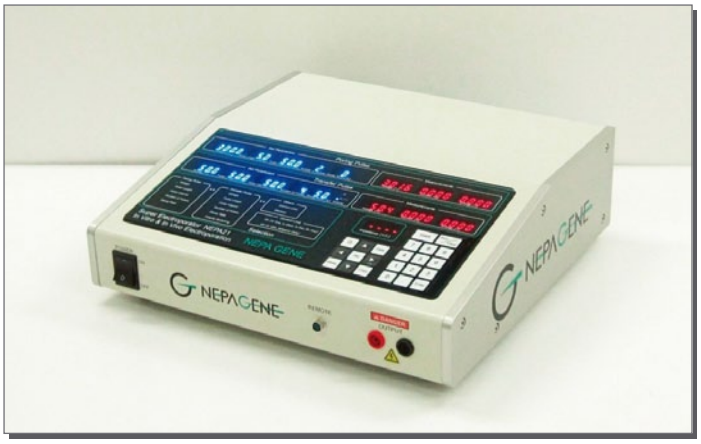
NEPAGENE

NEPA21

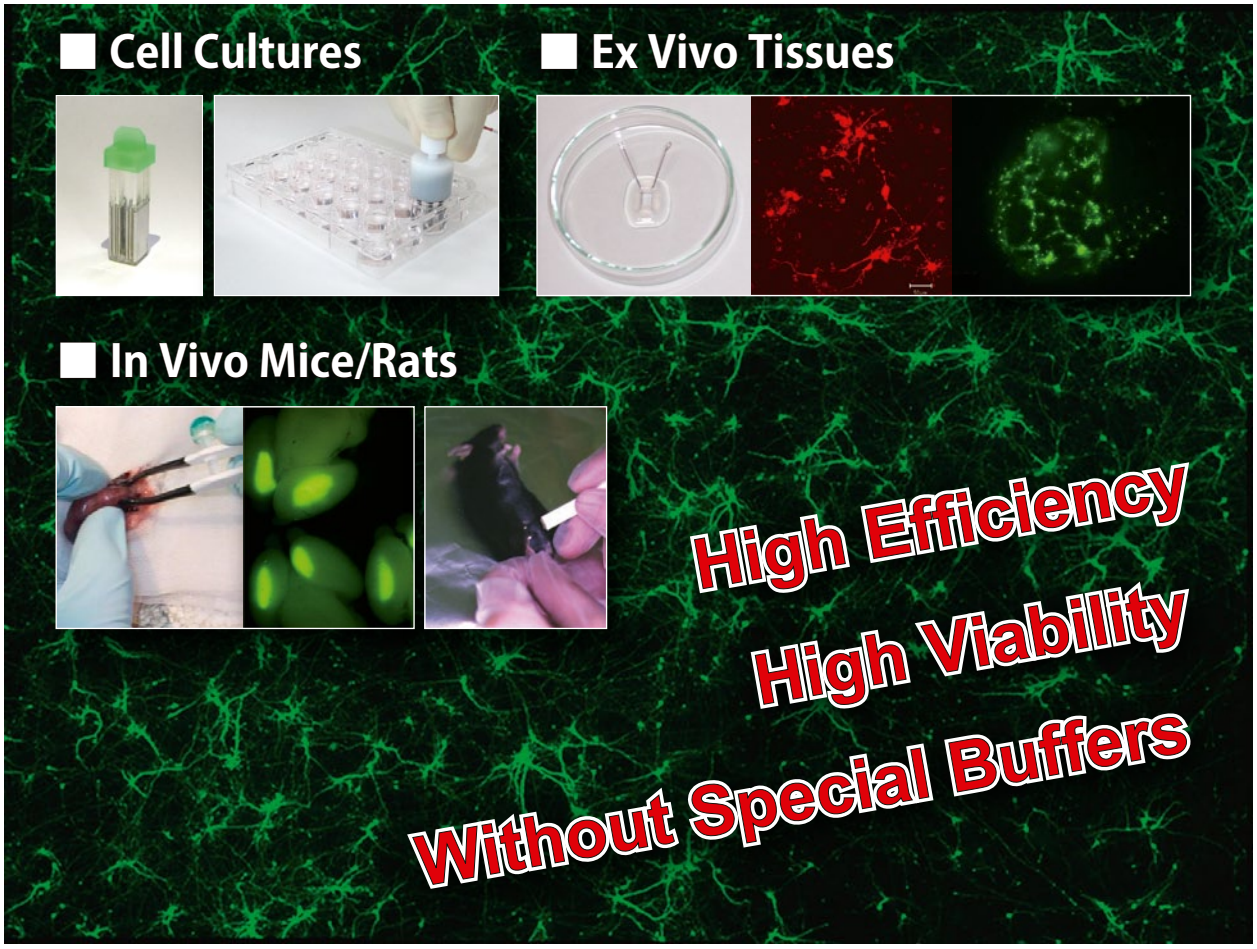
Transfection System



Super Electroporator NEPA21

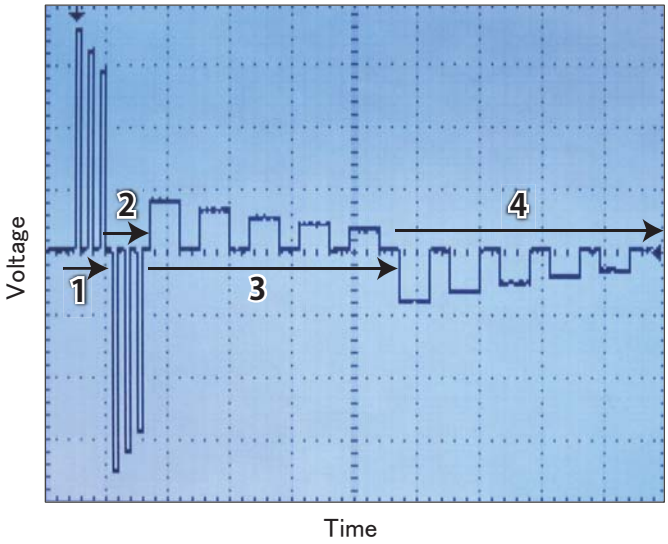
Versatile Applications

*The NEPA21 electroporator can cover all application range of the second-class CUY21 electroporators.



Novel 4-Step Multiple Electroporation Pulse

Electric pulses delivered by NEPA21



The 4-step pulse with voltage decay results in **higher transfection efficiency and higher viability WITHOUT special buffers.**

Step 1 : Poring Pulse Mode

High Voltage, Short Duration, Multiple Pulses, Voltage Decay

This poring pulse is for forming pores (small holes) in cell membrane with minimum damage.

Step 2: Polarity Exchanged Poring Pulse

