Jasmine Nelson, Biology

Year in School: Senior
Faculty Mentor: Dr. Vladislav Glinskii, Biochemistry
Funding Source: Molecular Imaging Program

The use of parallel flow chamber techniques for studying cancer endothelial cell adhesion

Breast cancer is the second most common cancer in North American women. It has the propensity to metastaticize to bone and bone marrow. Such metastases, causing intractable pain, pathological fractures, and death are massive clinical problems. In order to establish secondary tumors in bones, blood-borne metastatic cells should adhere to the endothelium lining the walls of the bone marrow microvessels. In this study, we evaluated the suitability of the parallel flow chamber technique for studying metastatic breast cancer cell adhesive interaction with cultured human bone marrow microvascular cells (HBMEC). We have found that, similar to leukocytes, a fraction of breast cancer cells infuse through the parallel flow chamber over the HBMEC monolayer exhibiting rolling behavior. Some rolling cells adhere permanently to the endothelium. The rolling and stable adhesion kinetics depends on experimental conditions such as shear rate and shear stress. In conclusion, the parallel flow chamber technique represents the valuable method of choice for analyzing the adhesive interaction of metastatic cancer cells with endothelium under conditions of physiological flow conditions.