

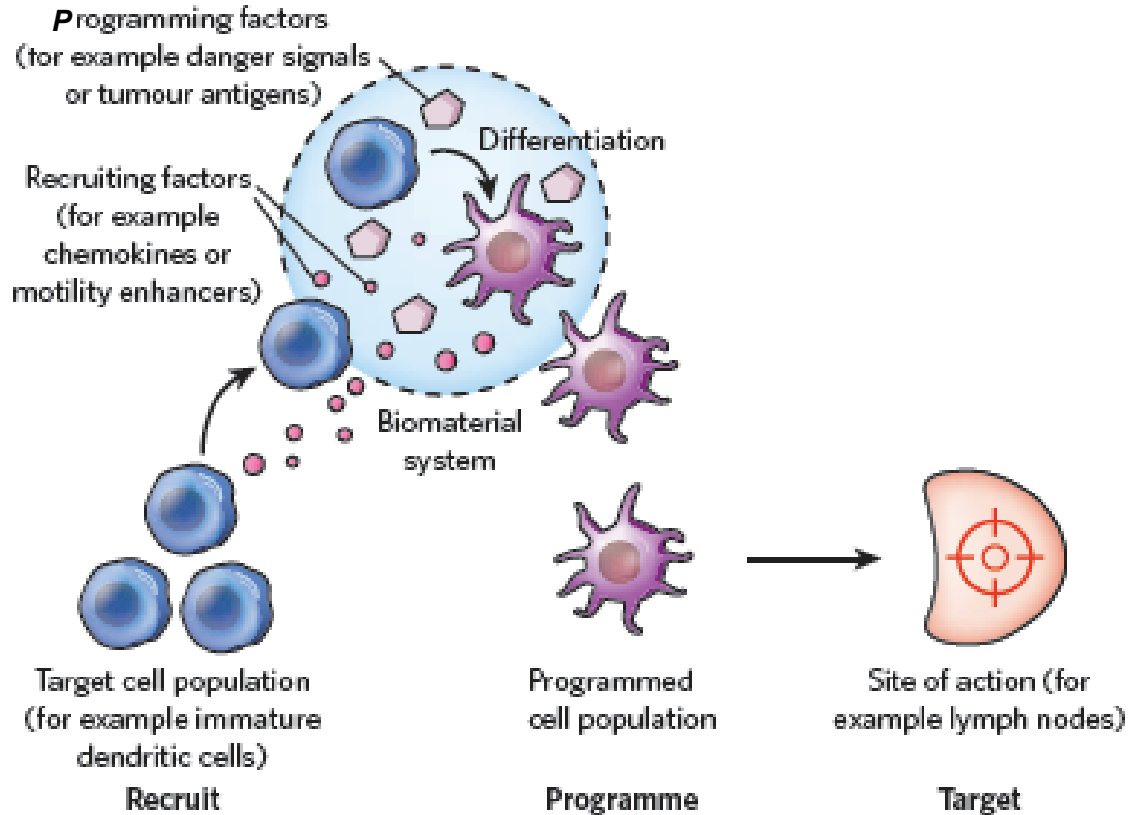
Biomaterials for Cancer Immunotherapy



Lyell (licensed IP, equity), Attivare (licensed IP, equity), Novartis (sponsored research)

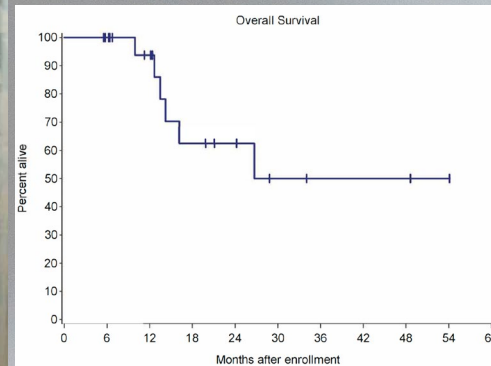


Infection-mimicking Polymer Vaccine



WDEVax

Phase I trial: Stage IV Melanoma patients treated Dana Farber Cancer Institute (Dr. Stephen Hodi: PI)



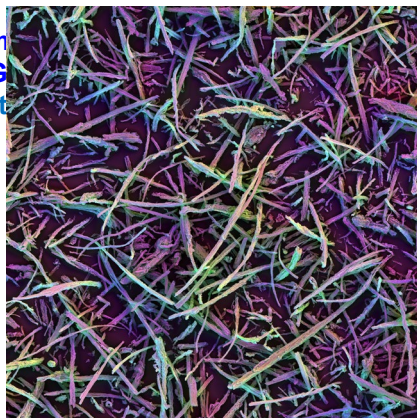
Dr. Stephen Hodi (right) helped enroll Mary Gooding (left) in a phase 1 clinical trial in which an implantable cancer treatment vaccine may help her immune system remove the remaining cancer cells in her body.

