

# The 16<sup>th</sup> US-Korea Forum on Nanotechnology

## DNA-scaffolded biomaterials enable modular and tunable control of immune cell therapies

*Xiao Huang, PhD*

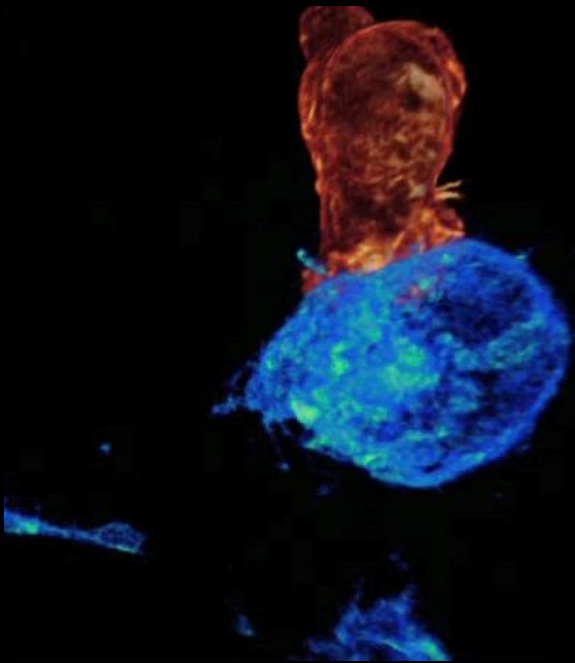
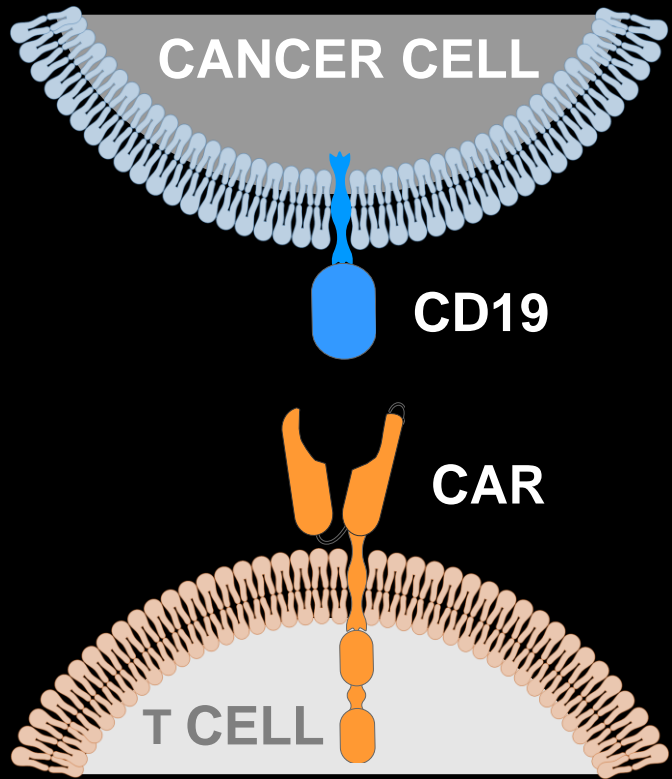
*Postdoc Scholar, Desai Lab*

