

Versatile and Effective Delivery of messenger RNA using RJH Reagents

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About R&JH Biosciences

We develop novel transfection reagents that deliver different types of nucleic acids to a range of mammalian cells in culture, while tailoring the transfection 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 specific and 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 offer reagents tailored for primary and suspension cells, as well as adherent cell lines.

Clinical Development

We are developing delivery systems to implement nucleic acid therapeutics in a clinical setting. Our goals are to realize the therapeutic potential of nucleic acid involved in RNAi (siRNA) and transgene expression (pDNA and mRNA). Partnerships are actively sought for various preclinical and clinical programs.

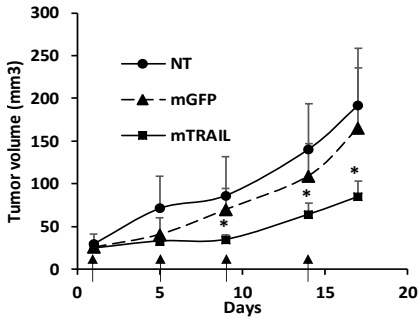
R&D Services

We offer high quality research and development services associated with transfection optimization and construct validation. Our goal is to provide the best delivery materials for your cargo and cell of choice. Our services are assessed and initiated by a quote request via the screening services page on our website or by a simple email.

In Vivo mRNA Delivery

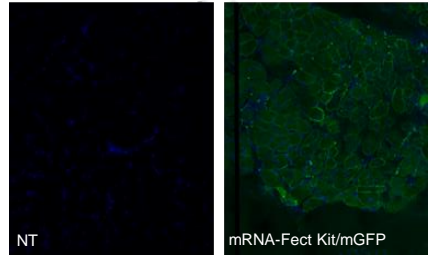
The mRNA-Fect reagent is a highly effective transfection reagent optimized for mRNA delivery in various animal models. Along with Trans-Booster as part of a kit, mRNA-Fect can deliver a mRNA payload to circulating as well as attached cells in an *in vivo* setting.

Inhibition of Tumor Growth with Local mRNA injections



Growth of breast cancer SUM149 xenografts. Study groups corresponding to No treatment (NT), mRNA coding for GFP (mGFP) and TRAIL (mTRAIL) are shown. Data represent mean \pm SD of 5-8 animals at each time. mRNA was formulated with **mRNA-Fect**, and injected (lower arrows) in the vicinity of tumors. Tumor volume after treatment of mTRAIL complexes was significantly less after day 9 (* $p < 0.05$).

GFP Expression in Mouse Tibialis Anterior Muscle

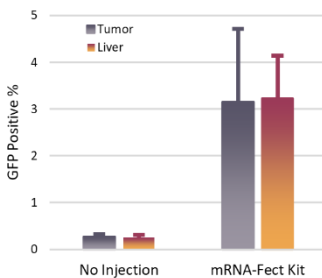


GFP expression in tibialis anterior muscles of NCG mice.

NT (No-treatment): Injection with RPMI.
mRNA-Fect Kit/mGFP: mGFP injection with mRNA-Fect Kit.

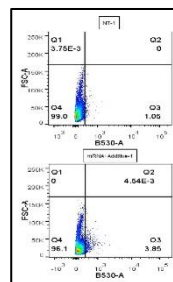
The animals were analyzed after 2 days of injection for GFP expression. There was no GFP expression in the NT group. A robust GFP expression was evident in animals treated with mGFP complexes prepared with the **mRNA-Fect Kit**.

Systemic Delivery of mRNA

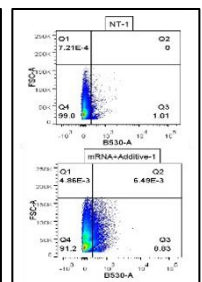


GFP mRNA delivery to mice by systemic injection. Transfection was quantified using flow cytometry to measure the percentage of GFP(+) cells in SC tumour and liver tissues 48 hours after IV injection. **mRNA-Fect Kit** enables efficient mRNA delivery *in vivo*.

Tumor Analysis

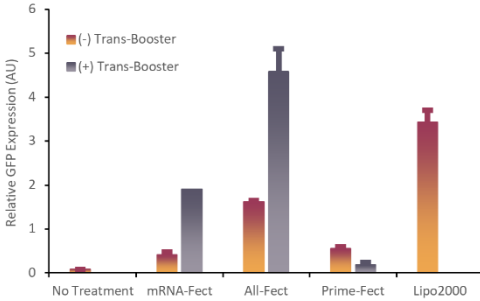


Liver Analysis



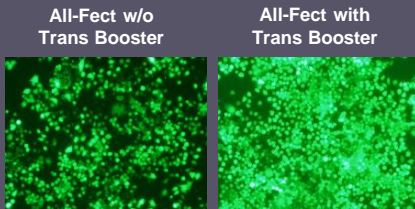
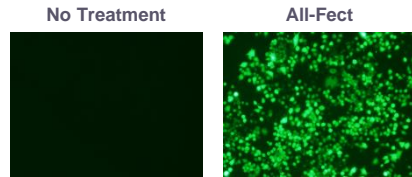
mRNA Delivery to Neuronal Cells

Thorough testing of RJH Biosciences' reagents are conducted to find optimal conditions for mRNA transfection in particular cells, neuronal cells in this case. Exceptionally high efficiencies are achieved using mRNA-Fect and All-Fect, both of which are offered in kits with Trans-Booster.



