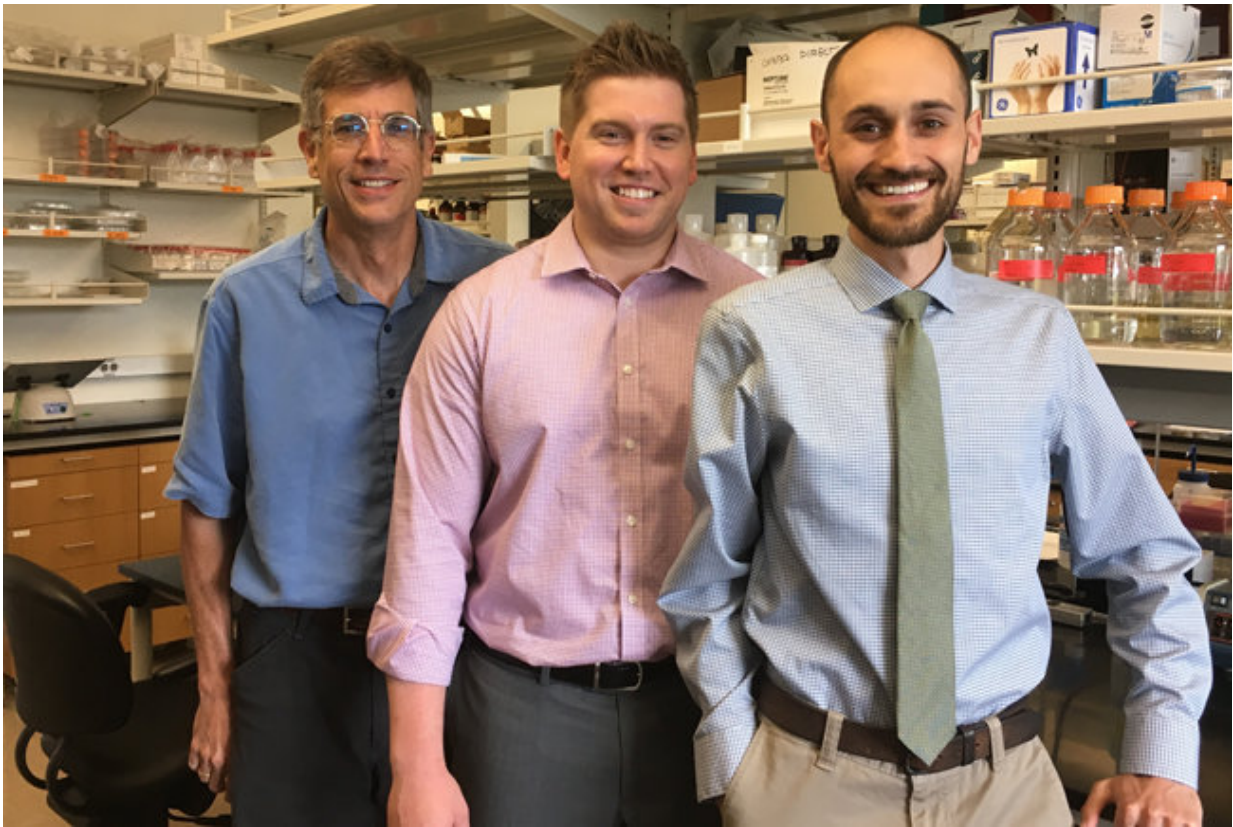


# Eradicating cancer with immune cells armed with nanorings

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(L-R) Dr. Carston R. Wagner with his students, Jacob Petersburg and Cliff Csizmar, at the Wagner Research Lab. Credit: University of Minnesota

Can we use nanotechnology to transform our own immune cells into cancer serial killers?

Dr. Carston R. Wagner, professor and endowed chair of the Department of Medicinal Chemistry in the College of Pharmacy and Masonic Cancer Center member, has proven so by his team's development of techniques that activate [immune cells](#), specifically T-cells, to track down and eradicate [tumor cells](#). This research, published in *ACS Nano*, highlights one of the most exciting areas in [cancer therapy](#).

The College of Pharmacy's Wagner Research Lab developed a method for rapidly functionalizing T-cell surfaces without the need for genetic engineering. The study demonstrated the ability to safely eradicate solid tumors in mice. Furthermore, the research exhibited effectiveness against breast cancer, the most common form of cancer among women.

"We designed protein-based nanorings that bind to T-cells," explained Wagner. "The modified T-cells—called Prosthetic Antigen Receptors (PAR-T)—quickly and continuously destroy [cancer cells](#) upon finding them."

The researchers demonstrated that they can use the Food and Drug Administration (FDA) approved drug Trimethoprim to switch the nanorings off to help address potential toxic side effects that can arise with immune cell-based anticancer therapies.

"With some luck, using the tools of chemical biology and nanotechnology, we may be able to expand the scope of [cancer immunotherapy](#) for the treatment of some of the toughest cancers we face," stated Wagner.

Wagner and his fellow researchers are currently working on targeting [cancer stem cells](#), which is key to stopping cancer from recurring. Preliminary studies have shown that a PAR-T cell approach can work in this arena, too. In the hope of moving their discoveries into the clinic, the U of M recently licensed the technology to Tychon Bioscience,

LLC., a local start-up company, where Wagner is a founder and Chief Scientific Officer.

**More information:** Jacob R. Petersburg et al. Eradication of Established Tumors by Chemically Self-Assembled Nanoring Labeled T Cells, *ACS Nano* (2018). [DOI: 10.1021/acsnano.8b01308](https://doi.org/10.1021/acsnano.8b01308)

Provided by University of Minnesota

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