*University of California San Francisco*



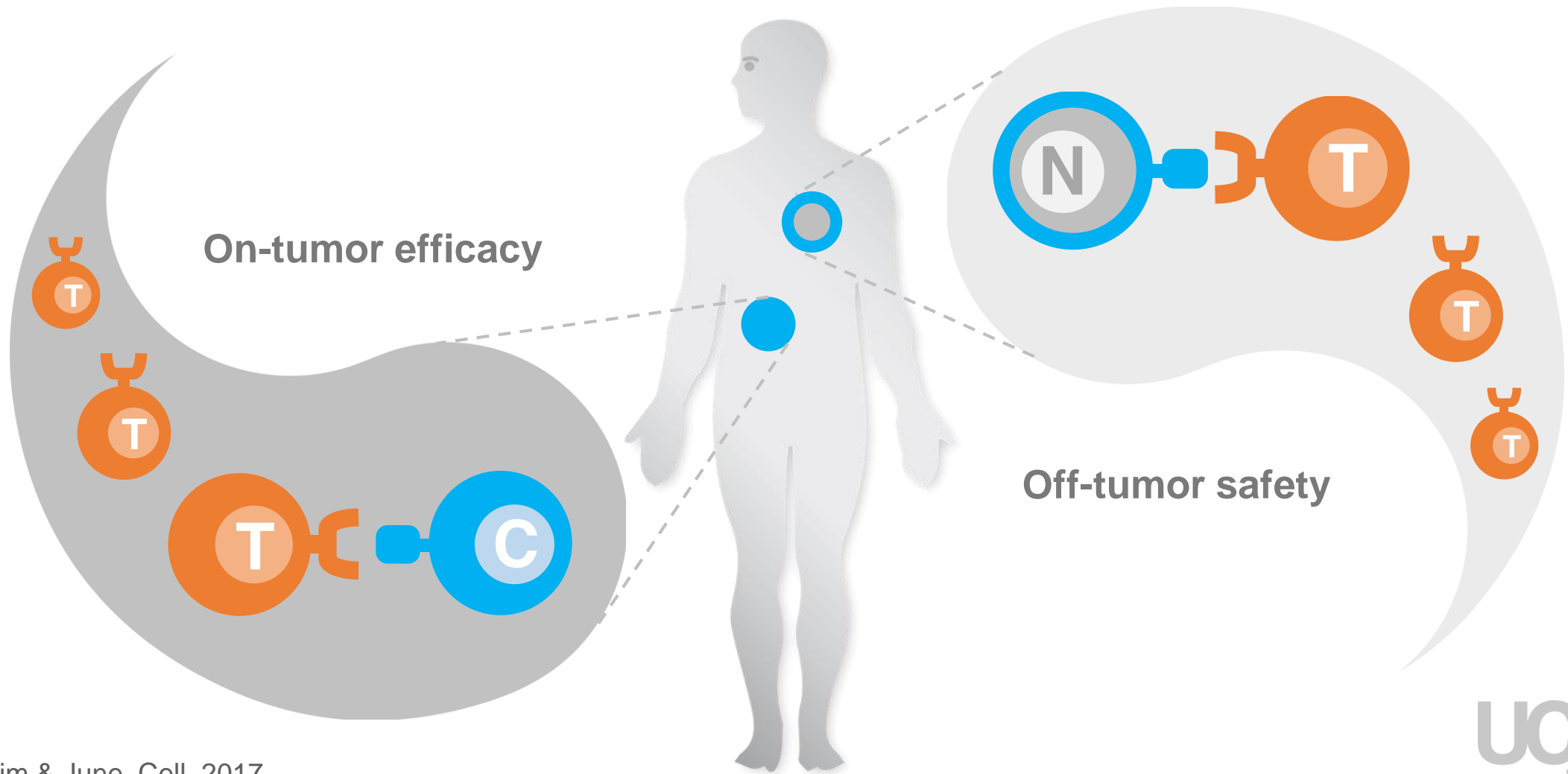
UCSF

# CAR-T therapy – revolutionary cancer therapy

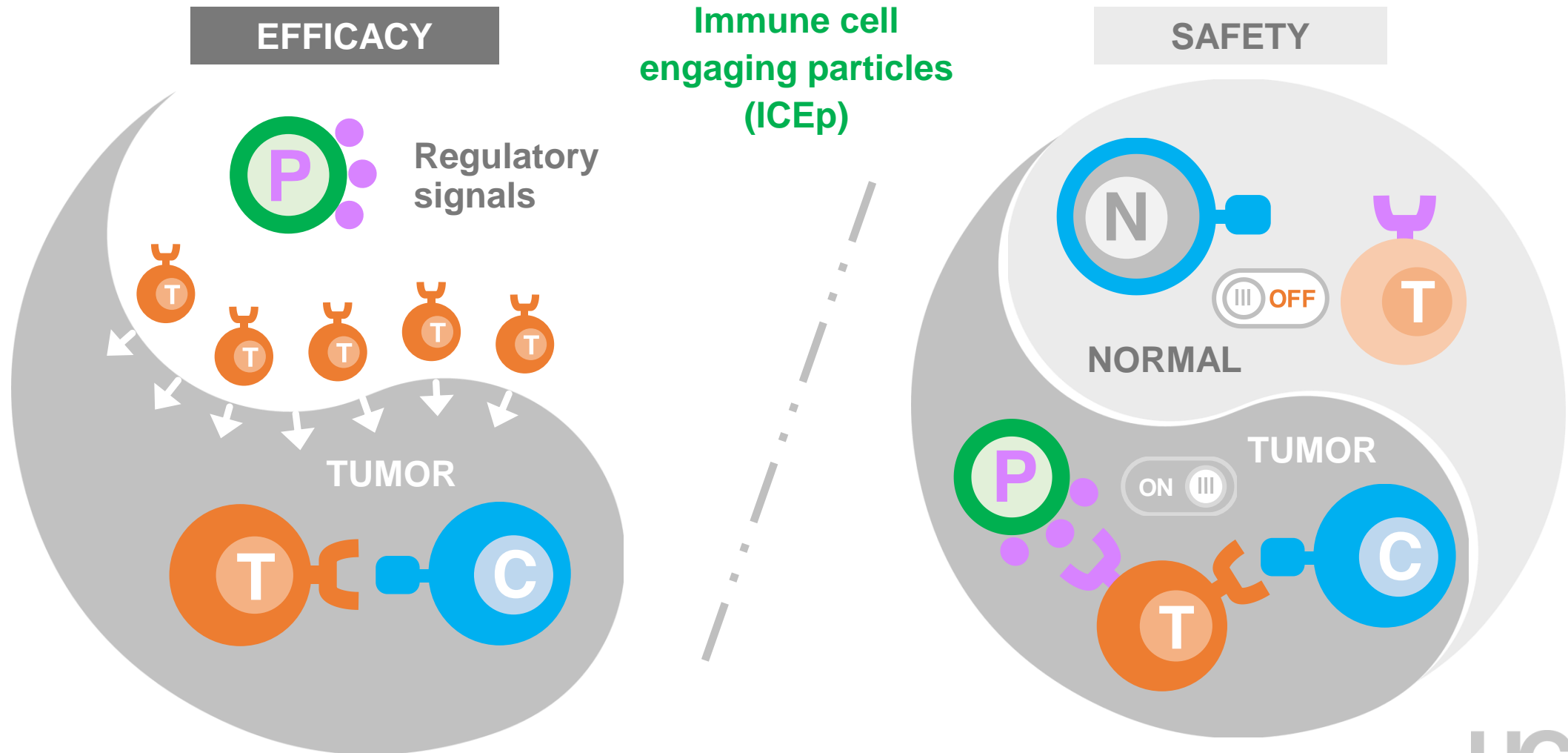


Brown & Mackall. Nature Reviews Immunology, 2019

# Efficacy and safety are critical aspects for cancer