

Engineered peptides open new avenue for immunotherapy drug development

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In a new study published in [Nature Biomedical Engineering](#), researchers at The University of Texas MD Anderson Cancer Center have designed a new method for developing immunotherapy drugs using engineered peptides to elicit a natural immune response inside the body.

In [preclinical models](#) of locally advanced and [metastatic breast cancer](#), this method improved tumor control and prolonged survival, both as a monotherapy and in combination with [immune checkpoint inhibitors](#).

"Amino acids are the building blocks of life and, when a few of them are linked together, they create a peptide. All the biological functions performed by our body are done by proteins and peptides, so our goal was to find a way to redesign these [small molecules](#) to possess the unique ability to activate our immune system," said senior author Betty Kim, M.D., Ph.D., professor of Neurosurgery.

The body's immune system is built to patrol and identify infected or diseased cells to eliminate, but cancer cells often exploit weaknesses in the immune system to avoid detection. The goal of immunotherapy is to bolster the body's natural ability to identify and destroy cancer cells. Current immune checkpoint inhibitors are antibodies designed to block specific immune signaling pathways.

The engineered peptide improves the immune system's ability to detect and destroy cancer cells in a unique way. Rather than using an external compound to initiate a response, or harvesting and modifying immune cells for cell therapies, the peptide serves as a messenger to activate specific signaling pathways in immune cells to boost their performance.

"These findings open a whole new avenue for developing immunotherapy drugs. By using designed polypeptides, we can potentially

activate immune signaling pathways to enhance anti-tumor responses. Additionally, since these are naturally derived agents, we anticipate the toxicity profile would be significantly better than with synthetic compounds," said co-corresponding author Wen Jiang, M.D., Ph.D., associate professor of Radiation Oncology.

More information: Synthetic cationic helical polypeptides for the stimulation of antitumour innate immune pathways in antigen-presenting cells, *Nature Biomedical Engineering* (2024). [DOI: 10.1038/s41551-024-01194-7](https://doi.org/10.1038/s41551-024-01194-7).
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