

## Novel Crosslinked Hydrogel Improves Efficacy and Side Effects of Cancer Treatment (#8505)

*An innovative immunotherapy method uses checkpoint inhibitors to advance current antitumor therapeutics*

This invention describes a new drug delivery system for improving cancer treatment via the local and sustained delivery of antibodies targeting immune checkpoints. It utilizes a local intradermal injection of in situ crosslinked hydrogel to tumor-draining lymph nodes in order to deliver immune checkpoint blockade antibodies and promote activation of t cells so that they can infiltrate the tumor microenvironment. Specifically, the Georgia Tech research team's method mixes synthesized thiolated thermosensitive polymers with maleimide functionalized polyethylene glycol to make the hydrogel. The hydrogel is then combined with the antibody of interest before delivery.

In early experiments, this technology demonstrated reduced tumor growth, improved survival rates, and minimal liver toxicity. By promoting the differentiation, proliferation, and activation of tumor-specific t cells, the crosslinked hydrogel leverages the body's immune system to augment the effects of antitumor treatments.

### Benefits/Advantages

- **Versatile:** Can integrate with all types of immune checkpoint blockade antibodies and respond to various types of cancers
- **Improved tolerability via local delivery:** Limits side effects on nonmalignant tissues and organs—a challenge of other immunotherapies
- **Innovative:** Leverages the body's natural immune response to reduce the likelihood of cancer recurrence

### Potential Commercial Applications

- Anticancer treatments

### Background/Context for This Invention

Immunotherapy has become a widely popular method for treating cancer as it leverages the body's immune system to target and kill cancer cells naturally. Immunotherapies are usually administered systemically; however, this route often leads to adverse effects on nonmalignant tissues and organs and limits the effectiveness of the treatment on the tumor site. Georgia Tech's crosslinked hydrogel delivery method meets the need for innovative drug delivery systems for immune checkpoint blockade antibodies,

which could serve to improve the viability of immunotherapy as an alternative to chemical drug treatment.

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**More Information**

**U.S. Number:** 63/051,107

**Publications**

**For more information about this technology, please visit:**

<https://licensing.research.gatech.edu/technology/novel-crosslinked-hydrogel-improves-efficacy-and-side-effects-cancer-treatment>

Images:

The automated sequential delivery of multiple fluids. A varying number of delay gates imprinted in the branches are shown in the figure.

COVID-19 and flu saliva test on paper: (A) The automatic sequential delivery of multiple reagents required for virus test; (B) Water pouring into the device triggers the virus assay, allowing the presence of SARS-CoV-2 and influenza A & B viruses to be visually identified by the color changes in the corresponding detection spot

