

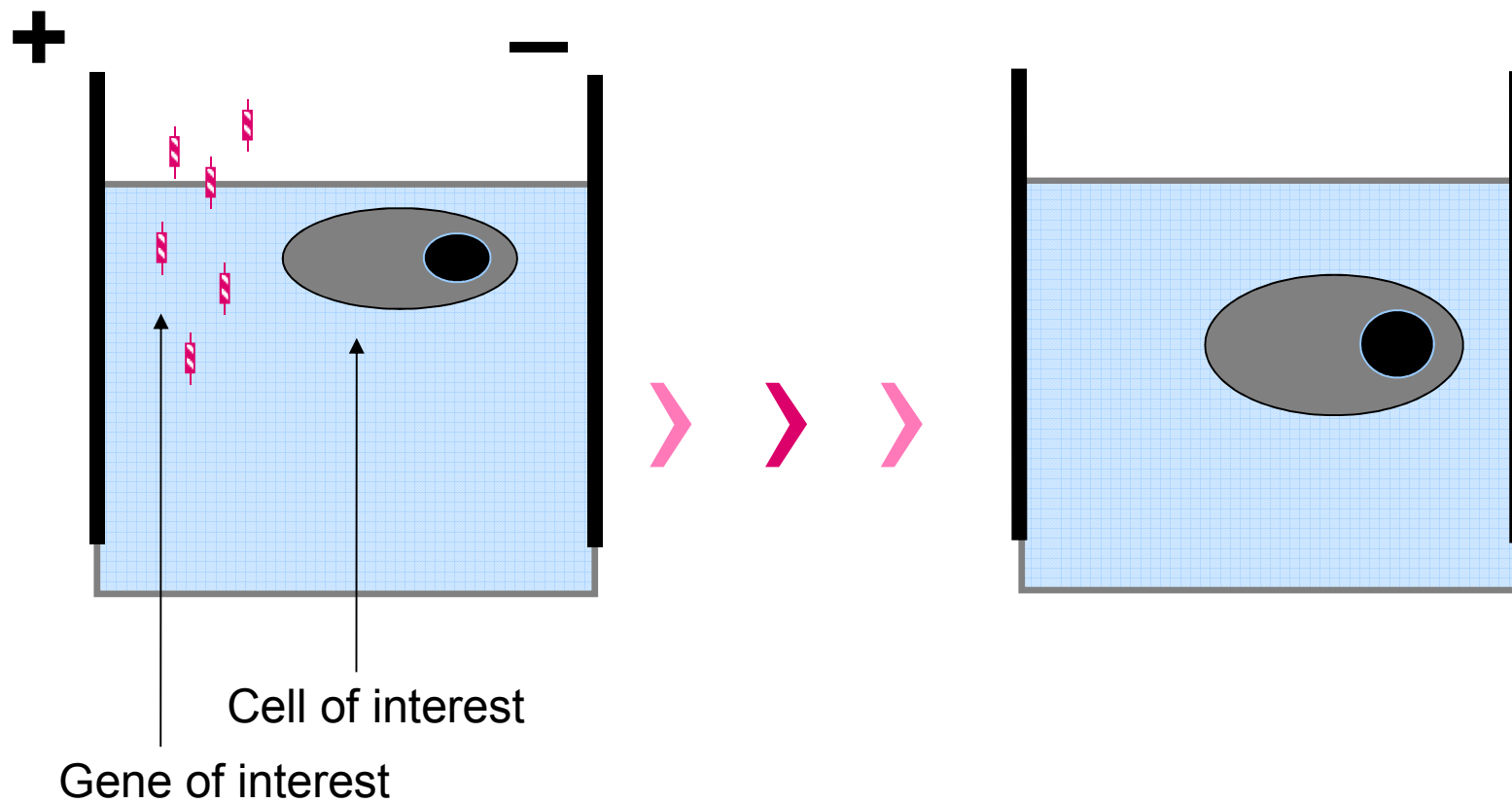
**Lonza**

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