CANCER PREVENTION & RESEARCH INSTITUTE OF TEXAS

Award ID:
RP120572

Project Title:
Development of cancer traps for prolonging lifespan by eliminating metastatic cancer cells

Award Mechanism:
High Impact/High Risk

Principal Investigator:
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Entity:
The University of Texas at Arlington

Lay Summary:

It is well known that the ineffectiveness of conventional cancer therapy is mostly caused by active cancer metastasis and that its success can be ensured by the reduction of such cancer cell migration. Recent studies indicate that certain chemokines are responsible for cancer metastasis and bone marrow stem cell-seeded scaffold attracts metastatic cancer cells. We hypothesize that, by localized release of such chemokines or creating bone microenvironment as decoys, novel in situ injectable “cancer trap” can be built to recruit and trap various circulating cancer cells. Our objective is to develop such implantable traps that can distract the cancer cells, trap and kill them and thereby enhance the efficacy of conventional therapy. To build a “cancer trap”, we propose to fabricate injectable temperature sensitive gels with the ability to form solid depot in the subcutaneous space following needle injection and polymeric three dimensional traps made out of FDA approved polymers which can then release a variety of cancer chemokines that will serve as the bait, or use bone marrow stem cells and bone morphogenetic protein-2 to mimic bone environment that will lure the cancer cells into the trap. We will then evaluate the ability of these two types of cancer traps to recruit and then eradicate immigrated cancer cells via localized radiation or chemotherapy. Our preliminary studies have found that “cancer trap” implants would reduce the numbers of metastasic cancer cells and, most importantly, increase (~ 2 folds) the lifespan of cancer bearing mice. The successful completion of the proposed work will lead to the development of novel cancer treatments which can substantially improve the efficacy of the traditional cancer therapies by reducing the numbers of circulating metastatic cancer cells. Furthermore and importantly, such traps can be custom designed and then applied to a wide range of cancers such as skin, breast, prostate, thyroid, ovarian and peritoneal cancers.