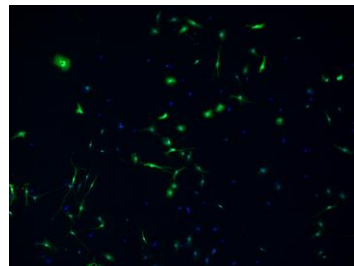
Transfecting Neuro-2a (N2a) cells with a GFP-expressing mRNA using a variety of RJH reagents. GFP expression was evaluated using fluorospectroscopy. High transfection efficiencies were achieved using the All-Fect reagent with the Trans-Booster combination.

Transfecting Neuro-2a cells with a GFP-expressing mRNA using All-Fect. High efficiency mRNA delivery was achieved, as visualized by fluorescent microscopy.



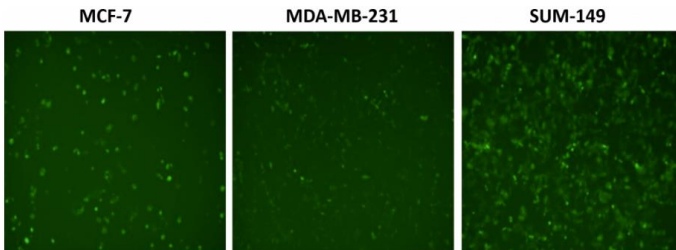
Neuro-2a cells transfected with a GFP-expressing mRNA using All-Fect with and without Trans-Booster. The Trans-Booster enhances transfection efficiencies with mRNA in N2a cells.

Transfection of primary rat dorsal root ganglion (DRGs) neurons with a GFP mRNA using All-Fect. DAPI-stained (blue), GFP-expressing (green) neurons indicate highly efficient transfection from the GFP-mRNA in primary neurons.

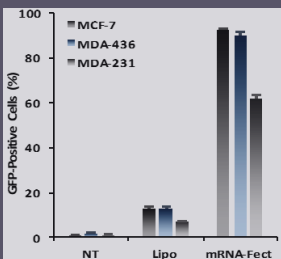


mRNA Delivery to Breast Cancer Cells

RJH Biosciences developed several protocols for optimal transfection of mRNA to a range of breast cancer cells. mRNA-Fect has been specially designed for mRNA payload delivery and can be purchased as part of a kit that also includes Trans-Booster for enhanced transfection efficiencies.

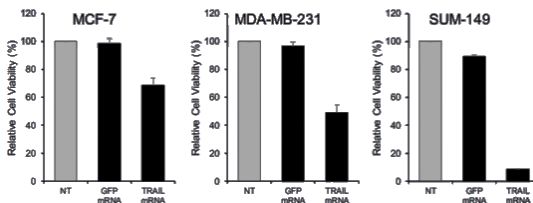
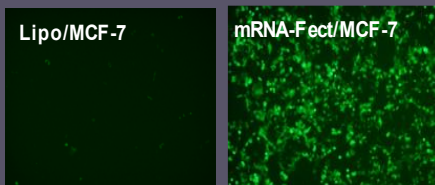


GFP-mRNA transfection of breast cancer cells with mRNA-Fect. Fluorescence micrographs were taken 72 hours post transfection. Significant GFP expression is evident in all three cell types post-transfection. Optimization parameters are available from RJH Biosciences to help researchers achieve maximal results in particular cell model.



Transfecting a variety of breast cancer cell lines with GFP-expressing mRNA using mRNA-Fect. The percentage of GFP-positive cells is quantified using flow cytometry. mRNA-Fect provides superior transfection efficiencies than the leading lipofection reagent.

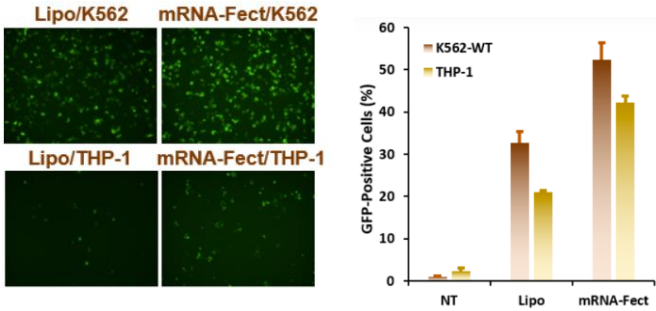
Transfecting MCF-7 cells with a GFP-expressing mRNA using mRNA-Fect (right) and competitor Lipofectamine™ 2000 (left). Highly competitive mRNA delivery was achieved using mRNA-Fect, as visualized by fluorescent microscopy.