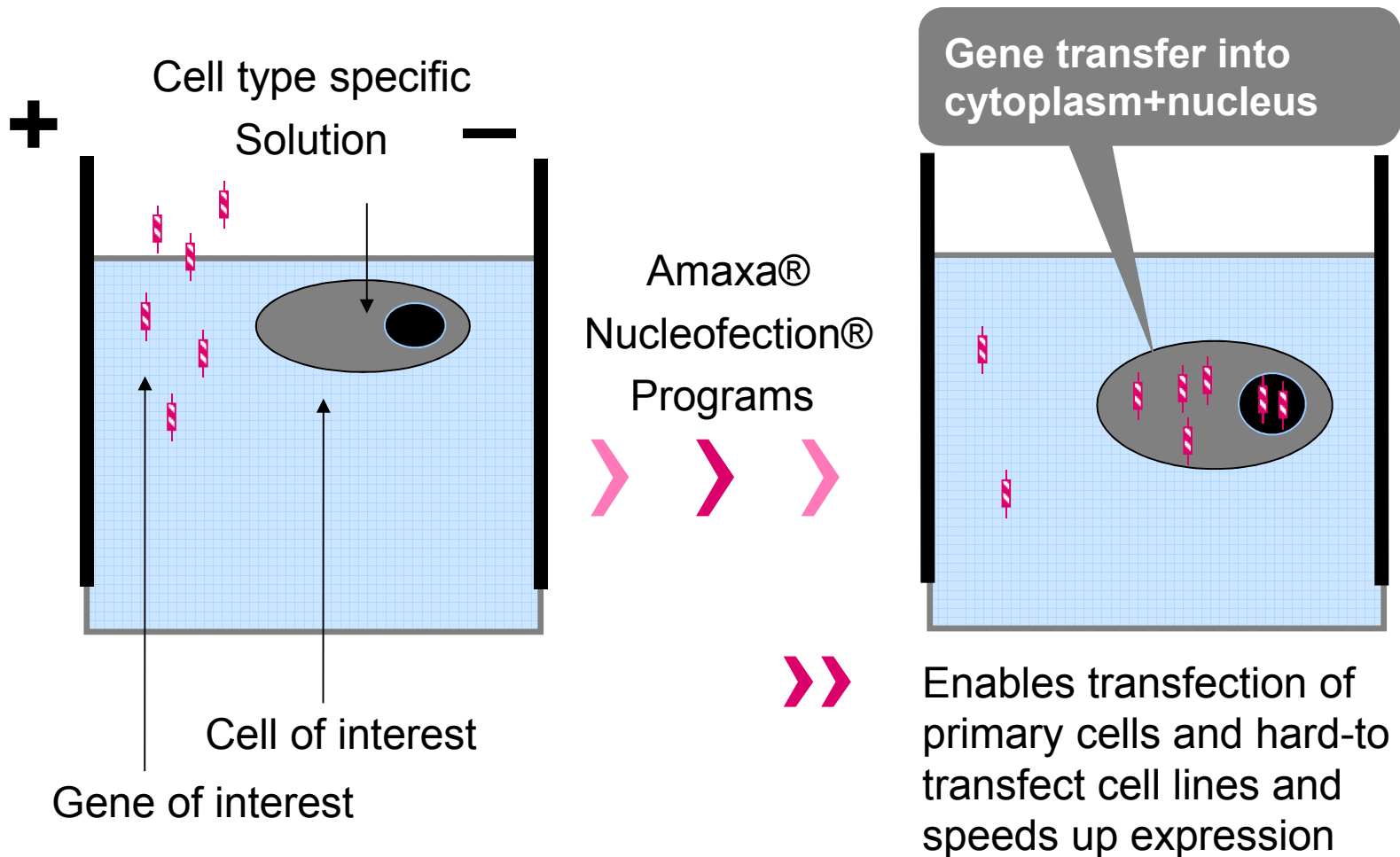
**4D-Nucleofector<sup>®</sup> –  
What is nucleofection?**

