Umoja BIOPHARMA

Your Body. Your Hope. Your Cure.

Retooling Your Immune System In Vivo to Fight Cancer

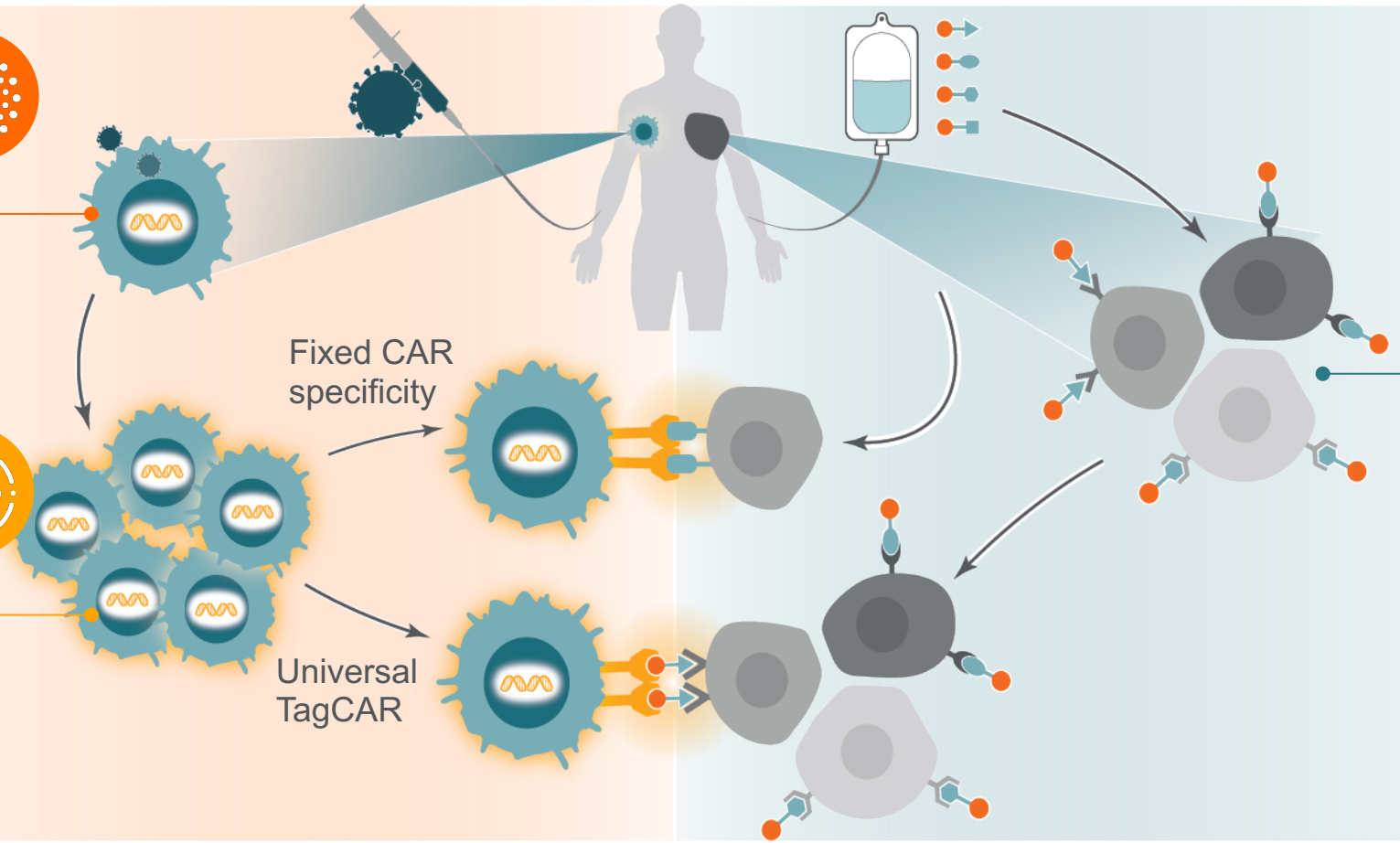
ASGCT, May 2021

Our mission is to advance and improve access to immunotherapy by retooling the patient's immune system in vivo, freeing them from the burden of cancer in their daily lives

Umoja's integrated immunotherapy platform provides solutions to the challenges in both blood and solid tumor CAR-T therapies

