



# Nucleofector™ Technology

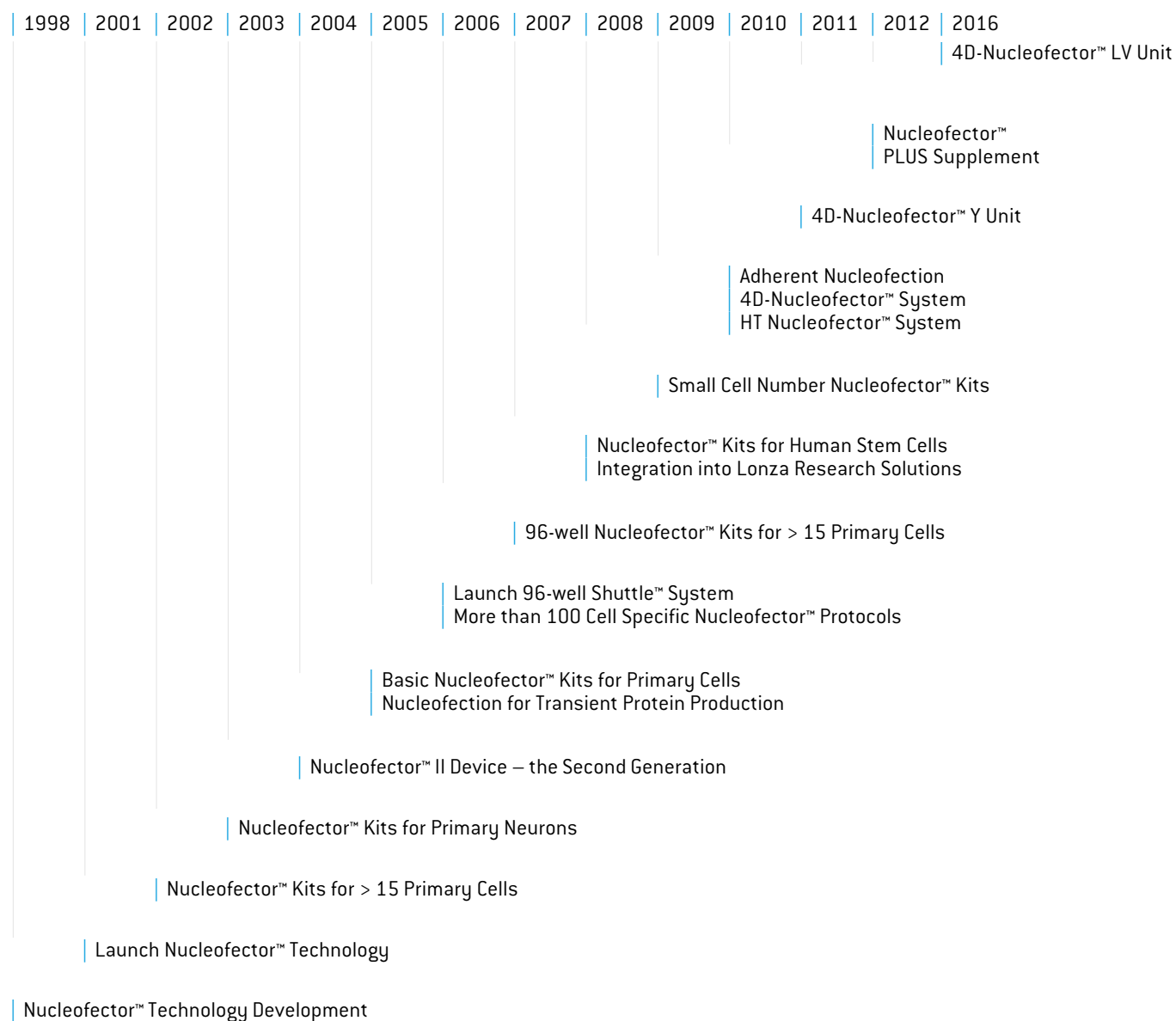
## Stretching Transfection Dimensions



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# History of Constant Innovation

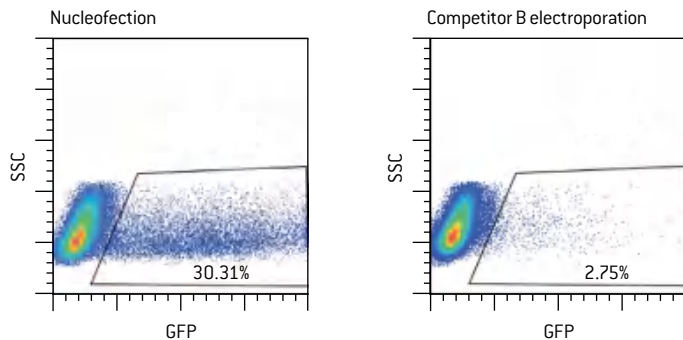


# Introduction: Nucleofector™ Technology

The application of systems biology and multidisciplinary approaches require that cells and model systems display in vivo like cellular functionality. This means that the future of cell transfection is in using primary cell types, and that transfecting these physiologically relevant cell types is typically a very difficult task using traditional methods. Additionally, when using relevant cell lines as model systems, the critical issues are to achieve reproducibly efficient transfection with high levels of viability while matching throughput capability with the number of transfections required at each project phase – from proof of concept, through to scale-up and screening-like approaches. With the Nucleofector™ Technology primary cells and stem cells, as well as cell lines, can be consistently transfected at high efficiency.

Developed in 1998, the Nucleofector™ Technology was introduced to the research market in 2001 as the first efficient non-viral transfection method for primary cells and hard-to-transfect cell lines. Since then the technology has evolved through constant innovation (see history).

## Nucleofector™ Technology – the Superior Non-viral Method

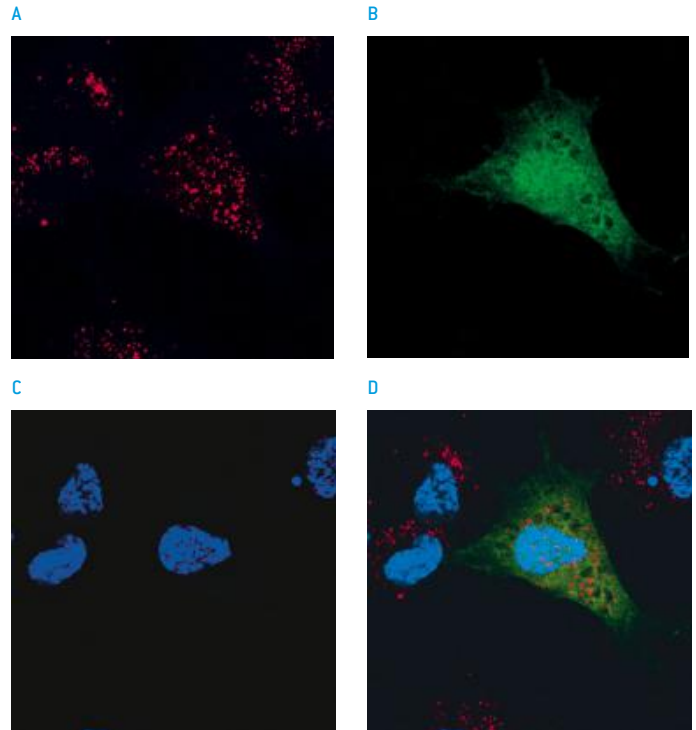


Transfection of the human natural killer cell line NKL using traditional electroporation and Nucleofection.  $5 \times 10^6$  NKL cells were transfected with  $2.5 \mu\text{g}$  of pmaxGFP™ Vector. Nucleofection: Nucleofector™ Solution V; Program 0-017. Competitor B electroporation: 25 mV, 96  $\mu\text{F}$ . Transfection efficiency was monitored by flow cytometry after 24 hours. Cells transfected by Nucleofection show a significantly better transfection efficiency compared to cells transfected by traditional electroporation. Cell viability, as measured 18 hours after transfection, was also superior using Nucleofection. [Data courtesy of Dr. John Coligan, Laboratory of Immunogenetics, NIH/NIAID, Rockville, MD, USA. J Immunol Methods [2004] 284: 133-140.]

## The Principle

Nucleofection is a technology based on the momentary creation of small pores in cell membranes by applying an electrical pulse. The comprehensive way in which Nucleofector™ Programs and cell type-specific solutions are developed enables nucleic acid substrates delivery not only to the cytoplasm, but also through the nuclear membrane and into the nucleus. This allows for high transfection efficiencies up to 99% and makes the transfection success independent from any cell proliferation.

## DNA Delivery Straight Into the Nucleus



Normal human dermal fibroblasts (neonatal) were transfected with  $2.5 \mu\text{g}$  TMR-labeled plasmid DNA encoding eGFP. After 2 hours, cells were fixed with 3.5% PFA and analyzed by confocal microscopy. TMR label is shown in [A], GFP fluorescence in [B], DAPI nuclear staining in [C] and a merge of all three fluorescent labels in [D].

