

RJH Reagents for Efficient Biodistribution of Nucleic Acids in Animal Models

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About RJH Biosciences

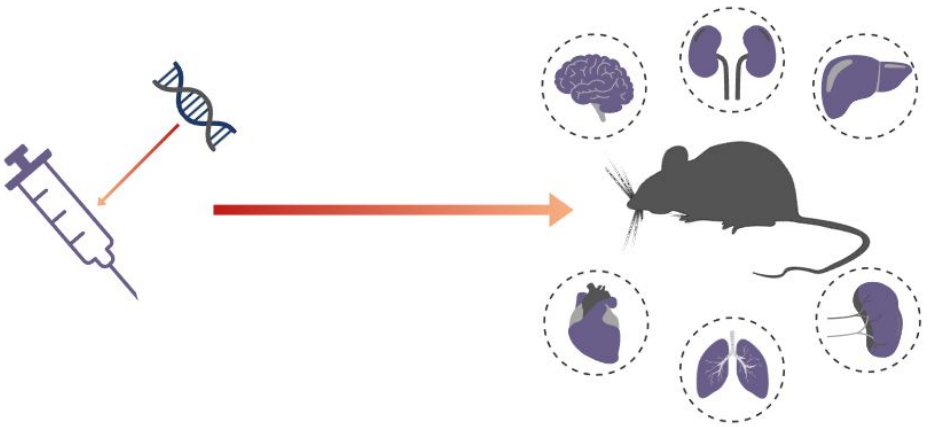
We develop novel transfection reagents that deliver different types of nucleic acids to a range of mammalian cells in culture, while tailoring the agents further to act as delivery vehicles for preclinical models and clinical therapy involving nucleic acids. Our reagents display exceptional activities on specific types of cells, while acting broadly for delivery of different types of nucleic acids.

Transfection Reagents

We offer broadly acting transfection reagents to modify cells with DNA and RNA. The reagents are polymeric in nature and have been optimized for a variety of cell types and applications involving cell culture (in vitro) and animal models (in vivo). We are proud to offer transfection reagents tailored for primary cells and suspension cells, as well as adherent cell lines and animal models.

Clinical Development

We are developing novel nucleic acid delivery systems to effectively implement nucleic acid therapeutics in a clinical setting. Our goals are to realize the potential of RNA interference (RNAi) via delivery of siRNA, and to enable transgene expression via direct administration of plasmid DNA (pDNA) and mRNA to express proteins in situ. Partners are actively sought for various preclinical and clinical programs.



Nucleic Acid Therapeutics

Nucleic acid therapeutics use RNA or DNA molecules to regulate gene expression, treat diseases, or deliver genetic instructions. Important therapeutic nucleic acids include **small interfering RNA (siRNA)**, which silences specific genes, and **messenger RNA (mRNA)**, which instructs cells to produce functional proteins. By tapping into the endogenous nucleic acid biochemistry, these therapies enable precision treatments for a variety of diseases, from genetic defects to cancers and viral infections. Nucleic acid therapeutics hold immense promise not only for treating diseases, but also curing them. For instance, siRNA has shown success in silencing disease-causing oncogenes, while mRNA vaccines, such as those developed for COVID-19, highlight their potential to rapidly respond to emerging health crises.

Delivering Nucleic Acids

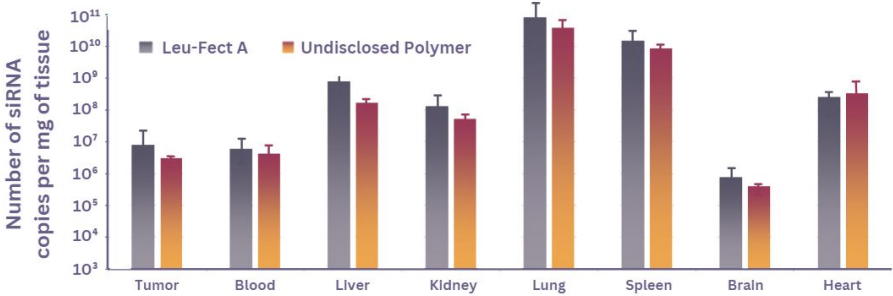
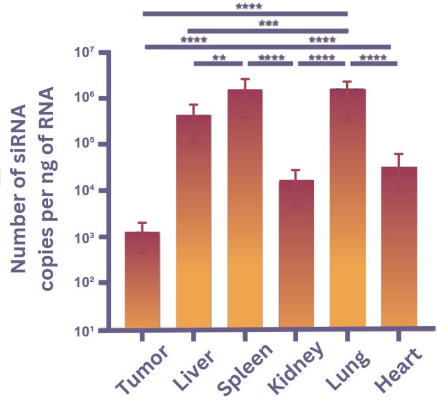
Delivering nucleic acid therapeutics involves overcoming challenges on the way to their site of action, such as enzymatic degradation and cellular uptake. Various delivery systems protect these molecules and facilitate their entry into cells, where they can be expressed or act on target genes. Our **lipopolymeric** carriers, with an optimal balance of cationic and lipid groups, encapsulate nucleic acids, shielding them from degradation and promoting efficient uptake by interacting with the cell membrane. Once inside, the nucleic acids are released into the cytoplasm, where they either silence genes (siRNA) or instruct protein synthesis (mRNA), enabling their therapeutic effects.