therapy

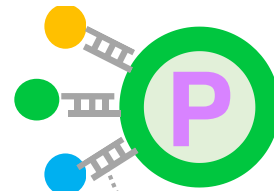
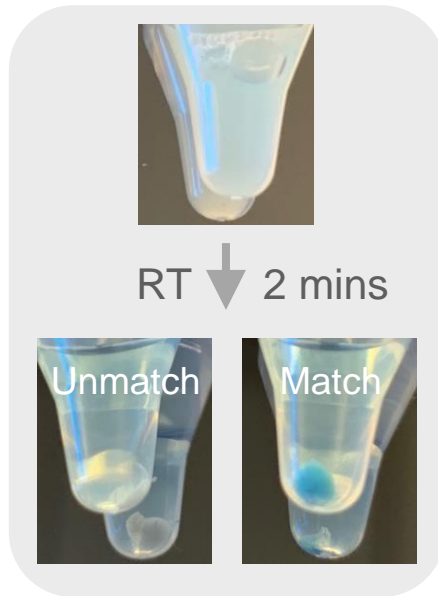


# Biomaterials can modulate immune cell behaviors



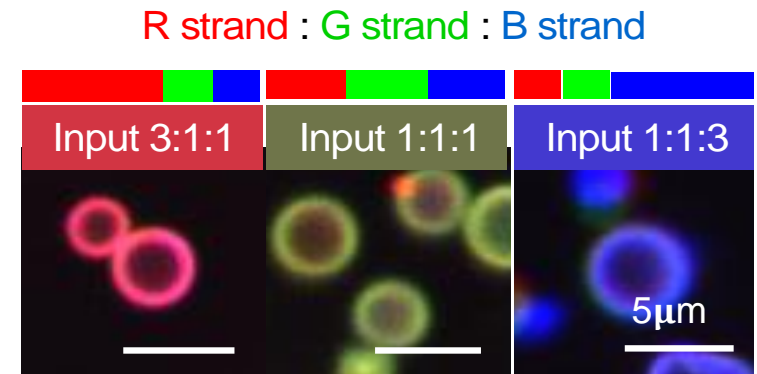
# DNA scaffolds on biomaterials allows efficient loading and precise control of functional proteins

