



Harvard John A. Paulson
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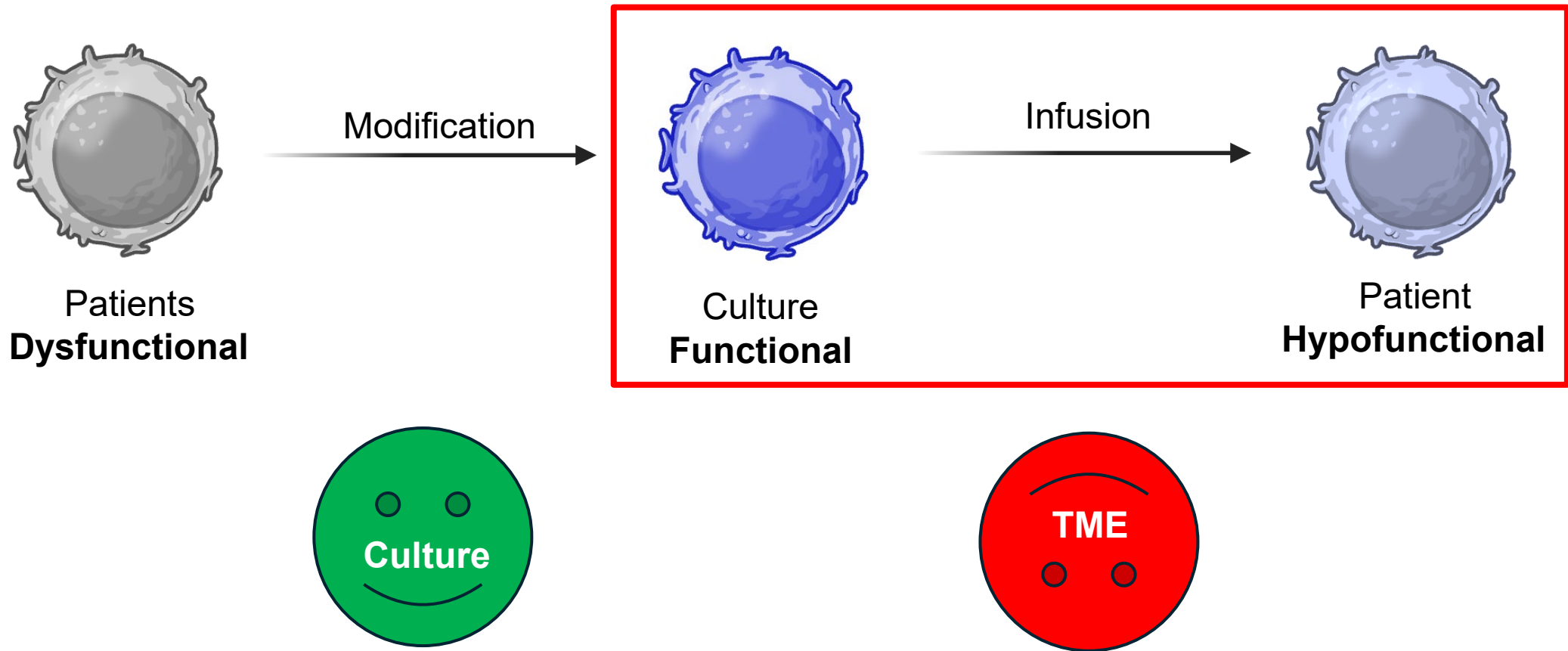
Cellular Backpacking to Enhance T Cell-based Cancer Therapy

Presenter: Suyog Shaha

Thesis committee: Prof. Samir Mitragotri, Prof. David Mooney, Prof. Marcela Maus



A decline in Cytotoxic T lymphocyte (CTL) functionality post-infusion is often observed in non-responder cancer patients



TME: tumor microenvironment

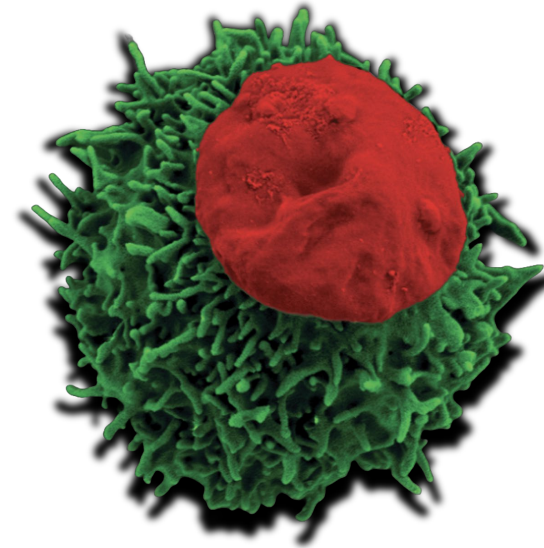
Rudloff et al., Nature Immunology (2023); Chiffelle et al., Immunity (2024)