# What Benefits Are Important for Your Work?

## Looking for Superior Transfection Performance?

- Electrical parameters are optimized to gain high transfection efficiency and retain high viability
- Excellent preservation of the physiological status of transfected cells

## Easy-to-use Technology?

- More than 650 cell-type specific protocols lead to direct transfection success with a multitude of different cell types
- Easy optimization protocols for cell lines and primary cells allow for quick and streamlined optimization of virtually any cell type

## Excellent Technical and Applicative Support?

- Highly-skilled scientific support team to assist you in your research
- Scientific Support Team members have a masters or PhD level education in biology, biochemistry or biotechnology
- Many of them with over 10 years experience in transfection support

## Relying on a Proven and Innovative Technology?

- More than 4000 peer-reviewed publications and thousands of systems placed worldwide
- Modularity of the 4D-Nucleofector™ System allows easy adaptation to new applications
- Invention of Nucleofection of cells in adherence

## Using Various Cell Numbers for Different Applications?

- Nucleofection of  $2 \times 10^4$  to  $1 \times 10^9$  depending one device
- Transferability of protocol conditions from small to larger cell numbers with the 4D-Nucleofector™ System

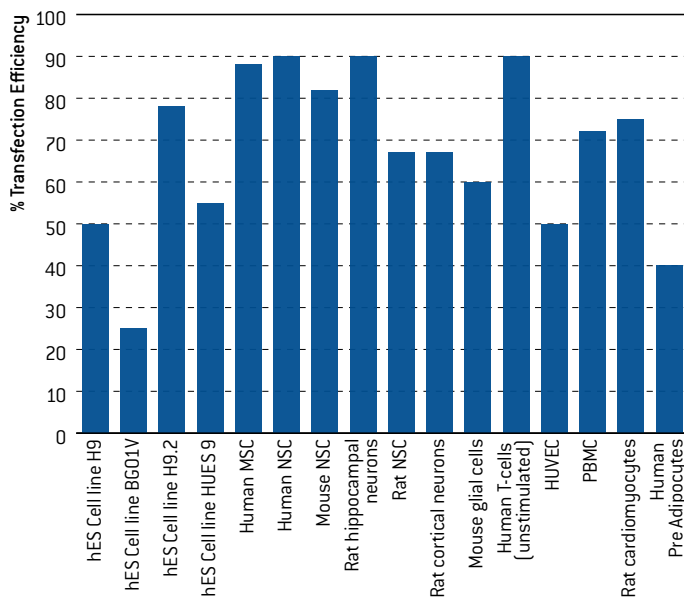
## Easy Expansion of Your Research?

- Explore complex systems by using the same conditions to deliver DNA, RNA, oligonucleotides, PNA, peptides or proteins
- Different device platforms fulfill your choice of sample throughput from 1 through 384 transfections per run including automated high throughput

## Avoiding Cross-contamination?

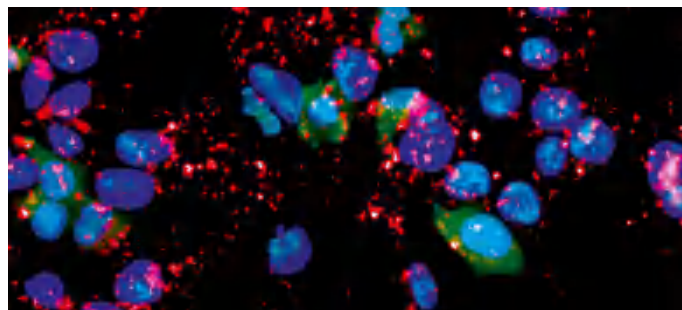
Disposable, sterile Nucleofection Vessels minimize the risk of cross-contamination with cell or substrate leftovers

## Average Transfection Efficiency for Primary Cells and Human Stem Cells



Overview about transfection efficiencies achieved by Nucleofection for various primary cells and stem cells.

## Conserving Functionality – the First Step to Meaningful Analysis

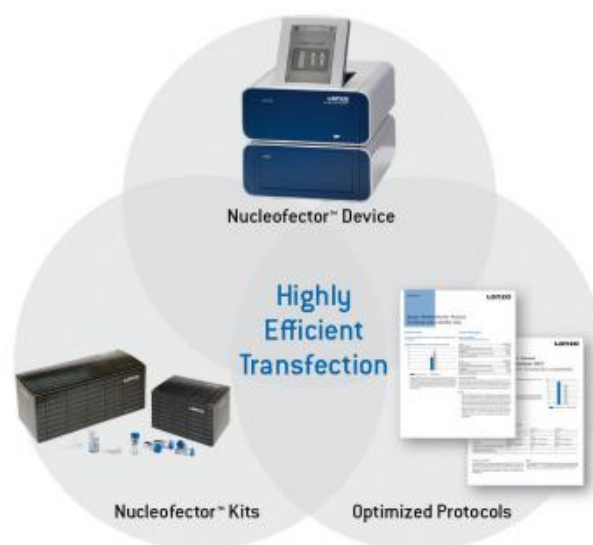


Human H9 ES cells preserve pluripotency post Nucleofection. H9 cells were transfected by Nucleofection with the pmaxGFP™ Vector. (A) Cells analyzed after 24 hours show expression of GFP (green) as well as of the pluri potency markers SSEA4 (red) and Oct4 (purple). The blue signals refer to nuclear staining by DAPI. (B) The percentage of double-positive cells (GFP/SSEA4) was analyzed by flow cytometry. [Data kindly provided by Jennifer Moore, Rutgers University, Piscataway, USA.]





# The Components of the Nucleofector™ Technology

The Nucleofector™ Technology relies on the combination of a Nucleofector™ Device and cell specific Nucleofector™ Kits.

- The **Nucleofector™ Device** delivers unique electrical parameters. The electrical settings are pre-programmed for each optimized cell type and can be selected via the device or PC software. We offer three different device platforms plus an add-on device (see table below)
- The **Nucleofector™ Kits** contain a specific Nucleofector™ Solution and Supplement, specified cuvettes, pipettes, and the pmaxGFP™ Control Vector. All Nucleofector™ Solutions provide a protective environment that allows for high transfection efficiency and cell viability, while helping to maintain physiologically relevant cellular functions.  
A collection of Nucleofector™ Kits with optimized protocols for primary cells and cell lines is available
- Besides providing optimal Nucleofection Conditions, **Optimized Protocols** offer comprehensive guidance, including tips for cell sourcing, passage, growth conditions and media, and post transfection culture



## Overview of Nucleofection Platforms

	Advanced Platform	96-well Add-on	High-throughput Platform	Basic Device
Device	4D-Nucleofector™ System	96-well Shuttle™ Device	384-well Nucleofector™ System	Nucleofector™ 2b Device System
				
Throughput (samples per run)	Low to medium (1-16)	Low to high (1-96)	High (384)	Low (1)
Reaction volume	20 µL, 100 µL, 1 mL, up to 20 mL	20 µL	20 µL	100 µL
Electrode material	Conductive polymer	Conductive polymer	Conductive polymer	Aluminum
Low cell numbers (X Unit)	$2 \times 10^4$ to $1 \times 10^6$ (20 µL)	$2 \times 10^4$ to $1 \times 10^6$	$2 \times 10^4$ to $1 \times 10^6$	–
Medium cell numbers (X Unit)	$2 \times 10^5$ to $2 \times 10^7$ (100 µL)	–	–	$2 \times 10^5$ to $2 \times 10^7$
High cell numbers (LV Unit)	$1 \times 10^7$ to $1 \times 10^8$ (1 mL) $1 \times 10^8$ to $1 \times 10^9$ (20 mL)	–	–	–
DNA Vector amount/mL sample			10 - 50 µg/mL	
siRNA amount/mL sample			2 - 2000 pmol/mL (2 nM - 2 µM)	
Adherent Nucleofection	■	–	–	–
Compatibility with 96-well Shuttle™ Device	■	–	–	–

# The Advanced Platform: 4D-Nucleofector™ System Offering Multi-dimensional Flexibility

Based on numerous user feedback, Lonza engineers and scientists have developed the innovative 4D-Nucleofector™ System. This system is designed for maximum flexibility and enables Nucleofection of cells in several formats combined with advanced performance and convenience.

Due to its modular design the 4D-Nucleofector™ System is extremely flexible in regard to the supported applications. The operation software allows you to design and save individual experimental setups. Additionally, a PC editor enables predefinition of experiments on a PC which can then be uploaded to the 4D-Nucleofector™ Core Unit via the integrated USB port.



## What Benefits Are Important for Your Work?

### Using Different Cell Numbers for Different Applications?

- Same protocol for small, medium and large scale transfection volumes
- 20 µL Nucleocuvette™ Strip for low cell numbers down to  $2 \times 10^4$
- 100 µL Nucleocuvette™ Vessels for high cell numbers up to  $2 \times 10^7$
- 1 mL or LV Nucleocuvette™ Cartridges for large cell numbers up to  $1 \times 10^9$

### Working with Various Throughputs?

- Flexible throughput from 1 to 16 samples
- Pre-programming of settings for up to 50 single 100 µL Nucleocuvette™ Vessels or one 20 µL Nucleocuvette™ Strip
- Kit costs tailored to your throughput

### Transfecting Different Primary Cell Types?

- Five primary cell kits covering a broad range of primary cells
- Primary Cell Optimization Kit for cells lacking an Optimized Protocol
- Easy optimization of a variety of cell lines using the 96-well Shuttle™ Add-on Device

### Preserving Cell Functionality?

- Adherent Nucleofection of neurons at later developmental stages
- No release of metal ions due to conductive polymer electrodes

- 1 Core Unit – Controlling the 4D-Nucleofector™ System**
    - Intuitive operation software for designing and saving experiments
    - Predefined Nucleofection Parameters and Experiments
    - PC editor for predefinition of experiments
    - 5.7" foldable touch screen to operate the system
    - Controls up to 5 functional units
    - USB port for software update and data transfer
    - Comprises USB and serial connectivity for the 96-well Shuttle™ Device
  - 2 X Unit – Supporting Nucleofection of Various Cell Numbers in Different Formats**
    - Features positions for 20 µL Nucleocuvette™ Strips and 100 µL single Nucleocuvette™ Vessels
    - Comprises HV connectivity for the 96-well Shuttle™ Device
  - 3 Y Unit – Enabling Adherent Nucleofection in 24-well Culture Plates**
    - Features position for one 24-well Dipping Electrode Array
- New** **LV Unit – For large-scale transfection of up to  $1 \times 10^9$  cells**
- Suited for 1 mL Nucleocuvette™ Cartridges (fixed volume) or LV Nucleocuvette™ Cartridges (flexible volume up to 20 mL)

