New method for combating prostate cancer developed

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A novel method of drug delivery to inhibit the growth of prostate cancer cells has been developed by a doctoral candidate in pharmacy at the Hebrew University of Jerusalem.

The student, Danny Goldstein, received the Barenholz Prize for Creativity and Originality in Applied Research for his work. The award, named for its donor, Yehezkel Barenholz, the Dr. Daniel G. Miller Professor of Cancer Research at the Hebrew University-Hadassah Medical School, was presented recently during the 70th meeting of the Hebrew University's Board of Governors.

Prostate cancer is the second leading cause of cancer-related death for men in the U.S. Present treatments for metastatic prostate cancer (cancer cells that spread to other parts of the body) include hormonal therapy, chemotherapy and radiotherapy, which frequently have serious side effects.

The well known drug, paclitaxel, exhibits a wide spectrum of anti-tumor activity. However, its therapeutic application in cancer therapy is limited, in part, due to its low water solubility, making it difficult to effectively deliver the drug to the points needed. It is also known to induce hypersensitivity reactions. Therefore, novel methods are needed that would allow for delivery of effective concentrations of paclitaxel over extended time intervals while minimizing toxicity.

Targeting drugs to disseminated prostate metastases is one of the most

challenging goals in prostate cancer therapy. Drug carriers -- nanoemulsions, liposomes (fatty droplets) and nanoparticles -- have shown great potential as delivery systems for an increasing number of active molecules. Although capable of enhanced accumulation in the target tissue, these carriers cannot achieve their missions unless specific binding agents are attached to them which will ensure that they succeed in attaching to the targeted tissues.

It has been shown that the HER2 receptor is over-expressed in prostate cancer cells. It was also known that trastuzumab (an antibody) binds specifically to HER2. But there had been no clinical data indicating that this antibody would provide any relief for prostate cancer patients.

Goldstein, a student of Prof. Simon Benita, was able to show that attaching trastuzumab molecules to the surface of oil droplets in nanoemulsions made possible the targeting of such droplets to cells over-expressing the HER2 receptor. He coupled trastuzumab with emulsions containing the toxic agent paclitaxel-palmitate and evaluated the efficiency of these emulsions in laboratory tests on cancerous prostate cells and on mice with induced prostate cancer. He found that this emulsion compound did not cause a hypersensitive reaction upon injection and even yielded better results than known drug treatments while inhibiting tumor growth substantially.

Goldstein cautions that this inhibiting activity of tumor metastases growth was not absolute and that while the results are encouraging, there is a need for further research to combat metastatic prostate cancer. Prof. Benita added that he hopes clinical trials using the new method can begin in about two years.

Source: The Hebrew University of Jerusalem