Thesis

A biomaterial strategy that co-migrates with CTLs like a backpack after infusion

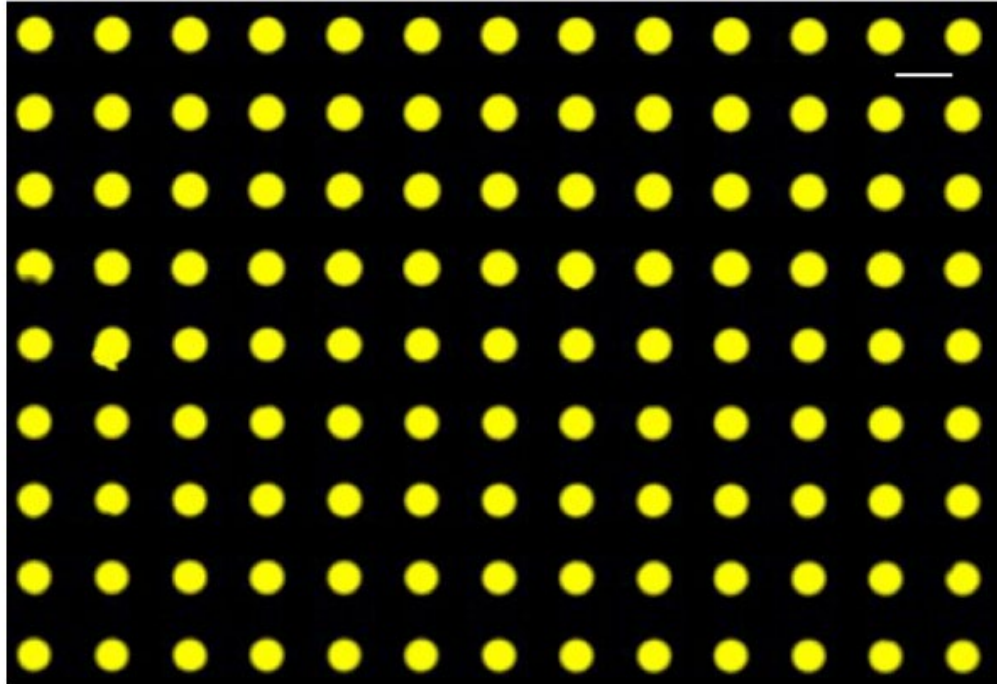


Design

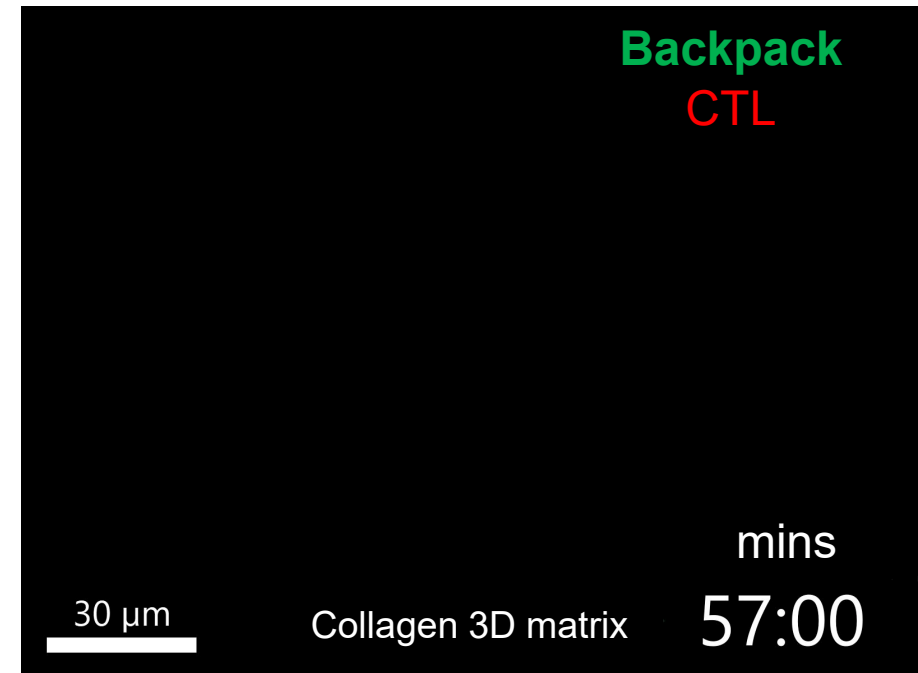


Execution

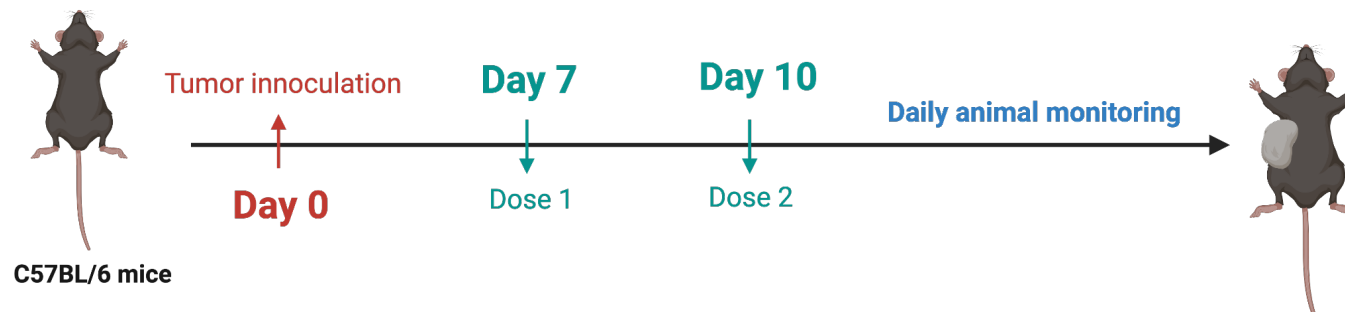
