MaxCyte®

Delivery Platform for Cell Engineering

Accelerating Drug Discovery,
Development and Bioproduction

“The MaxCyte STX has transformed our ability to perform large scale studies of human ion channel variants.”

Dr. Alfred L. George, Jr.
Magerstadt Professor and Chair
Northwestern University

The Global Cell-Engineering Solution Provider

MaxCyte unites its proven delivery platform with unmatched cell-engineering expertise to accelerate the discovery, development and manufacturing of next generation medicines — helping partners to unlock their product potential and enabling previously unfeasible cell-engineering applications.

MaxCyte’s delivery platform is designed to meet the stringent demands of cell therapy

MaxCyte pioneered the development of a cell engineering platform more than 16 years ago for the delivery of biomolecules that fulfills the stringent demands of clinical use — namely the ability to safely and reproducibly modify human cells with high efficiency, low cytotoxicity, and at the scale required to treat patients. Today, those same benefits are also used to accelerate the development of small molecule drugs, biologics and vaccines.

Flow Electroporation™ Technology

MaxCyte’s delivery platform is based on Flow Electroporation™ Technology, a universal transfection technology capable of high-performance delivery of virtually any molecule, to any cell, at any scale, providing scientists the freedom to use the most physiologically relevant system, facilitating the identification, development, and manufacturing of drug and biotherapeutic candidates of the highest quality.

The Only Cell-Engineering Technology Able to Scale from Early-Stage R&D to Biomanufacturing

Flow Electroporation™ Technology can engineer as few as half a million cells and up to 200 billion cells in a single transfection without requiring re-optimization or sacrificing performance upon scale up, enabling seamless scalability.

APPLICATIONS

TRANSIENT PROTEIN PRODUCTION
- Recombinant proteins
- Therapeutic antibodies
- Antibody-like molecules

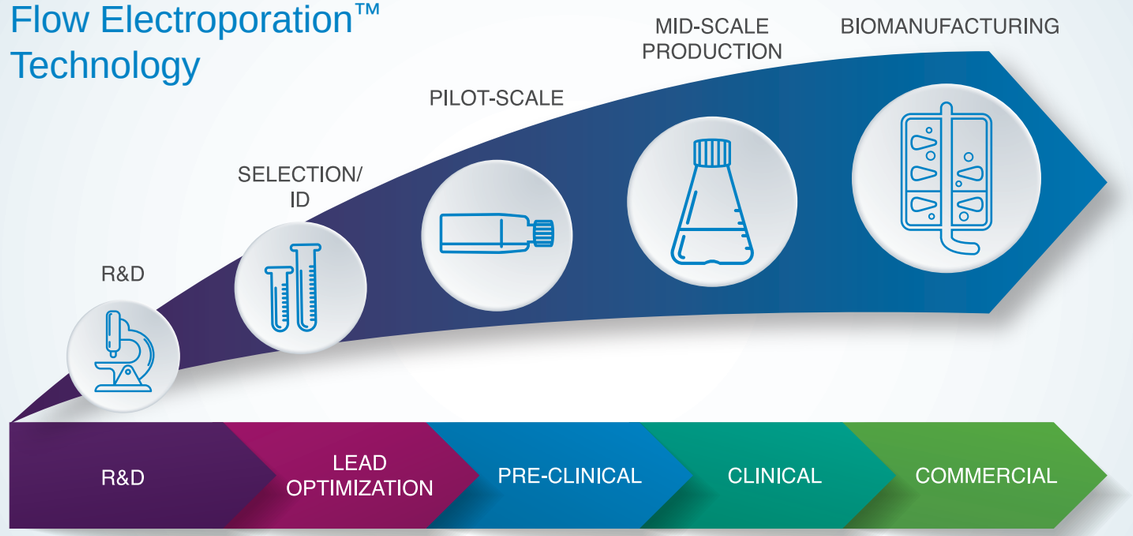
STABLE EXPRESSION
- Stable pools
- Stable clone generation

