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Transfection into EXOSMES by Electroporation

The NEPA21 is the only device on the market to approach **EXOSOMES** Electroporation from the perspective of optimising delivered energy.

- The finer control over the delivered energy available with the NEPA21 offers specific and important advantages for EXOSOMES electroporation. As the thrust of NEPA21 protocols is to minimise delivered energy, this means that the targets are electroporated with less current (than competing device protocols).
- For particularly sensitive and delicate targets, identifying and only delivering the required energy (and no more) to porate the membrane is of utmost importance for their viability post electroporation.
- The success of the NEPA21 for cell electroporation is evident by the number of laboratories what have published with the NEPA21 system, and the quantum of client laboratory verified Viability % and Transfection Efficiency %.
- The NEPA21 system is supported by a suite of over 250 different electrode configurations, which further enhance the applicability of the system and empower researchers with further experimental options and opportunities.

See page below

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APPLICATIONS

Transfection into EXOSOMES by Electroporation

Client Lab Results

Labeled DNA oligos into Serum Exosomes and Milk Exosomes
Note below the concentration combination for the exosomes and oligos. The goal was to load the exosomes with DNA oligo, then to add them to cell culture medium and they will enter the cells by endocytosis or membrane fusion.
For the combinations design the client based work on the following publications:
https://www.nature.com/articles/srep10112
https://www.nature.com/articles/srep10300

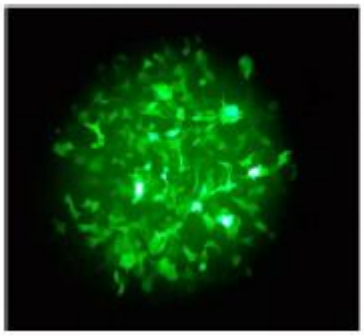
This client previously used the Amaxa nucleofector device but the NEPA21 results are significantly better.

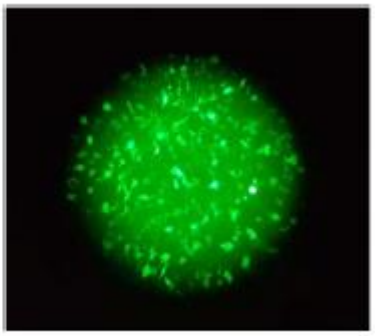
3134 murine mammary adenocarcinoma cell line

	% Viability	Transfection Efficiency
1	100	5%
2	100	10%
3	85	20%
4	90	40%
5	90	40%
6	100	60%-70%
7	100	60%-70%
8	90	50%
9	90	40%
10	50	40%
11	50	30%

A549 adenocarcinomic human alveolar basal epithelial cell line

	% Viability	Transfection Efficiency
1	100	15%
2	100	15%
3	70	20%
4	50	50%
5	50	50%
6	40	60%
7	20	10%
8	20	10%
9	10	70%
10	50	1%-5%
11	10	50%





L1210 - mouse lymphocytic leukemia

Single dsRed transfection

	% Viability	% Transfection Efficiency
6	85	70
8	70	70
5	60	60

- A single plasmid transfection 1 $(\mu g)/(\mu l)$

Co transfection mCherry

	% Viability	% Transfection Efficiency
6	65	10
8	75	10

- One plasmid concentration was: $0.176\frac{\mu g}{\mu l}$
  Second plasmid concentration was: $0.141\frac{\mu g}{\mu l}$