# The Amaxa<sup>®</sup> Nucleofector<sup>®</sup> Technology

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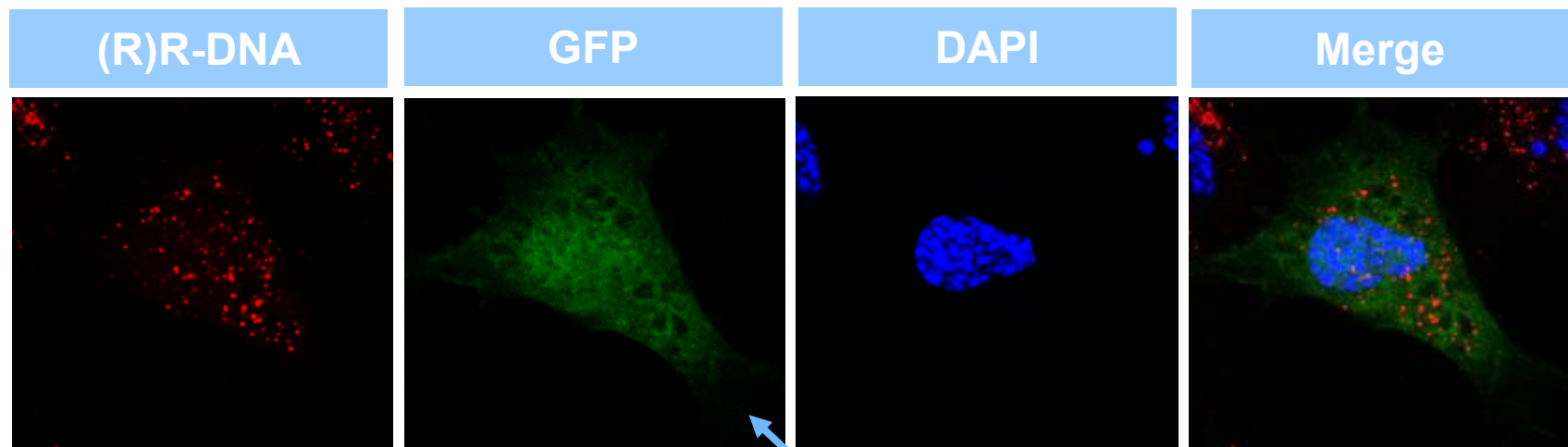


# The Amaxa<sup>®</sup> Nucleofector<sup>®</sup> Technology



# DNA is Delivered Into the Cytoplasm And Into the Nucleus

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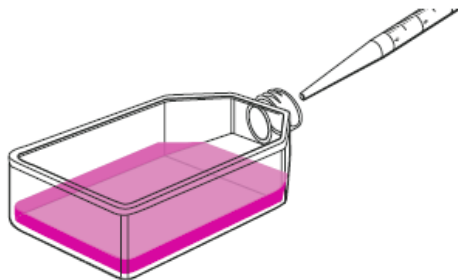


Primary NHDF-neo cells were transfected with (R)R-labeled plasmid DNA encoding GFP, fixed **after 2h** in 3.5% PFA and analyzed by confocal microscopy.

# Simple Handling – Optimized Protocols

## Step 1

Harvest cells of interest.



## Step 2

Mix & combine

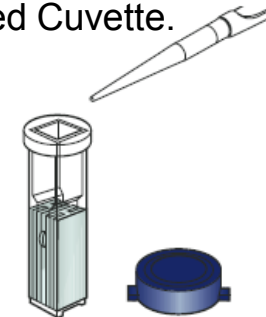
Nucleofector® Solution  
with Supplement

Cells

DNA or siRNA

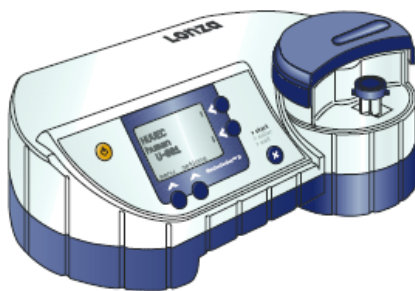


Transfer to an Amaxa®  
Certified Cuvette.



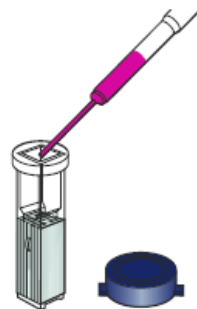
## Step 3

Select Nucleofector®  
Program. Insert cuvette.



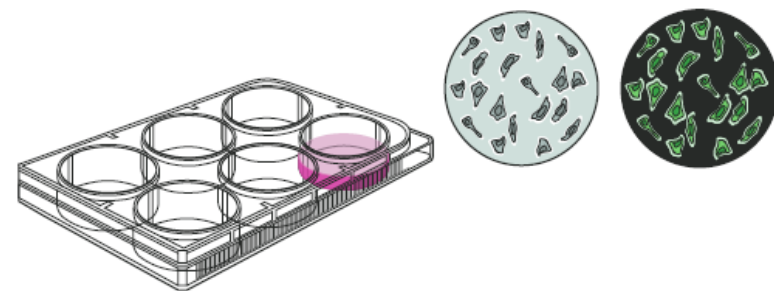
## Step 4

Rinse cuvette with  
culture medium



## Step 5

Transfer to culture dish. Expression can be  
detected as soon as 3-8 hours post



# Amaxa<sup>®</sup> Cell Database: Transfected Cell Types

Lists more than 1200 cell lines and primary cells

Provides

- Cell information
- Nucleofection<sup>®</sup> Conditions
- ⊗ Cells with OP
- Customer data (not verified)
- public >800