FAST

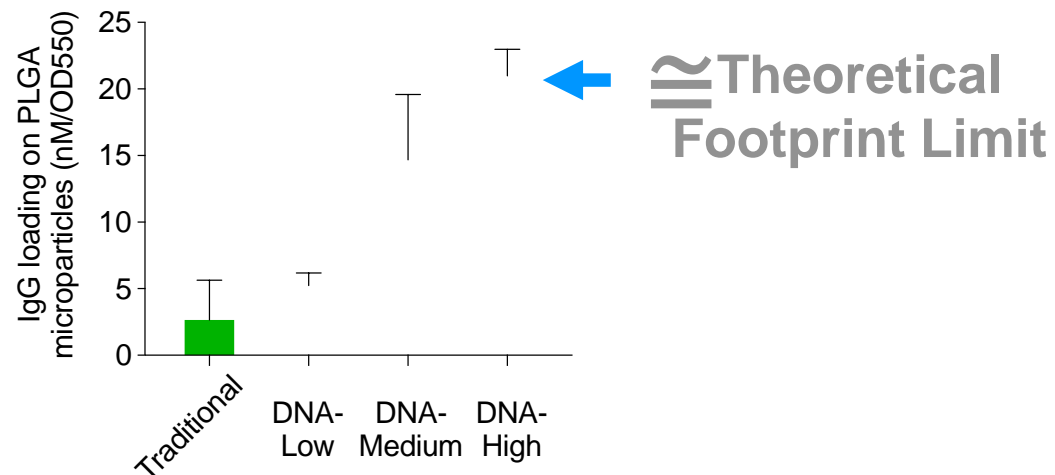


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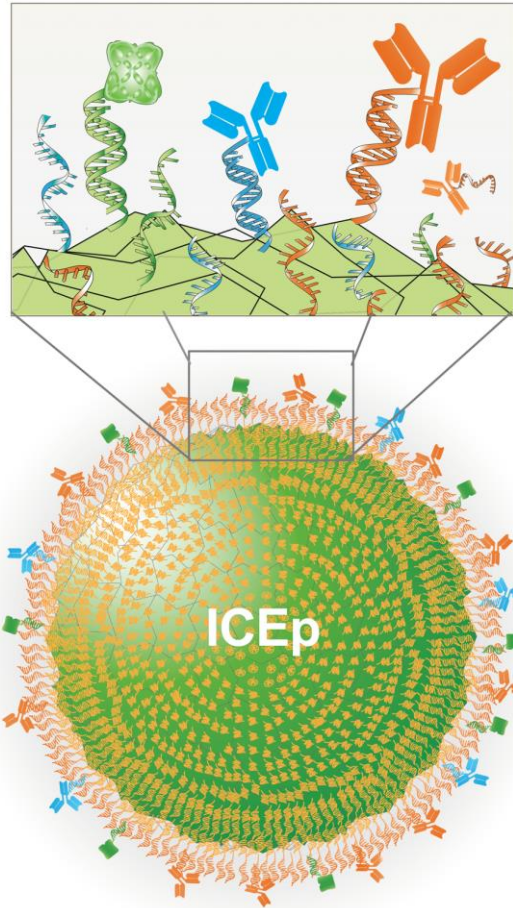
VERSATILE



