1044-92-88 **Hannah L Callender*** (callende@ima.umn.edu), IMA, 400 Lind Hall, 207 Church St SE, Minneapolis, MN 55455, and **Hans G Othmer**. *Modeling the Development of Nascent Focal Adhesions as a First Step in Understanding the Beginning Stages of Cell Motility.* Preliminary report.

Cell motility is an essential process in the life cycle of many organisms. For instance, it plays a crucial role in embryonic development, wound healing, the immune response, and cancer cell metastasis. Therefore, an understanding of the mechanism by which cells migrate may lead to the development of novel therapeutic strategies for controlling, for example, invasive tumor cells.

Four steps are involved in successful cell motility: 1) Actin polymerization drives protrusion of a thin lamellipodium along the leading edge in the direction of migration. 2) The protrusion adheres to the extracellular matrix by "focal adhesions" (FAs), large protein complexes. 3) Myosin II-driven actin convergence pulls on FAs at the front to generate traction. 4) This traction causes weaker FAs in the rear to detach, through contraction of actin bundles known as "stress fibers", thus moving the cell body forward.

FAs serve as mechanical links from the cell to its surroundings and as biochemical signaling hubs to concentrate and direct numerous signaling proteins within the cell. Here we present a mathematical model to describe the early dynamics of these focal adhesions in mammalian cells to determine the necessary components and the role of each in the growth and fate of the FAs. (Received August 22, 2008)