



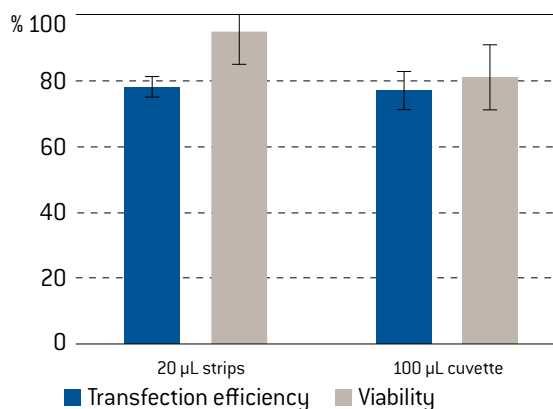
4D-Nucleofector™ Protocol for MDBK Cells

For 4D-Nucleofector™ X Unit—Transfection in Suspension

Bovine kidney; epithelial cells

Example for Nucleofection of MDBK

Transfection efficiency and viability of MDBK cells 24 hours post Nucleofection. MDBK cells were transfected with program FS-100 in 20 µL Nucleocuvette™ Strips (0.4 µg pmaxGFP™ Vector) or 100 µL Nucleocuvette™ Vessels (2 µg pmaxGFP™ Vector). 24 hours post Nucleofection, transfection efficiency was analyzed on a FACSCalibur™ (Becton Dickinson). Cell viability was determined using ViaLight™ Plus Assay and normalized to untransfected control sample.



Product Description

Recommended Kit(s) – SF Cell Line 4D-Nucleofector™ X Kit

Cat No.	V4XC-2012	V4XC-2024	V4XC-2032
Transfection volume	100 µL	100 µL	20 µL
Size [reaction]	2 x 6	24	2 x 16
Nucleofector™ Solution	2 x 0.675 mL (0.492 mL + 27% overfill)	2.25 mL (1.968 mL + 13% overfill)	0.675 mL (0.525 mL + 22% overfill)
Supplement	2 x 0.15 mL (0.108 mL + 27% overfill)	0.5 mL (0.432 mL + 13% overfill)	0.15 mL (0.115 mL + 22% overfill)
pmaxGFP™ Vector (1 µg/µL in 10 mM Tris pH 8.0)	50 µg	50 µg	50 µg
Single Nucleocuvette™ (100 µL)	12	24	-
16-well Nucleocuvette™ Strips (20 µL)	-	-	2

Storage and Stability

Store Nucleofector™ Solution, Supplement and pmaxGFP™ Vector at 4°C. For long-term storage, pmaxGFP™ Vector is ideally stored at -20°C. The expiration date is printed on the solution box. Once the Nucleofector™ Supplement is added to the Nucleofector™ Solution, it is stable for three months at 4°C

Note

4D-Nucleofector™ Solutions can only be used with conductive polymer Nucleocuvette™ Vessels, i.e. in the 4D-Nucleofector™ and the 96-well Shuttle™ System. They are not compatible with the Nucleofector™ II/2b Device.

Required Material

Note

Please make sure that the supplement is added to the Nucleofector™ Solution prior to use. For preparing aliquots, mix Nucleofector™ Solution and Supplement in a ratio of 4.5 : 1 (see Table 1).

- 4D-Nucleofector™ System (4D-Nucleofector™ Core and X Unit)
- Supplemented 4D-Nucleofector™ Solution at room temperature
- Supplied 100 µL single Nucleocuvette™ or 20 µL 16-well Nucleocuvette™ Strips
- **Compatible tips for 20 µL Nucleocuvette™ Strips:** epT.I.P.S. [US/CDN: Eppendorf North America, Cat. No. 2491.431, Rest of World: Eppendorf AG, Cat. No. 0030073.266], Matrix TallTips™ [Matrix Technologies Corp., Cat. No. 7281] or LTS Tips [Rainin Instrument, LLC, Cat. No. SR-L10F, SR/SS-L250S, SR/SS-L300S]. Before using other types of pipette tips, please ensure they reach the bottom of the Nucleocuvette™ wells without getting stuck
- Supplied pmaxGFP™ Vector, stock solution 1 µg/µL

Note

When using pmaxGFP™ Vector as positive control, dilute the stock solution to an appropriate working concentration that allows pipetting of the recommended amounts per sample (see Table 3). Make sure that the volume of substrate solution added to each sample does not exceed 10% of the total reaction volume (2 µL for 20 µL reactions; 10 µL for 100 µL reactions).

