219 Improving Immunotherapy with mRNA Delivery

Asset Overview

Product Type	Lipid-like nanoparticle delivery system
Indication	Oncology, Immunology
Current Stage	Lead Identification/optimization
Target(MoA)	Activation of antigen
Brief Description	• The set of new compositions that enhance the efficacy of mAb-based treatment by modulating the population of target antigens • It consists of pairing an established immunotherapeutic mAb with a lipid-like nanoparticle delivery system that delivers antigen-encoding mRNA • In vivo data demonstrates that this technology markedly enhances cancer survival rates compared to standard mAb treatment
Organization	The Ohio State University

Differentiation

□ **Unmet needs in cancer immunotherapy**

- For twenty years, the use of monoclonal antibodies (mAbs) as anti-tumor drugs has been successful in managing cancer disease and increasing patient lifespan. These treatments are capable of inducing strong responses in patients with advanced cancers, but each of these treatments only benefit a subset of patients
- This limitation occurs in-part because mAb-based treatments are only effective if target cancer cells express the antigen bound by the mAb. Therefore, if the population of cancer cells expressing an antigen grows, then the efficacy of mAb-based treatment also grows
- mAb-based treatments will have limited efficacy if the method of treatment is limited to the antibody without consideration of its target antigen population. For example, efficacy of treatment for a mAb with perfect antigen specificity and affinity cannot be improved if the target antigen population is already saturated with antibody
- Therefore, if both the proportion of antigen-expressing cancer cells and also the antigen density increases, then it is possible to increase the efficacy of mAb-based treatments used in cancer immunotherapy

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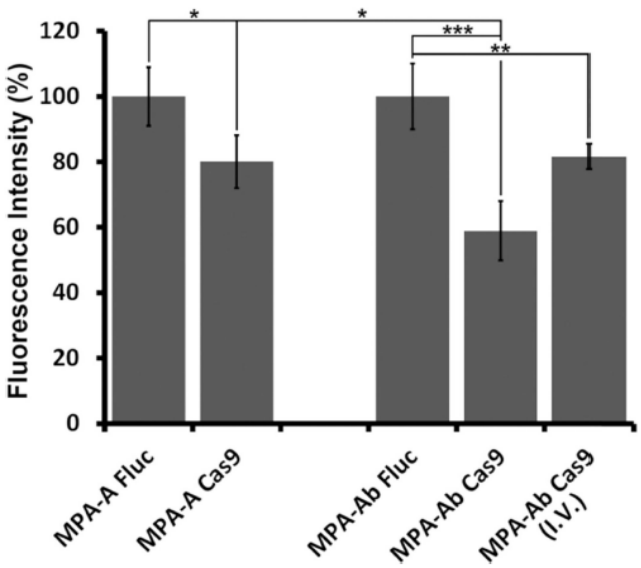
Key Data

Effective delivery of Cas9 mRNA induces cleavage of eGFP gene and consequently reduces the eGFP signals in these cells

Mouse xenograft tumor model using the 293T cells stably expressing enhanced green fluorescent protein (eGFP)
Effective delivery of Cas9 mRNA induces cleavage of eGFP gene and consequently reduces the eGFP signals in these cells



Nude mice bearing xenograft tumors were randomly divided into five groups (n = 4), and four groups were injected intratumorally, with two treated groups (MPA-A/Cas9 LLNs and MPA-Ab/Cas9 LLNs) and two control groups (MPA-A/Fluc LLNs and MPA-Ab/Fluc LLNs), at a dose of 2.5 μg/100 mm3 tumor; for the last group, MPA-Ab/Cas9 LLNs were injected intravenously at a dose of 0.88 mg/kg. Five days after treatment, the tumors were dissected and lysed. The eGFP signal was quantified using FACS analysis.

Both MPA-A and MPA-Ab LLNs encapsulating Cas9 mRNA significantly reduced the eGFP signal in a mouse xenograft model

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Intellectual Property

Patent No.	
Application Date	
Status	
Country	

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