Cancer-killing proteins destroy tumor cells in bloodstream

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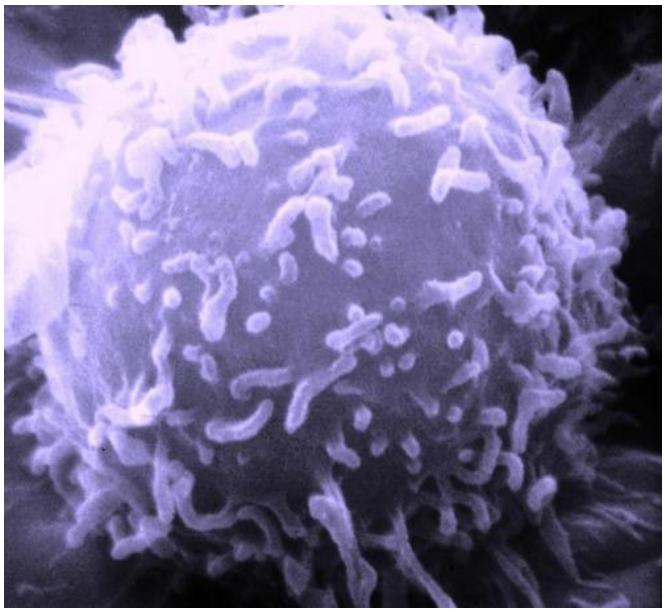

Electron microscopic image of a single human lymphocyte. Credit: Dr. Triche National Cancer Institute

Cornell researchers have discovered potent cancer-killing proteins that can travel by white blood cells to kill tumors in the bloodstream of mice with metastatic prostate cancer. The breakthrough study will be published Feb. 10 as the cover article in the *Journal of Controlled Release*.

"The therapy is remarkably effective in vivo and shows several advantages, such as no toxicity and getting good results with very low dosages," said senior author Michael King, the Daljit S. and Elaine Sarkaria Professor in Cornell's Meinig School of Biomedical Engineering. "It was our wildest dream to completely prevent the spread of prostate cancer. And that's what happened in this system."

Moving from the lab to mouse models, this therapy seeks, attacks and destroys cancer cells circulating in the bloodstream, concurrently preventing the spontaneous formation and growth of metastatic tumors. While surgery and radiation treat primary tumors, it remains difficult to detect and reach metastatic cancer cells - which makes the treatment of spreading cancer more treacherous and problematic, King explains.

King's laboratory created nano-sized liposomes with a protein called TRAIL (Tumor Necrosis Factor Related Apoptosis-Inducing Ligand) that attach to leukocytes (white blood cells). The liposomes are about one-one hundredth the size of the white blood cells. As the white blood cells travel throughout the bloodstream, the hitchhiking TRAIL protein kills the tumor cells - leaving the bloodstream free of cancer.

In the study prostate cancer cells were implanted into the prostate of male mice to let the tumors grow. The researchers found that secondary tumors were prevented by the treatment and that the primary tumor shrunk in size.

While treated mice showed no metastases, the circulating tumor cell count remained greatly reduced but not completely zero, which leads scientists to believe "you don't have to be perfect in completely eliminating circulating tumor cells to observe a very good outcome," said King.

Further, the King group found that a single dose of the therapy - even delivered very late in the course of the disease - can substantially reduce the number of tumor cells. King said: "This suggests that it may never be too late to help."

Provided by Cornell University