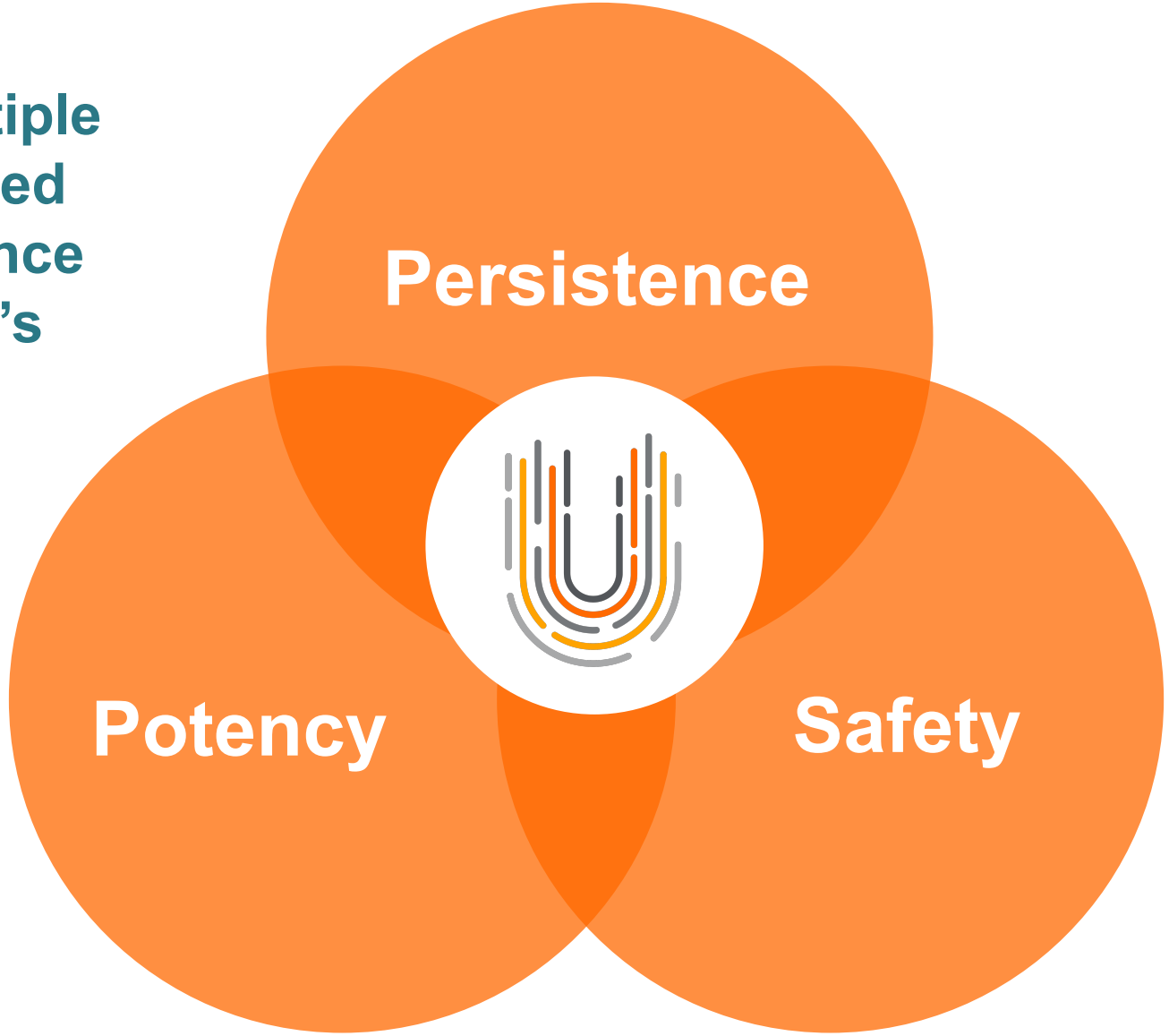
ARM:
VivoVec engineers cells in vivo
- surface engineered lentivirus-mediated in vivo transduction

EXPAND:
RACR preferentially expands engineered cells
- Rapamycin activated cytokine receptor (RACR)



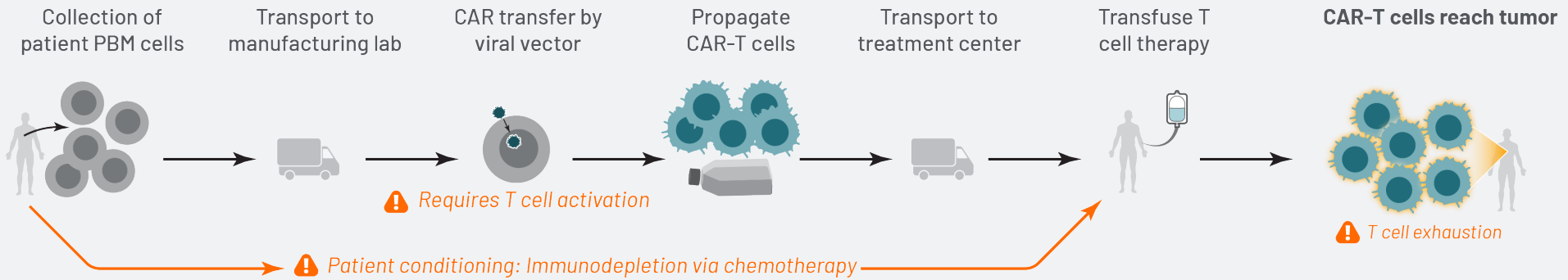
DESTROY:
TumorTag universally targets multiple tumor elements
- small molecule bi-specific adapters

Umoja's platform captures multiple key potency attributes associated with autologous CAR-T cells since it is compatible with the patient's own immune system…



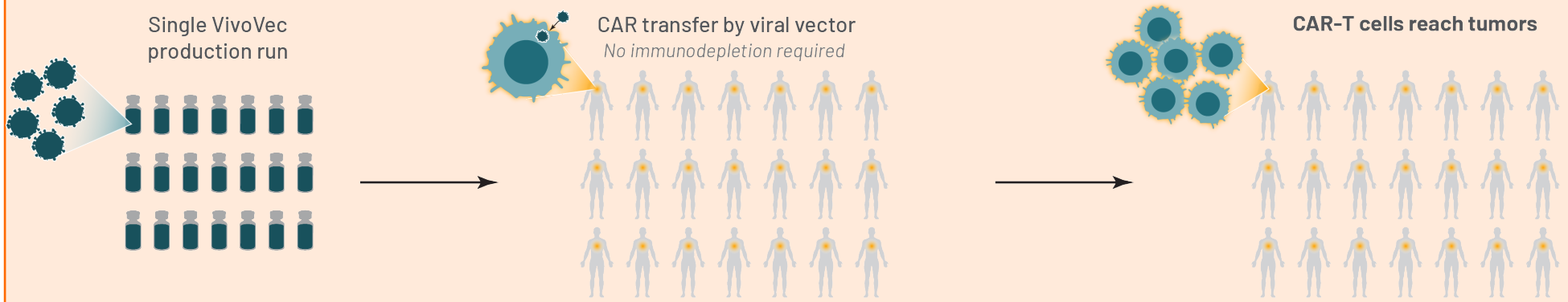
… while expanding convenience and scalability beyond allogeneic products