Hodi et al., *Cancer Immunology Res.*, 2025

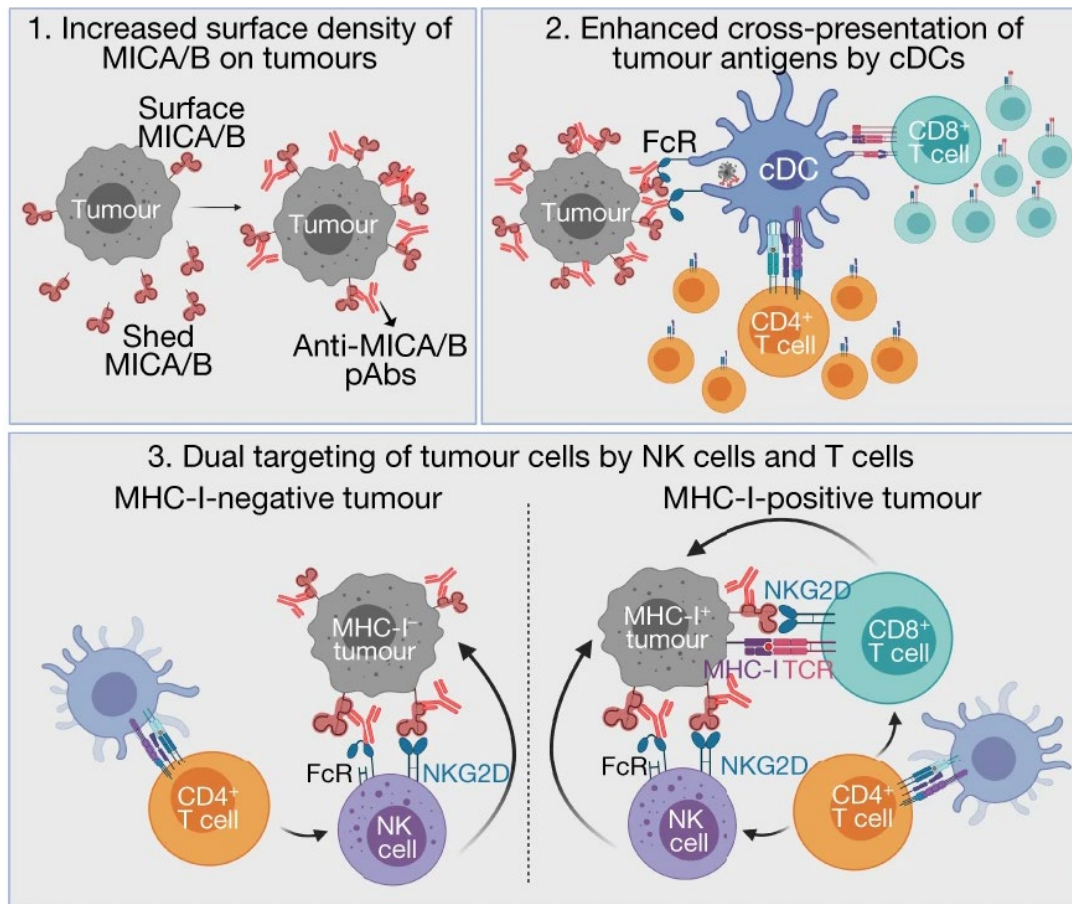
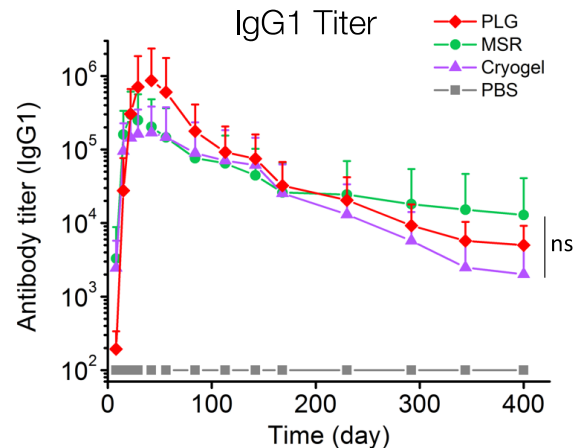
Injectable, Vaccinate against Common Antigens