# The Most Flexible Unit: 4D-Nucleofector™ X Unit

## Different Vessels for Flexible Cell Numbers

The X Unit of the 4D-Nucleofector™ System can handle two different Nucleocuvette™ Vessels both composed out of the same conductive polymer electrode material:

### Single 100 µL Nucleocuvette™ Vessels:

- Novel conductive polymer 100 µL cuvettes replacing former aluminum cuvettes
- For high cell numbers at low throughput (e.g. for biochemical applications or Western Blots)



### 16-well 20 µL Nucleocuvette™ Strips

- Same strips as those assembled to a 96-well Nucleocuvette™ Plate
- For low cell numbers at medium throughput (e.g. reporter gene assays, RNAi)

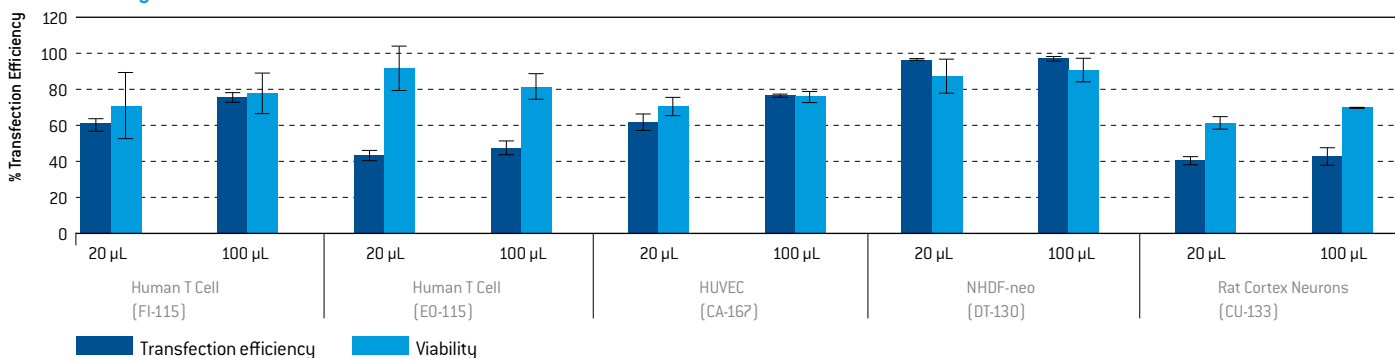


## Same Conditions for Different Cells Numbers

As the same electrode material is now used for 20 and 100 µL cuvettes, Nucleofection Conditions are transferable between the different Nucleocuvette™ vessels offering maximum flexibility and convenience:

- Once the conditions are known for one format they can be easily transferred to the other format.
- Conditions are transferable between different throughput formats (4D-Nucleofector™ System, 96-well Shuttle™ Device and HT Nucleofector™ System).
- Existing 96-well Shuttle™ Protocols can be used with the 4D-Nucleofector™ system.

## Transferability Between Nucleofection Conditions Between Different Formats



Various primary cells were transfected in the two Nucleocuvette™ vessel formats (20 µL and 100 µL) using the indicated programs. Twenty-four hours post Nucleofection cells were analyzed for transfection efficiency (flow cytometry) and viability (cell number normalized to no program control).



# The Adherent Nucleofection Module: 4D-Nucleofector™ Y Unit

Electroporation-based methods have so far required cells to be in suspension for transfection. The Nucleofector™ Technology entered a new era and allows direct Nucleofection of cells in adherence. Cells which typically grow in adherence in cell culture, can be kept and transfected by Nucleofection in their physiological state.

The 4D-Nucleofector™ Y Unit works with disposable conductive polymer dipping electrode arrays that can be inserted into standard 24-well culture plates for the Nucleofection.

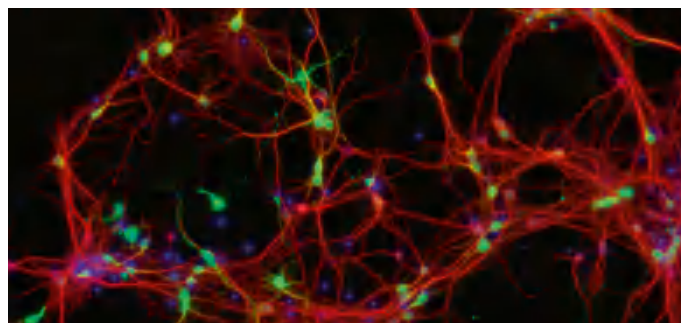
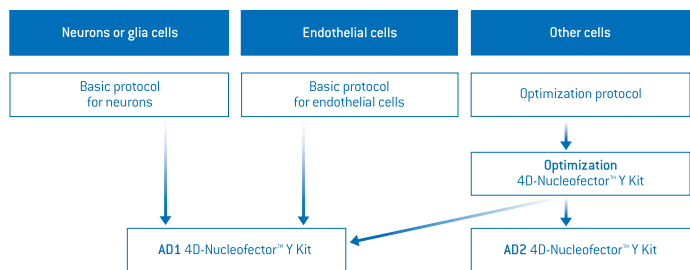


## Benefits

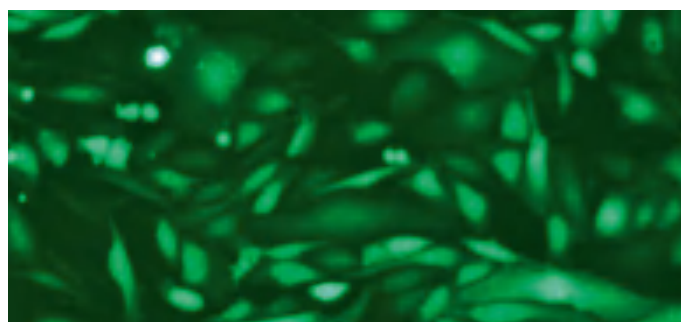
- Pre- and post Nucleofection culture in 24-well culture plates
- Nucleofection of cells at any time point during this culture period, i.e. at a later developmental stage
- Transfection efficiencies up to 70% combined with high viabilities
- Compatible with Clonetics™ primary animal neurons

## Consumables

Following our new simplified kit strategy invented with the 4D-Nucleofector™ System we offer two Nucleofector™ Solutions called AD1 and AD2 both available as separate kits or combined to an optimization kit. Each solution may serve different cell types. You can easily find out which solution is optimal for your cell of interest by using the following guideline:



Efficient adherent Nucleofection of neurons in 24-well culture plates. Mouse cortical neurons were seeded into poly-D-lysine coated 24-well plates ( $1 \times 10^5$  cells/well). After 6 DIV, cells were transfected with pmaxGFP™ Vector using the AD1 4D-Nucleofector™ Y Kit. One day post Nucleofection, cells were stained by MAP2 antibody (red) and analyzed by fluorescence microscopy for maxGFP™ protein expression.



Human umbilical vein endothelial cells (HUVEC) were isolated and plated in passage 1 into collagen-coated 24-well plates at a density of 50,000 cells/well. After 1DIV cells were transfected with 16 µg pmaxGFP™ Vector using AD1 4D-Nucleofector™ Y Solution and program CA-215. Cells were analyzed for maxGFP™ Protein expression after 24h. (Data kindly provided by M. Sauvage, Pharmaceutical Industry, FR)

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

# The Large-scale Format: 4D-Nucleofector™ LV Unit New

Experience the new functional unit for the 4D-Nucleofector™ System which expands our proven system to larger-scale transfection.

The LV Unit allows for closed, scalable transfection of larger cell numbers in the range of  $1 \times 10^7$  to  $1 \times 10^9$  cells. Transfection protocols can be established in smaller scale using the X Unit and subsequently transferred to the LV Unit without the need for re-optimization. Transferability has been tested for various cell types, including human T cells, CHO-S, HEK293-S, or K562.

## Benefits

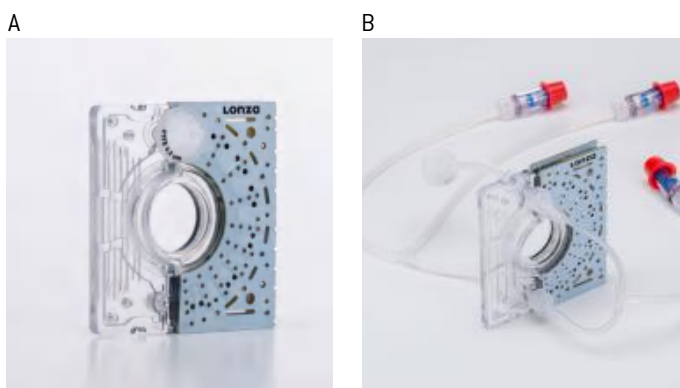
- **Closed system** – Sterile Nucleofection of up to  $10^9$  cells
- **Real scalability** – Optimization in small scale
- **Established protocols** – Benefit from 700+ optimized cell types
- **Simple handling** – Minimal training needs
- **4D-Nucleofector™ LogWare** – Optional operation via 21CFR part11 compliant software

## Applications\*

- *Ex-vivo* modification of human primary cells for the development and establishment of cell therapy application (e.g. genome editing, generation of CAR-T cells)
- Transient production of potential therapeutic proteins or antibodies for construct screening
- Generation of large numbers of transiently modified primary cells for cell-based assays



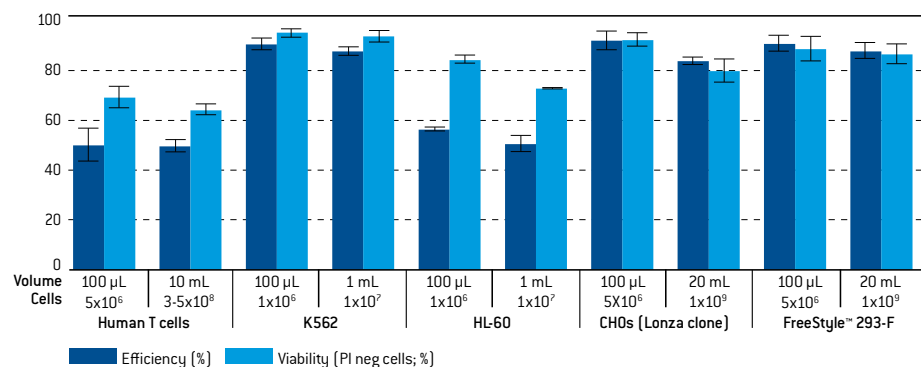
4D Nucleofector™ System with Core, LV Unit, and mounted LV Nucleocuvette™ Cartridge