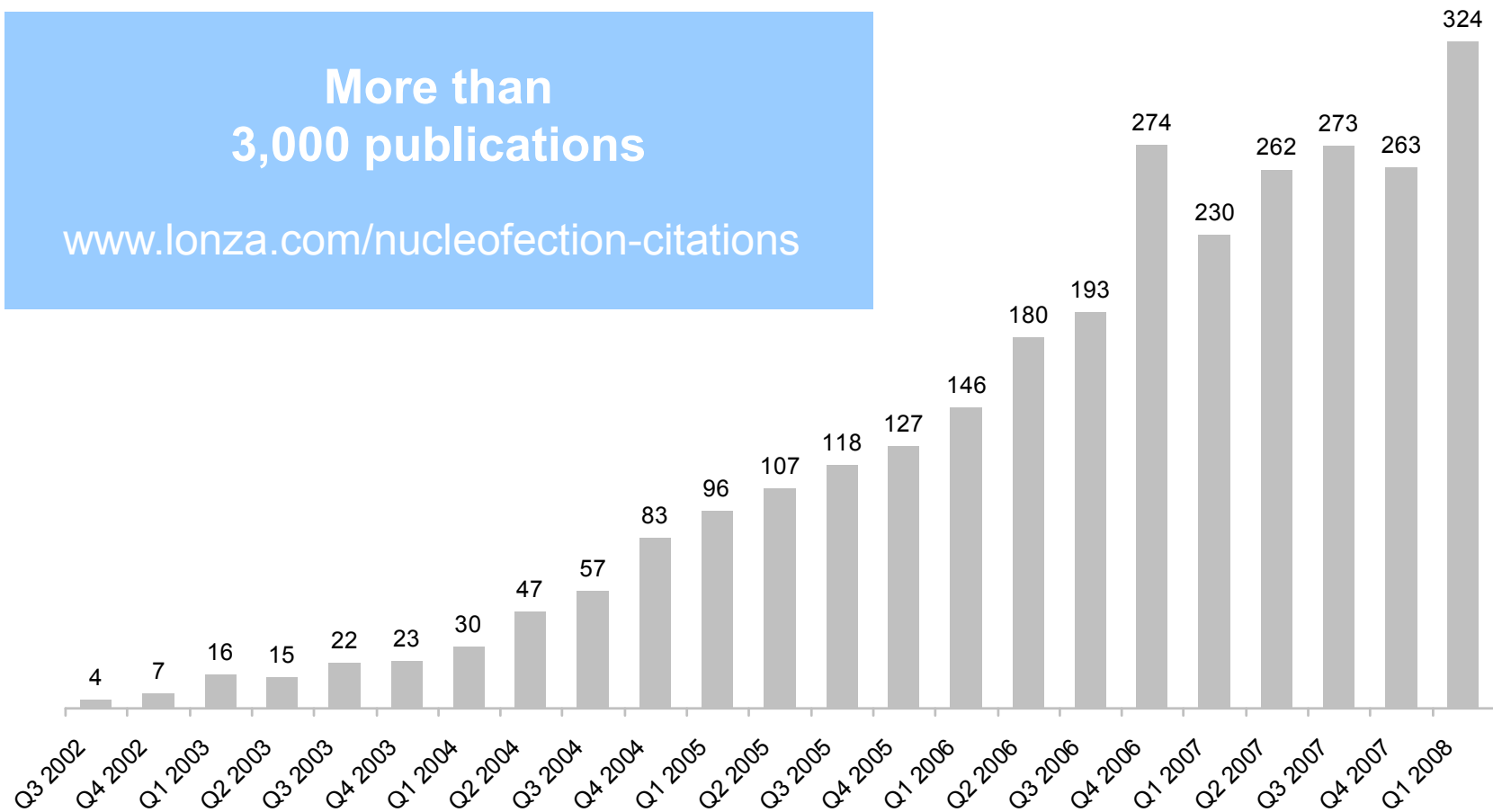
A			
⊗ <a href="#">A-10 (ATCC)</a>	⊗ <a href="#">A2058 (ATCC)</a>	<a href="#">AGN2a</a>	⊗ <a href="#">Astrocyte, rat</a>
⊗ <a href="#">A-375 (ATCC)</a>	<a href="#">A2780</a>	⊗ <a href="#">AGS (ATCC)</a>	<a href="#">ASZ001</a>
⊗ <a href="#">A-431 (ATCC)</a>	<a href="#">A3.01</a>	<a href="#">AML</a>	<a href="#">AT-1</a>
<a href="#">A-498 (ATCC)</a>	⊗ <a href="#">A549 (ATCC)</a>	<a href="#">AML-DC</a>	<a href="#">ATDC5</a>
<a href="#">A172</a>	⊗ <a href="#">A7r5 (ATCC)</a>	<a href="#">ARH 77</a>	<a href="#">AtT20</a>
<a href="#">A2.A2</a>	<a href="#">Adipocyte (pre), human</a>	⊗ <a href="#">ARPE-19 (ATCC)</a>	
<a href="#">A20</a>	<a href="#">Adipose stem cell, human</a>	<a href="#">Astrocyte, human</a>	
⊗ <a href="#">A20 (ATCC)</a>	<a href="#">Adrenocortical, bovine (BAC)</a>	⊗ <a href="#">Astrocyte, mouse</a>	