Genom
STING
Radiat

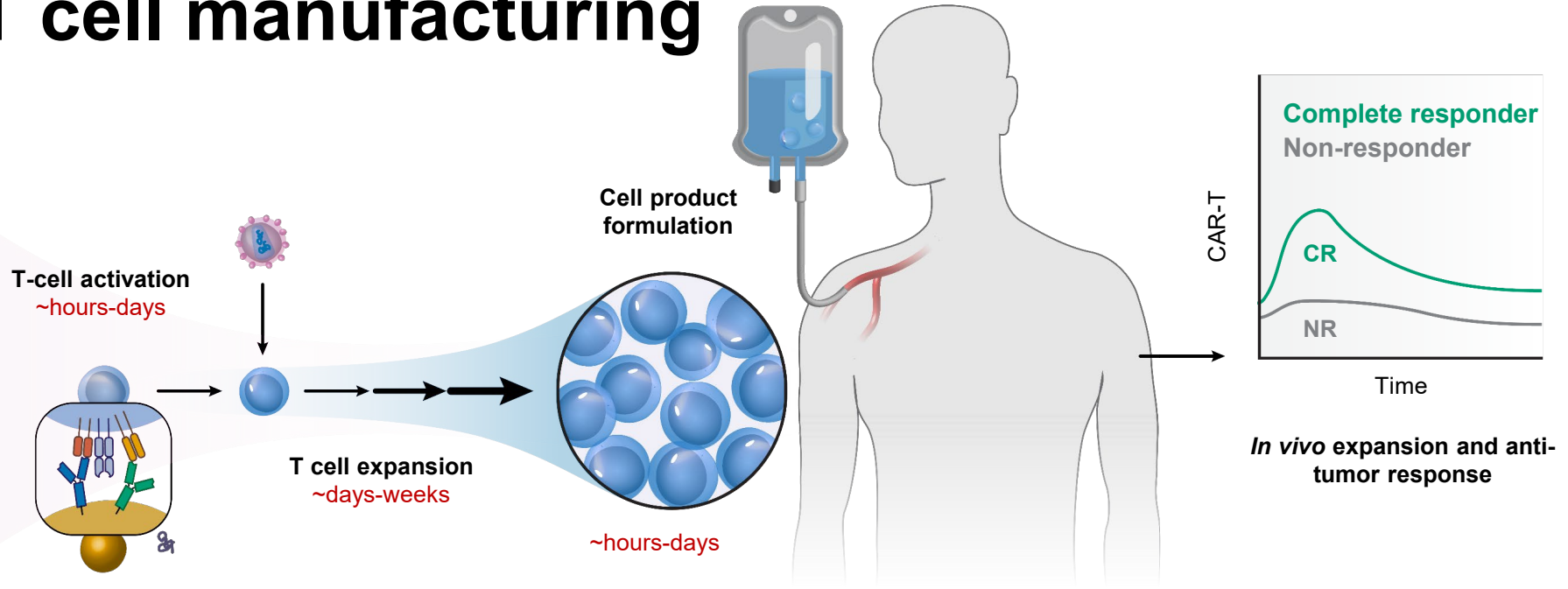


Mesoporous silica microparticles



With Kai Wucherpfennig (DFCI) - Kim et al., *Nature Biotechnology*, 2015; Li et al., *Nature Materials*, 2018; Badrinath et al., *Nature* 2022; Najibi et al., *Nature BME* 2024

