Investigating Possible Protein-Protein Interactions of Abelson (Abl) and Abl related gene (Arg) Proteins with the Vasodilator-Stimulated (VASP) Family of Proteins

Abstract:

Cell migration is vital to the maintenance of all cellular organisms. It enables proper immune responses, embryonic development, and tissue morphogenesis. This complex process requires the coordination of a multitude of biochemical events. Thus, regulation of these events is key to efficient cell movement. Unregulated cell migration can have dire consequences, such as tumor cell growth. Cytoskeletal dynamics are the driving force behind the steps necessary for metastasis. Members of the Vasodilator-Stimulated Phosphoprotein (VASP) family of proteins, which include VASP, Mena (the mammalian homolog of the *Drosophila* Enabled protein), and EVL (Ena/VASP-like), are implicated as regulators of cytoskeletal dynamics. The cAMP-dependent protein kinase (PKA) controls VASP's functions and protein-protein interactions by direct phosphorylation. The interaction between VASP proteins and the Abelson non-receptor tyrosine kinase, Abl, is of particular importance. Mutant forms of Abl are causative for human chronic myeloid leukemia, and Abl has been shown to bind VASP during cellular attachment to the extra-cellular matrix (ECM) in a PKA-regulated manner. The Abl-related gene (Arg) is an Abl family member that interacts directly with both actin and microtubule cytoskeletons. Despite the homology of Arg to Abl and the prominent role of Arg in regulating cell migration, the interaction of Arg and VASP proteins has never been investigated. Herein, we take two approaches in attempt to elucidate the binding characteristics between each pair of proteins from the Abl and VASP families to further understand the regulation of biochemical events driving cell motility. The first involves *in vitro* binding assays to test the ability of each protein-protein interaction to occur. As a complementary approach, live-cell imaging experiments are being conducted to observe Abl/VASP protein localization during cell migration. Combining these approaches we will be able to draw conclusions further driving investigation of how these proteins affect cell motility.