Human Endothelial Progenitor Cells (EPCs) isolated from peripheral blood have the following CD34, VEGFR-2, or AC 133 (CD133) and Aldehyde dehydrogenase antigen-positive cells, which may home to site of neo-vascularization and differentiate into endothelial cells. Endothelial Cells contribute to tumor angiogenesis, and can originate from sprouting from neighboring pre-existing vessels. The bone marrow-derived circulating EPCs can contribute to tumor angiogenesis and growth of certain tumors. In this study we observed EPCs labeled with GFP contribute to Breast, Brain and Prostate Cancer tumor angiogenesis in mouse tumor transplants. This study confirms the EPCs play a major role in tumor angiogenesis in Breast, Brain and Prostate cancers as indicated in the tumor transplants.

Method: Primary Normal Aortic Arch tissue was obtained from consenting patients during surgical procedure in Celprogen’s Endothelial Cell Complete Growth Medium. The Aortic Arch tissue sections were processed as primary endothelial cell culture and the other section was processed and cultured as Endothelial Progenitor cells in Endothelial Complete Growth Media and matrix. After 14 days in culture the cells were characterized for Endothelial Progenitor markers: CD34, VEGFR-2, CD133 and Aldehyde dehydrogenase antigen positive cells. The cell based assay system enabled one to perform a high throughput characterization of these endothelial progenitor cells.

Animal studies: In this study five female SCID nude mice were injected subcutaneously with Breast Cancer Stem Cells (3-) in their mammary fat pad 1000 cells per mouse. On the third day 83,000 Endothelial Progenitor cells with GFP were at the site of subcutaneous tumor injection site. At day 20 the mice were euthanized and the tumor tissues were sectioned and analyzed under Fluorescence inverted microscope. The following major organs were harvested Brain, Lungs, Liver, Kidney and Bone Marrow and analyzed for neo-vascularization of metastases at these secondary tumor sites.

Results: The results are indicated in the following Figures 1-9, and Graph 1.

Conclusions: This study has demonstrated that Endothelial Progenitor cells play a major role in Tumor angiogenesis in Breast Cancer implants. The results indicate that endothelial progenitor cells participate in the neo-vascularization of tumor growth in in-vivo model systems.

Acknowledgment: The authors would like to thank the following individuals for their technical support and critical review: O. Shobh and M. Warden.