T cell manufacturing



Unmet clinical needs

1. Improve the quality and yield of therapeutic T-cell products
2. Enhance therapeutic T-cell activity after infusion

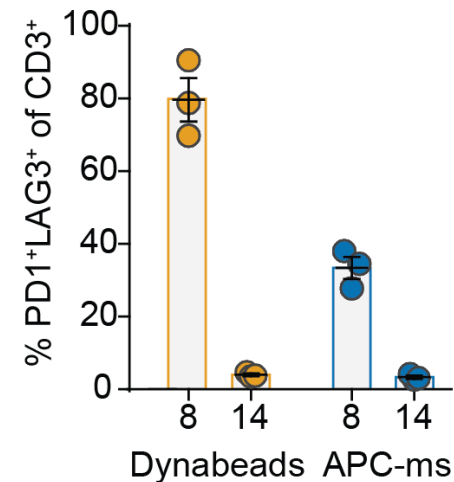
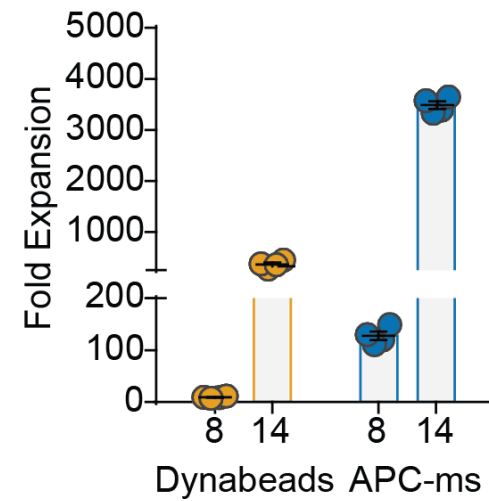
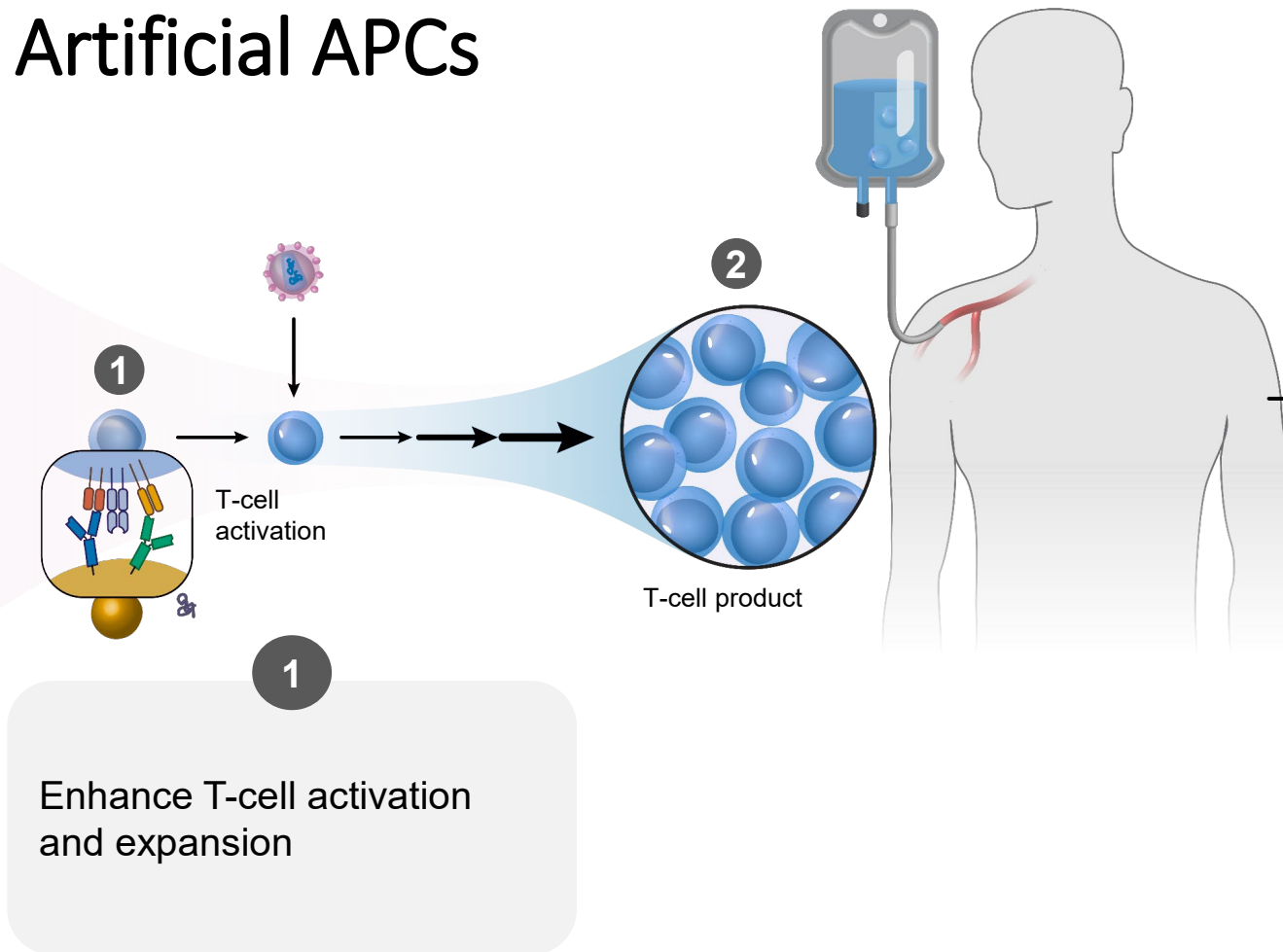
Artificial Cells to Manufacture Cell Therapy



