

Abstract Submitted
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A mathematical model of breast cancer cell motion through a microfluidic device. JARED BARBER, Indiana University-Purdue University Indianapolis — Deaths due to breast cancer are usually caused by metastases at other locations (e.g. bone), not by the primary tumor. Much research has targeted understanding how to lower the metastatic potential of individual breast cancer cells with the end goal being the mitigation of the effects of breast cancer on the 3.5 million people in the US affected by the disease. Experiments show that metastatic potential correlates well with the physical properties of a cell and its surrounding environment. Biology also suggests that mechanotransduction of cellular pathways (e.g. apoptosis, division) can affect metastatic potential. Because of these insights, we are developing a mechanical model of breast cancer cell translocation in microvessels. Our first model is a two-dimensional model with interconnected viscoelastic elements submersed in a surrounding Stokes flow. This model has been used to consider breast cancer cell translocation through a microfluidic device that was designed as a diagnostic tool for assessing the metastatic potential of breast cells. We will present this current model and share results. We believe that further development of this model will allow consideration of metastatic potential in both in vitro and in vivo settings.

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