Vascular Targeting Peptide Dependent Adhesion of Metastatic Cells

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Background The vasculature of normal tissues and tumors is highly specialized. In vivo screening of peptide libraries displayed on phage in live mice, has yielded specific homing peptides for a large number of normal tissue and tumor tissues.

Methods We studied the effect of tissue-homing peptides on tumor cell adhesion in the metastasis cascade with the following experiments. 1) Binding study of metastatic cell expressing the skin homing peptide (CVALCREACG), to skin endothelial cell by the Stamper-Woodruff assay and endothelial cell-specific immunostaining using anti-CD31 antibody. 2) The effect of lung homing peptide, GFE-1 (CGFECVRQCPERC) on in vivo experimental metastasis assay of C8161 and B16 melanoma and 3) Binding study of C8161 and B16 melanoma to membrane dipeptidase (MDP) which is GFE-1 receptor.

Result Metastatic C8161 melanoma cell expressing the skin homing peptide in N-terminal of placenta alkaline phosphatase molecule by transfection, binds to skin endothelial cell specifically. In addition, GFE-1 peptide inhibits the in vivo experimental metastasis of C8161 cell, but doesn’t inhibit metastasis of B16 melanoma. The receptor of GFE-1 peptide expressed in the lung, MDP-transfected COS-1 binds to C-8161, not to B16 melanoma. These results mean that C8161 cell expresses the GFE-1 sequence or similar structure in the cell surface and binds to MDP molecule in the lung endothelial cell during the metastatic cascade.

Conclusion The tissue specific metastatic phenomenon depends on the adhesion of targeting molecules of metastatic cell surface to tissue specific vasculature receptor.