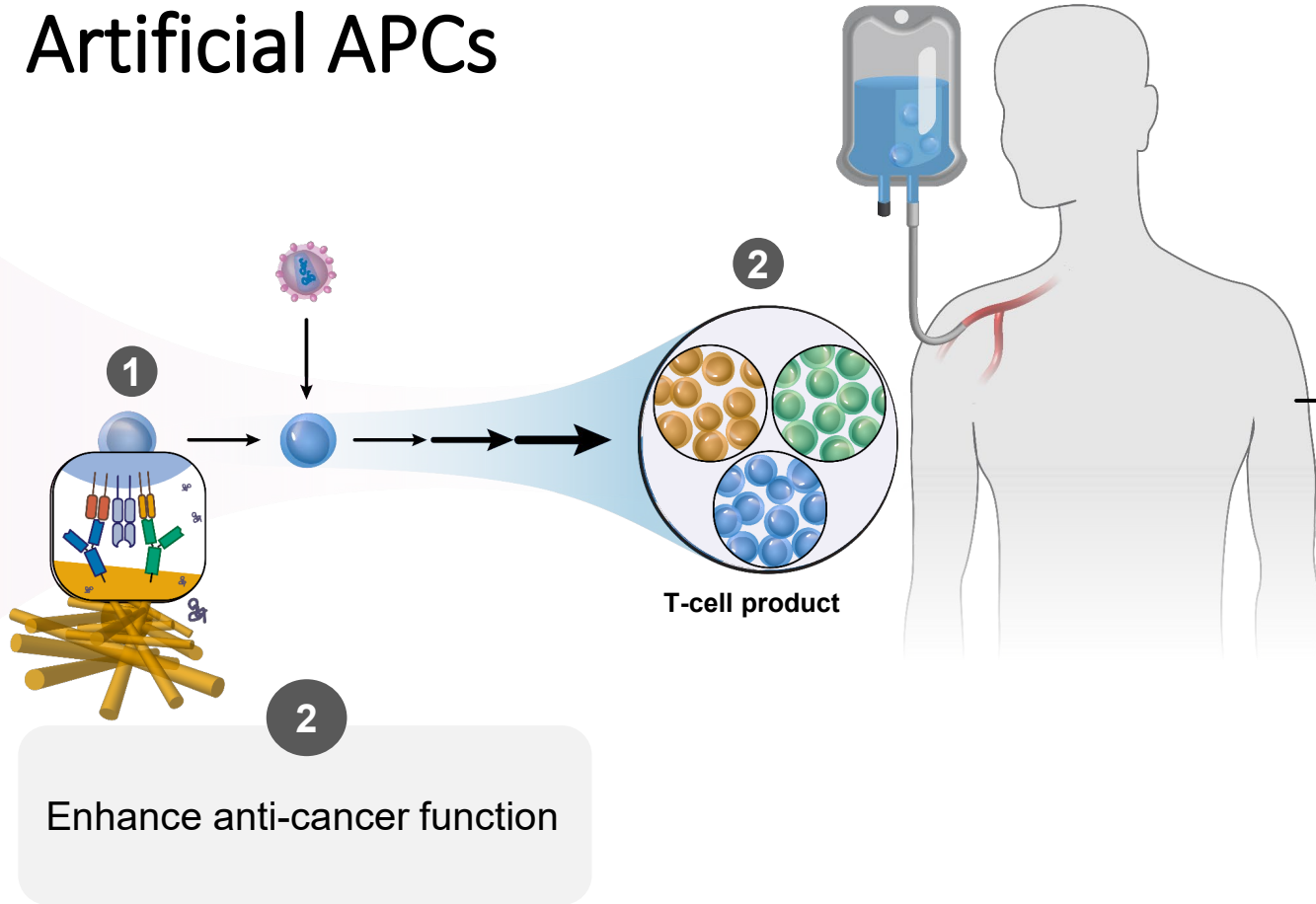
Antigen-presenting cell (**APC**)