This can be applied to adherent-cell/tissue transfection.

Step 3: Transfer Pulse Mode

Low Voltage, Long Duration, Multiple Pulses, Voltage Decay

This transfer pulse is for delivering the target molecules (DNA, RNA, etc.) into cells with minimum damage.

Step 4: Polarity Exchanged Transfer Pulse

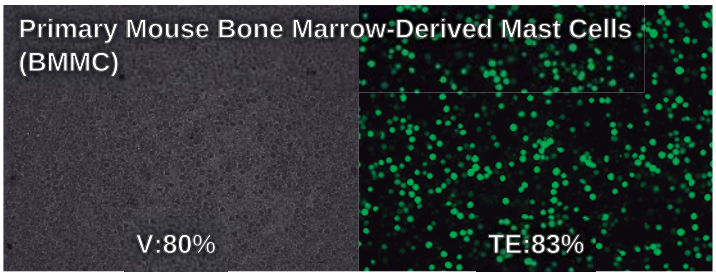
This can increase the transfection efficiency.

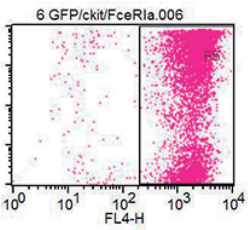
Transfection with Electroporation Cuvettes for Cell Cultures

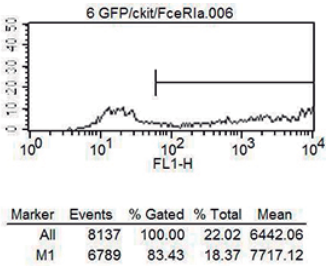
The NEPA21 Electroporator makes it possible to achieve high transfection efficiency and viability without resourse to special buffers for **difficult-to-transfect cells such as PRIMARY CELLS, STEM CELLS, IMMUNE CELLS, BLOOD CELLS, etc.**