Two formats available. (A) **1 mL Nucleocuvette™ Cartridge**: 1 mL filling volume for up to  $1 \times 10^8$  cells (manual filling via sterile injection port) (B) **LV Nucleocuvette™ Cartridge**: Up to 20 mL processing volume (in 1 mL steps) for up to  $1 \times 10^9$  cells (automatic filling via reservoirs or bags)

\* Nucleofector™ Kits and Devices are for research use only and are not intended for human therapeutic or diagnostic use

## Transferability From Small to Large-Scale



Comparison of various exemplary cell types transfected with pmaxGFP™ Vector in small volume (100 µL Nucleocuvette™ Vessels) or larger volumes (1 mL or LV Nucleocuvette™ Cartridge) using the same conditions. Data represent the mean of various independent experiments

# 4D-Nucleofector™ Logware

For the 4D-Nucleofector™ System, Lonza offers accessory products which provide higher quality standards for transfection applications in upstream GMP manufacturing environments.

## Benefits

- Compliance with Title 21 CFR part 11/annex 11
- User administration
- Electronic signatures with user name and password
- Logging of any modification, creation of data or user interaction with time stamp
- Reporting of result failures with failure description
- Data export according to Title 21 CFR part 11
- Generation of audit trails
- No data deletion possible



4D-Nucleofector™ LogWare

Login

User name:

Password:

q w e r t z u i o p  
a s d f g h j k l  
ABC y x c v b n m <X>  
12# Del

LOGIN

4D-Nucleofector™ LogWare - Login screen

## The Add-on: 96-well Shuttle™ Device

The 96-well Shuttle™ Device delivers flexible throughput combined with economical processing, speed, and pre-optimized protocols for a range of both primary cells and cell lines. It is a medium throughput extension to the 4D-Nucleofector™ Device suited for convenient optimization of Nucleofection Conditions or as assay establishment tool. The complete system consists of three components:

- The 4D-Nucleofector™ Device (Core and X Unit) serving as the program delivery unit
- The 96-well Shuttle™ Device as contacting unit which mediates the transfer of the respective 96-well program to a specific well of the 96-well Nucleocuvette™ Plate
- A laptop computer with the 96-well Shuttle™ Software controlling the interaction between the devices



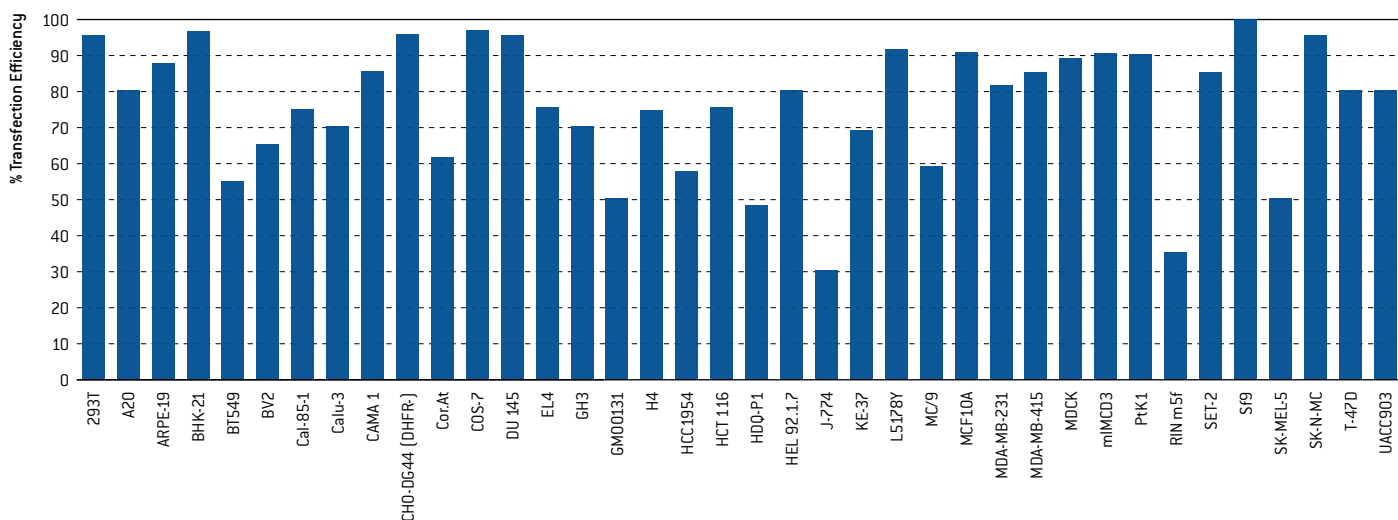
## Consumables

- P1 – P5 96-well Nucleofector™ Kits for transfection primary cells
- SE, SF and SG 96-well Nucleofector™ Kits for transfection cell lines
- Optimization kits for primary cells and cell lines

## Benefits

- Up to 96 independent programs can be run per plate, processed automatically in <5 minutes
- Modular 6 × 16 Nucleocuvette™ plate for scalable throughput
- Fulfills prerequisites for liquid handling integration
- Optimization of any difficult-to-transfect cell line in just 1 plate
- Variable cell numbers from 10<sup>4</sup> – 10<sup>6</sup> cells per reaction

## Optimization of Nucleofection Conditions Within Just One Experiment



Examples of cell lines that have been optimized by customers using the Cell Line Optimization 96-well Nucleofector™ Kit.

# The High-throughput Platform: HT Nucleofector™ System

The HT Nucleofector™ System is an independent platform for high-throughput Nucleofection in 384-well format. With an extremely fast plate processing time of one minute and high reproducibility it is the ideal tool for screening applications. Furthermore cell storage time in Nucleofector™ Solution is reduced to a minimum and all existing 96-well Shuttle™ Protocols can be used without further optimization.

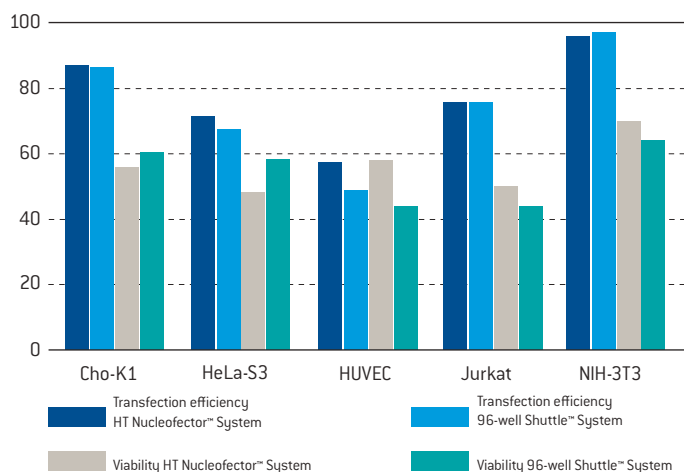
The HT Nucleofector™ System consists of three components:

- A **Power Supply Unit** generating the high voltage pulses.
- The **Plate Handler Unit** with an electrically driven carousel that comprises two plate positions.
- An intuitive **PC-based Operation Software** which allows easy parameterization of HT Nucleofection Experiments and can be seamlessly integrated into market leading liquid handling systems.



## Consumables

The HT Nucleofector™ Kits use existing 96-well Shuttle™ Protocols but contain specific conductive polymer 384-well Nucleocuvette™ Plates. The plates fulfill SBS standards to allow handling by automated liquid handling systems. Each of the 384-wells is individually addressable. Due to the use of conductive polymer cuvettes there is no contamination of cell suspension with metal ions.



Same conditions used for the 96-well Shuttle™ and the HT Nucleofector™ Systems. The HT Nucleofector™ System works with 96-well Shuttle™ Parameters, thus the full spectrum of already optimized protocols is available for the HT Nucleofector™ System.

## Benefits

### Does Speed Count for Your Screens?

- Processes a 384-well plate in one minute
- Carousel handling two plates

### Combining High Performance with Minimum Material Consumption?

- Nucleofection of low cell numbers down to  $2 \times 10^4$  cells

### Easy-to-use and Automatable System?

- Uses existing 96-well Shuttle™ Protocols
- Operated by intuitive PC-software
- Seamless integration into automated liquid handling environments

# The Basic Device: Nucleofector™ 2b Device

The Nucleofector™ Device is the single cuvette based system that has been used in research labs since 2001. It allows efficient transfection of hard-to-transfect cell lines and primary cells with different substrates (e.g. DNA vectors or siRNA oligonucleotides) in low throughput format.

