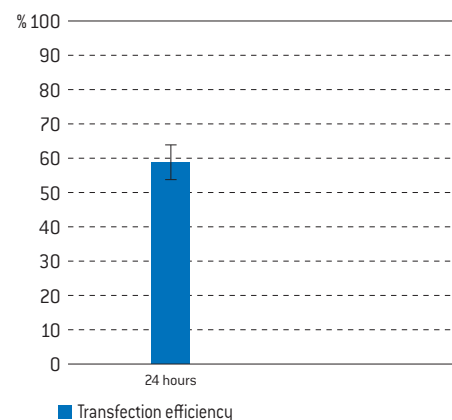


# Amaxa™ 4D-Nucleofector™ Protocol for HL-60 For 4D-Nucleofector™ X Unit

Human acute promyelocytic leukemia; myeloblastic cells;

## Example for Nucleofection™ of HL-60 cells

Transfection efficiency of HL-60 cells 24 hours post Nucleofection™. HL-60 cells were transfected with program EN-138 and 0.4 µg of pmaxGFP™ Vector in 20 µl Nucleovette™ Strips. 24 hours post Nucleofection™ cells were analyzed on a FACSCalibur™ [Becton Dickinson]. Cell viability (% PI negative cells) is usually around 60% after 24 hours.



## 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% overflow)	2.25 ml (1.968 ml + 13% overflow)	0.675 ml (0.525 ml + 22% overflow)
Supplement	2 x 0.15 ml (0.108 ml + 27% overflow)	0.5 ml (0.432 ml + 13% overflow)	0.15 ml (0.115 ml + 22% overflow)
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 Nucleocuvettes™ (conductive polymer cuvettes), i.e. in the 4D-Nucleofector™ System and the 96-well Shuttle™ Device. 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. The ratio of Nucleofector™ Solution to supplement is 4.5: 1 (see table 1)

- 4D-Nucleofector™ System (4D-Nucleofector™ Core Unit and 4D-Nucleofector™ 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 Instruments, 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 1µg/µl**

### Note

For positive control using pmaxGFP™, dilute the stock solution to an appropriate working concentration. Further details are provided in table 3 of this Optimized Protocol. The volume of substrate solution added to each sample should 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
- **Culture medium:** Iscove's Modified Dulbecco's Medium with 4 mM L-glutamine adjusted to contain 1.5 g/L sodium bicarbonate, 80% ; fetal calf serum, 20%
- Prewarm appropriate volume of culture medium to 37 °C (see table 2)
- Appropriate number of cells/sample (see table 2)

## 1. Pre Nucleofection™

- 1.1 Replace media 2–3 times a week
- 1.2 Passage cells at a density of 7–8 x 10<sup>5</sup> cells/ml. Do not use cells after passage 25 for Nucleofection™
- 1.3 Seed out 1 x 10<sup>5</sup> cells/ml
- 1.4 Subculture 3 days before Nucleofection™
- 1.5 Cells should be grown to a density of 5–7 x 10<sup>5</sup> cells/ml before Nucleofection™

## 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% CO<sub>2</sub> 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 Count an aliquot of the cells and determine cell density
- 2.8 Centrifuge the required number of cells (see table 3) at 90xg for 10 minutes at room temperature. Remove supernatant completely
- 2.9 Resuspend the cell pellet carefully in room temperature 4D-Nucleofector™ Solution (see table 3)
- 2.10 Prepare mastermixes by dividing cell suspension according to number of substrates
- 2.11 Add required amount of substrates to each aliquot (max. 10% of final sample volume)
- 2.12 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.

- 2.13 Gently tap the Nucleocuvette™ Vessels to make sure the sample covers the bottom of the cuvette
- 2.14 Place Nucleocuvette™ Vessel with closed lid into the retainer of the 4D-Nucleofector™ X Unit. Check for proper orientation of the Nucleocuvette™ Vessel
- 2.15 Start Nucleofection™ Process by pressing the "Start" on the display of the 4D-Nucleofector™ Core Unit (for details, please refer to the device manual)
- 2.16 After run completion, carefully remove the Nucleocuvette™ Vessel from the retainer
- 2.17 Incubate Nucleocuvette™ 10 minutes at room temperature
- 2.18 Resuspend cells with pre-warmed medium (for recommended volumes see table 5). 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 5)

### 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

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

For more technical assistance, contact our Scientific Support Team:

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**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 medium per sample post Nucleofection™ (for transfer and culture)	1.5 ml	230 µl
Cell number per Nucleofection™ Sample	2 x 10 <sup>6</sup> (Minimal cell number: 8 x 10 <sup>5</sup> cells, a lower cell number leads to a major increase in cell mortality; maximal cell number: 4 x 10 <sup>6</sup> )	4 x 10 <sup>5</sup> (1 x 10 <sup>5</sup> cells can be used with slightly reduced viability, at even lower cell numbers viability is strongly decreased)

**Table 3: Contents of one Nucleofection™ Sample and recommended program**

	100 µl Single Nucleocuvette™	20 µl Nucleocuvette™ Strip
Cells	2 x 10 <sup>6</sup>	4 x 10 <sup>5</sup>
Substrate*	pmaxGFP™ Vector	1–2 µg
	or plasmid DNA (in H <sub>2</sub> O or TE)	1–2 µg
	or siRNA	30–300nM siRNA (3–30 pmol/sample)
SF Cell Line 4D-Nucleofector™ X Solution	100 µl	20 µl
Program	EN-138	EN-138

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

**Table 4: Culture volumes required for post Nucleofection™ Steps**

	100 µl Single Nucleocuvette™	20 µl Nucleocuvette™ Strip*
12-well culture plate	1 ml	-
96-well culture plate	-	150 µl
Culture medium to be added to the sample post Nucleofection™	500 µl	80 µl

\* Maximum cuvette volume 200 µl

**Table 5: Recommended volumes for sample transfer into culture plate**

	100 µl Single Nucleocuvette™	20 µl Nucleocuvette™ Strip*
Culture medium to be added to the sample post Nucleofection™	500 µl	80 µl
Volume of sample transferred to culture plate	complete sample (use supplied pipettes)	50 µl

\* Maximum cuvette volume 200 µl