More information on: [www.lonza.com/cell-database](http://www.lonza.com/cell-database)

# Validation of the Amaxa<sup>®</sup> Nucleofector<sup>®</sup> Technology

More than  
3,000 publications

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



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**4D-Nucleofector<sup>®</sup> –  
Features and Benefits**



# Agenda

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## ■ Introduction

- Existing and Future Products
- Overview 4D-Nucleofector<sup>®</sup> System

## ■ Details about

- The Core Unit
- The X-Unit
- The Operation Software
- Consumables
- System key benefits

## Existing and Future Products

Low

**Throughput**

Very High

**Nucleofactor<sup>®</sup> II**  
a device to transfect cells by Nucleofection<sup>®</sup> using single cuvettes.

**96-well Shuttle<sup>®</sup> Device**  
a Nucleofactor<sup>®</sup> 2 add-on device allowing **96** transfections in parallel.

**4D-Nucleofactor<sup>®</sup>**  
the Nucleofactor<sup>®</sup> II successor. A system enabling transfection of cells by Nucleofection<sup>®</sup> in several formats.

**96-well Shuttle<sup>®</sup> Device**  
a Nucleofactor<sup>®</sup> 4D add-on device allowing **96** transfections in parallel.

**HT-Nucleofactor<sup>®</sup>**  
High Throughput Nucleofection<sup>®</sup> System. A new, independent system supporting up to **384** transfections in parallel.

## Overview 4D-Nucleofector<sup>®</sup> System



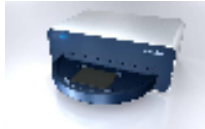

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A new, modular system offering advanced performance and convenience. Comprising one **Core Unit** and several **Functional Modules** the system is designed for maximum flexibility.

### Features

- **1D Easy**
  - transfection of various cell numbers with same conditions
- **2D Fast**
  - different throughput, from one to 16 wells in 10 seconds
- **3D Flexible**
  - Nucleofection of cells in adherence for assays at various stages
- **4D Future-proof**
  - Modular system for upcoming transfection challenges

# Our Product Family - A technical Comparison

				
<b>Device</b>	4D-Nucleofector	96-well Shuttle	HT Nucleofector	Nucleofector*
<b>Throughput</b>	Low (1-16)	Medium (96)	High (384)	Low (1)
<b>Reaction volume</b>	100µl and 20µl	20µl	20µl	100µl
<b>Electrode material</b>	Conductive polymer	Conductive polymer	Conductive Polymer	Aluminum
<b>Cell numbers</b>	10 <sup>4</sup> to 10 <sup>7</sup>	10 <sup>4</sup> to 10 <sup>6</sup>	10 <sup>4</sup> to 10 <sup>6</sup>	10 <sup>5</sup> to 10 <sup>7</sup>
<b>Adherent Nucleofection</b>	Yes	Yes	Yes	No
<b>Shuttle compatibility</b>	Yes	-	No	<b>No</b>