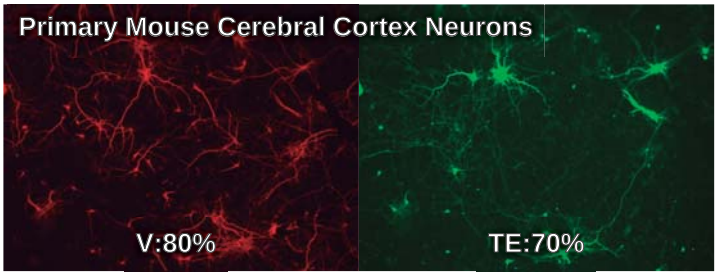
NEPA21 Transfection Data

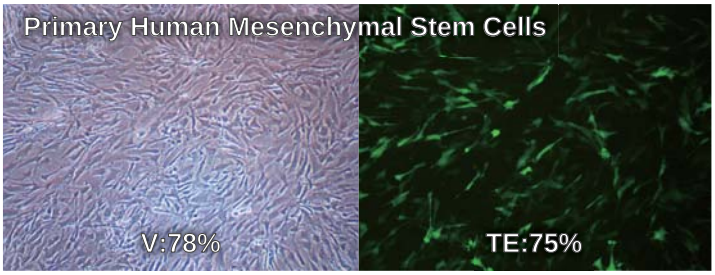
The pictures right show GFP expression. V: Viability TE: Transfection Efficiency

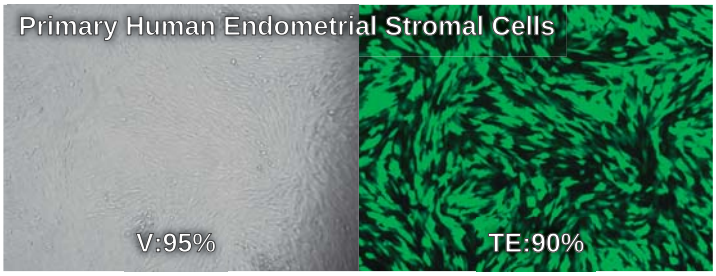


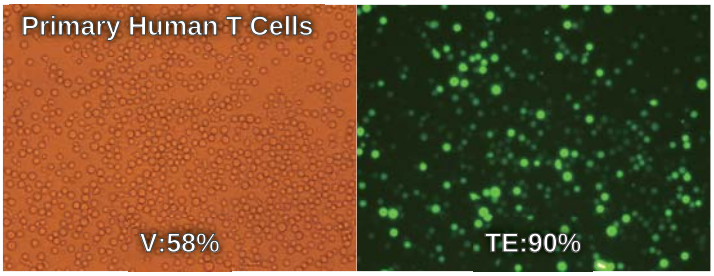












NEPA21 Transfection Data

V: Viability TE: Transfection Efficiency

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Excellent results for difficult-to-transfect cells

	V	TE
Primary HUVEC	95%	75%
Primary Human Endometrial Stromal cells	95%	90%
Primary Human Dermal Fibroblasts	95%	89%
Primary Human T cells	58%	90%
Primary PBMC	93%	66%
Primary Mouse Cerebral Cortex Neurons	80%	70%
Primary Mouse Hippocampal Neurons	80%	60%
Primary Mouse Neural Progenitor cells	80%	60%
Primary Mouse DRG Neurons	70%	70%
Primary MEF	90%	85%
Primary BMMC	80%	83%
Primary Mouse Liver cells	70%	50%
Primary Rat Schwann cells	90%	80%
Primary Chick Embryonic Fibroblasts	80%	90%
Primary Goat Embryonic Epithelial Fibroblasts	80%	55%
Primary Human Mesenchymal Stem cells	78%	75%
Human iPS cells	90%	79%
Mouse ES cells	80%	90%
Mouse iPS cell derived Neural Stem cells		86%
Mouse Neural Stem cells	90%	80%
Mouse Neurospheres	90%	75%

		V	TE
HEK293	Human Embryonic Kidney cells	92%	91%
HEK293T	Human Embryonic Kidney cells	90%	95%
HDF	Human Dermal Fibroblasts (106-05)	90%	90%
PANC-1	Human Pancreatic Carcinoma cells	55%	75%
MIA-PaCa-2	Human Pancreatic Carcinoma cells	80%	77%
HepG2	Human Hepatoma cells	88%	76%
H69	Human Small-Cell Lung Cancer cells	90%	85%
H1299	Human Lung Cancer cells	90%	90%
A549	Human Lung Adenocarcinoma cells	85%	90%