## Consumables

- More than 50 dedicated primary cell kits, e.g. for blood cells or stem cells
- A collection of 5 cell line kits and an optimization kit covering a broad range of cell lines

## Benefits

### Highly Efficient Transfection in Single Cuvette Format?

- Up to 90% efficiency with plasmid DNA
- Up to 99% efficiency with siRNA duplexes
- Also suited for peptides, proteins or small molecules

### Easy-to-use Technology with Reliable Results?

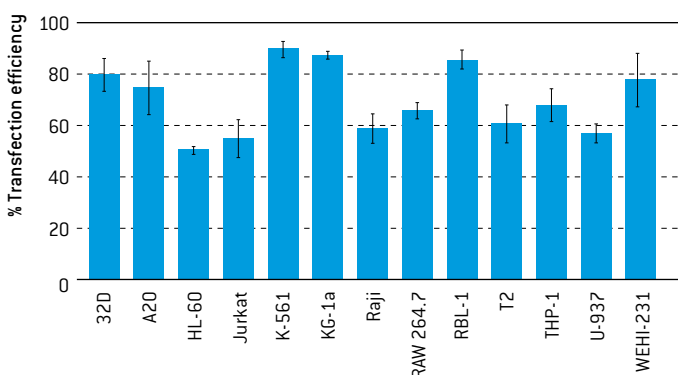
- More than 150 ready-to-use Optimized Protocols contain cell type-specific guidance
- Lonza's Cell Database contains user-developed protocols and data for more than 650 cell types
- Reliable and reproducible results due to high viability and preservation of cell functionality
- Approaching 4000 peer-reviewed publications

### Consumables Tailored to Your Needs?

- Nucleofector™ Kits are available in low, normal and high usage format, reducing the waste of precious consumables and offer flexible pricing for different transfection throughputs



### High Transfection Efficiencies in Suspension Cell Lines



Transfection efficiencies 24 hours post Nucleofection in selected cell lines relevant for immunology research. Cells were transfected with either eGFP, maxGFP™ Reporter Protein or H-2KK and analyzed 24 hours post Nucleofection. Viability ranged from 60 – 90%.

# Nucleofector™ Kits Tailored to Your Needs

## Kits for 4D-Nucleofector™, 96-well Shuttle™ and 384-well Nucleofector™ Systems

As Nucleofection Vessels for the 4D-Nucleofector™, 96-well Shuttle™ and HT Nucleofector™ Systems utilize the same conductive polymer electrode material, Nucleofection Conditions are transferable between the different vessels or platforms offering maximum flexibility and convenience.

### Nucleofector™ Kits for Primary Cells – High Convenience Due to Simplified Concept

With our conductive polymer cuvette concept, which was first established for the 96-well Shuttle™ System and now transferred to any new platform, we were able to streamline our kit concept for primary cells. The number of required Nucleofector™ Solutions for primary cells is narrowed down to only 5 solutions which makes Nucleofection of several different primary cell types much more convenient.

- A total of 5 dedicated primary cell Nucleofector™ Kits P1 – P5, each suited for several primary cell types
- Primary cell optimization Nucleofector™ Kits of primary cells lacking an optimized protocol



### Nucleofector™ Kits for Cell Lines

For transfection of cell lines using the 4D-Nucleofector™, 96-well Shuttle™ or 384-well Nucleofector™ Systems

- Selection of 3 cell line Nucleofector™ Kits SE, SF and SG
- Cell line optimization Nucleofector™ Kits for cell lines lacking an optimized protocol

	100 µL Nucleocuvette™	16-well Nucleocuvette™ Strip	1 mL Nucleocuvette™ Cartridge	LV Nucleocuvette™ Cartridge
	4D-Nucleofector™ X Unit	4D-Nucleofector™ X Unit	4D-Nucleofector™ LV Unit	4D-Nucleofector™ LV Unit
Application	high cell numbers at low throughput e.g. for biochemical applications or Western Blots	low cell numbers at medium throughput e.g. reporter gene assays, RNAi	larger cells numbers, e.g. transient protein production, cell-based assays or establishing cell therapies	larger cells numbers, e.g. transient protein production, cell-based assays or establishing cell therapies
Cells/sample	$2 \times 10^5$ to $2 \times 10^7$ cells	$2 \times 10^4$ to $1 \times 10^6$ cells	$2 \times 10^7$ – $1 \times 10^8$ cells	$1 \times 10^8$ – $1 \times 10^9$ cells
Reaction volume	100 µL	20 µL	1 mL	up to 20 mL
Size(s) available	12 or 24 reactions	32 reactions	2 reactions	1 to 5 reactions

Table 1 – Kits types and sizes for the 4D-Nucleofector™, 96-well Shuttle™ or HT Nucleofector™ System.

## 4D-Nucleofector™ Kits for Adherent Nucleofection

For adherent Nucleofection using the 4D-Nucleofector™ Y Unit, specific kits are required including an optimized 24-well Dipping Electrode Array made with conductive polymer electrodes.

### Nucleofector™ Kits for Primary Cells

- Two 4D-Nucleofector™ Y Kits (AD 1 and AD2) that may serve different cell types
- An Optimization 4D-Nucleofector™ Y Kit for primary cells or cell lines lacking an Optimized Protocol

**Note:** Kits may also be used for cell lines

In addition to the specific Nucleofector™ Solution, Supplement, pmaxGFP™ Control Vector, each kit contains a 24-well Dipping Electrode Array and a Nunclon™ Δ Surface 24-well plate (Nunc).

## Kits for Nucleofector™ II/2b Device


### Nucleofector™ Kits for Primary Cells





The Nucleofector™ II/2b uses cell type specific kits, each of them dedicated to an individual primary cell.

- Individually developed Nucleofector™ Kits for more than 35 primary cell types

### Nucleofector™ Kits for Cell Lines

- 5 different Cell line Nucleofector™ Kits C, L, R, T, and V
- Optimized Protocols outlining the optimal Nucleofector™ Kit for a large selection of cell lines can be downloaded from our website
- Cell line optimization Nucleofector™ Kit for cell lines lacking an Optimized Protocol

 To find out which kit is the optimal one for your cell type of interest please check out our cell database for most up-to-date information [www.lonza.com/celldatabase](http://www.lonza.com/celldatabase)

	Dipping Electrode Array	96-well Nucleocuvette™ Plate	384-well Nucleocuvette™ Plate	Aluminum Cuvettes
	4D-Nucleofector™ Y Unit	96-well Shuttle™ Device	384-well Nucleofector™ System	Nucleofector™ II/2b Device
				
Application	analysis by confocal microscopy high cell numbers	low cell numbers at higher throughput e.g. reporter gene assays, RNAi, optimization	low cell numbers at high throughput e.g. screening	high cell numbers at low throughput e.g. for biochemical applications or Western Blots
Cells/sample	0.5 – 3 x 10 <sup>4</sup> cells	2 x 10 <sup>4</sup> to 1 x 10 <sup>6</sup> cells	2 x 10 <sup>4</sup> to 1 x 10 <sup>6</sup> cells	2 x 10 <sup>5</sup> to 2 x 10 <sup>7</sup> cells
Reaction volume	20 µL	20 µL	20 µL	100 µL
Size(s) available	32 reactions	96 or 960 reactions	768 or 3840 reactions	10, 25, or 100 reactions



# Ordering Information

Cat. No.	Product Name	Description
<b>Nucleofector™ Devices and Systems</b>		
<b>384-well Nucleofector™ System</b>		
AAU-1001	384-well Nucleofector™ System	Includes power supply, plate handler, laptop, and software
AWT-1001	384-well Nucleofector™ System Installation and Training	
AUW-1001	384-well Nucleofector™ Service Contract	Valid for 1 year, can be purchased at any time during the guarantee period. Comprises diagnosis and repair of the system along with all replacement parts.
<b>4D-Nucleofector™ System</b>		
AAF-1002B	4D-Nucleofector™ Core Unit	
AAF-1002L	4D-Nucleofector™ LV Unit	Including 2 LV reservoir racks. Requires the core unit to build complete system
AAF-1002X	4D-Nucleofector™ X Unit	Requires the Core Unit to build complete system
AAF-1002Y	4D-Nucleofector™ Y Unit	Requires the Core Unit to build complete system
AWA-3001-B	4D-Nucleofector™ Core Unit Guarantee Extension	Valid for 1 year
AWA-3001-HT	HT Nucleofector™ System Guarantee Extension	Valid for 1 year
AWA-3001-LV	4D-Nucleofector™ LV Unit Guarantee Extension	Valid for 1 year
AWA-3001-X	4D-Nucleofector™ X Unit Guarantee Extension	Valid for 1 year
AWA-3001-Y	4D-Nucleofector™ Y Unit Guarantee Extension	Valid for 1 year
AWF-1001	Nucleofector™ Commercial License	Standard license excluding 3rd party services
AXP-1003	Inspection equipment 4D-Nucleofector™ Single Cuvette	
AXP-1004	Inspection equipment 4D-Nucleofector™ 16-well Strip	
<b>96-well Shuttle™ Device</b>		
AAM-1001S	96-well Shuttle™ Device	Including Laptop and Nucleofector™ 96-well Shuttle™ Software, 4D-Nucleofector™ Core and X Unit must be purchased separately
AWA-3001-S	96-well Shuttle™ Device Guarantee Extension	Valid for 1 year
AXP-1002	Inspection Equipment 96-well Shuttle™ Device	
<b>Nucleofector™ 2b Device</b>		
AAB-1001	Nucleofector™ 2b Device	
AWA-3001-2b	Nucleofector™ 2b Device Guarantee Extension	Valid for 1 year
VKA-1001	Electroporation Cuvettes for Bacteria [1 mm gap]	50 cuvettes
AXP-1001	Inspection Equipment Nucleofector™ II/2b Device	
<b>On-site Training</b>		
SBA-1005	Nucleofection Basic Installation and Training	
SBA-1006	Nucleofection Wet Lab Training	
<b>Software</b>		
SAAF-1001	4D-Nucleofector™ LogWare	
SBA-1001	96-well Shuttle™ Automation Package	

