Abstract Submitted
for the MAR16 Meeting of
The American Physical Society

Interplay of differential cell mechanical properties, motility, and proliferation in emergent collective behavior of cell co-cultures[1] LEO SUTTER, DAN KOLBMAN, Rochester Institute of Technology, MINGMING WU, MINGLIN MA, Cornell University, MOUMITA DAS, Rochester Institute of Technology
— The biophysics of cell co-cultures, i.e. binary systems of cell populations, is of great interest in many biological processes including formation of embryos, and tumor progression. During these processes, different types of cells with different physical properties are mixed with each other, with important consequences for cell-cell interaction, aggregation, and migration. The role of the differences in their physical properties in their collective behavior remains poorly understood. Furthermore, until recently most theoretical studies of collective cell migration have focused on two dimensional systems. Under physiological conditions, however, cells often have to navigate three dimensional and confined micro-environments. We study a confined, three-dimensional binary system of interacting, active, and deformable particles with different physical properties such as deformability, motility, adhesion, and division rates using Langevin Dynamics simulations. Our findings may provide insights into how the differences in and interplay between cell mechanical properties, division, and motility influence emergent collective behavior such as cell aggregation and segregation experimentally observed in co-cultures of breast cancer cells and healthy breast epithelial cells.

[1]This work was partially supported by a Cottrell College Science Awaed

Moumita Das
Rochester Institute of Technology

Date submitted: 05 Nov 2015 Electronic form version 1.4