Talk Title

Local Cytokine mRNA-LNP Cocktails and In Vivo CAR-T Engineering for Next-Generation Cancer Immunotherapy

2. Abstract

Nucleic-acid–based immunotherapy offer attractive opportunities for cancer treatment.

One approach consists of local cytokine mRNA-LNP cocktails designed to convert immunologically “cold” tumors into inflamed, treatment-responsive " hot" sites. By delivering combinations of pro-inflammatory cytokines directly into the tumor, these formulations enable controlled and transient microenvironmental rewiring. They promote dendritic-cell activation, enhance antigen presentation, and increase the recruitment and retention of effector immune cells. This strategy addresses a fundamental barrier in solid-tumor immunotherapy: the absence of a permissive immune niche.

We also explore in vivo CAR-T cell engineering using targeted lipid nanoparticles delivering minicircle DNA. This technology programs circulating T cells directly in situ, avoiding ex vivo manipulation and offering a scalable path toward accessible, transient CAR-T responses.

Together, these two modalities show how distinct nucleic-acid delivery strategies can tackle different bottlenecks in cancer immunotherapy—one acting locally on the tumor microenvironment, the other systemically on the immune effector population.