

Long-Lasting & Self-Sustaining Cell-Based Drug Delivery System

Summary

Current T-cell therapies rely on the successful transplant and survival of infused, therapeutic cells in a patient. The efficacy of a cell therapy is limited by the extent of cell survival after adoptive cell transfer (ACT) and by the stability of the engraftment. Poor engraftment of transplanted cells results in loss of therapeutic efficacy, increasing the financial and physical burdens borne by patients. Similarly, patients who suffer from chronic disorders requiring repeated administration of therapeutic proteins, such as EPO, have few treatment options: many require multiple injections or invasive, expensive alternatives. There is thus a significant unmet need for long-lasting and self-sustaining therapies for multiple indications.

Technology Description

Researchers at Vanderbilt have created a novel drug delivery system using two distinct T-cell populations that interact to promote engraftment and persistence in pre-clinical models, increasing the efficacy of T-cell therapies. Furthermore, "booster" treatments can be administered months after the first dose to produce an expansion of antigen specific T cells. These advantages result in longer-term therapeutic efficacy and could reduce the number of treatments required. This system also represents a viable self-renewing platform for the delivery of biologic drugs in patients who would otherwise require frequent administration.

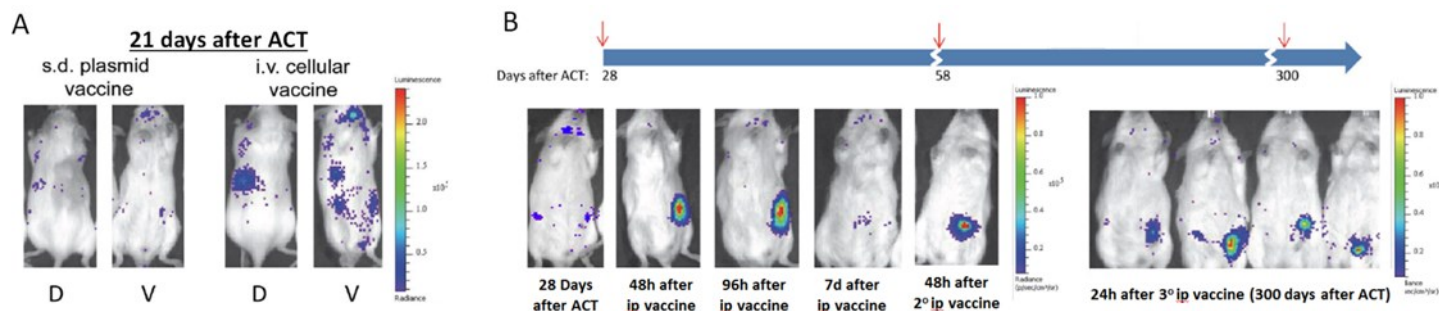


Figure 1. Luciferase imaging demonstrating the utility of T cell vaccination. **A)** Representative comparison of T cell engraftment achieved using subdermal plasmid vaccination (left panels) and self-antigen specific T cell vaccination (right panels). **B)** Images showing T-cell localization after cellular "booster" vaccine administration 28, 58, and 300 days post-adoptive cell transfer (ACT). Red arrows on timeline indicate days when "booster" treatments were given.

Intellectual Property Status

A patent application has been filed

Technology Development Status

This invention was recently published in *Nature Communications*; DOI: [10.1038/s41467-018-03787-8](https://doi.org/10.1038/s41467-018-03787-8)

Technology Features

- Prolongs efficacy window of T-cell therapy
- Self-renewing source of a biologic drug
- "Booster" treatments can be administered
- Effects last weeks after the first dose
- Reduces number of treatments and costs for patients

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VU REFERENCE: VU17070

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