

MAR07-2006-002127

Abstract for an Invited Paper
for the MAR07 Meeting of
the American Physical Society

Integration of actin dynamics and adhesion in cell migration¹

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Cell migration requires transmission of motion generated in the actin cytoskeleton to the extracellular environment through a complex assembly of proteins in focal adhesions. We developed Correlational Fluorescent Speckle Microscopy to measure the coupling of focal adhesion proteins to actin filaments. Different classes of focal adhesion structural and regulatory molecules exhibited varying degrees of correlated motions with actin filaments, indicating hierarchical transmission of actin motion through focal adhesions. Interactions between vinculin, talin and actin filaments appear to constitute a slippage interface between the cytoskeleton and integrins, generating a molecular clutch that is regulated during the morphodynamic transitions of cell migration.

¹NIH Director's Pioneer Award Program, DP1-OD000435