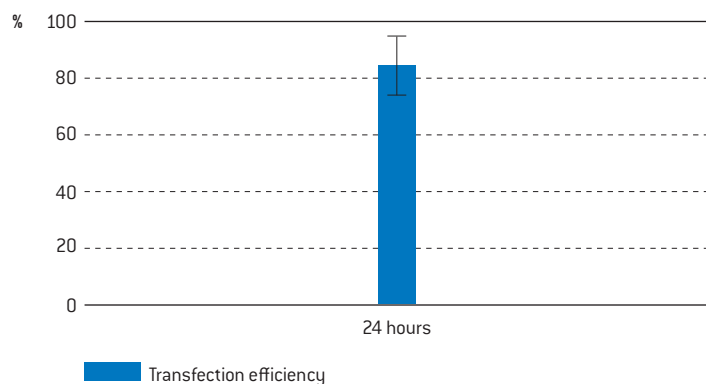


# Amaxa™ 96-well Shuttle™ Protocol for HEK-293 (ATCC®)

## Cell Description

Human embryonal kidney, also known as HEK-293; adherent fibroblastoid cells in monolayers; (ATCC® CRL-1573™, cryopreserved).

### Example for Nucleofection™ of 293 Cells



**Transfection efficiency of 293 cells 24 hours post Nucleofection™.** 293 cells (ATCC® CRL-1573™) were transfected with program 96-CM-130 and 0.4 µg of pmaxGFP™ Vector. 24 hours post Nucleofection™ cells were analyzed on a FACSCalibur™ with HTS option (Becton Dickinson). Cell viability (% PI negative cells) is usually around 90% after 24 hours.

## Product Description

### Recommended Kits

SF Cell Line 96-well Nucleofector™ Kit

Cat. No.	V4SC-2096
Size (reactions)	1×96
SF Cell Line 96-well Nucleofector™ Solution	2.25 ml
Supplement	0.5 ml
pmaxGFP™ Vector (1.0 µg/µl in 10 mM Tris pH 8.0)	50 µg
Nucleocuvette™ Plate (s)	1

Cat. No.	V4SC-2960
Size (reactions)	10×96
SF Cell Line 96-well Nucleofector™ Solution	22.5 ml
Supplement	5.0 ml
pmaxGFP™ Vector (1.0 µg/µl in 10 mM Tris pH 8.0)	50 µg
Nucleocuvette™ Plate (s)	10

### 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

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

## Required Material

### Note

Please make sure that the entire supplement is added to the Nucleofector™ Solution.

- Nucleofector™ 96-well Shuttle System (Nucleofector™ Device, version IIS; 96-well Shuttle™ Device; laptop with 96-well Shuttle™ Software)
- Supplemented 96-well Nucleofector™ Solution at room temperature
- Supplied Nucleocuvette™ Plate(s)
- Supplied pmaxGFP™ Vector, stock solution 1 µg/µl

### Note

Volume of substrate solution added to each sample should not exceed 10 % of the total reaction volume (2 µl for 20 µl reactions). For positive control using pmaxGFP™ Vector, please dilute the stock solution to reach the appropriate working concentration.

- Substrate of interest, highly purified, preferably by using endotoxin-free kits; A260 : A280 ratio should be at least 1.8
- Nucleocuvette™ compatible tips: 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
- 96-well culture plates or 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 (ATCC®, Cat. No. 30-2003) supplemented with 10 % FCS and 1 mM sodium pyruvate (Lonza, Cat. No. BE13-115E)
- Prewarm appropriate volume of culture medium to 37°C (255 µl per sample)
- Appropriate number of cells (2×10<sup>5</sup> cells per sample; maximum cell number: 1×10<sup>6</sup>; minimum cell number: 5×10<sup>3</sup> can be used with slightly reduced viability. At even lower cell numbers viability is strongly decreased

## 1. Pre Nucleofection™

### Cell culture recommendations

- 1.1 Replace media every 2–3 days
- 1.2 Passage cells at 80–90 % confluency. Cells should not be used for Nucleofection™ after passage number 20
- 1.3 Seed out 5×10<sup>5</sup> cells/25 cm<sup>2</sup> flask
- 1.4 Subculture 2–3 days before Nucleofection™
- 1.5 Optimal confluency for Nucleofection™: 80–90 %. Higher cell densities may cause lower Nucleofection™ Efficiencies