# Ordering Information

Cat. No.	Product Name	Description	Size
<b>Primary Cell Kits for 4D-Nucleofector™, 96-well Shuttle™ and 384-well Nucleofector™ Systems</b>			
<b>384-well Nucleofector™ Kits</b>			
V5SP-1002	P1 Primary Cell 384-well Nucleofector™ Kit	20 µL Nucleocuvette™ Plate	768 reactions (384-well)
V5SP-1010	P1 Primary Cell 384-well Nucleofector™ Kit	20 µL Nucleocuvette™ Plate	3840 reactions (384-well)
V5SP-2002	P2 Primary Cell 384-well Nucleofector™ Kit	20 µL Nucleocuvette™ Plate	768 reactions (384-well)
V5SP-2010	P2 Primary Cell 384-well Nucleofector™ Kit	20 µL Nucleocuvette™ Plate	3840 reactions (384-well)
V5SP-3002	P3 Primary Cell 384-well Nucleofector™ Kit	20 µL Nucleocuvette™ Plate	768 reactions (384-well)
V5SP-3010	P3 Primary Cell 384-well Nucleofector™ Kit	20 µL Nucleocuvette™ Plate	3840 reactions (384-well)
V5SP-4002	P4 Primary Cell 384-well Nucleofector™ Kit	20 µL Nucleocuvette™ Plate	768 reactions (384-well)
V5SP-4010	P4 Primary Cell 384-well Nucleofector™ Kit	20 µL Nucleocuvette™ Plate	3840 reactions (384-well)
V5SP-5002	P5 Primary Cell 384-well Nucleofector™ Kit	20 µL Nucleocuvette™ Plate	768 reactions (384-well)
V5SP-5010	P5 Primary Cell 384-well Nucleofector™ Kit	20 µL Nucleocuvette™ Plate	3840 reactions (384-well)
V5SP-9001	Primary Cell Optimization 384-well Nucleofector™ Kit	20 µL Nucleocuvette™ Plate	384 reactions (384-well)
<b>4D-Nucleofector™ Kits</b>			
V4XP-1012	P1 Primary Cell 4D-Nucleofector™ X Kit L	100 µL Nucleocuvette™ Vessel	12 reactions
V4XP-1024	P1 Primary Cell 4D-Nucleofector™ X Kit L	100 µL Nucleocuvette™ Vessel	24 reactions
V4XP-1032	P1 Primary Cell 4D-Nucleofector™ X Kit S	20 µL Nucleocuvette™ Strip	32 reactions (16-well)
V4XP-2012	P2 Primary Cell 4D-Nucleofector™ X Kit L	100 µL Nucleocuvette™ Vessel	12 reactions
V4XP-2024	P2 Primary Cell 4D-Nucleofector™ X Kit L	100 µL Nucleocuvette™ Vessel	24 reactions
V4XP-2032	P2 Primary Cell 4D-Nucleofector™ X Kit S	20 µL Nucleocuvette™ Strip	32 reactions (16-well)
V4LP-3002	P3 Primary Cell 4D-Nucleofector™ LV Kit L	1 mL Nucleocuvette™ Cartridge	2 reactions
V4LP-3020	P3 Primary Cell 4D-Nucleofector™ LV Kit XL	LV Nucleocuvette™ Cartridge	1 reaction
V4LP-3520	P3 Primary Cell 4D-Nucleofector™ LV Kit XL	LV Nucleocuvette™ Cartridge	5 × 1 reaction
V4XP-3012	P3 Primary Cell 4D-Nucleofector™ X Kit L	100 µL Nucleocuvette™ Vessel	12 reactions
V4XP-3024	P3 Primary Cell 4D-Nucleofector™ X Kit L	100 µL Nucleocuvette™ Vessel	24 reactions
V4XP-3032	P3 Primary Cell 4D-Nucleofector™ X Kit S	20 µL Nucleocuvette™ Strip	32 reactions (16-well)
V4XP-4012	P4 Primary Cell 4D-Nucleofector™ X Kit L	100 µL Nucleocuvette™ Vessel	12 reactions
V4XP-4024	P4 Primary Cell 4D-Nucleofector™ X Kit L	100 µL Nucleocuvette™ Vessel	24 reactions
V4XP-4032	P4 Primary Cell 4D-Nucleofector™ X Kit S	20 µL Nucleocuvette™ Strip	32 reactions (16-well)
V4XP-5012	P5 Primary Cell 4D-Nucleofector™ X Kit L	100 µL Nucleocuvette™ Vessel	12 reactions
V4XP-5024	P5 Primary Cell 4D-Nucleofector™ X Kit L	100 µL Nucleocuvette™ Vessel	24 reactions
V4XP-5032	P5 Primary Cell 4D-Nucleofector™ X Kit S	20 µL Nucleocuvette™ Strip	32 reactions (16-well)
V4XP-9096	Primary Cell Optimization 4D-Nucleofector™ X Kit	20 µL Nucleocuvette™ Strip	96 reactions (16-well)
<b>96-well Shuttle™ Kits</b>			
V4SP-1096	P1 Primary Cell 96-well Nucleofector™ Kit	20 µL Nucleocuvette™ Plate	96 reactions (96-well)
V4SP-1960	P1 Primary Cell 96-well Nucleofector™ Kit	20 µL Nucleocuvette™ Plate	960 reactions (96-well)
V4SP-2096	P2 Primary Cell 96-well Nucleofector™ Kit	20 µL Nucleocuvette™ Plate	96 reactions (96-well)
V4SP-2960	P2 Primary Cell 96-well Nucleofector™ Kit	20 µL Nucleocuvette™ Plate	960 reactions (96-well)
V4SP-3096	P3 Primary Cell 96-well Nucleofector™ Kit	20 µL Nucleocuvette™ Plate	96 reactions (96-well)
V4SP-3960	P3 Primary Cell 96-well Nucleofector™ Kit	20 µL Nucleocuvette™ Plate	960 reactions (96-well)
V4SP-4096	P4 Primary Cell 96-well Nucleofector™ Kit	20 µL Nucleocuvette™ Plate	96 reactions (96-well)
V4SP-4960	P4 Primary Cell 96-well Nucleofector™ Kit	20 µL Nucleocuvette™ Plate	960 reactions (96-well)
V4SP-5096	P5 Primary Cell 96-well Nucleofector™ Kit	20 µL Nucleocuvette™ Plate	96 reactions (96-well)
V4SP-5960	P5 Primary Cell 96-well Nucleofector™ Kit	20 µL Nucleocuvette™ Plate	960 reactions (96-well)
V4SP-9096	Primary Cell Optimization 96-well Nucleofector™ Kit	20 µL Nucleocuvette™ Plate	160 reactions (96-well)
<b>Adherent Nucleofection™ Kits</b>			
V4YP-1A24	AD1 4D-Nucleofector™ Y Kit	24-well Dipping Electrode	24 reactions
V4YP-2A24	AD2 4D-Nucleofector™ Y Kit	24-well Dipping Electrode	24 reactions
V4YP-9A48	Primary Cell Optimization 4D-Nucleofector™ Y Kit	24-well Dipping Electrode	48 reactions

# Ordering Information

Cat. No.	Product Name	Description	Size
<b>Primary Cell Kits for Nucleofector™ I, II or 2b Device</b>			
<b>Nucleofector™ Kits for Blood Cells</b>			
VAPA-1001	Human B Cell Nucleofector™ Kit	100 µL aluminum cuvette	10 reactions
VPA-1001	Human B Cell Nucleofector™ Kit	100 µL aluminum cuvette	25 reactions
WVPA-1001	Human B Cell Nucleofector™ Kit	100 µL aluminum cuvette	4 × 25 reactions
VAPA-1004	Human Dendritic Cell Nucleofector™ Kit	100 µL aluminum cuvette	10 reactions
VPA-1004	Human Dendritic Cell Nucleofector™ Kit	100 µL aluminum cuvette	25 reactions
WVPA-1004	Human Dendritic Cell Nucleofector™ Kit	100 µL aluminum cuvette	4 × 25 reactions
VAPA-1008	Human Macrophage Nucleofector™ Kit	100 µL aluminum cuvette	10 reactions
VPA-1008	Human Macrophage Nucleofector™ Kit	100 µL aluminum cuvette	25 reactions
WVPA-1008	Human Macrophage Nucleofector™ Kit	100 µL aluminum cuvette	4 × 25 reactions
VPA-1007	Human Monocyte Nucleofector™ Kit	100 µL aluminum cuvette	25 reactions
WVPA-1007	Human Monocyte Nucleofector™ Kit	100 µL aluminum cuvette	4 × 25 reactions
VAPA-1005	Human Natural Killer Cell Nucleofector™ Kit	100 µL aluminum cuvette	10 reactions
VPA-1005	Human Natural Killer Cell Nucleofector™ Kit	100 µL aluminum cuvette	25 reactions
WVPA-1005	Human Natural Killer Cell Nucleofector™ Kit	100 µL aluminum cuvette	4 × 25 reactions
VAPA-1002	Human T Cell Nucleofector™ Kit	100 µL aluminum cuvette	10 reactions
VPA-1002	Human T Cell Nucleofector™ Kit	100 µL aluminum cuvette	25 reactions
WVPA-1002	Human T Cell Nucleofector™ Kit	100 µL aluminum cuvette	4 × 25 reactions
VAPA-1010	Mouse B Cell Nucleofector™ Kit	100 µL aluminum cuvette	10 reactions
VPA-1010	Mouse B Cell Nucleofector™ Kit	100 µL aluminum cuvette	25 reactions
WVPA-1010	Mouse B Cell Nucleofector™ Kit	100 µL aluminum cuvette	4 × 25 reactions
VAPA-1011	Mouse Dendritic Cell Nucleofector™ Kit	100 µL aluminum cuvette	10 reactions
VPA-1011	Mouse Dendritic Cell Nucleofector™ Kit	100 µL aluminum cuvette	25 reactions
WVPA-1011	Mouse Dendritic Cell Nucleofector™ Kit	100 µL aluminum cuvette	4 × 25 reactions
VAPA-1009	Mouse Macrophage Nucleofector™ Kit	100 µL aluminum cuvette	10 reactions
VPA-1009	Mouse Macrophage Nucleofector™ Kit	100 µL aluminum cuvette	25 reactions
WVPA-1009	Mouse Macrophage Nucleofector™ Kit	100 µL aluminum cuvette	4 × 25 reactions
VPA-1006	Mouse T Cell Nucleofector™ Kit	100 µL aluminum cuvette	25 reactions
WVPA-1006	Mouse T Cell Nucleofector™ Kit	100 µL aluminum cuvette	4 × 25 reactions
<b>Nucleofector™ Kits for Bone/Cartilage Cells</b>			
VPF-1001	Human Chondrocyte Nucleofector™ Kit	100 µL aluminum cuvette	25 reactions
VVPF-1001	Human Chondrocyte Nucleofector™ Kit	100 µL aluminum cuvette	4 × 25 reactions
<b>Nucleofector™ Kits for Cardiac Cells</b>			
VAPE-1002	Rat Cardiomyocyte - Neonatal Nucleofector™ Kit	100 µL aluminum cuvette	10 reactions
VPE-1002	Rat Cardiomyocyte - Neonatal Nucleofector™ Kit	100 µL aluminum cuvette	25 reactions
WVPE-1002	Rat Cardiomyocyte - Neonatal Nucleofector™ Kit	100 µL aluminum cuvette	4 × 25 reactions
<b>Nucleofector™ Kits for Dermal Cells</b>			
VAPD-1002	Human Keratinocyte Nucleofector™ Kit	100 µL aluminum cuvette	10 reactions
VPD-1002	Human Keratinocyte Nucleofector™ Kit	100 µL aluminum cuvette	25 reactions
WVPD-1002	Human Keratinocyte Nucleofector™ Kit	100 µL aluminum cuvette	4 × 25 reactions
VAPD-1003	Human Melanocyte - Neonatal Nucleofector™ Kit	100 µL aluminum cuvette	10 reactions
VPD-1003	Human Melanocyte - Neonatal Nucleofector™ Kit	100 µL aluminum cuvette	25 reactions
WVPD-1003	Human Melanocyte - Neonatal Nucleofector™ Kit	100 µL aluminum cuvette	4 × 25 reactions
<b>Nucleofector™ Kits for Endothelial Cells</b>			
VAPI-1001	Basic Nucleofector™ Kit for Primary Mammalian Endothelial Cells	100 µL aluminum cuvette	10 reactions
VPI-1001	Basic Nucleofector™ Kit for Primary Mammalian Endothelial Cells	100 µL aluminum cuvette	25 reactions
WVPI-1001	Basic Nucleofector™ Kit for Primary Mammalian Endothelial Cells	100 µL aluminum cuvette	4 × 25 reactions
VPB-1001	Human Coronary Artery Endothelial Cell Nucleofector™ Kit	100 µL aluminum cuvette	25 reactions
WPB-1001	Human Coronary Artery Endothelial Cell Nucleofector™ Kit	100 µL aluminum cuvette	4 × 25 reactions
VPB-1003	Human Microvascular Endothelial Cell-Lung Nucleofector™ Kit	100 µL aluminum cuvette	25 reactions
WVPB-1003	Human Microvascular Endothelial Cell-Lung Nucleofector™ Kit	100 µL aluminum cuvette	4 × 25 reactions