VACCINES AND VIRAL VECTORS
- Recombinant antigens
- VLPs and VRPs
- Lentivirus and AAV

GENE EDITING
- CRISPR, ZFN and TALENs

CELL-BASED ASSAYS
- Ion channels/GPCRs
- Reporter gene assays
- Kinases

Flow Electroporation™ Technology



CAPABILITIES

ANY CELL

- Primary and stem cells
- Cell lines
- Insect cells
- Difficult-to-transfect cells

ANY MOLECULE

- DNA
- RNA, mRNA, gRNA, siRNA
- Proteins
- Cell lysates

ANY SCALE

- Basic research
- Large-scale screening and production
- Pre-clinical and clinical manufacturing

MaxCyte Scalable Transfection Systems

The MaxCyte STX and MaxCyte VLX Scalable Transfection Systems provide superior cell engineering and seamlessly scale for efficient migration from early research to commercial manufacturing. Key features include:

HIGH PERFORMANCE

- >90% transfection efficiencies for commonly used cell types
- >90% cell viabilities
- Computer-controlled system for reproducible results

FLEXIBILITY

- Single, animal component-free electroporation buffer for all cell types
- Pre-loaded library of validated, cell specific protocols

SCALABILITY

- 0.5 x 10^6 to 7 x 10^8 cells in seconds
- Up to 2 x 10^{11} in <30 minutes

QUALITY

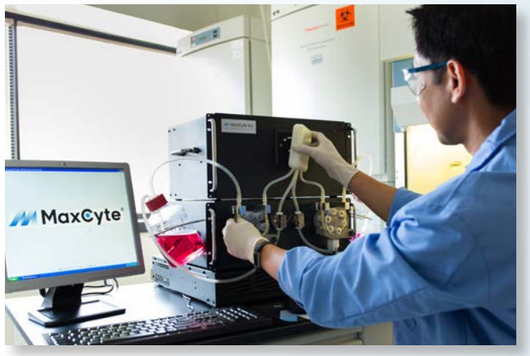
- Sterile, single use processing assemblies
- Closed, cGMP-compliant, ISO-certified and CE-marked instruments
- Supported by a US FDA master file

"The MaxCyte STX has enabled us to meet our yearly protein production goal in five months!"

James B. Pace
Research Scientist III
Albany Molecular Research, Inc.

MaxCyte STX®

0.5x10^6 up to 2x10^{10} cells



MaxCyte VLX®

Up to 2x10^{11} cells

Flow Electroporation™ Technology — Universal, Fully-Scalable Transfection

Flow Electroporation™ Technology leverages a fundamental property of cells — the reversible permeability of membranes in response to an electrical charge — to create a transformative method for universally delivering molecules such as nucleic acids and proteins to cells. It does not require the use of specific cell types, expression vectors, media additives or reagents. High-level performance combines with unmatched scalability to enable:

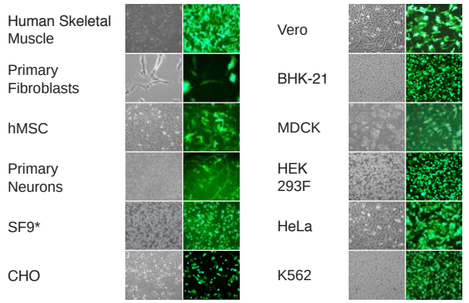
✓ Increased productivity
✓ Higher quality candidates
✓ More physiologically relevant assays
✓ Shortened development and commercialization timelines

Exceptional Performance and Flexibility

Transfect any cell type including adherent, suspension, primary and stem cells with minimal cell disturbance. A single, chemically-defined electroporation buffer is used for all cells. MaxCyte scientists have developed a library of cell type-specific electroporation protocols providing optimum transfection results.

