A 'magnetic' solution to identify and kill tumors

August 9 2010

Though a valuable weapon against cancerous tumors, radiation therapy often harms healthy tissue as it tries to kill malignant cells. Now, Prof. Israel Gannot of Tel Aviv University's Department of Biomedical Engineering is developing a new way to destroy tumors with fewer side effects and minimal damage to surrounding tissue.

His innovative method, soon to be published in the journal *Nanomedicine,* uses heat to kill the tumor cells but leaves surrounding healthy tissue intact. Using specific biomarkers attached to individual tumors, Prof. Gannot's special mixture of nano-particles and antibodies locates and binds to the tumor itself.

"Once the nano-particles bind to the tumor, we excite them with an external magnetic field, and they begin to heat very specifically and locally," says Prof. Gannot. The magnetic field is manipulated to create a targeted rise in temperature, and it is this directed heat elevation which kills the tumors, he says.

The treatment has been proven effective against epithelial cancers, which can develop in almost any area of the body, such as the breast or lung. By using a special feedback process, also developed in his laboratory, the process can be optimized for individual treatment.

A cure without casualty

The specialized cocktail of nano-particles and antibodies is administered safely and simply, through topical local injection or injection into the blood stream. As an added benefit, the mixture washes out of the body without leaving a trace, minimizing side effects.

If clinical trials are successful, the technique may become a mainstay of patient care. The nano-particles themselves are already FDA-approved, and according to Prof. Gannot, the method is effective almost any type of tumor, as long as its specific markers and its antibodies can be identified.

The countdown to demolition

In addition to being minimally invasive, this treatment boasts sheer speed. It can be applied during an out-patient procedure — the entire technique lasts only six hours — which allows patients to recuperate in the comfort of their own homes.

Prof. Gannot is currently applying his technique to cell lines and to ex vivo tissues and tissue-like substitutes in his lab, and plans to start in vivo experiments by next year.

Provided by Tel Aviv University

Citation: A 'magnetic' solution to identify and kill tumors (2010, August 9) retrieved 27 April 2024 from https://phys.org/news/2010-08-magnetic-solution-tumors.html