- Substrate of interest, highly purified, preferably by using endotoxin-free kits; A260:A280 ratio should be at least 1.8
- Cell culture plates of your choice
- **For detaching cells:** 0.5 mg/mL Trypsin and 0.2 mg/mL EDTA in PBS and supplemented culture media or PBS/0.5% BSA
- **Culture medium:** Minimum Essential Medium (Eagle) [Lonza; Cat. No. BE12-662F] supplemented with 1 mM sodium pyruvate, 0.1 mM nonessential amino acids and 1.5 g/L sodium bicarbonate, 10% Horse serum, 100 µg/mL streptomycin, 100U/mL penicillin, 2mM Ultraglutamine 1 [Lonza; Cat. No. BE17-605E/U1]
- Prewarm appropriate volume of culture medium to 37°C (see Table 2)
- Appropriate number of cells/sample (see Table 3)

1. Pre Nucleofection

Cell culture recommendations

- 1.1 Replace media every 2 – 3 days
- 1.2 Passage cells 3 times a week. A subculture ratio of 1:5 to 1:8 is recommended
- 1.3 Seed out 2 – 2.5 x 10⁶ cells/cm²
- 1.4 Subculture 2 – 3 days before Nucleofection with a ratio of 1:5 to 1:8

Trypsinization

- 1.5 Remove media from the cultured cells and wash cells once with an appropriate volume of PBS
- 1.6 For harvesting, incubate the cells ~5 minutes at 37°C with an appropriate volume of indicated trypsinization reagent (please see required material)
- 1.7 Neutralize trypsinization reaction with supplemented culture medium or PBS/0.5% BSA once the majority of the cells (>90 %) have been detached

2. Nucleofection

For Nucleofection sample contents and recommended Nucleofector™ Program, please refer to Table 3.

- 2.1 Please make sure that the entire supplement is added to the Nucleofector™ Solution
- 2.2 Start 4D-Nucleofector™ System and create or upload experimental parameter file (for details see device manual)
- 2.3 Select/Check for the appropriate Nucleofector™ Program (see Table 3)
- 2.4 Prepare cell culture plates by filling appropriate number of wells with desired volume of recommended culture media (see Table 4) and pre-incubate/equilibrate plates in a humidified 37°C/5% CO₂ incubator
- 2.5 Pre-warm an aliquot of culture medium to 37°C (see Table 4)
- 2.6 Prepare plasmid DNA or pmaxGFP™ Vector or siRNA (see Table 3)
- 2.7 Harvest the cells by trypsinization (please see 1.5 – 1.7)
- 2.8 Count an aliquot of the cells and determine cell density
- 2.9 Centrifuge the required number of cells (see Table 3) at 90xg for 10 minutes at room temperature. Remove supernatant completely
- 2.10 Resuspend the cell pellet carefully in room temperature 4D-Nucleofector™ Solution (see Table 3)
- 2.11 Prepare mastermixes by dividing cell suspension according to number of substrates
- 2.12 Add required amount of substrates to each aliquot (max. 10% of final sample volume)
- 2.13 Transfer mastermixes into the Nucleocuvette™ Vessels

Note

As leaving cells in Nucleofector™ Solution for extended periods of time may lead to reduced transfection efficiency and viability it is important to work as quickly as possible. Avoid air bubbles while pipetting

- 2.14 Gently tap the Nucleocuvette™ Vessels to make sure the sample covers the bottom of the cuvette
- 2.15 Place Nucleocuvette™ Vessel with closed lid into the retainer of the 4D-Nucleofector™ X Unit. Check for proper orientation of the Nucleocuvette™ Vessel
- 2.16 Start Nucleofection Process by pressing “Start” on the display of the 4D-Nucleofector™ Core Unit (for details, please refer to the device manual)
- 2.17 After run completion, carefully remove the Nucleocuvette™ Vessel from the retainer
- 2.18 Resuspend cells with pre-warmed medium (for recommended volumes see Table 2). Mix cells by gently pipetting up and down two to three times. When working with the 100 µL Nucleocuvette™ use the supplied pipettes and avoid repeated aspiration of the sample
- 2.19 Plate desired amount of cells in culture system of your choice (for recommended volumes see Table 2).