		V	TE
MCF 10A	Human Breast Cells	90%	80%
MCF-7	Human Breast Cancer cells	80%	70%
HCT116	Human Colon Cancer cells	95%	90%
Caco-2	Human Colon Cancer cellss	95%	80%
HeLa	Human Cervical Carcinoma cells	87%	93%
OVCAR-3	Human Ovarian Carcinoma cells	90%	79%
PC-3	Human Prostate Cancer cells	90%	95%
SH-SY5Y	Human Neuroblastoma cells	60%	90%
iHAM-4	Human Amniotic Mesenchymal cells	59%	95%
	Human Dental Pulp cells	90%	85%
RPE	Retinal Pigment Epithelium cells	90%	70%
Jurkat	Human T-cell Leukemia cells	95%	95%
K562	Human Chronic Myelogenous Leukemia cells	91%	99%
THP-1	Human Acute Monocytic Leukemia cells	85%	67%
HL-60	Human Promyelocytic Leukemia cells	80%	80%
697	Human Pre-B Acute Lymphoblastic Leukemia cells	79%	72%
BJAB	Human EBV-negative Burkitt Lymphoma cells	96%	96%

		V	TE
NIH/3T3	Mouse Embryonic Fibroblasts	74%	81%
3T3-L1	Mouse Embryonic Fibroblasts	90%	90%
C2C12	Mouse Myoblast cells	94%	90%
Neuro-2a	Mouse Neuroblastoma cells	90%	90%
MIN6	Mouse Pancreatic Beta cells	70%	56%
RAW264.7	Mouse Macrophage-like cells	57%	71%
BA/F3	Mouse pro-B cells	90%	90%
PC12	Rat Adrenal Pheochromocytoma cells	90%	70%
H9c2	Rat Ventricular Myoblasts	75%	80%
CHO	Chinese Hamster Ovary Cells	74%	90%
CHO-K1	Chinese Hamster Ovary Cells	95%	95%
MDCK	Madrin-Darby Canine Kidney Cells	90%	95%
BEF	Bovine Fetal Fibroblasts	78%	72%
BAFC	Bovine Aortic Endothelial Cells	80%	80%

High Performance WITHOUT Special Buffers

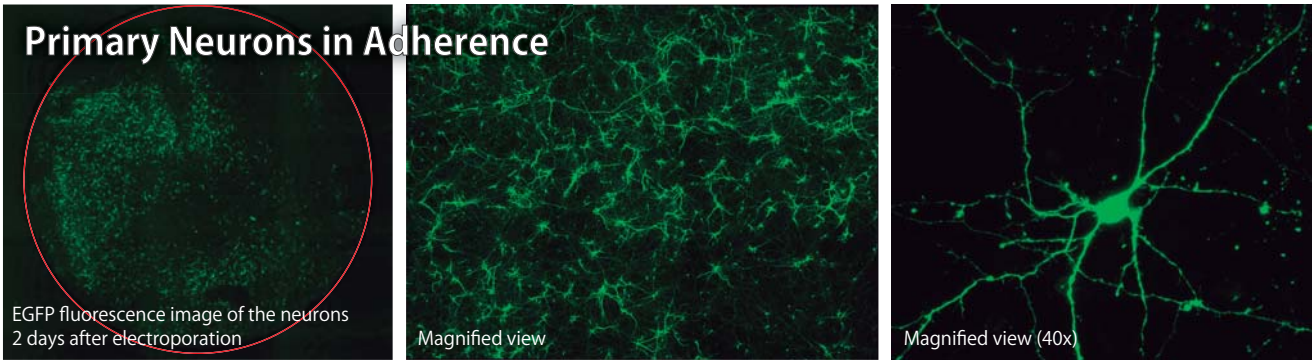
Comparison with Competitors

Transfection Device	NEPA21 (Nepa Gene)	N (Company L)	N (Company I(L))
Characteristics	New Electroporation No Special Buffers	Electroporation and Special Buffers	Electroporation and Special Buffers
Consumables (Disposable Kits)	Economy Cuvettes USD 2.00/reaction	Special Kits USD 20.00/reaction	Special Kits USD 20.00/reaction

The running cost of NEPA21 is much lower than other transfection devices!

Transfection with Cell-Culture-Plate Electrodes

By using the Adherent Cell Electrode CUY900 series, it is now possible to transfer DNA/RNA directly into **CELLS IN ADHERENCE** in a commercially available multi-well plate.