EFFICIENT

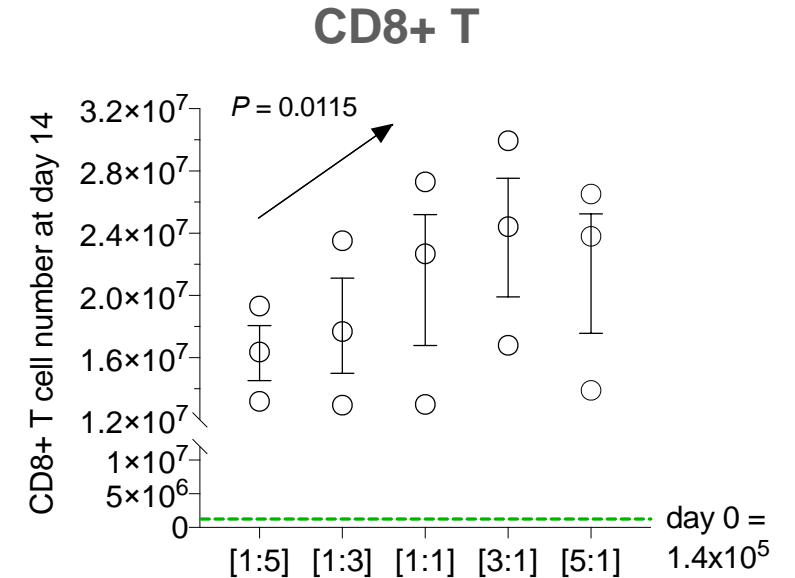
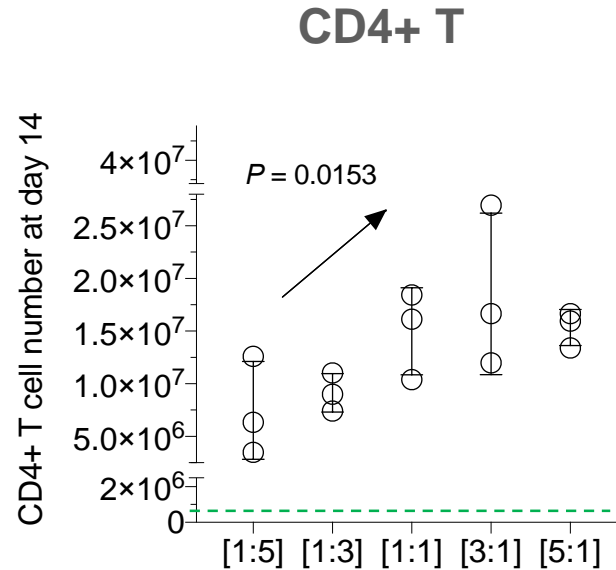
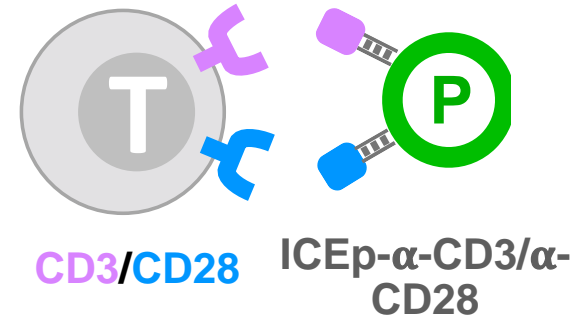