Artificial APC

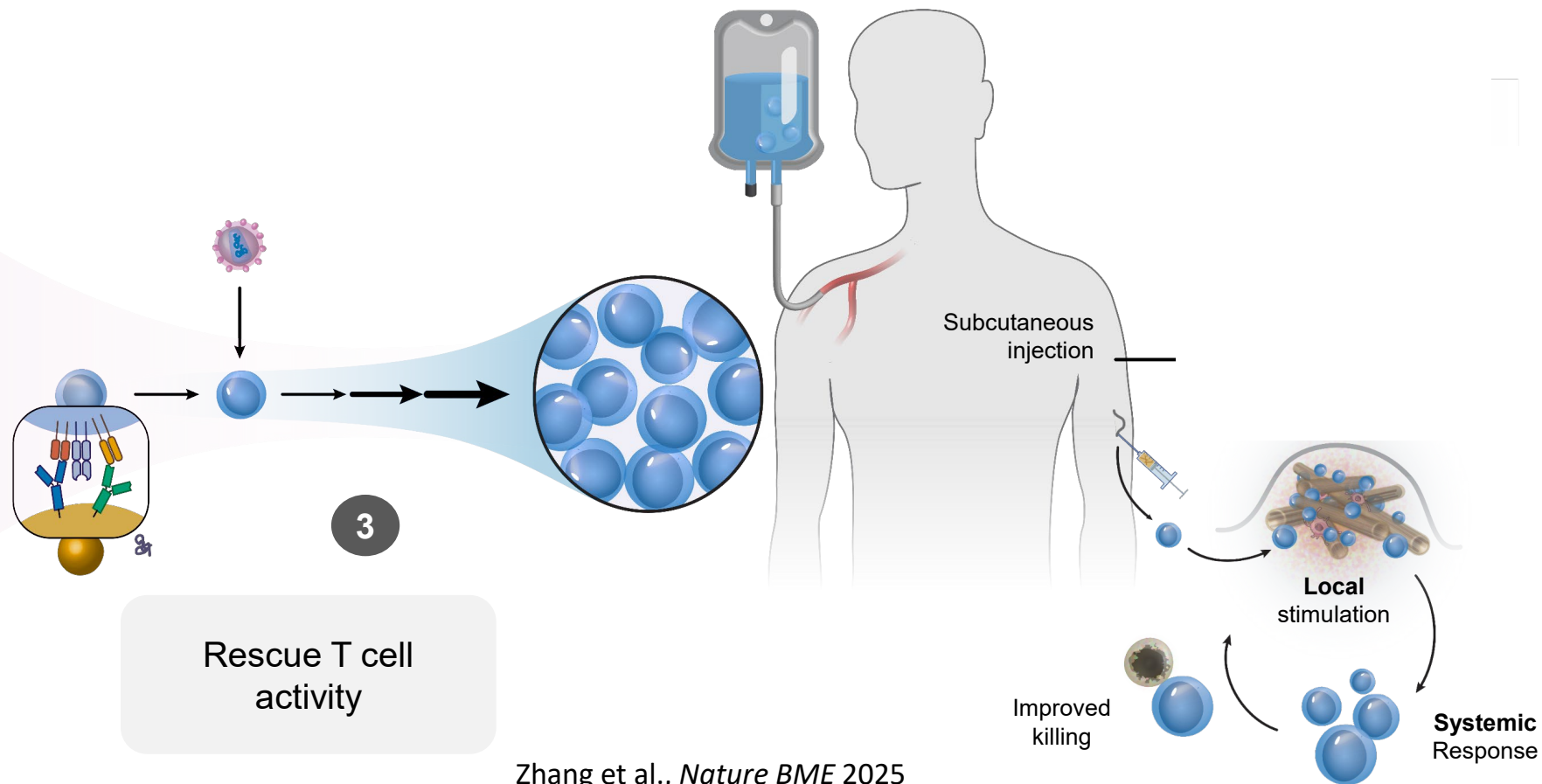
Artificial APCs

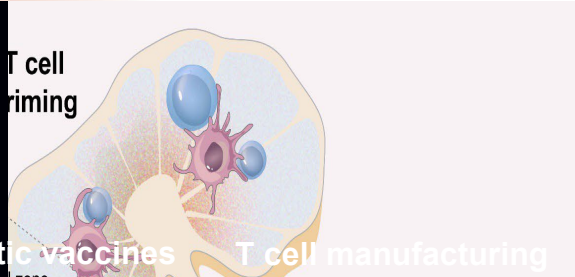