\* Nucleofector without Shuttle connectivity

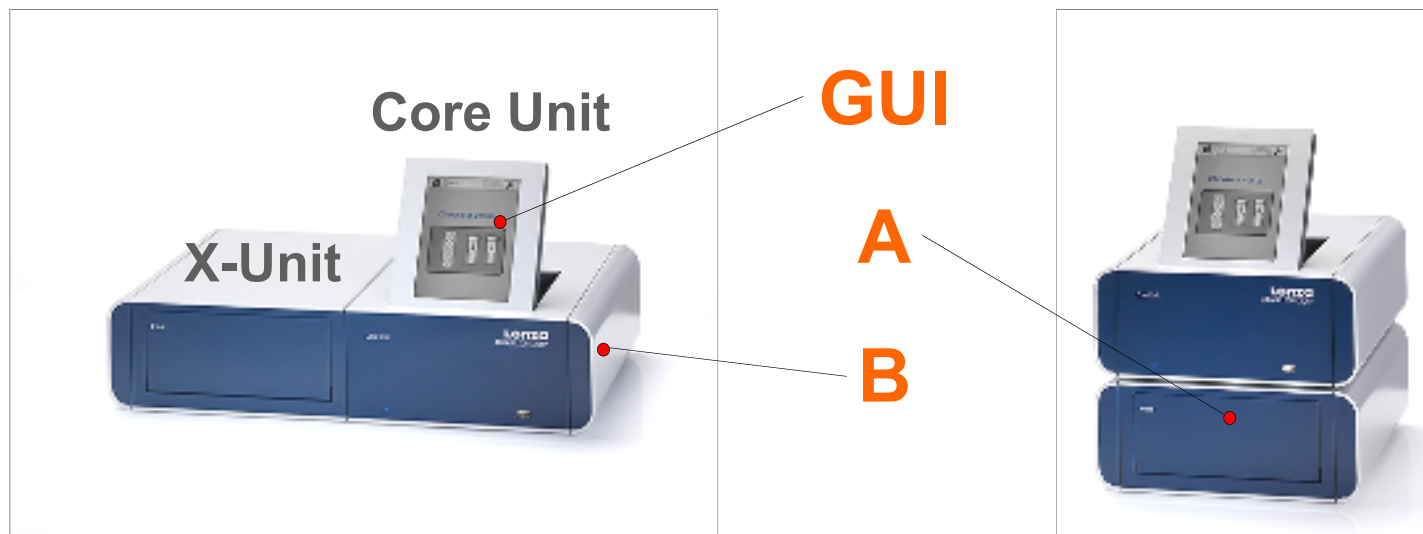
# Agenda - First Part

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- Introduction
  - Existing and Future Products
  - Overview 4D-Nucleofector<sup>®</sup> System
  
- **Details about**
  - The Core Unit
  - The X-Unit
  - The Operation Software
  - Consumables
  - System key benefits

## 4D-Nucleofector<sup>®</sup> System

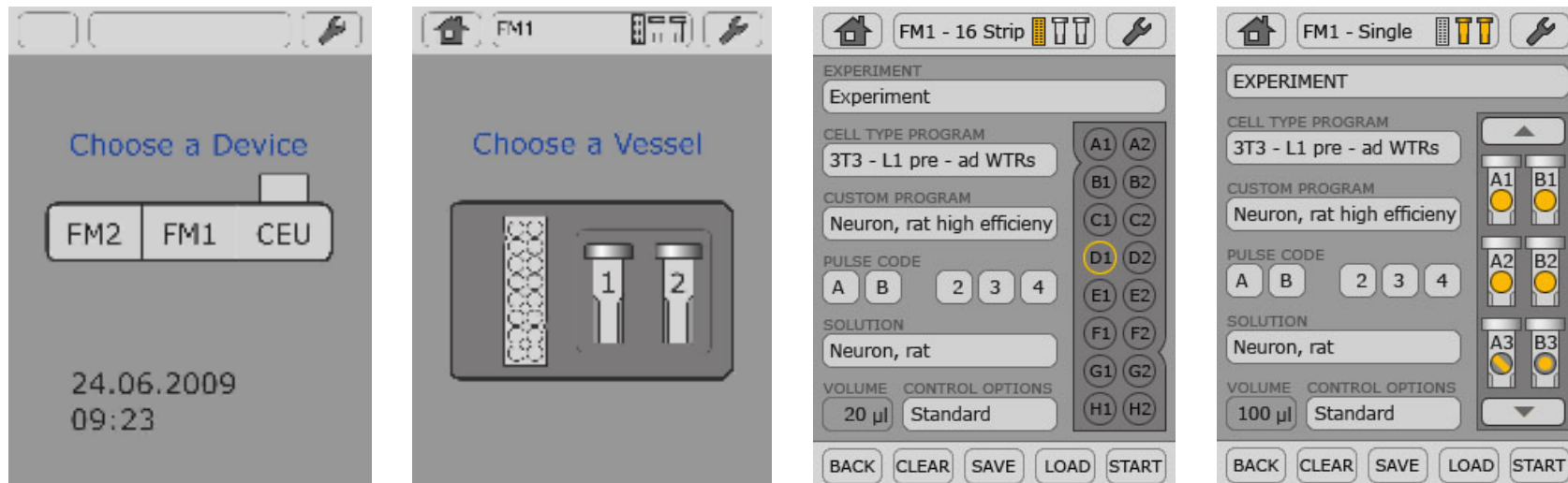
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### **Straight, very elegant, valuable and distinguishable**