# ICEp can provide unique opportunities for boosting of immune cell efficacy

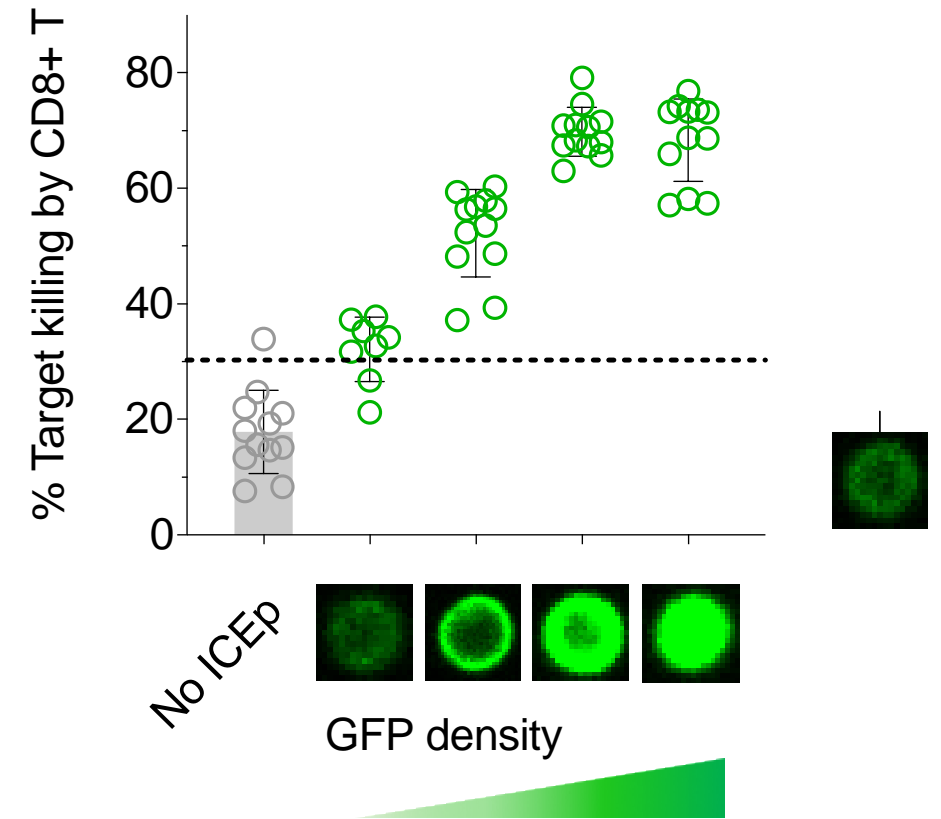
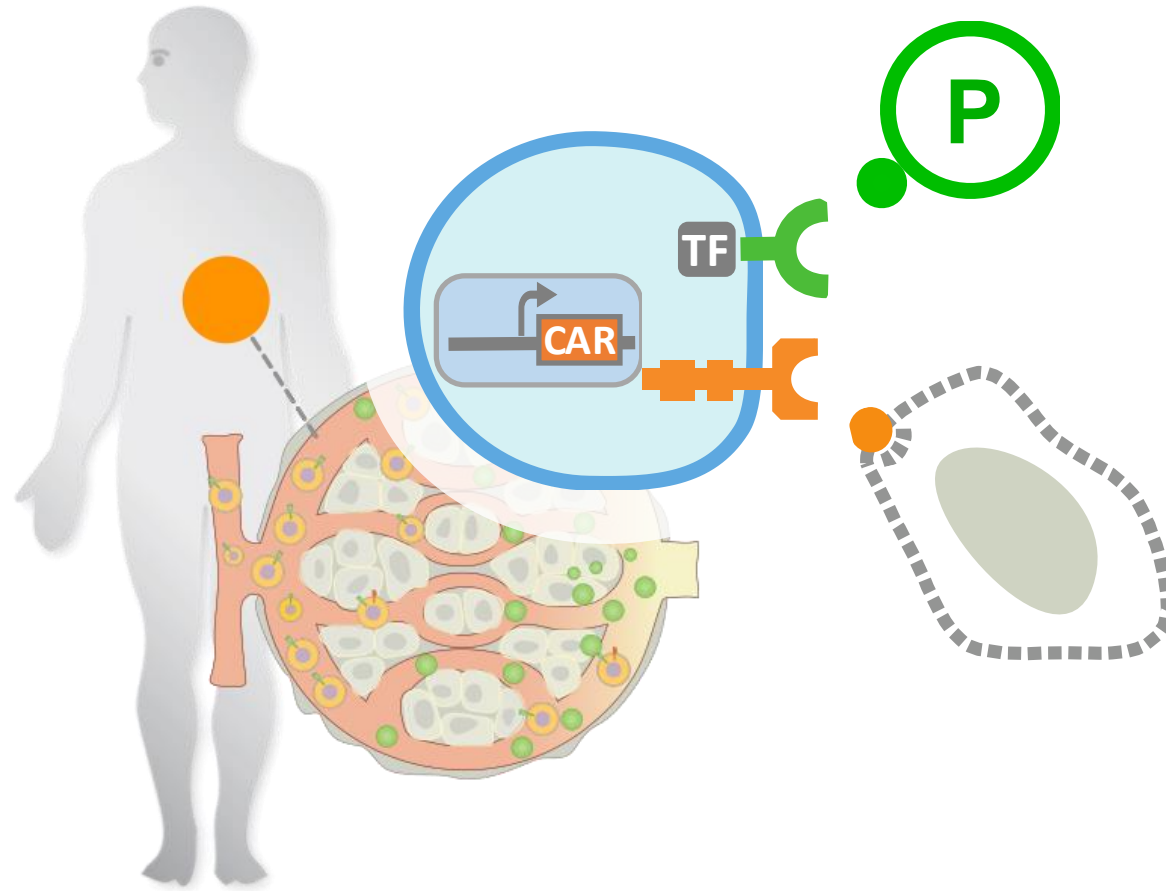


- Co-stimulatory signals
- Cytokines
- Checkpoint inhibitors
- Adjuvants
- Antigens
- ...

