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Scaffolds for Cancer Cell Ablation

Technology No. 20170057

IP Status: Pending US Patent; **Application #:** 16/152,769

Novel therapeutic approach targets disseminating tumor cells

A new cancer-fighting technology uses non-invasive local hyperthermia to kill metastasizing breast cancer cells. The approach builds upon existing poly(ε-caprolactone) scaffolds that recruit and trap metastasizing breast cancer cells in vivo. An electrically conductive/semi-conductive metal disk placed in the center of the porous polymer scaffold can generate enough heat to kill cancer cells attached to the disk. The heat is generated through electromagnetic induction by an oscillating magnetic field within a radiofrequency coil. Tumor cells are recruited to the scaffold by immune cells, and wound healing after thermal therapy creates an inflammatory environment that may facilitate future recruitment of tumor cells. This ability to noninvasively thermally ablate captured cells using biomaterial scaffolds could potentially extend focal thermal therapies to disseminated cancers.

Applies focal therapy (thermal, cryo, or electrical) to destroy cancer cells

Breast cancer is a leading cause of death for women worldwide, usually due to metastasis of the primary tumor to vital organs such as the lung, liver and brain. Currently, few therapeutic options exist for metastatic disease, as cancer metastasis typically remains undetected until it is very advanced and often incurable. While focal therapies such as local application of heat have been successfully applied to solid tumors, this novel approach applies non-invasive local hyperthermia to disseminating tumor cells. Scaffolds have recently been shown to recruit metastasizing breast cancer cells very early in disease progression, and their capture reduces tumor burden at other sites and improves survival. This new technology enhances the therapeutic potential of this approach by combining it with focal therapy (thermal, cryo, or electrical) to destroy the captured tumor cells.

Phase of Development

- In vitro and ex vivo data showing proof of concept

Benefits

- Localized treatment
- Can be applied to most organs

Features

- Scaffolds with metal disks recruit and kill metastatic cancer cells
- Amount of heat generated is tunable
- Non-invasive oscillating magnetic field heats disk to kill attached tumor cells
- Implanted porous polymer (polycaprolactone) scaffold
- Thermal, cryo, or electrical focal therapy kills cells
- Creates inflammatory environment that may recruit future tumor cells

Applications

- Implantable medical device for cancer treatment
- Breast cancer
- Cancer therapy
- Metastatic cancer

Researchers

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Publications

Biomaterial scaffolds for non-invasive focal hyperthermia as a potential tool to ablate metastatic cancer cells
Biomaterials, 2018 Jun;166:27-37

Interested in Licensing?

The University relies on industry partners to further develop and ultimately commercialize this technology. The license is for the sale, manufacture or use of products claimed by the patents. Please contact us to share your business needs and licensing and technical interests in this technology.

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