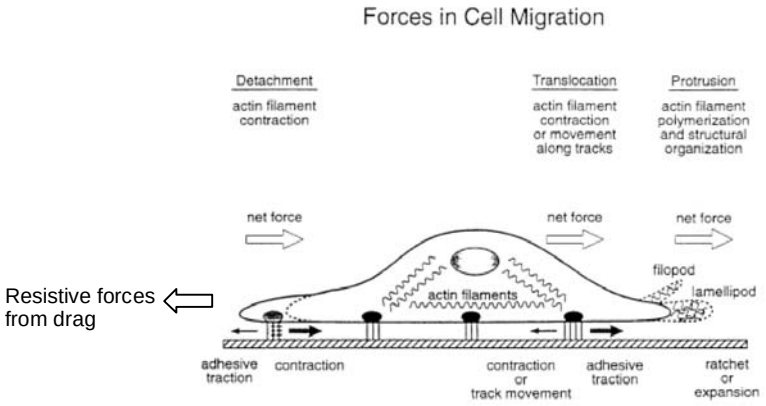
Poster Session - Eileen Fong

Title
Cell Locomotion On Ligand-Modified Surfaces

Abstract
Cell motility is essential in myriad biological processes and is well explained by the commonly accepted mechanism of actin adhesion and contraction. We also know that cell locomotion is greatly affected by a lot of other factors such as presence of growth factors, interaction with the receptors/ligands on migration sites, temperature, pH etc. And in recent years, there is a growing popularity with surface-modified materials such as peptide-tethered hydrogels and polymers, artificial peptide proteins etc. However, there is little quantitative understanding on the effect of cell-binding ligands concentrations on cell migration.

As seen in the Figure below, the total force consists of 3 main components: traction forces due to the traction of the front and the rear of the cell and forces due to cell protrusion in the 3D matrix, balanced by the resistive forces resulting from the viscous drag experienced by the cell due to the viscoelastic nature of the substrate.



Adapted from: G. Maheshwari et al, *Deconstructing (and Reconstructing) Cell Migration*, Microscopy Research and Technique, v43, 1998, pp. 358-368

In this study, a simplified model is proposed to attempt to correlate these 3 forces with the velocity and position of a migrating cell and the biochemical properties of its surface. And by measuring the force of a migrating cell through methods such as AFM or others, cell migration behavior can be predicted and controlled eventually by varying the ligand densities of the engineered surface. This way, cell migration may be optimized for specific bioengineering applications.