Autologous or Allogeneic approaches require extensive ex vivo manipulations



Logistically complex, expensive, introduces less-than ideal activation and expansion conditions that may lead to unfavorable T cell health

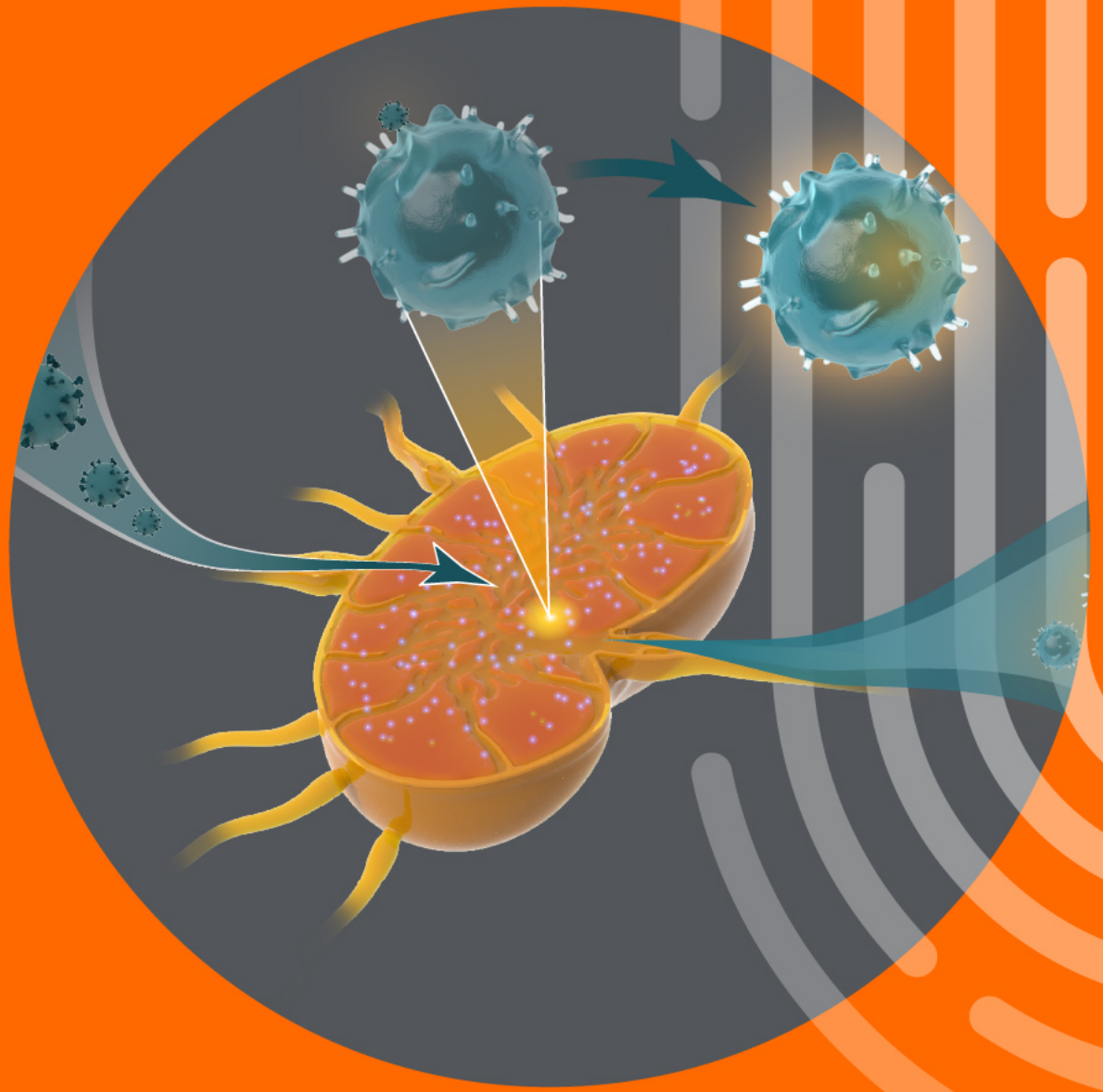
VivoVec — one manufacturing process treats thousands of patients in vivo



One lot treats many patients who "manufacture" their own CAR-T cells with minimal manipulation and with potentially enhanced potency