- Controlled via **G**raphical **U**ser **I**nterface
- Electrically driven drawer for cuvette/sample retainer (**A**)
- Could be assembled side by side or on top of each other
- Noble housing, shell made of metal (**B**)

# 4D-Nucleofector® System - Operation Software



## The intuitive tool operating the 4D-Nucleofector® System

- Easy-to-use through up-to-date touch screen interface
- Comes with predefined Nucleofection® parameters and experiments
- Supports data transfer / software update via USB storage device
- PC based parameterization tool for predefinition of experiments available

## 4D-Nucleofector® System - Consumables

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### Consumables tailored to customer needs

- Kits supporting Nucleofection in 16-well Nucleocuvette Strips (20µl) (A)
- Kits supporting Nucleofection in single CP-cuvettes (100µl) (B)
- Three kits for cell lines; five kits for primary cells
- Primary cell optimization kit
- Kits for adherent cell Nucleofection



**Pre-culture Cyro Neurons  
with PNGM**



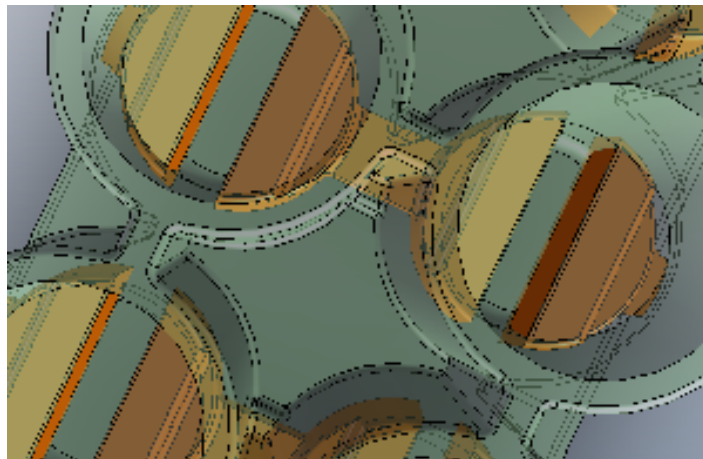
**Nucleofection<sup>®</sup> with ACT kit**