Human primary T cells



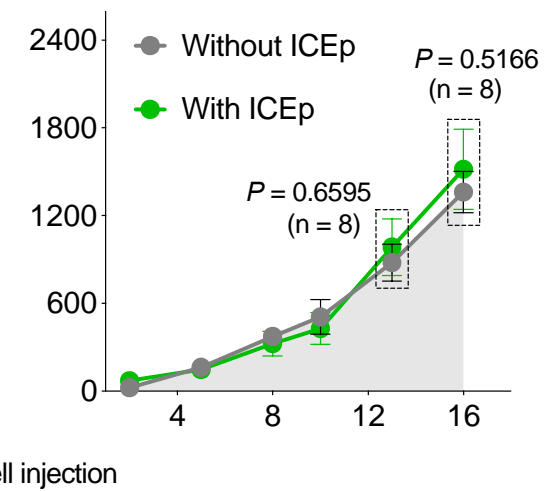
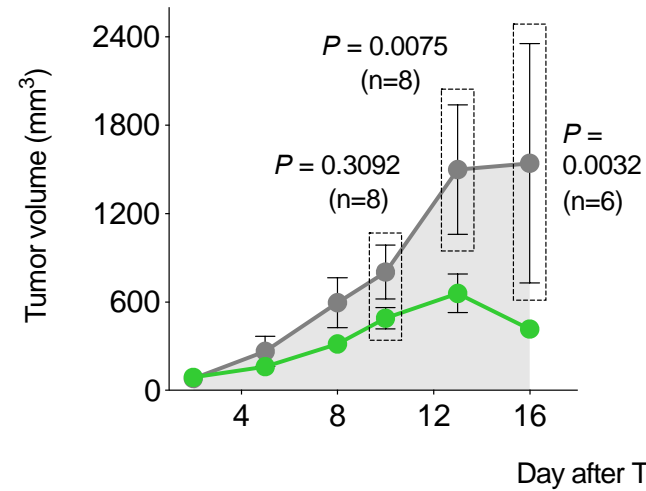
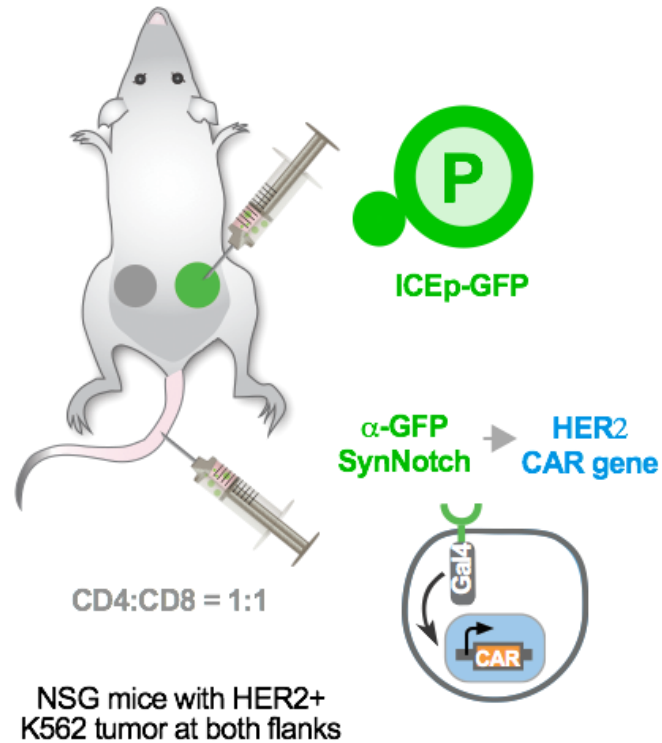
# Local activation of AND-gate CAR-T cells by ICEp to enhance safety



1. Roybal, et al. Cell, 2016
2. Huang, et al. BioRxiv, 2019



# NSG mice dual tumor model for local CAR-T cell activation





# Acknowledgements



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PBRR

*Thank you!*