VivoVec

In vivo CAR T cell generation

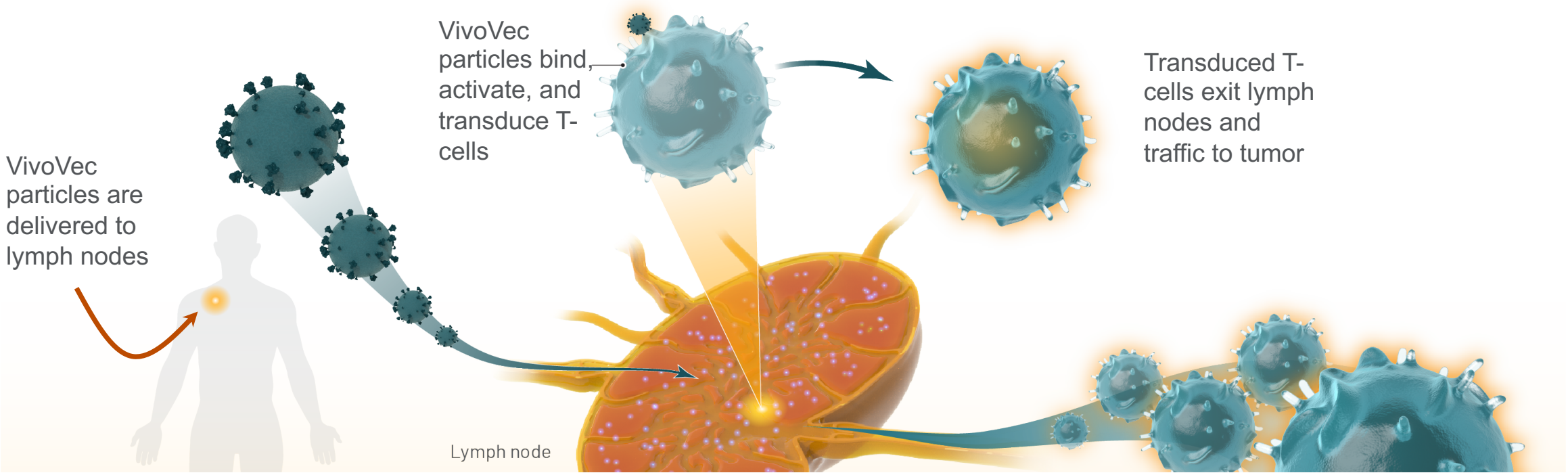


VivoVec platform solves the technical barriers to *in vivo* genetic engineering of T cells

Technical hurdles for in vivo genetic engineering	VivoVec Solutions
”Condition”/activate T cells for efficient transduction	**Lentivirus surface engineering for efficient T cell activation and transduction in vivo**
In vivo expansion of engineered T cells	**Drug-regulated cytokine receptor in the payload enables in vivo stimulation and expansion of transduced cells**
Avoid exhaustion during expansion	**“Natural” expansion process in the body maintains high potency**
VSV-G enveloped lenti particles are highly immunogenic and rapidly rejected	**Novel glycoprotein reduces potential for immunogenicity (relative to VSV-G)**

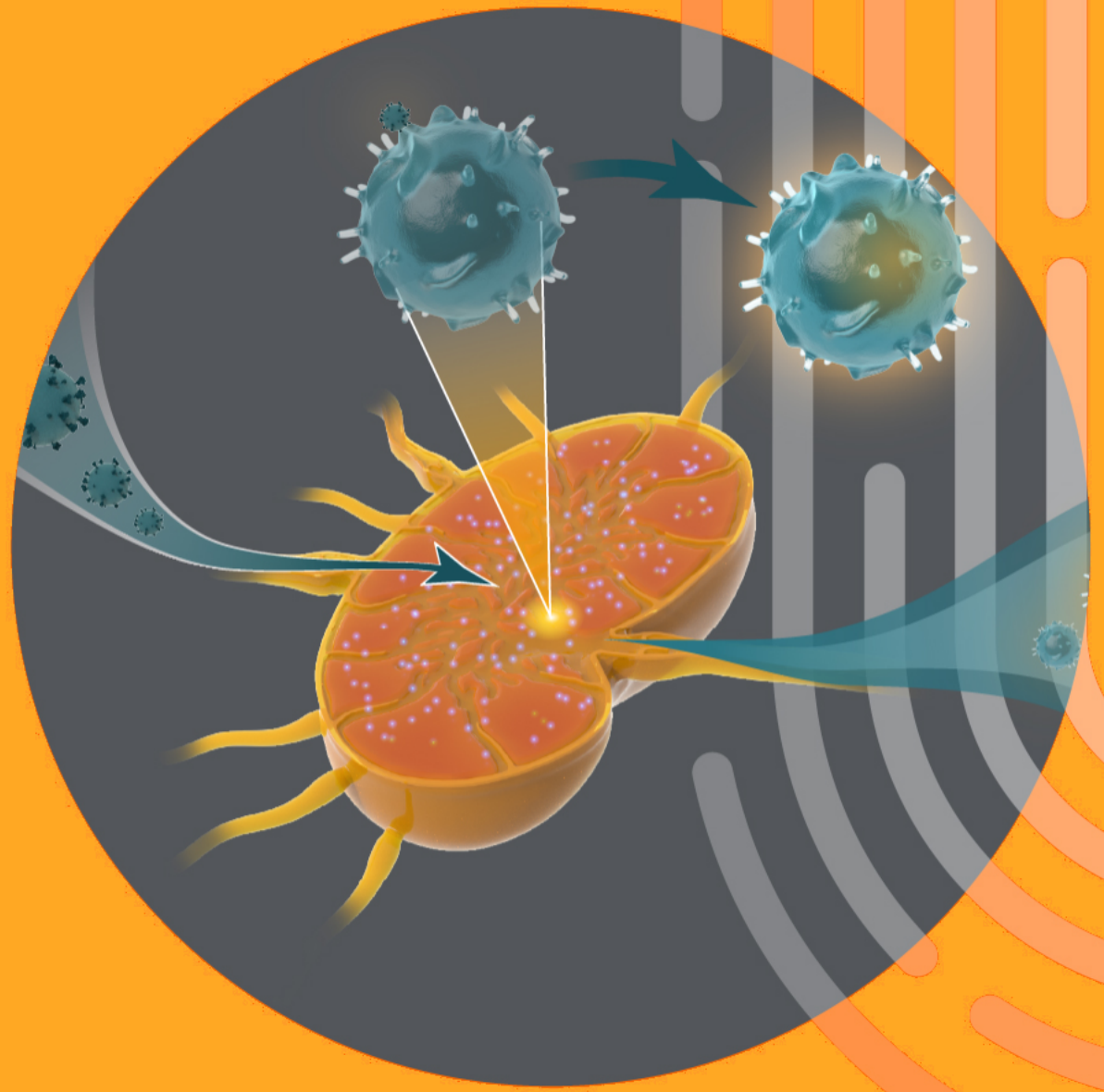
Foundational concept:
lymph nodes are nature's optimized T cell "manufactory"

