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3D Contraction Force in Different Morphology of Cancer Cell
JIHAN KIM, NICHOLAS GROVES, BO SUN, Oregon State University — Cell migration is an integrated process that is important in life. Migration is essential for embryonic development as well as homeostatic processes such as wound healing and immune responses. Unlike normal migration process, we have seen that aberrant behavior in cancer cell. In this experiment we focused on its behavior through connective extracellular matrix (ECM). When cell migrates through 3D ECM, it deforms the matrix by applying forces around its environment. To obtain traction forces, we computed deformation field of the matrix around a cell. The existing experiment had been done with analysis on elongated-shape of MDA-MB-231 breast cancer cell. And highly dense fluorescent particles embedded in 3D collagen were used to capture a deformation field of matrix. In this experiment we developed a technique to capture the deformation field without introducing particles inside of collagen gel. This method can eliminate any interactions between particles and collagen fibers. In addition, we obtained deformation field of different morphology of breast cancer cells. Finally we were able to determine the topology of traction forces in cancer cell based on its shapes.

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