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# Treating Carcinomas Using Immunotoxin Specific for Cancer Stem Cells (20110014, Dr. John Ohlfest)

Technology No. 20110014

**IP Status:** Issued US Patent; **Application #:** 14/990,501

## Targeting Cancer Stem Cells to Prevent Tumor Recurrence

Carcinomas are invasive malignant tumors of transformed epithelial cells. It has been proposed that tumor cells derive from a small population of cancer stem cells (CSCs) - self-generating progenitor cells that can migrate, replicate, and differentiate into mature cancer cells. CSCs appear resistant to chemotherapy drugs and radiation treatment. Although the majority of cancer cells may be destroyed with traditional treatment, tumor recurrence is likely due to CSC survival. Thus, therapeutic applications may benefit from targeting this cancer cell population.

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## Destroying Cancer Stem Cells with CD133 Specific Immunotoxin

An immunotoxin is an antibody that is linked to a toxin. Using a mechanism unrelated to conventional chemotherapeutic agents, the immunotoxin kills only cells that express the protein specific for the antibody. Thus, immunotoxins can be tuned to recognize proteins restricted to certain cell types. A monoclonal antibody directed at CD133, a glycoprotein accepted as a CSC marker, has been shown to arrest tumor progression in animal models of breast and head/neck carcinomas. Furthermore, bispecific ligand immunotoxins show greater specificity and enhancement of treatment. Combining a CSC-directed immunotoxin with traditional cancer therapy may reduce tumor recurrence and improve patient outcome.

**BENEFITS OF TARGETING CANCER STEM CELLS WITH IMMUNOTOXIN**

- Greater sensitivity allows better detection, identification, and targeting of CSCs
- Single chain variable fragment (scFv) of antibody decreases immunogenicity
- Immunotoxin depletion of CSC may serve as monotherapy or adjuvant therapy
- Immunotoxin targeting of multiple proteins provides greater specificity towards CSCs with minimal effect on normal cells

**Fulfillment Details** Licensee will receive rights to practice the intellectual property (patent application) for the purposes of developing and manufacturing a commercial product.

**Phase of Development** Researchers are demonstrating anti-carcinoma activity in cell culture and mouse models of tumor progression.

### **Researchers**

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