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Migration Modes in Cancer Cell Motility[1] DI WU, HELIM ARANDA-ESPINOZA, University of Maryland, College Park — Cancer cell metastasis is a result of secondary tumor proliferation after single or collective cancer cell migration from a primary tumor. The biophysical mechanisms of cancer cell migration and transmigration through the body vasculature, while investigated, is not extensively quantified. In general, directed cell motility is traditionally viewed as the result of lamellipodia generation through which the cell moves by extending an actin protrusion and adhesion beneath its plasma membrane. However, cancer cells also exhibit motility through blebbing, which involves momentary membrane detachment from the actin cortex, membrane expansion and retraction. While blebbing, cancer cells do not form cell-substrate attachments as with lamellipodia. In vitro studies of single cancer cell migration through microfluidic microchannels of constant or linearly changing widths model in vitro conditions of single cell migration through capillary pores. We study both modes of motility and observe that cancer cell migration using lamellipodia or blebbing depends on channel width. Drug treatments to manipulate the cytoskeleton demonstrate that cancer cell migration changes speed but not the mode of migration.

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