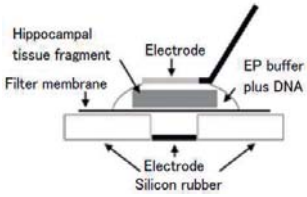


pCAGGS-EGFP plasmid was transferred into primary neurons cultured for 6 days in adherent state.
The neurons were prepared from E15 mouse cerebral cortex.
*The red circle indicates a whole shape of the well-bottom of a 24-well plate.

Department of Neurochemistry, National Institute of Neuroscience, Japan

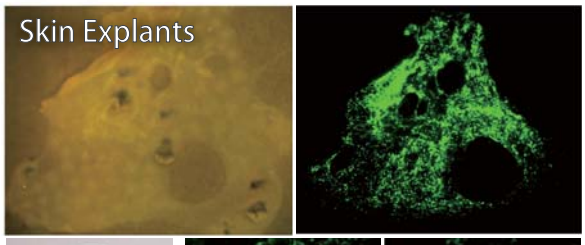
With Ex Vivo Electrodes

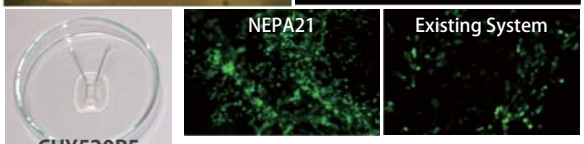
■ In Vitro Tissues/Organs



A fragment of the mouse embryonic hippocampus was placed on a filter and EP buffer containing plasmid DNA was applied onto the tissue. A cover electrode was attached to the surface of a droplet.

Kawabata I et al. Neuroreport. 2004 Apr 29;15(6):971-5.

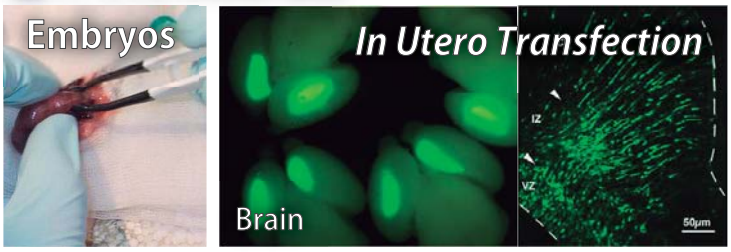




Much more GFP+ cells are shown on Fig. NEPA21.

With In Vivo Electrodes

■ In Vivo Mice/Rats



Plasmid DNA was injected into one or both lateral ventricles through the uterine wall, and electronic pulses were applied to the brain from outside the uterine wall.
After electroporation, the brains were taken out and observed under a fluorescence stereomicroscope. Fluorescence was observed in the lateral region of the hemisphere

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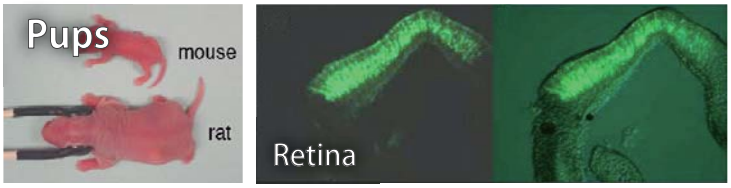
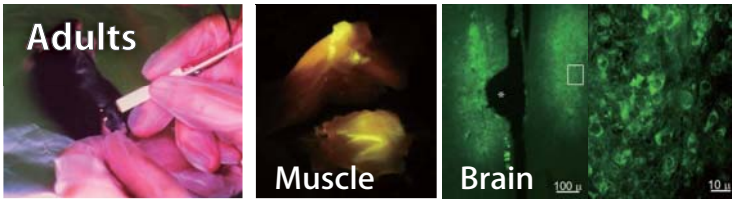
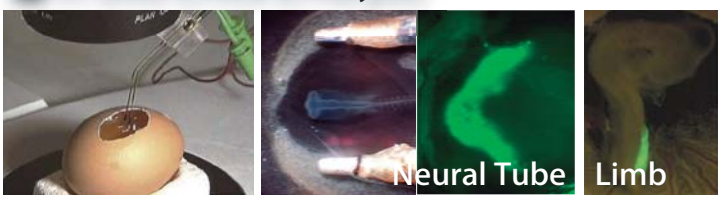




Transfection targets:

Brain, Retina, Muscle, Skin, Liver, Testis, etc.

■ In Ovo Chick Embryos



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