SYNTHGENE

Precise and efficient antibody-LNP conjugation solutions

Empowering in vivo CAR-T therapy

The success of in vivo CAR therapy hinges on the precise delivery of CAR-encoding mRNA to target immune cells. Synthgene Biotech, a pioneer with a strong background in chemical biology, offers a one-stop solution for controllable, efficient, and highly active HiSynth® antibody-LNP conjugation, completely resolving the core challenges of traditional methods such as poor targeting, off-target effects, loss of activity, and process instability.

Catalog #	Products/Services	Specifications/ Deliverables
10116	Antibody LNP Conjugation Kit	5 Rxn (200ug Ab-LNP/Rxn)
N/A	Antibody-LNP conjugation and encapsulation service	Ab-LNP and quality control report

Core Advantages

Highly Efficient Conjugation, Maximum Activity

Multiple Conjugation Tools: The core team is proficient in various antibody conjugation methods and has published numerous related articles [1]-[16]. For conjugation of different antibodies with LNPs, the optimal conjugation method can be screened.
Mature Conjugation Platform: Stable process, high conjugation efficiency, and minimal batch-to-batch variation ensure data reliability.
Complete Activity Guarantee: Ensures that the conjugated antibody retains its native conformation and biological function, achieving "once loaded, it can still run."

Technology Platform	Traditional Coupling Solution	HiSynth® Coupling Solution
Antibody activity	Antibody aggregation and inactivation	The antibody retains its native conformation and biological function.
Process stability	Uncontrollable reaction, unstable process	The process is stable, and the conjugation efficiency is high.
Impurity control	Many byproducts, uncontrollable impurities	The reaction specificity is good, and impurities are controllable.
Safety	Potential introduction of highly immunogenic gene	The biocompatibility is high, and the safety profile is good.

Flexible Collaboration, Accelerated Industrialization

Flexible Collaboration Models: Using our antibody-LNP conjugation kit allows you to independently explore the conjugation process, while our company can provide a complete end-to-end service from precise conjugation to final formulation.
Industrialization Implementation: The conjugation technology platform has achieved process scale-up. Through platform licensing and technology transfer, we assist you in completing CMC process development and GMP production transfer.

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Data Display

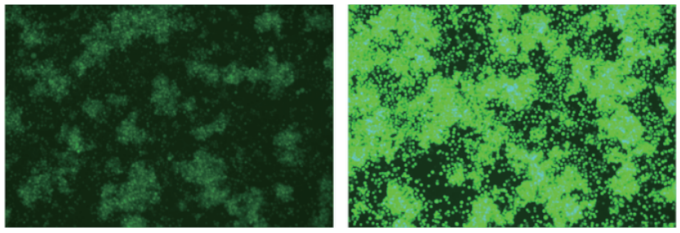
Comparison of Physicochemical Indicators Before and After Antibody Conjugation

	mRNA-LNP	Size (nm)	PDI	EE (%)
LNP	CD19 CAR mRNA-LNP	96.7	0.08	98
	eGFP mRNA-LNP	104.2	0.08	96
LNP-Ab	CD19 CAR mRNA-tLNP	98.4	0.11	97
	eGFP mRNA-tLNP	112.6	0.06	96

Using this kit to conjugate antibodies to the LNP surface, it can be seen that the PDI and encapsulation efficiency remain basically unchanged after conjugation, while the particle size increases slightly.

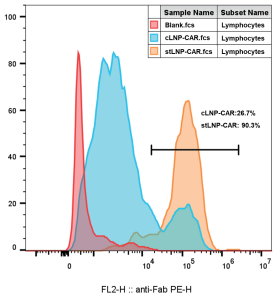
Antibody-conjugated LNP in vitro functional validation

LNP (eGFP)



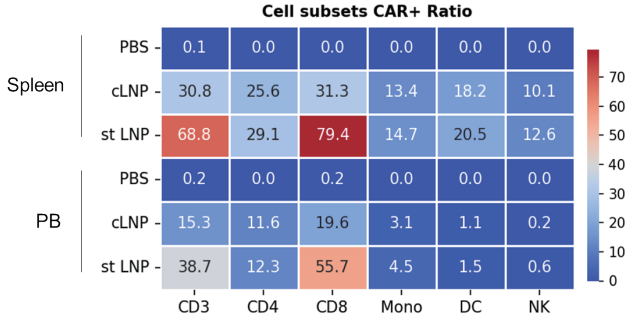
CD3-LNP (eGFP)

Using this kit to conjugate CD3 antibody to the surface of LNP encapsulated with eGFP-mRNA and transfect Jurkat cells, a significant improvement in transfection efficiency was observed.



Using this kit, CD8 antibody was conjugated to the surface of LNPs encapsulated with CD19-CAR mRNA (Cat. No. 11055), and the CAR positivity rate of human primary CD8+ T cells increased from 26.7% to 90.3%.

In vivo functional validation of antibody-conjugated LNP



Using this kit, CD8 antibodies were conjugated to the surface of LNPs encapsulating CD19-CAR mRNA and injected via the tail vein into humanized NOG mice. The CAR-positive ratio was significantly increased in CD3+ and CD8+ T cell subsets derived from the spleen and peripheral blood.

Related articles published by the team

[1] *J. Am. Chem. Soc.* **2025**, *147, 3, 2809–2821*
[2] *Chem. Sci.* **2022**, *13*, 5345-5352.
[3] *Advanced therapeutics.* **2022,** *5* (1):2100161.
[4] *Angew Chem Int Ed Engl.* **2022**, *61*, e202200369.
[5] *J. Am. Chem. Soc.* **2021**, *143*, 18294–18304
[6] *Biomater. Sci.*, **2021**, *9*, 406-421.
[7] *J. Am. Chem. Soc.* **2020**, *142*, 2787-2794.
[8] *Angew. Chem. Int. Ed.* **2019**, *58*, 4886-4890. (VIP)
[9] *Chem. Commun*. **2019**, *55*, 2106-2109.
[10] *J. Am. Chem. Soc.* **2018**, *140*, 14542-14546.
[11] *Chem. Asian J.* **2018**, *13*, 3845-3849.
[12] *Chem. Eur. J.* **2018**, *24*, 2277-2285.
[13] *Chem. Eur. J.* **2018**, *24*, 5707-5722
[14] *Chem. Commun.* **2017**, *53*, 6452-6455.
[15] *J. Am. Chem. Soc.* **2016**, *138*, 15943-15949
[16] *Anal. Chem.* **2016**, *88*, 12403-12410

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