Abstract Submitted
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Metastatic Breast Cancer Cells Collectively Invade Collagen by Following a Glucose Gradient[1] BO SUN, ROBERT AUSTIN, Princeton University, LIYU LIU, Institute of Physics, Chinese Academy of Sciences, GUILLAUME DUCLOS, Physico-Chimie Curie, JEONGSEOG LEE, AMY WU, Princeton University, YOOSEOK KAM, Moffitt Cancer Center, EDUARDO SONTAG, Rutgers University, HOWARD STONE, JAMES STURM, Princeton University, ROBERT GATENBY, Moffitt Cancer Center — We show that MDA-MB-231 metastatic breast cancer cells collectively invade a three dimensional collagen matrix by following a glucose gradient. We observe that due to the 3D physical deformation of the matrix, as measured by the displacement of reporter beads within the matrix, there exists a long range deformation mechanical field inside the matrix which serves to couple the motions of the invading metastatic cell. The invasion front of the cells is a dynamic one, with different cells assuming the lead on a time scale of 24 hours due to certain cells having higher speeds of penetration, which are not sustained. The front cell leadership is dynamic presumably due to metabolic costs associated with the long range strain field which proceeds the invading cell front, which we have imaged using confocal imaging and marker beads imbedded in the collagen matrix.

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