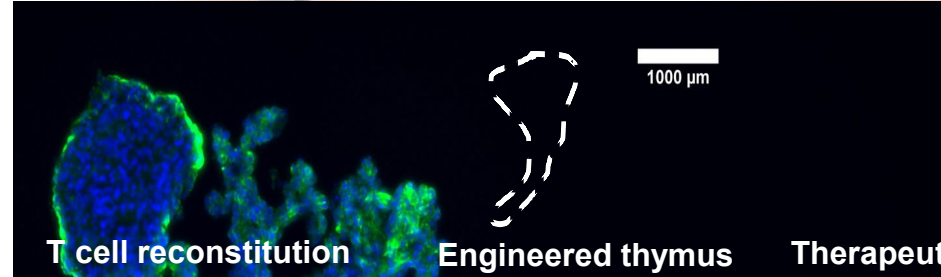
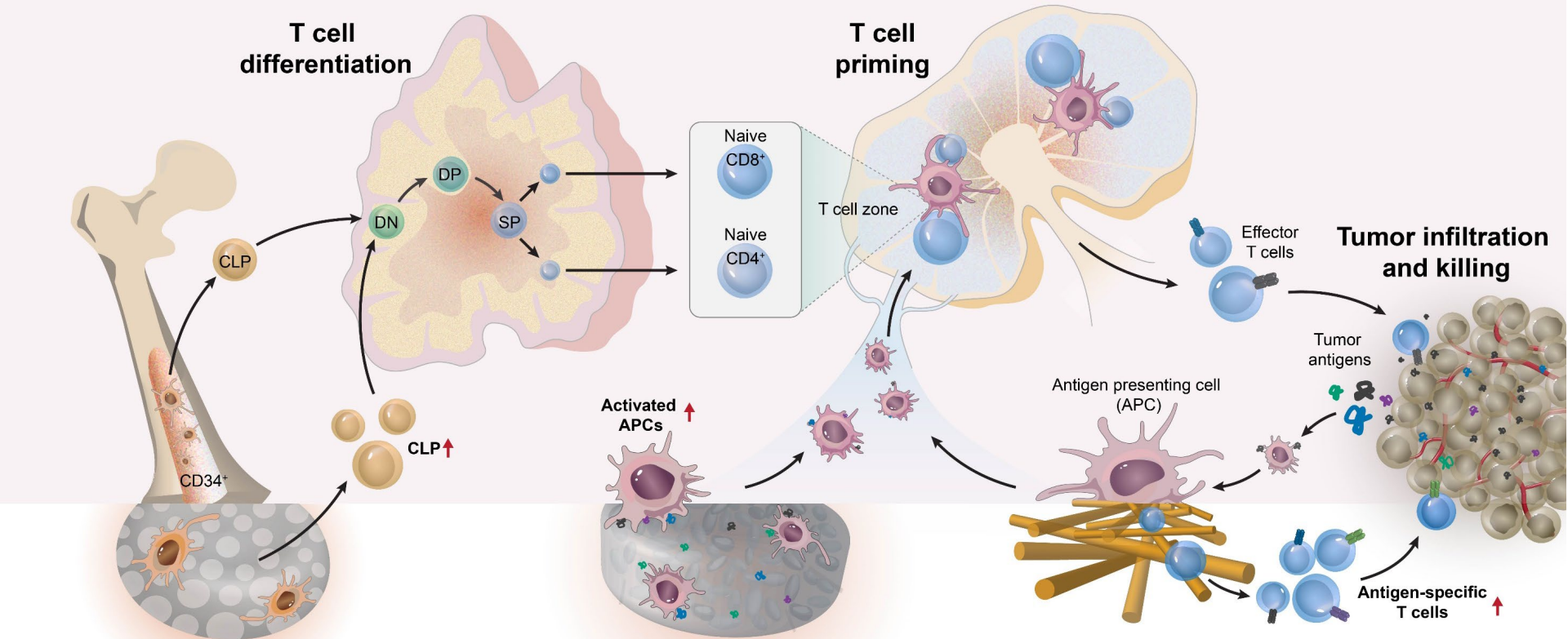