3. Post Nucleofection

- 3.1 Incubate the cells in humidified 37°C/5% CO₂ incubator until analysis. Gene expression or down regulation, respectively, is often detectable after only 4 – 8 hours

Table 1: Volumes required for a single reaction

	100 µL Single Nucleocuvette™	20 µL Nucleocuvette™ Strip
Volume of Nucleofector™ Solution	82 µL	16.4 µL
Volume of Supplement	18 µL	3.6 µL

Table 2: Required amounts of cells and media for Nucleofection

		100 µL Single Nucleocuvette™	20 µL Nucleocuvette™ Strip
Culture plate format		6-well plate	96-well plate
Culture medium	Pre-filled in plate	1000 µL	175 µL
	Added to sample post Nucleofection	400 µL	80 µL
Volume of sample transferred to culture plate		complete sample (use supplied pipettes)	25 µL
Final culture volume		1500 µL	200 µL

Table 3: Contents of one Nucleofection sample and recommended program

		100 µL Single Nucleocuvette™	20 µL Nucleocuvette™ Strip
Cells		0.5 x 10 ⁶ (Lower or higher cell numbers may influence transfection results)	1 x 10 ⁵ (Lower or higher cell numbers may influence transfection results)
Substrate*	pmaxGFP™ Vector	2 µg	0.4 µg
	or plasmid DNA (in H ₂ O or TE)	1-5 µg	0.2-1µg
	or siRNA	30–300 nM siRNA (3–30 pmol/sample)	30–300 nM siRNA (0.6–6 pmol/sample)
SF 4D-Nucleofector™ X Solution		100 µL	20 µL
Program		FS-100	FS-100

*Volume of substrate should comprise maximum 10% of total reaction volume

Additional Information

For an up-to-date list of all Nucleofector™ References, please refer to:
www.lonza.com/nucleofection-citations

For more technical assistance, contact our Scientific Support Team:

USA /Canada

Phone: 800 521 0390 (toll-free)

Fax: 301 845 8338

E-mail: scientific.support@lonza.com

Europe and Rest of World

Phone: +49 221 99199 400

Fax: +49 221 99199 499

E-mail: scientific.support.eu@lonza.com

Lonza Cologne GmbH
50829 Cologne, Germany

For research use only. Not for use in diagnostic procedures.

The Nucleofector™ Technology, comprising Nucleofection Process, Nucleofector™ Device, Nucleofector™ Solutions, Nucleofector™ 96-well Shuttle™ System and 96-well Nucleocuvette™ plates and modules is covered by patent and/or patent-pending rights owned by Lonza Cologne GmbH.

Nucleofector, Nucleofection, 4D-Nucleofector, Nucleocuvette and maxGFP are registered trademarks of the Lonza Cologne GmbH in Germany and/or U.S. and/or other countries. This kit contains a proprietary nucleic acid coding for a proprietary copepod fluorescent protein intended to be used as a positive control with this Lonza product only. Any use of the proprietary nucleic acid or protein other than as a positive control with this Lonza product is strictly prohibited. USE IN ANY OTHER APPLICATION REQUIRES A LICENSE FROM EVROGEN. To obtain such a license, please contact Evrogen at license@evrogen.com.

The CMV promoter is covered under U.S. Patents 5,168,062 and 5,385,839 and its use is permitted for research purposes only. Any other use of the CMV promoter requires a license from the University of Iowa Research Foundation, 214 Technology Innovation Center, Iowa City, IA 52242.

All trademarks belong to Lonza or its affiliates or to their respective third party owners. The information contained herein is believed to be correct and corresponds to the latest state of scientific and technical knowledge. However, no warranty is made, either expressed or implied, regarding its accuracy or the results to be obtained from the use of such information and no warranty is expressed or implied concerning the use of these products. The buyer assumes all risks of use and/or handling. Any user must make his own determination and satisfy himself that the products supplied by Lonza Group Ltd or its affiliates and the information and recommendations given by Lonza Group Ltd or its affiliates are (i) suitable for intended process or purpose, (ii) in compliance with environmental, health and safety regulations, and (iii) will not infringe any third party's intellectual property rights.

© 2015 Lonza. All rights reserved.
D4XC-2057_2015-10