Investigating the Interaction and Co-localization of VASP and Abl in Mammalian Cells

The non-receptor tyrosine kinase c-Abl (Abl) is expressed in many cell types and is involved in multiple intracellular signaling pathways. In its inactive resting state, Abl is found in the nucleus and the cytoplasm. In response to various stimuli including the introduction of growth factors, treatment with DNA damaging agents, and engagement of cell integrin receptors to the extracellular matrix, Abl has been shown to become activated and localize to different areas of the cell. Alterations to Abl and its known protein complexes that lead to dysregulation can be oncogenic, specifically in the proliferation of certain leukemias. Evidence exists of an association between the vasodilator stimulated protein (VASP) and cytoplasmic Abl, however, the relevance of this interaction for Abl function remained unknown. Our research objective was to determine whether VASP regulates the subcellular localization of Abl during cellular adhesion. Towards this end, we biochemically fractionated cells into membrane, cytoplasmic, nuclear and cytoskeletal fractions and then monitored for the presence of Abl via western blots from cell extracts prepared from control fibroblasts and those devoid of VASP. Biochemical studies revealed that Abl localizes to different subcellular compartments in cells control cells as compared to those devoid of VASP. Interestingly, during cellular adhesion, the association of Abl with the cytoskeleton appeared to be VASP-dependent, as there was little Abl protein detected in the cytoskeletal fractions. Currently, co-immunoprecipitation and live-cell imaging techniques are being used to further investigate the interactions between VASP family member proteins (Mena and EVL) and an Abl family member protein, Arg (Abl-related gene). As different methods are applied to our investigation, the modes of interaction and regulation between VASP and Abl will be more thoroughly studied.