Biodistribution of siRNA

Leu-Fect is a versatile delivery reagent capable of efficiently delivering siRNA to various in vivo models, ensuring effective biodistribution and target gene silencing across multiple tissues.

Leu-Fect demonstrates effective biodistribution of siRNA in mice, delivering high siRNA copy numbers across multiple tissues. It avoids liver clearance for a wider systemic biodistribution of the siRNA.

Quantification of siRNA copy levels in tissues 12 days after systemic delivery with RJH reagents. siRNA copy numbers per ng of total RNA were measured in tumor, liver, spleen, kidney, lung, and heart tissues using digital droplet PCR 12 days after initial injection. High siRNA delivery efficiency was observed across multiple tissues, highlighting the efficacy of RJH delivery reagents.



Biodistribution of siRNA in tissues 48 hours after systemic delivery using RJH reagents. siRNA copy numbers per mg of tissue were measured in liver, spleen, kidney, lung, heart, and tumor tissues 48 hours post-injection. RJH reagents enable efficient siRNA delivery across multiple organs, demonstrating effective biodistribution.

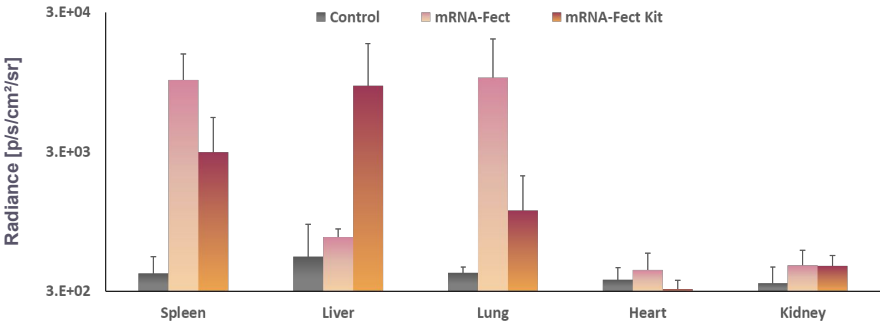
Leu-Fect A

SKU (Size)	#30-10 (0.75 mL), #30-20: (1.5 mL)
Nucleic Acid	siRNA, microRNA, ASO Delivery
Cell Types	Stem, primary, suspension cells
Serum	Compatible
Buffer	Aqueous
Storage Temp.	-20 °C
Shelf Life	1 year

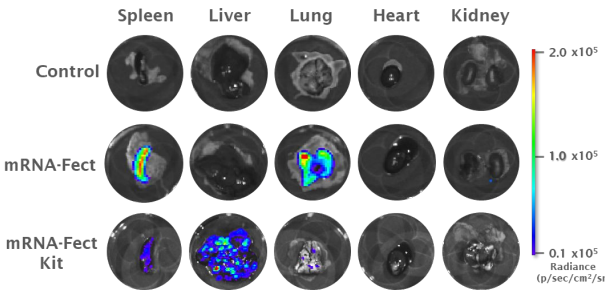
Biodistribution of mRNA

mRNA-Fect was designed for mRNA delivery in various cell lines and in animal models. It is capable of delivering intact mRNA to specific organs after systemic application.

mRNA-Fect and mRNA-Fect Kit are effective for delivering 'active' Luciferase mRNA *in vivo* following intravenous injection.



In Vivo Biodistribution of Luc-mRNA. Luciferase expression detected in various organs following single intravenous injection of 10 µg luciferase mRNA delivered by mRNA-Fect and mRNA-Fect Kit. High luciferase expression was observed in spleen and lungs with mRNA-Fect, and in spleen and liver with mRNA-Fect Kit, detected as radiance 24 hours post treatment.



In Vivo mRNA Biodistribution of Luc-mRNA. Luciferase expression in various organs as quantitated by radiance values following a single intravenous injection of Luc-mRNA.

mRNA-Fect

SKU (Size)	#80-10 (0.75 mL), #80-20 (1.5 mL)
Nucleic Acid	mRNA, Cas9 mRNA complexes
Cell Types	Primary (pDNA), cell lines (siRNA)
Serum	Compatible
Buffer	Aqueous
Storage Temp.	-20 °C
Shelf Life	1 year

Product Selection

We have a variety of reagents suitable for delivery of nucleic acids to animal models. The table below summarizes the recommended use of RJH reagents for siRNA and mRNA delivery. The RJH products have been found to be effective with an ever-expanding list of applications involving different nucleic acids in animal models. Please contact us for further guidance and testing in different systems.

RJH Products Tailored for Animal Studies

Product	Product No	Feature
ALL-Fect	10-10/20	delivery of small quantity of pDNA, siRNA
ALL-Fect In Vivo	10-30	delivery of large quantity of pDNA, siRNA
ALL-Fect Kit	10-40/50/60	with Trans-Booster for improved transfection
Prime-Fect	20-10/20	delivery of small quantity of pDNA, siRNA
Prime-Fect In Vivo Kit	20-40/50	delivery of large quantity of pDNA, siRNA with Trans-Booster for improved transfection
Leu-Fect A	30-10/20	delivery of small and large quantity of siRNA, microRNA, and ASO
Leu-Fect B	40-10/20	delivery of small and large quantity of siRNA, microRNA, and ASO
mRNA-Fect	80-10/20	delivery of small quantity of mRNA
mRNA-Fect In Vivo	80-30	delivery of large quantity of mRNA
mRNA-Fect Kit	80-40/50/60	with Trans-Booster for improved transfection



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