Umoja leverages a deep understanding of the human immune system's physiology for its proprietary approach to *in vivo* T cell engineering

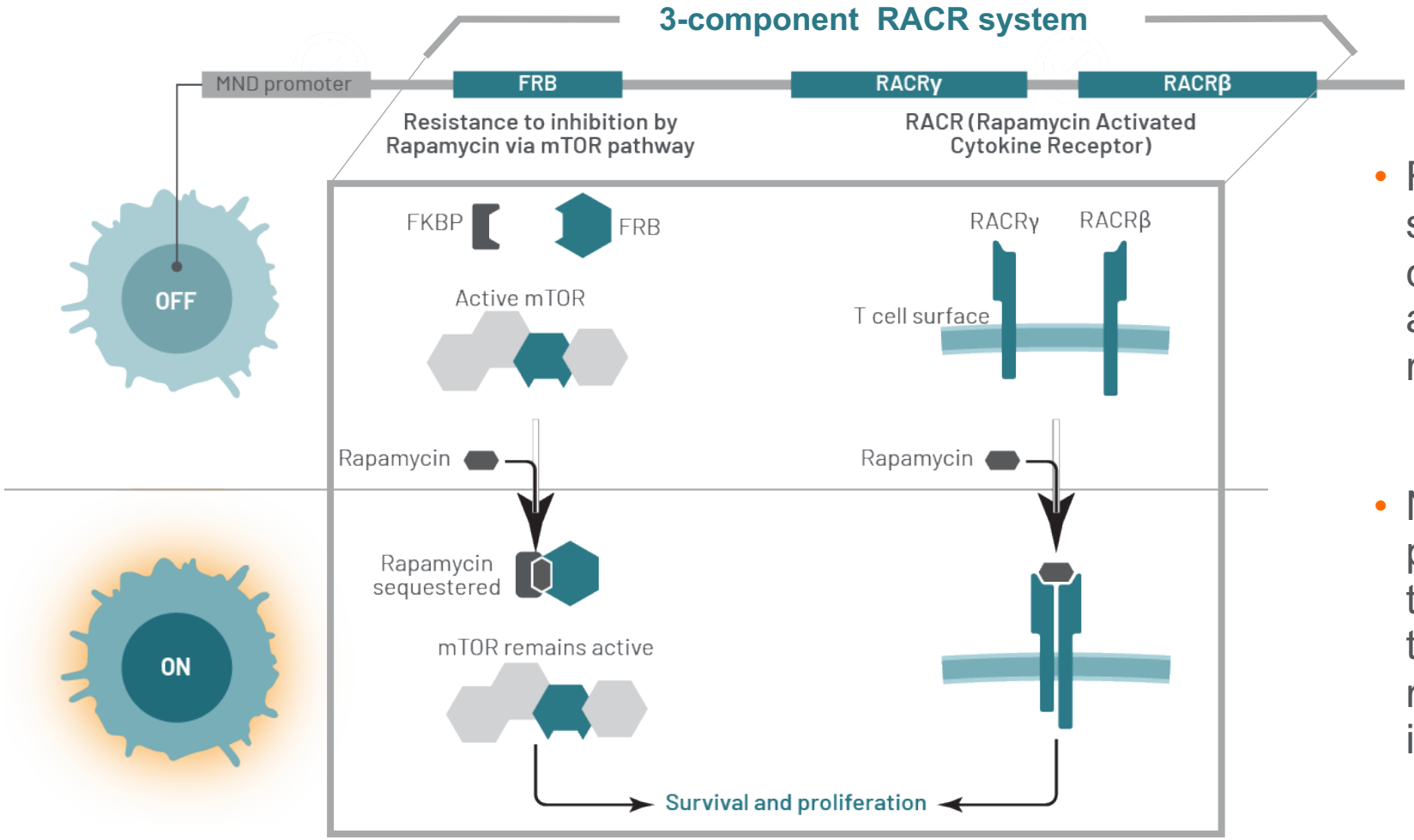


RACR

In vivo CAR T cell expansion



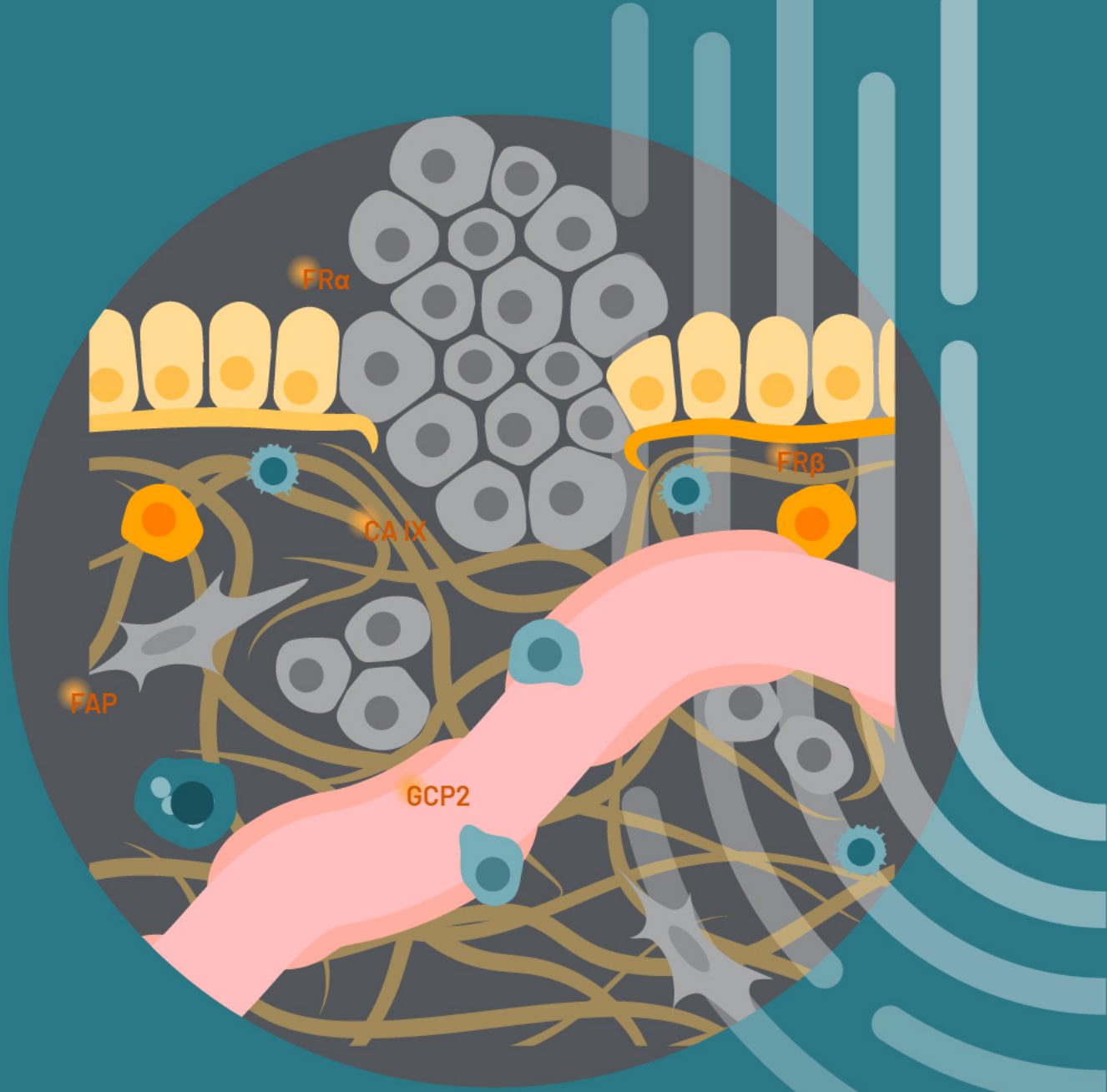
RACR: Rapamycin Activated Cytokine Receptor provides control over expansion



- Rapamycin activates the RACR system which replicates common γ chain cytokine activating STAT5 signaling for robust proliferation and survival
- Naked intracellular FRB domain provides rapamycin resistance to transduced cells while non transduced T and B cells are repressed through mTOR inhibition