# Ordering Information

Cat. No.	Product Name	Description	Size
VAPB-1002	Human Umbilical Vein Endothelial Cell Nucleofector™ Kit	100 µL aluminum cuvette	10 reactions
VPB-1002	Human Umbilical Vein Endothelial Cell Nucleofector™ Kit	100 µL aluminum cuvette	25 reactions
VVPB-1002	Human Umbilical Vein Endothelial Cell Nucleofector™ Kit	100 µL aluminum cuvette	4 × 25 reactions
<b>Nucleofector™ Kits for Epithelial Cells</b>			
VAPI-1005	Basic Nucleofector™ Kit for Primary Mammalian Epithelial Cells	100 µL aluminum cuvette	10 reactions
VPI-1005	Basic Nucleofector™ Kit for Primary Mammalian Epithelial Cells	100 µL aluminum cuvette	25 reactions
VVPI-1005	Basic Nucleofector™ Kit for Primary Mammalian Epithelial Cells	100 µL aluminum cuvette	4 × 25 reactions
VPK-1002	Human Mammary Epithelial Cell Nucleofector™ Kit	100 µL aluminum cuvette	25 reactions
VVPK-1002	Human Mammary Epithelial Cell Nucleofector™ Kit	100 µL aluminum cuvette	4 × 25 reactions
<b>Nucleofector™ Kits for Fibroblasts</b>			
VAPI-1002	Basic Nucleofector™ Kit for Primary Mammalian Fibroblasts	100 µL aluminum cuvette	10 reactions
VPI-1002	Basic Nucleofector™ Kit for Primary Mammalian Fibroblasts	100 µL aluminum cuvette	25 reactions
VVPI-1002	Basic Nucleofector™ Kit for Primary Mammalian Fibroblasts	100 µL aluminum cuvette	4 × 25 reactions
VAPD-1001	Human Dermal Fibroblast Nucleofector™ Kit	100 µL aluminum cuvette	10 reactions
VPD-1001	Human Dermal Fibroblast Nucleofector™ Kit	100 µL aluminum cuvette	25 reactions
VVPD-1001	Human Dermal Fibroblast Nucleofector™ Kit	100 µL aluminum cuvette	4 × 25 reactions
VAPD-1004	Mouse Embryonic Fibroblast Nucleofector™ Kit 1	100 µL aluminum cuvette	10 reactions
VPD-1004	Mouse Embryonic Fibroblast Nucleofector™ Kit 1	100 µL aluminum cuvette	25 reactions
VVPD-1004	Mouse Embryonic Fibroblast Nucleofector™ Kit 1	100 µL aluminum cuvette	4 × 25 reactions
VAPD-1005	Mouse Embryonic Fibroblast Nucleofector™ Kit 2	100 µL aluminum cuvette	10 reactions
VPD-1005	Mouse Embryonic Fibroblast Nucleofector™ Kit 2	100 µL aluminum cuvette	25 reactions
VVPD-1005	Mouse Embryonic Fibroblast Nucleofector™ Kit 2	100 µL aluminum cuvette	4 × 25 reactions
VPD-1006	Mouse Embryonic Fibroblast Starter Nucleofector™ Kit	100 µL aluminum cuvette	10 reactions
<b>Nucleofector™ Kits for Hepatocytes</b>			
VAPL-1004	Mouse/Rat Hepatocyte Nucleofector™ Kit	100 µL aluminum cuvette	10 reactions
VPL-1004	Mouse/Rat Hepatocyte Nucleofector™ Kit	100 µL aluminum cuvette	25 reactions
VVPL-1004	Mouse/Rat Hepatocyte Nucleofector™ Kit	100 µL aluminum cuvette	4 × 25 reactions
<b>Nucleofector™ Kits for Neural Cells</b>			
VAPI-1006	Basic Nucleofector™ Kit for Primary Mammalian Glial Cells	100 µL aluminum cuvette	10 reactions
VPI-1006	Basic Nucleofector™ Kit for Primary Mammalian Glial Cells	100 µL aluminum cuvette	25 reactions
VVPI-1006	Basic Nucleofector™ Kit for Primary Mammalian Glial Cells	100 µL aluminum cuvette	4 × 25 reactions
VAPI-1003	Basic Nucleofector™ Kit for Primary Mammalian Neurons	100 µL aluminum cuvette	10 reactions
VPI-1003	Basic Nucleofector™ Kit for Primary Mammalian Neurons	100 µL aluminum cuvette	25 reactions
VVPI-1003	Basic Nucleofector™ Kit for Primary Mammalian Neurons	100 µL aluminum cuvette	4 × 25 reactions
VPG-1002	Chicken Neuron Nucleofector™ Kit	100 µL aluminum cuvette	25 reactions
VVPG-1002	Chicken Neuron Nucleofector™ Kit	100 µL aluminum cuvette	4 × 25 reactions
VAPG-1001	Mouse Neuron Nucleofector™ Kit	100 µL aluminum cuvette	10 reactions
VPG-1001	Mouse Neuron Nucleofector™ Kit	100 µL aluminum cuvette	25 reactions
VVPG-1001	Mouse Neuron Nucleofector™ Kit	100 µL aluminum cuvette	4 × 25 reactions
VAPG-1003	Rat Neuron Nucleofector™ Kit	100 µL aluminum cuvette	10 reactions
VPG-1003	Rat Neuron Nucleofector™ Kit	100 µL aluminum cuvette	25 reactions
VVPG-1003	Rat Neuron Nucleofector™ Kit	100 µL aluminum cuvette	4 × 25 reactions
<b>Nucleofector™ Kits for Parasites</b>			
VAMI-1011	Basic Parasite Nucleofector™ Kit 1	100 µL aluminum cuvette	10 reactions
VMI-1011	Basic Parasite Nucleofector™ Kit 1	100 µL aluminum cuvette	25 reactions
VVMI-1011	Basic Parasite Nucleofector™ Kit 1	100 µL aluminum cuvette	4 × 25 reactions
VAMI-1021	Basic Parasite Nucleofector™ Kit 2	100 µL aluminum cuvette	10 reactions
VMI-1021	Basic Parasite Nucleofector™ Kit 2	100 µL aluminum cuvette	25 reactions
VVMI-1021	Basic Parasite Nucleofector™ Kit 2	100 µL aluminum cuvette	4 × 25 reactions
VMI-1001	Basic Parasite Starter Nucleofector™ Kit	100 µL aluminum cuvette	10 reactions
<b>Nucleofector™ Kits for Smooth Muscle Cells</b>			
VAPI-1004	Basic Nucleofector™ Kit for Primary Mammalian Smooth Muscle Cells	100 µL aluminum cuvette	10 reactions
VPI-1004	Basic Nucleofector™ Kit for Primary Mammalian Smooth Muscle Cells	100 µL aluminum cuvette	25 reactions

