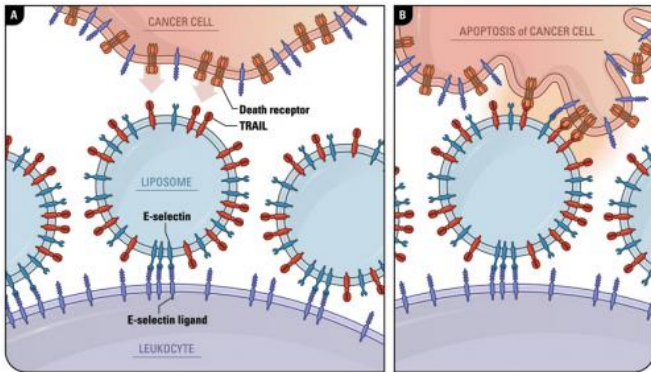


Piggy-backing proteins ride white blood cells to wipe out metastasizing cancer

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Credit: Cornell University

Cornell biomedical engineers have discovered a new way to destroy metastasizing cancer cells traveling through the bloodstream – lethal invaders that are linked to almost all cancer deaths – by hitching cancer-killing proteins along for a ride on life-saving white blood cells.

"These circulating [cancer cells](#) are doomed," said Michael King, Cornell professor of biomedical engineering and the study's senior author. "About 90 percent of cancer deaths are related to metastases, but now we've found a way to dispatch an army of killer white [blood cells](#) that cause apoptosis – the cancer cell's own death – obliterating them from the bloodstream. When surrounded by these guys, it becomes nearly impossible for the cancer cell to escape."

Metastasis is the spread of a cancer cells to other parts of the body. Surgery and radiation are effective at treating primary tumors, but difficulty in detecting metastatic cancer cells has made treatment of the spreading cancers problematic, say the scientists.

King and his colleagues injected human blood

samples, and later mice, with two proteins: E-selectin (an adhesive) and TRAIL (Tumor Necrosis Factor Related Apoptosis-Inducing Ligand). The TRAIL protein joined with the E-selectin protein was able to stick to leukocytes – white blood cells – abundant in the bloodstream. When a cancer cell comes into contact with TRAIL, which is nearly unavoidable in the frenzied flow of blood, the cancer cell essentially kills itself.

"The mechanism is surprising and unexpected in that this repurposing of white blood cells in flowing blood is more effective than directly targeting the cancer cells with liposomes or soluble protein," say the authors.

In the laboratory, King and his colleagues tested this concept's efficacy.

When treating cancer cells with the proteins in saline, they found a 60 percent success rate in killing the cancer cells. In normal laboratory conditions, the saline lacks [white blood cells](#) to serve as a carrier for the adhesive and killer proteins. Once the proteins were added to flowing blood that mimicked human-body conditions, however, the success rate in killing the cancer cells jumped to nearly 100 percent.

The study, "TRAIL-Coated Leukocytes that Kill Cancer Cells in the Circulation," was published online today in the journal *Proceedings of the National Academy of Sciences*.

More information: TRAIL-coated leukocytes that kill cancer cells in the circulation, *PNAS*, www.pnas.org/cgi/doi/10.1073/pnas.1316312111

Provided by Cornell University

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