Backpacks efficiently bind to and co-migrate with CTLs



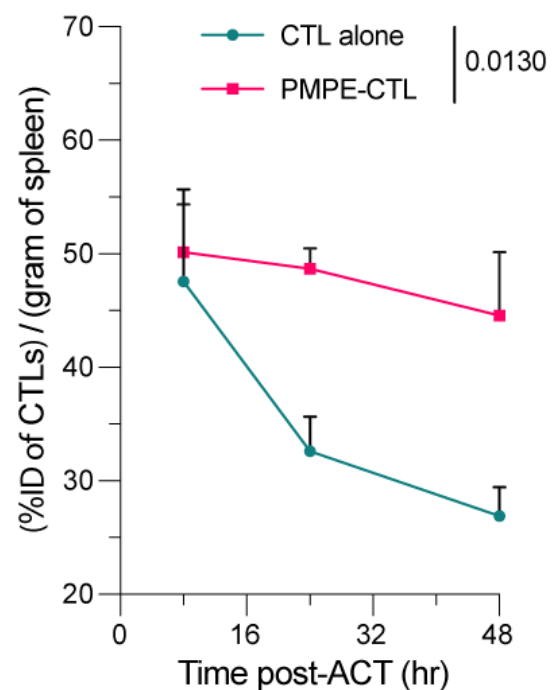
Backpacks (6 μm)



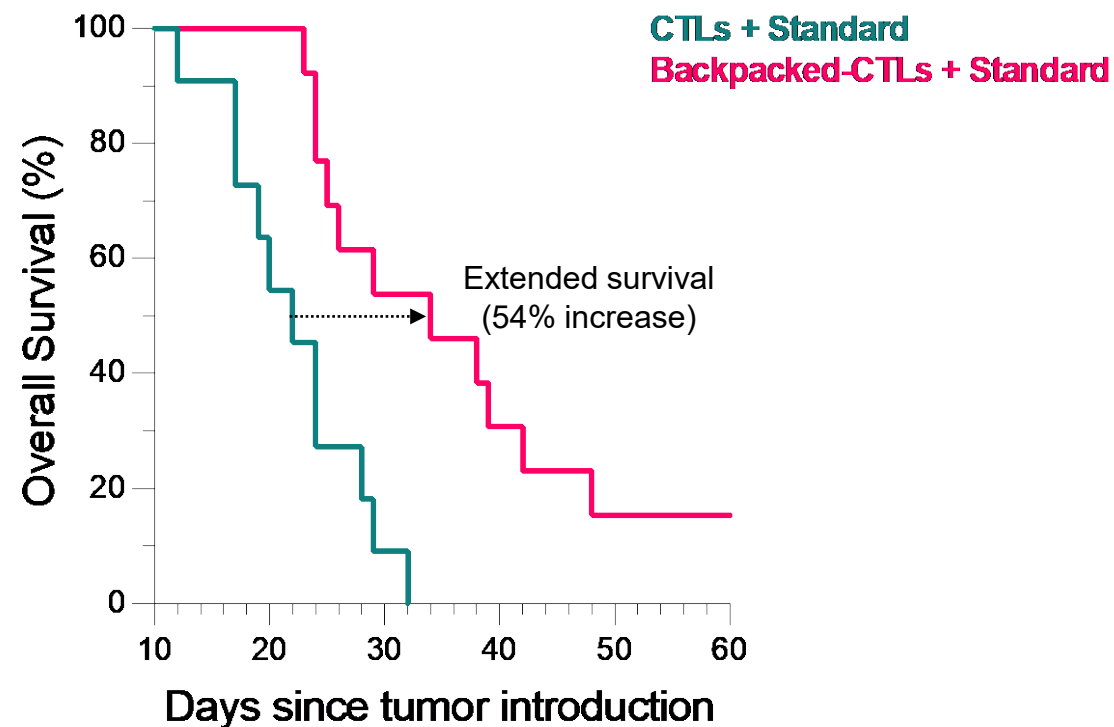
CTLs with backpacks outperform CTLs in treating melanoma in mice



