

DEVELOPMENT OF NOVEL BREAST CANCER-TARGETED SPECT IMAGING PEPTIDES BY PHAGE DISPLAY

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SHORT ABSTRACT

Malignancy of the breast is the leading cause of cancer among women and the second leading cause of cancer-related death. Despite implementation of mammograms and breast exams, there still exists a need to detect highly aggressive cancer at its earliest stage. Development of targeted molecules, such as peptides, by phage display allows for specific imaging of a targeted antigen. The hypothesis of this dissertation was that phage display could be used to select novel peptides for breast cancer imaging.

In vivo phage display selection is a strategy that allows for selection of peptides based on their function in the environment in which they will be used. The work here demonstrated that *in vivo* phage display successfully was able to select a peptide with improved pharmacokinetics and tumor targeting in comparison to a previous generation. Additionally, the selection yielded a peptide that mimicked a putative tumor vasculature-associated protein termed EGFL6. EGFL6 was determined to be expressed in breast cancer and may serve as the basis for future investigations. Finally, a peptide was discovered that bound to and imaged BT-474 human breast cancer tumors in mice. This cell line is of importance because it represents resistance susceptible breast cancer, a major cause of death among women.

These results demonstrate the utility of phage display and highlight the novel targeting agents that can be obtained by the technology.