Artificial APCs



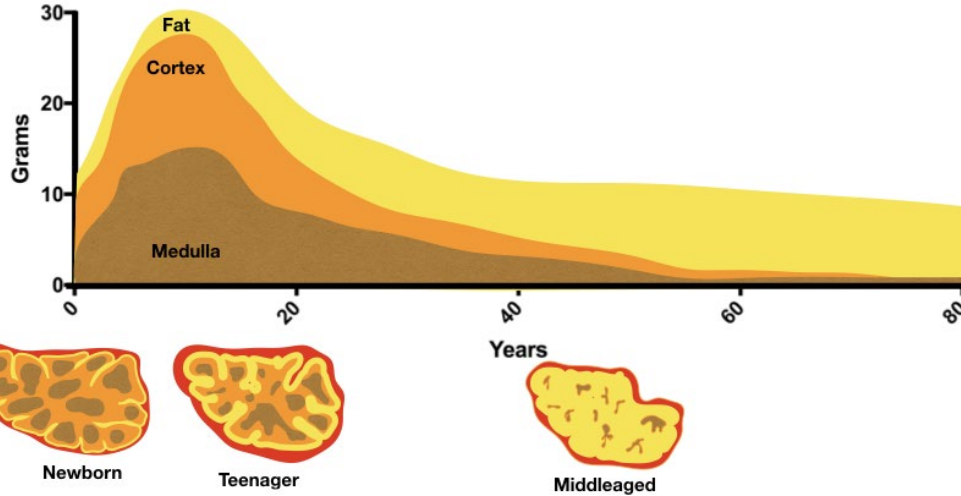
Artificial APCs



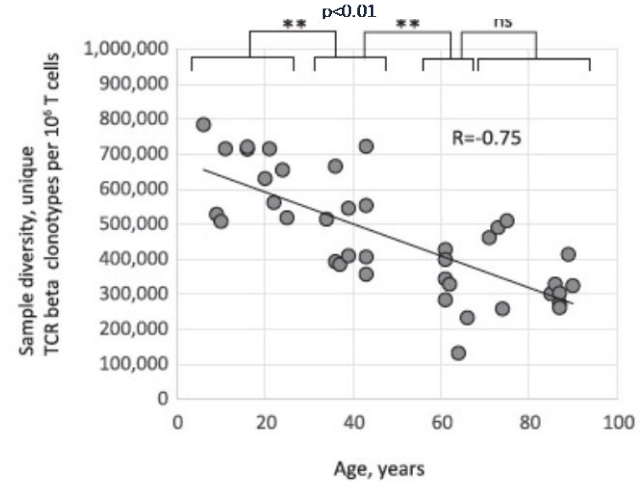


Slow or Reverse Immune Aging

Thymus deteriorates after puberty



T cell receptor diversity with age

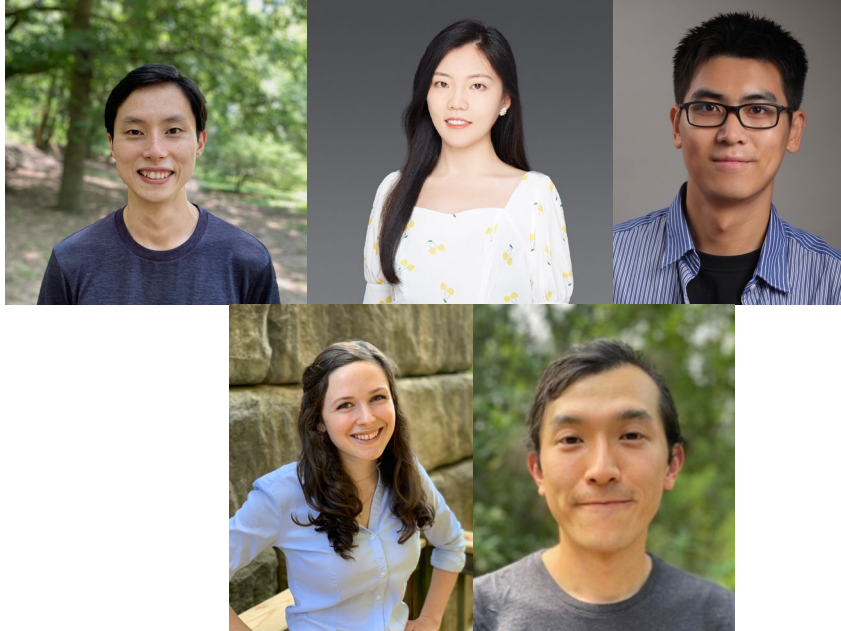


J Immunol 2014, 192 (6) 2689-2698

Susceptibility: cancer, infectious diseases, survival



NCI Physical Sciences- Oncology Network
Cancer Tissue Engineering Collaborative (TEC)



- 1U54CA274726
- 5R01CA276459
- 5K00CA253759/5K00CA253756/5K00CA274690/4K00CA264411/4K00CA274695

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