# Ordering Information

Cat. No.	Product Name	Description	Size
VPPI-1004	Basic Nucleofector™ Kit for Primary Mammalian Smooth Muscle Cells	100 µL aluminum cuvette	4 × 25 reactions
VAPC-1001	Human Aortic Smooth Muscle Cell Nucleofector™ Kit	100 µL aluminum cuvette	10 reactions
VPC-1001	Human Aortic Smooth Muscle Cell Nucleofector™ Kit	100 µL aluminum cuvette	25 reactions
WVPC-1001	Human Aortic Smooth Muscle Cell Nucleofector™ Kit	100 µL aluminum cuvette	4 × 25 reactions
<b>Nucleofector™ Kits for Stem Cells</b>			
VAPA-1003	Human CD34 <sup>+</sup> Cell Nucleofector™ Kit	100 µL aluminum cuvette	10 reactions
VPA-1003	Human CD34 <sup>+</sup> Cell Nucleofector™ Kit	100 µL aluminum cuvette	25 reactions
WVPA-1003	Human CD34 <sup>+</sup> Cell Nucleofector™ Kit	100 µL aluminum cuvette	4 × 25 reactions
VAPE-1001	Human Mesenchymal Stem Cell Nucleofector™ Kit	100 µL aluminum cuvette	10 reactions
VPE-1001	Human Mesenchymal Stem Cell Nucleofector™ Kit	100 µL aluminum cuvette	25 reactions
WVPE-1001	Human Mesenchymal Stem Cell Nucleofector™ Kit	100 µL aluminum cuvette	4 × 25 reactions
VAPH-5012	Human Stem Cell Nucleofector™ Kit 1	100 µL aluminum cuvette	10 reactions
VPH-5012	Human Stem Cell Nucleofector™ Kit 1	100 µL aluminum cuvette	25 reactions
WVPH-5012	Human Stem Cell Nucleofector™ Kit 1	100 µL aluminum cuvette	4 × 25 reactions
VAPH-5022	Human Stem Cell Nucleofector™ Kit 2	100 µL aluminum cuvette	10 reactions
VPH-5022	Human Stem Cell Nucleofector™ Kit 2	100 µL aluminum cuvette	25 reactions
WVPH-5022	Human Stem Cell Nucleofector™ Kit 2	100 µL aluminum cuvette	4 × 25 reactions
VPH-5002	Human Stem Cell Nucleofector™ Starter Kit	100 µL aluminum cuvette	18 reactions
VAPH-1001	Mouse Embryonic Stem Cell Nucleofector™ Kit	100 µL aluminum cuvette	10 reactions
VPH-1001	Mouse Embryonic Stem Cell Nucleofector™ Kit	100 µL aluminum cuvette	25 reactions
WVPH-1001	Mouse Embryonic Stem Cell Nucleofector™ Kit	100 µL aluminum cuvette	4 × 25 reactions
VAPG-1004	Mouse Neural Stem Cell Nucleofector™ Kit	100 µL aluminum cuvette	10 reactions
VPG-1004	Mouse Neural Stem Cell Nucleofector™ Kit	100 µL aluminum cuvette	25 reactions
WVPG-1004	Mouse Neural Stem Cell Nucleofector™ Kit	100 µL aluminum cuvette	4 × 25 reactions
VPG-1005	Rat Neural Stem Cell Nucleofector™ Kit	100 µL aluminum cuvette	25 reactions
WVPG-1005	Rat Neural Stem Cell Nucleofector™ Kit	100 µL aluminum cuvette	4 × 25 reactions

# Ordering Information

Cat. No.	Product Name	Description	Size
<b>Nucleofector™ Kits for Cell Lines</b>			
<b>Cell Line Kits for 4D-Nucleofector™, 96-well Shuttle™ and 384-well Nucleofector™ Systems</b>			
V5SC-9001	Cell Line Optimization 384-well Nucleofector™ Kit	20 µL Nucleocuvette™ Plate	384 reactions (384-well)
V4XC-9064	Cell Line Optimization 4D-Nucleofector™ X Kit	20 µL Nucleocuvette™ Strip	64 reactions (16-well)
V4SC-9096	Cell Line Optimization 96-well Nucleofector™ Kit	20 µL Nucleocuvette™ Plate	96 reactions (96-well)
V5SC-1002	SE Cell Line 384-well Nucleofector™ Kit	20 µL Nucleocuvette™ Plate	768 reactions (384-well)
V5SC-1010	SE Cell Line 384-well Nucleofector™ Kit	20 µL Nucleocuvette™ Plate	3840 reactions (384-well)
V4XC-1012	SE Cell Line 4D-Nucleofector™ X Kit L	100 µL Nucleocuvette™ Vessel	12 reactions
V4XC-1024	SE Cell Line 4D-Nucleofector™ X Kit L	100 µL Nucleocuvette™ Vessel	24 reactions
V4XC-1032	SE Cell Line 4D-Nucleofector™ X Kit S	20 µL Nucleocuvette™ Strip	32 reactions (16-well)
V4SC-1096	SE Cell Line 96-well Nucleofector™ Kit	20 µL Nucleocuvette™ Plate	96 reactions (96-well)
V4SC-1960	SE Cell Line 96-well Nucleofector™ Kit	20 µL Nucleocuvette™ Plate	960 reactions (96-well)
V5SC-2002	SF Cell Line 384-well Nucleofector™ Kit	20 µL Nucleocuvette™ Plate	768 reactions (384-well)
V5SC-2010	SF Cell Line 384-well Nucleofector™ Kit	20 µL Nucleocuvette™ Plate	3840 reactions (384-well)
V4LC-2002	SF Cell Line 4D-Nucleofector™ LV Kit L	1 mL Nucleocuvette™ Cartridge	2 reactions
V4LC-2020	SF Cell Line 4D-Nucleofector™ LV Kit XL	LV Nucleocuvette™ Cartridge	1 reaction
V4LC-2520	SF Cell Line 4D-Nucleofector™ LV Kit XL	LV Nucleocuvette™ Cartridge	5 × 1 reaction
V4XC-2012	SF Cell Line 4D-Nucleofector™ X Kit L	100 µL Nucleocuvette™ Vessel	12 reactions
V4XC-2024	SF Cell Line 4D-Nucleofector™ X Kit L	100 µL Nucleocuvette™ Vessel	24 reactions
V4XC-2032	SF Cell Line 4D-Nucleofector™ X Kit S	20 µL Nucleocuvette™ Strip	32 reactions (16-well)
V4SC-2096	SF Cell Line 96-well Nucleofector™ Kit	20 µL Nucleocuvette™ Plate	96 reactions (96-well)
V4SC-2960	SF Cell Line 96-well Nucleofector™ Kit	20 µL Nucleocuvette™ Plate	960 reactions (96-well)
V5SC-3002	SG Cell Line 384-well Nucleofector™ Kit	20 µL Nucleocuvette™ Plate	768 reactions (384-well)
V5SC-3010	SG Cell Line 384-well Nucleofector™ Kit	20 µL Nucleocuvette™ Plate	3840 reactions (384-well)
V4XC-3012	SG Cell Line 4D-Nucleofector™ X Kit L	100 µL Nucleocuvette™ Vessel	12 reactions
V4XC-3024	SG Cell Line 4D-Nucleofector™ X Kit L	100 µL Nucleocuvette™ Vessel	24 reactions
V4XC-3032	SG Cell Line 4D-Nucleofector™ X Kit S	20 µL Nucleocuvette™ Strip	32 reactions (16-well)
V4SC-3096	SG Cell Line 96-well Nucleofector™ Kit	20 µL Nucleocuvette™ Plate	96 reactions (96-well)
V4SC-3960	SG Cell Line 96-well Nucleofector™ Kit	20 µL Nucleocuvette™ Plate	960 reactions (96-well)
<b>Cell Line Kits for Nucleofector™ I, II or 2b Device</b>			
VACA-1004	Cell Line Nucleofector™ Kit C	100 µL aluminum cuvette	10 reactions
VCA-1004	Cell Line Nucleofector™ Kit C	100 µL aluminum cuvette	25 reactions
VVCA-1004	Cell Line Nucleofector™ Kit C	100 µL aluminum cuvette	4 × 25 reactions
VACA-1005	Cell Line Nucleofector™ Kit L	100 µL aluminum cuvette	10 reactions
VCA-1005	Cell Line Nucleofector™ Kit L	100 µL aluminum cuvette	25 reactions
VVCA-1005	Cell Line Nucleofector™ Kit L	100 µL aluminum cuvette	4 × 25 reactions
VACA-1001	Cell Line Nucleofector™ Kit R	100 µL aluminum cuvette	10 reactions
VCA-1001	Cell Line Nucleofector™ Kit R	100 µL aluminum cuvette	25 reactions
VVCA-1001	Cell Line Nucleofector™ Kit R	100 µL aluminum cuvette	4 × 25 reactions
VACA-1002	Cell Line Nucleofector™ Kit T	100 µL aluminum cuvette	10 reactions
VCA-1002	Cell Line Nucleofector™ Kit T	100 µL aluminum cuvette	25 reactions
VVCA-1002	Cell Line Nucleofector™ Kit T	100 µL aluminum cuvette	4 × 25 reactions
VACA-1003	Cell Line Nucleofector™ Kit V	100 µL aluminum cuvette	10 reactions
VCA-1003	Cell Line Nucleofector™ Kit V	100 µL aluminum cuvette	25 reactions
VVCA-1003	Cell Line Nucleofector™ Kit V	100 µL aluminum cuvette	4 × 25 reactions
VCO-1001N	Cell Line Optimization Nucleofector™ Kit	100 µL aluminum cuvette	18 reactions



## Contact Information

### North America

Scientific Support: + 1 800 521 0390 (toll free)  
scientific.support@lonza.com

### Europe

Scientific Support: + 32 87 321 611  
scientific.support.eu@lonza.com

Lonza Cologne GmbH – 50829 Cologne, Germany

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