Stiffness in Cancer Cell Transmigration SUSAN HAMILLA, KIMBERLY STROKA, HELIM ARANDA-ESPINOZA, University of Maryland — Cancer metastasis, the ability for cancer cells to break away from the primary tumor site and spread to other organs of the body, is one of the main contributing factors to the deadliness of the disease. One of the rate-limiting steps in cancer metastasis that is not well understood is the adhesion of tumor cells to the endothelium followed by transmigration. Other factors include substrate stiffness and inflammation. To test these parameters, we designed an in vitro model of transendothelial migration. Our results suggest that cancer cell transmigration is a two-step process in which they first incorporate into the endothelium before migrating through. It was observed that the cumulative fraction of cancer cells that incorporate into the endothelium increases over time. Unlike leukocytes, which can directly transmigrate through the endothelium, cancer cells appear to have a two-step process of transmigration. Our results indicate that inflammation does not act as a signal for cancer cells to localize at specific sites and transmigrate similarly to leukocytes. Cancer cell transmigration also does not vary with substrate stiffness indicating that tissue stiffness may not play a role in cancer's propensity to metastasize to certain tissues.

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