A number of genetic alterations are required for malignant transformation. However, these mutations provide the source for tumor-associated antigens which can be recognized by cellular effectors of the immune system. Recent advances in tumor immunology - such as the improved understanding of antigen presentation as well as T cell activation - have opened new perspectives for cancer immunotherapy. The advantage of using tumor cell based vaccines is that these comprise the complete antigen pool of an individual tumor for activating polyclonal immune responses. However, the induction of antigen-specific immune responses is impaired by the fact that T cell activation is depending on additional nonspecific costimulatory signals provided by the antigen-presenting cell. The majority of solid human tumors does not express costimulatory molecules and is unable to deliver all signals required for T cell activation. In contrast, tumors often induce immunologic tolerance. Therefore, the introduction of genes encoding costimulatory molecules such as CD80 or cytokines is aimed at conferring the immunostimulatory potential of tumor cells. We have undertaken efforts at endowing a breast carcinoma cell line expressing at least seven known tumor associated antigens with immunostimulatory competence by CD80 gene transfer. In preclinical studies this cell line was demonstrated to induce specific immune responses. We designed a phase I/II trial to administer the CD80-modified cell line to patients with metastatic breast cancer to determine the toxicities of the vaccination protocol and nature of the vaccine-induced immune response.