TumorTag

Controllable Combinatorial Targeting of Tumor and Stroma



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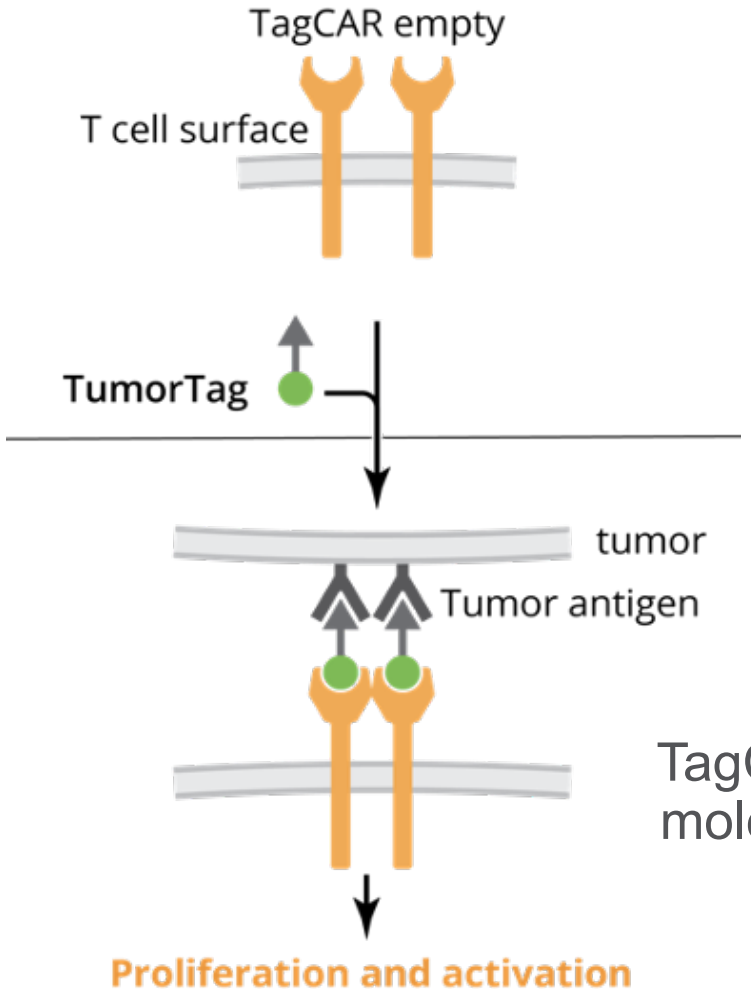
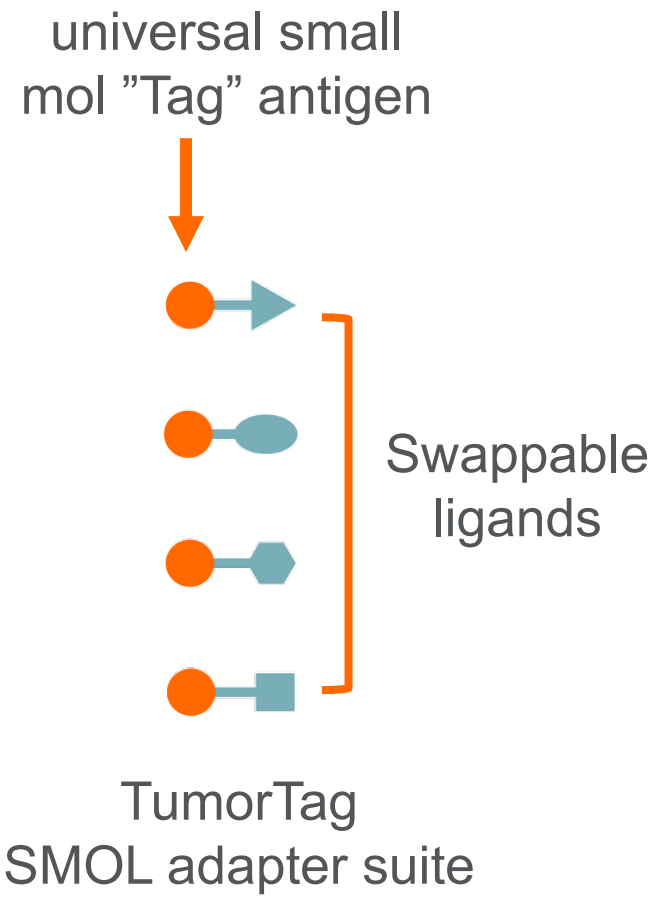
Targeting with adapters for broad tumor and stroma recognition