### Trypsinization

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

## 2. Nucleofection™

### One Nucleofection™ Sample Contains

- 2×10<sup>5</sup> cells
  - 0.2–1 µg plasmid DNA (in 1–2 µl H<sub>2</sub>O or TE) or 0.4 µg pmaxGFP™ Vector or 30–300 nM siRNA (0.6–6 pmol/sample)
  - 20 µl SF Cell Line 96-well Nucleofector™ Solution
- 2.1 Please make sure that the entire supplement is added to the Nucleofector™ Solution
  - 2.2 Start Nucleofector™ 96-well Shuttle™ Software, verify device connection and upload experimental parameter file (for details see device and software manuals)
  - 2.3 Select the appropriate 96-well Nucleofector™ Program **96-CM-130**
  - 2.4 Prepare cell culture plates by filling appropriate number of wells with desired volume of recommended culture media, e.g. 175 µl\* (see note at the end of this chapter) for one well of a 96-well plate and pre-incubate/equilibrate plates in a humidified 37°C/5 % CO<sub>2</sub> incubator
  - 2.5 Pre-warm an aliquot of culture medium to 37°C (80 µl per sample\*)
  - 2.6 Prepare 0.2–1 µg plasmid DNA or 0.4 µg pmaxGFP™ Vector or 30–300 nM siRNA (0.6–6 pmol/sample)
  - 2.7 Harvest the cells by trypsinization (please see 1.6–1.8)
  - 2.8 Count an aliquot of the cells and determine cell density
  - 2.9 Centrifuge the required number of cells (2×10<sup>5</sup> cells per sample) at 90×g for 10 minutes at room temperature. Remove supernatant completely
  - 2.10 Resuspend the cell pellet carefully in 20 µl room temperature 96-well Nucleofector™ Solution per sample

#### A: One or several substrates (DNAs or RNAs) in multiples

- Prepare mastermixes by dividing cell suspension according to number of substrates
- Add required amount of substrates to each aliquot (max. 2 µl per sample)
- Transfer 20 µl of mastermixes into the wells of the 96-well Nucleocuvette™ Modules

#### B: Multiple substrates (e.g. Library Transfection)

- Pipette 20 µl of cell suspension into each well of a sterile U- or V-bottom 96-well microtiter plate
- Add 2 µl substrates (maximum) to each well
- Transfer 20 µl of cells with substrates into the wells of the 96-well Nucleocuvette™ Modules

#### Note

It is advisable to pre-dispense each cell suspension into a sterile round-bottom 96-well plate or to pipet from a pipetting reservoir for multi-channel pipettes. Use a multi-channel or single-channel pipette with suitable pipette tips. As leaving cells in 96-well 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.

- 2.11 Gently tap the Nucleocuvette™ Plate to make sure the sample covers the bottom of the well
- 2.12 Place 96-well Nucleocuvette™ Plate with closed lid into the retainer of the 96-well Shuttle. Well “A1” must be in upper left position
- 2.13 Start 96-well Nucleofection™ Process by either pressing “Upload and start” in the 96-well Shuttle™ Software or pressing “Upload” in the 96-well Shuttle™ Software and then the “Start” button at the 96-well Shuttle™ (for both options please refer to the respective Manual)
- 2.14 After run completion, open retainer and carefully remove the 96-well Nucleocuvette™ Plate from the retainer
- 2.15 Resuspend cells with 80 µl\* (recommendation for 96-well plates) or desired volume of pre-warmed medium (maximum cuvette volume 200 µl). Mix cells by gently pipetting up and down two to three times
- 2.16 Plate desired amount of cells in culture system of your choice. Recommendation for 96-well plates: Transfer 25 µl of resuspended cells to 175 µl pre-warmed medium prepared in 96-well culture plates\*

#### \* Note

The indicated cell numbers and volumes have been found to produce optimal 96-well Nucleofection™ Results in most cases. However, depending on your specific needs you may wish to test an extended range of cell numbers. Cell numbers and volumes can be adapted such that fewer cells are transferred or duplicate plates can be seeded.

## 3. Post Nucleofection™

- 3.1 Incubate the cells in humidified 37°C/5% CO<sub>2</sub> incubator until analysis. Gene expression or down regulation, respectively, is often detectable after only 4–8 hours

## Additional Information

### Up-To-Date List of all Nucleofector™ References

[www.lonza.com/nucleofection-citations](http://www.lonza.com/nucleofection-citations)

### Technical Assistance and Scientific Support

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