**Post-culture with PNGM**



**Analysis**

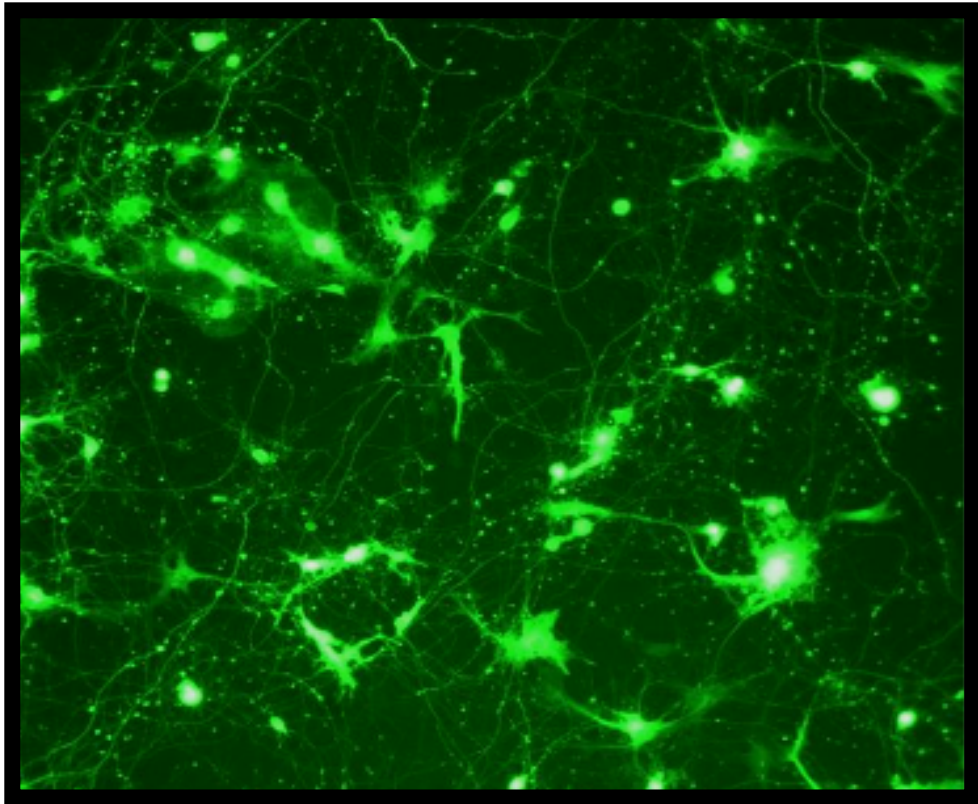
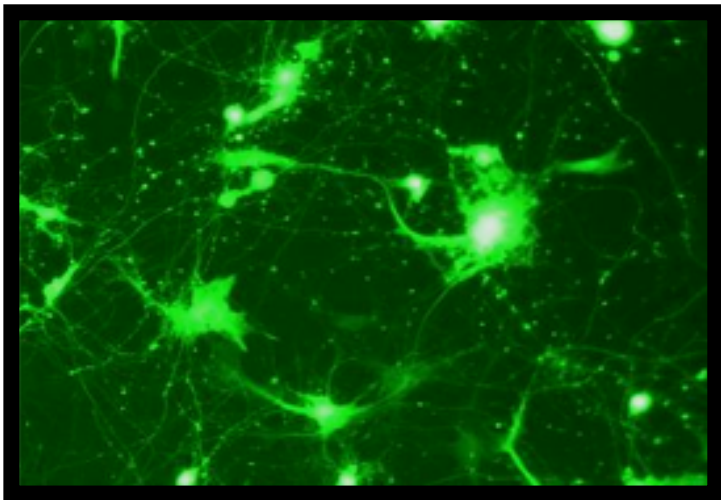
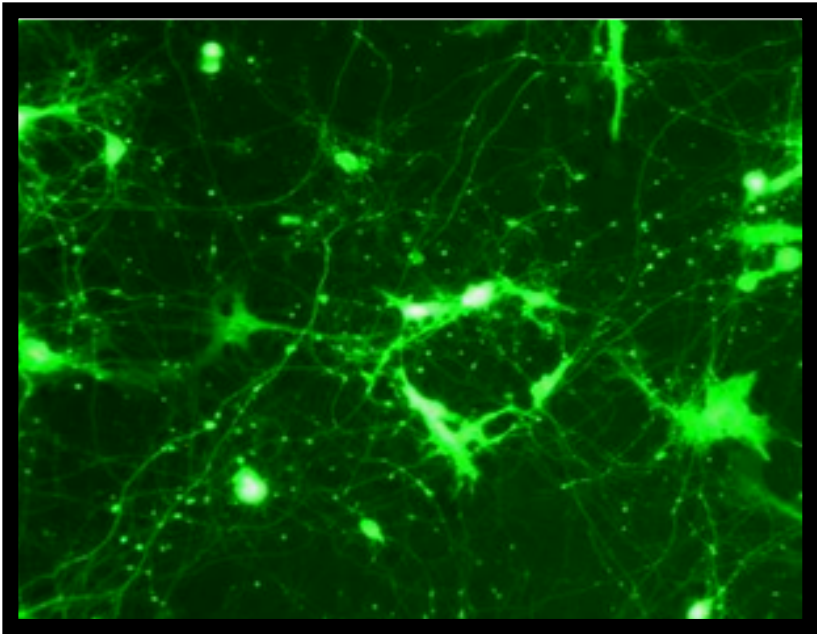


- ACT Shuttle/4D reagent kits
- PNGM
- Cryopreserved Neurons

**Adherent transfection**

Cyropreserved Rat Hippocampal  
Adherent Cell Transfection  
Shuttle® 96 well Program  
DR-121 DCPDL+Laminin coated ACT  
2 days post transfection (DIV9)

**Lonza**



## Overview 4D-Nucleofector<sup>®</sup> System

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### Key Benefits

#### ■ Using different cell numbers

- Same conditions for 100µl and 20µl transfection volume
- Cell numbers from  $2,5 \times 10^4$  (20µl) up to  $2 \times 10^7$  (100 µl) feasible

#### ■ Working with various throughputs

- Flexible throughput from 1 to 16 samples (plus Shuttle connectivity)
- Kit concept tailored to customer throughput

#### ■ Transfecting different primary cells

- Only **five** primary cell kits covering a broad range of cells
- A primary cell optimization kits

#### ■ Preserving cell functionality

- No release of metal ions due to **Conductive Polymer** cuvettes
- Adherent Nucleofection of cells possible

#### ■ Future-proof

- Modular architecture allows adaptation to new transfection challenges

# **Lonza**

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**Thank you for your kind attention!**