

PHAGE DISPLAY PEPTIDES FOR BREAST CANCER TARGETING

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ABSTRACT

Cancer cell surfaces differ from healthy cell surfaces allowing the detection of cancer targets on the cell. Use of these targets combined with radiolabeled targeting vehicles results in sensitive imaging agents, with peptides identified as targeting vehicles. Human epidermal growth factor receptor 2 (ErbB-2) and galectin-3 (gal-3) are two targets for peptides, which have been shown to be over-expressed in a variety of tumors, including breast adenocarcinomas. ErbB-2 is involved in signal transduction pathways for cell growth and differentiation. Gal-3 is a lectin involved in carbohydrate-mediated cancer cell adhesion via contact with the tumor-specific Thomsen-Friedenreich (TF) disaccharide antigen, which increases metastasis from primary tumors.

Bacteriophage (phage) display is a technique to select peptide sequences that bind to specific targets, such as ErbB-2 and gal-3. The target ErbB-2 was used to identify peptide KCCYSL. In this study, KCCYSL was radiolabeled by two different chelation chemistry methods and ^{99m}Tc to create two potential imaging agents. These radiolabeled peptides were analyzed both *in vitro* with breast cancer cell lines, and also *in vivo* performing biodistribution and breast tumor imaging studies in mouse models of breast cancer. Another target, gal-3, was used to identify peptide ANTPCGPYTHDCPVKR also using the phage display technique. In this study, to characterize the peptide and identify key residues for peptide interaction, *in vitro* cell binding and enzyme-linked immunosorbent assay experiments were done with alanine point mutation peptides.