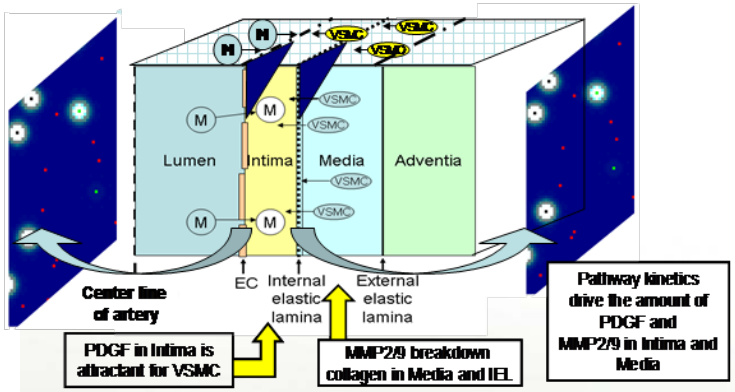
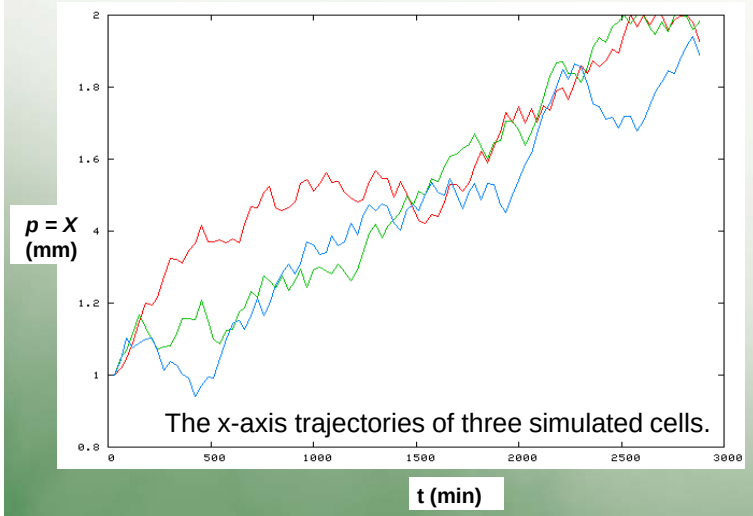
A Model of Cell Migration in the Presence of Chemo-attractants

Modeling and Simulation Group

Computational Sciences & Engineering Division





The x-axis trajectories of three simulated cells.

Problem Statement:

- **Healing of an artery after vascular surgery or injury critically depends on understanding behavior of small populations of cells. A model is needed for cell diffusion in a environment with many different chemical attractants and the model must account for phenotypic behavioral change in the cells.**

Technical Approach:

- **Hybrid modeling, i.e., combining discrete event simulation (DES) for cells and continuous modeling using partial differential equations (PDEs) for the chemical environment, is a possible approach to understanding cell behavior and modeling response to injury. MSG & the UT Graduate School of Medicine are pursing this approach.**

Benefit:

- **By developing a hybrid DES/PDE simulation approach, we hope to identify essential parts of the repair process to elucidate its complex actions. This will result in dramatically improved health care following vascular reconstructive surgery.**

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