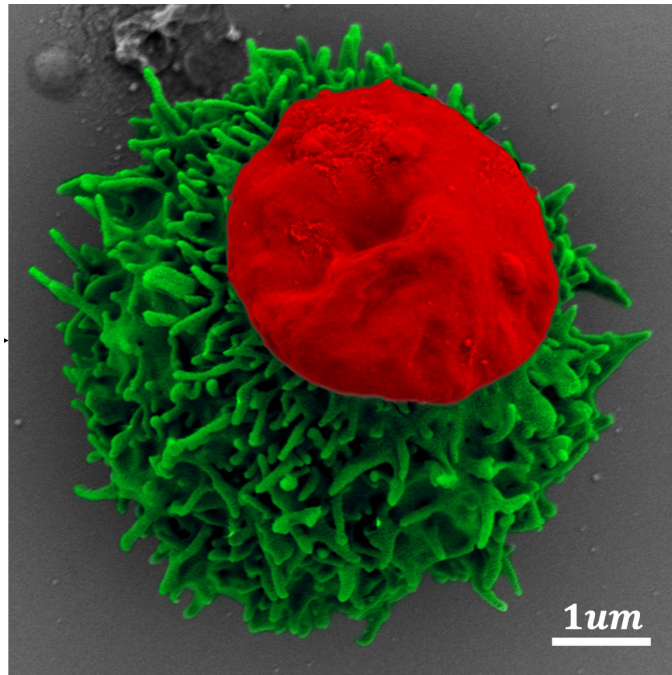
1) CTL Persistence



2) Animal Survival



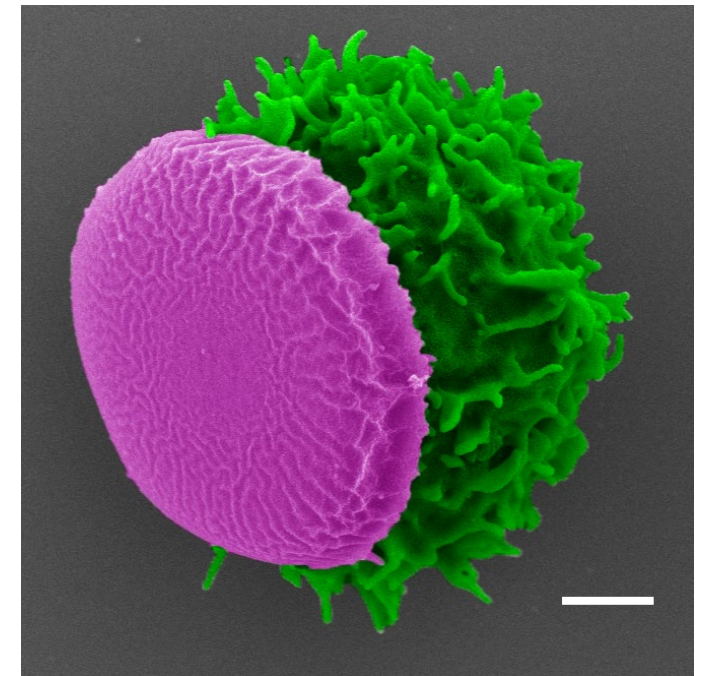
A co-migrating biomaterial: contact-driven surface engineering



Polymeric Micropatches



Cellular Backpacks



Hydrogel Micropatches