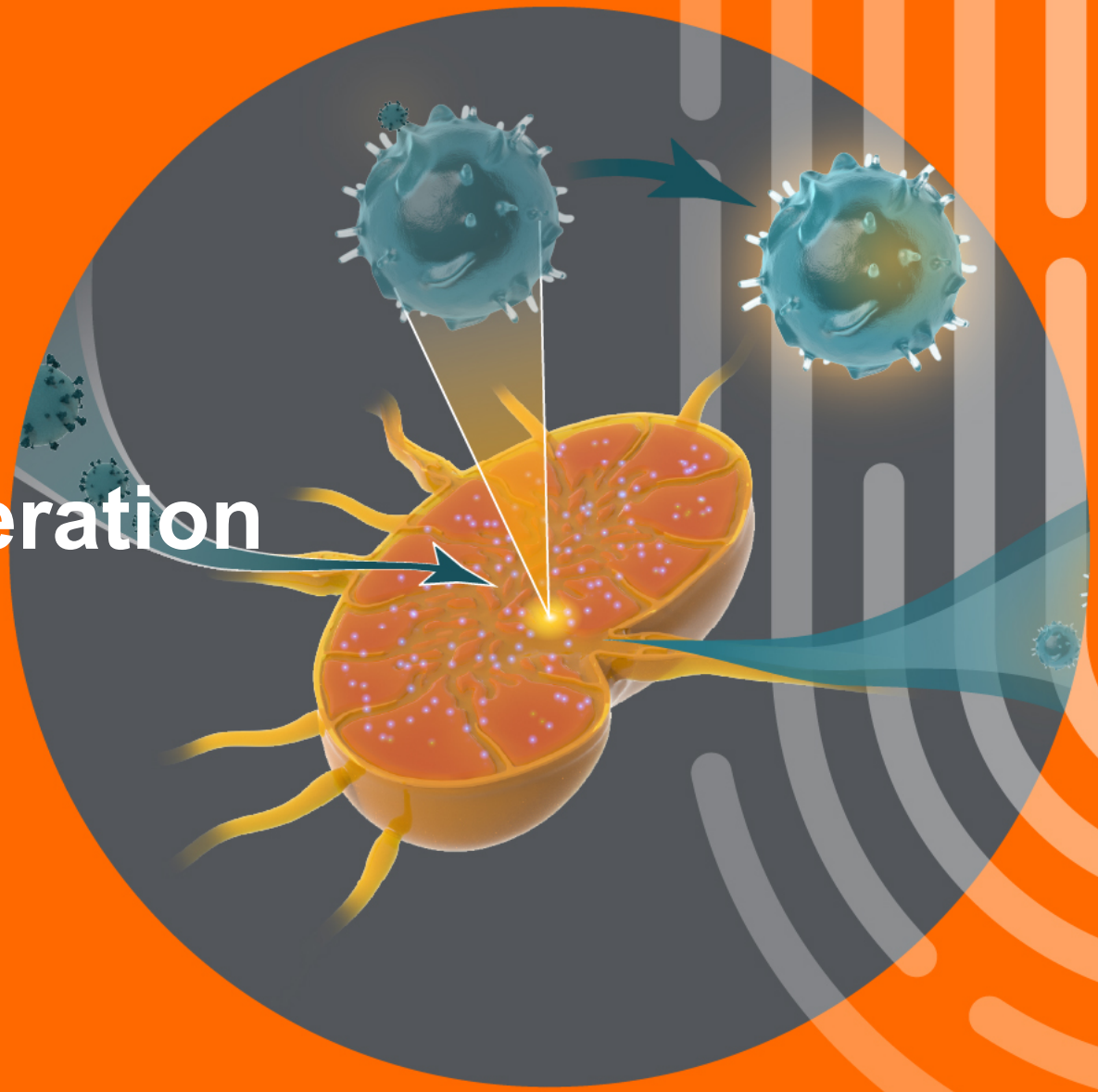


TagCAR sees a universal small molecule that “tags” an antigen



UB-VV100

In vivo CD19 CAR T generation for the treatment of B cell malignancies



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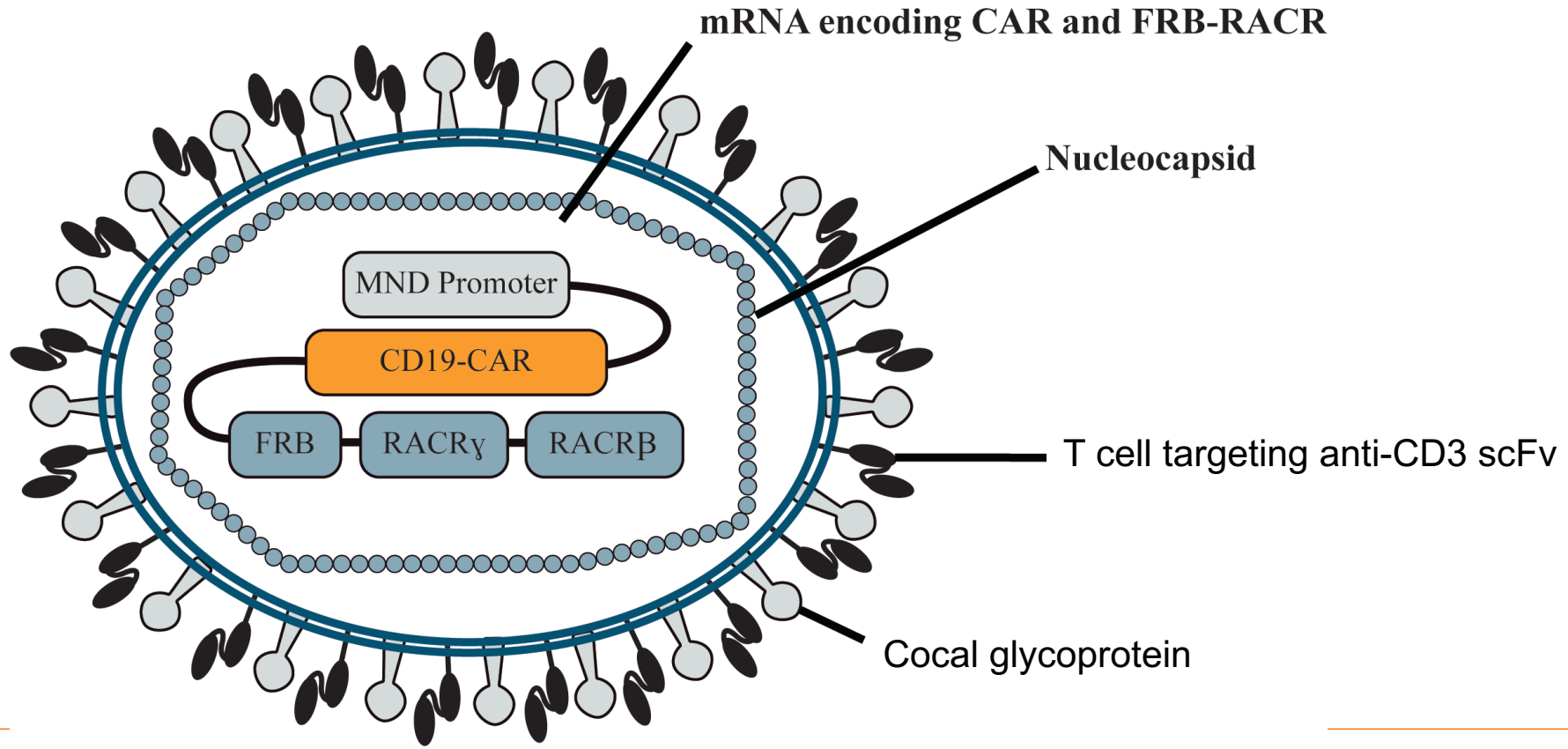
UB-VV100 drug product:

A 3rd generation, self-inactivating, replication-incompetent lentivirus designed for direct injection into patients to target T cells and deliver a payload consisting of a 2nd gen anti-CD19 CAR and a rapamycin-activated cytokine receptor (RACR) system for the treatment of B cell malignancies.

Abstract 637
Session 519
Poster #1210



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Thank you

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