The recommended plasmid concentration is 1 $(\mu g)/(\mu l)$

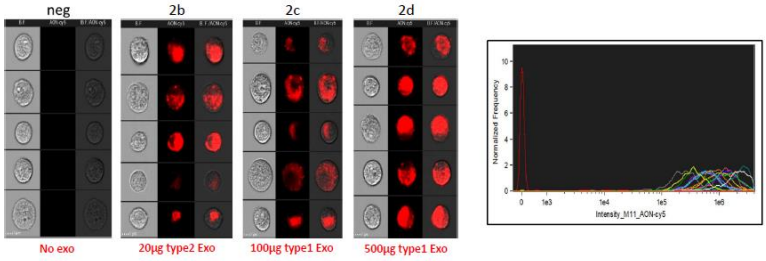
human ES cells

48 hours after electroporation

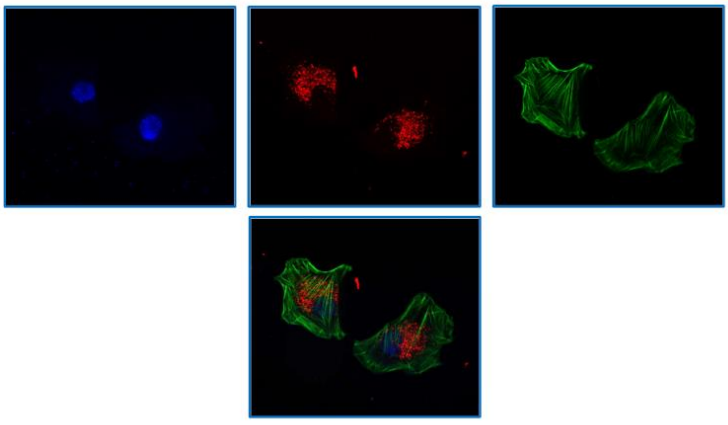
	% Viability	% Transfection Efficiency
7	70	20
8	50	40-50

- The yield with the competitor's electroporator is **25%**.

Labeled DNA oligos into Exosomes



Labeled DNA oligos into Exosomes



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PUBLICATIONS

Transfection into EXOSOMES by Electroporation

Exosomes

A modified CD9 tag for efficient protein delivery via extracellular vesicles
Inano S, Kitano T.
PLoS One. 2024 Oct 17;19(10):e0310083.

Exosome-based biomimetic nanoparticles targeted to inflamed joints for enhanced treatment of rheumatoid arthritis
Yan F, Zhong Z, Wang Y, Feng Y, Mei Z, Li H, Chen X, Cai L, Li C.
J Nanobiotechnology. 2020 Aug 20;18(1):115.

Effects of Lyophilization of Arginine-rich Cell-penetrating Peptide-modified Extracellular Vesicles on Intracellular Delivery
Noguchi K, Hirano M, Hashimoto T, Yuba E, Takatani-Nakase T, Nakase I.
Anticancer Res. 2019 Dec;39(12):6701-6709.

Effects of gefitinib treatment on cellular uptake of extracellular vesicles in EGFR-mutant non-small cell lung cancer cells
Takenaka T, Nakai S, Katayama M, Hirano M, Ueno N, Noguchi K, Takatani-Nakase T, Fujii I, Kobayashi SS, Nakase I.
Int J Pharm. 2019 Dec 15;572:118762.

Arginine-rich cell-penetrating peptide-modified extracellular vesicles for active macropinocytosis induction and efficient intracellular delivery
Nakase I, Noguchi K, Aoki A, Takatani-Nakase T, Fujii I, Futaki S.
Sci Rep. 2017 May 16;7(1):1991.

Vectorization of biomacromolecules into cells using extracellular vesicles with enhanced internalization induced by macropinocytosis
Nakase I, Noguchi K, Fujii I, Futaki S.
Sci Rep . 2016 Oct 17;6:34937.

Active macropinocytosis induction by stimulation of epidermal growth factor receptor and oncogenic Ras expression potentiates cellular uptake efficacy of exosomes.
Nakase I, Kobayashi NB, Takatani-Nakase T, Yoshida T
Sci Rep. 2015 Jun 3;5:10300.

Combined treatment with a pH-sensitive fusogenic peptide and cationic lipids achieves enhanced cytosolic delivery of exosomes.
Nakase I, Futaki S
Sci Rep. 2015 May 26;5:10112.

ACCESSORIES

Transfection into PRIMARY CELL CULTURES by Electroporation

Cuvette Chamber and Stand Holder

NEPA Cuvettes: 1mm, 2mm and 4mm