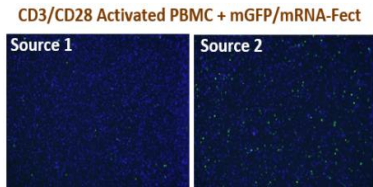
mRNA-Fect delivery of TRAIL-mRNA to breast cancer cells. Relative cell viability was measured 72 hours after transfection. In all three cell types, delivery of TRAIL-mRNA resulted in effective growth inhibition with limited inhibition from GFP-mRNA demonstrating mRNA-Fect's low toxicity, high efficiency transfection capabilities.

mRNA Delivery to PBMCs

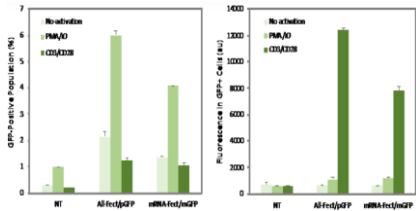
mRNA-Fect enables high efficiency mRNA transfection to peripheral blood mononuclear cells (PBMCs). Extensive testing of RJH reagents has shown superior delivery of mRNA payload, especially in difficult-to-transfect primary cells and suspension-growing cells.



Transfecting GFP-expressing mRNA in lymphocytic cell lines (K562 and THP-1) using mRNA-Fect and a competing lipofection reagent. GFP expression was visualized 48 hours after transfection using fluorescent microscopy (left) and the proportion of GFP-expressing cells was quantified by flow cytometry (right). mRNA-Fect achieved notably superior transfection efficiencies in both cell lines compared to the leading lipofection reagent.



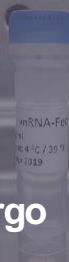
Merged DAPI-stained and green fluorescent micrographs of CD3/CD28 activated PBMCs (from two separate donor sources) transfected with mGFP using mRNA-Fect. mRNA-Fect shows highly efficacious transfection in these difficult-to-transfect primary, suspension-growing cells with minimal toxicity. Lipofection reagents were not effective in PBMCs (not shown)



GFP-expressing mRNA transfection in PBMCs using ALL-Fect and mRNA-Fect. Quantification by flow cytometry shows the percentage of GFP-positive cells (left) and extent of GFP fluorescence per cell (right). High efficiency mRNA delivery is achieved under optimally after CD3/CD28 activation (right), while PMA/IO gave auto-fluorescent cells (left) with little transfection.

Product Summary

Listing of RJH Products and their intended cargo



	Volume	Conc	SKU
All-Fect DNA, siRNA/microRNA/ASO, and CRISPR delivery	0.75 mL	1 mg/mL	10-10
	1.50 mL	1 mg/mL	10-20
All-Fect In Vivo DNA delivery	1.00 mL	5 mg/mL	10-30
All-Fect Kit DNA and CRISPR delivery	0.75 mL	1 mg/mL	10-40
	0.75 mL	0.4 mg/mL	
	1.50 mL	1 mg/mL	10-50
All-Fect In Vivo Kit DNA delivery	1.00 mL	5 mg/mL	10-60
	1.00 mL	2 mg/mL	
Prime-Fect DNA and siRNA/microRNA/ASO delivery	0.75 mL	1 mg/mL	20-10
	1.50 mL	1 mg/mL	20-20
Prime-Fect Kit DNA delivery	0.75 mL	1 mg/mL	20-40
	0.75 mL	0.4 mg/mL	
	1.50 mL	1 mg/mL	20-50
	1.50 mL	0.4 mg/mL	
Leu-Fect A siRNA/microRNA/ASO delivery	0.75 mL	1 mg/mL	30-10
	1.50 mL	1 mg/mL	30-20
Leu-Fect B siRNA/microRNA/ASO delivery	0.75 mL	1 mg/mL	40-10
	1.50 mL	1 mg/mL	40-20
mRNA-Fect mRNA and CRISPR delivery	0.75 mL	1 mg/mL	80-10
	1.50 mL	1 mg/mL	80-20
mRNA-Fect In Vivo mRNA delivery	1.00 mL	5 mg/mL	80-30
mRNA-Fect Kit mRNA and CRISPR delivery	0.75 mL	1 mg/mL	80-40
	0.75 mL	0.4 mg/mL	
	1.50 mL	1 mg/mL	80-50
	1.50 mL	0.4 mg/mL	
mRNA-Fect In Vivo Kit mRNA delivery	1.00 mL	5 mg/mL	80-60
	1.00 mL	2 mg/mL	
CRISP-Fect CRISPR delivery	0.75 mL	1 mg/mL	90-10
	0.75 mL	0.4 mg/mL	
	1.50 mL	1 mg/mL	90-20
	1.50 mL	0.4 mg/mL	



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