- High viability and transfection efficiency result in healthy, engineered cells
- Outperforms other transfection methods
- Consistent, highly reproducible transfection performance
- Engineered cells of superior quality for any application

>90% EFFICIENCY / >90% VIABILITY

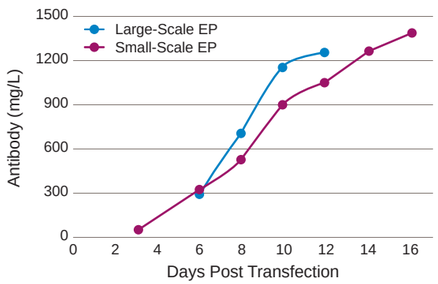


*Cells were transfected with pGFP DNA using the appropriate pre-loaded protocol on the MaxCyte STX. 24–48 hrs post transfection cells were examined for cell viability and transfection efficiency. *SF9 results at 72 hours.*

Unmatched, Seamless Scalability

Superior scalability enables transfection of as few as 0.5x10^6 cells within seconds up to as many as 2x10^{11} cells in less than 30 minutes. Flow Electroporation™ Technology scales in two ways — from small- to large-scale on a single instrument, and from one MaxCyte Scalable Transfection System to another.

- Transfect from <1 mL to up to 200L of cell culture in less than 30 minutes
- Scales from research to bioproduction to clinical applications
- No re-optimization required
- High transfection efficiency and high cell viability maintained at all scales



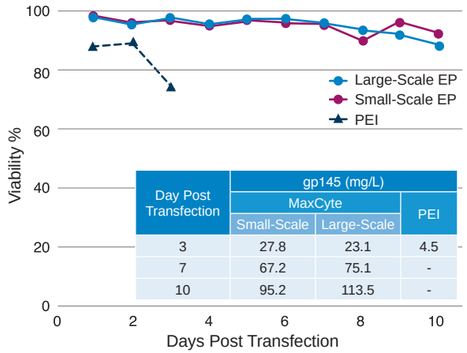
	Culture Volume	Number of Cells	[IgG]	Total IgG Produced
Small-Scale	20 mL	8E7	1.4 g/L	28 mg
Large-Scale	2.8 L	1E10	1.22 g/L	3.42 g

CHO-S cells were transfected with an IgG expression plasmid via small- or large-scale electroporation (EP) using the MaxCyte STX. 3.4 grams of antibody was produced from a 2.8 L culture following a single transfection.

Rapid, High-Titer Protein Production

Enjoy the ultimate in production system flexibility without sacrificing performance. Produce milli- to multi-gram quantities of high quality proteins within days of a single transient transfection.

- Express a variety of protein types
- High efficiency, high viability transfection of CHO, HEK, NS0, insect and other cell types
- Plasmid to high quality protein within days
- Eliminates the need for baculovirus and/or generation of cell lines



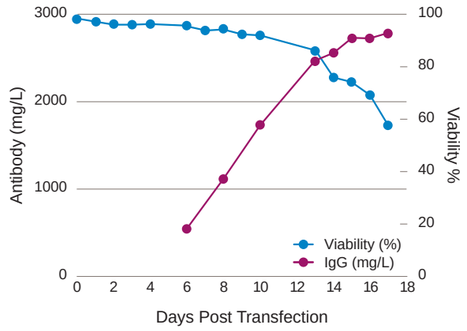
Day Post Transfection	gp145 (mg/L)		
	MaxCyte		PEI
	Small-Scale	Large-Scale	
3	27.8	23.1	4.5
7	67.2	75.1	-
10	95.2	113.5	-

CHO cells were transfected with a gp145 expression plasmid via small-scale EP ($8x10^7$ cells), large-scale EP ($2x10^9$ cells) or a customer's optimized PEI process. Transfected cells were inoculated into shake flasks at the same density and cultured for 10 days.

Gram-Scale Antibody Production in Cell Line of Choice

Transiently express milli- to multi-gram quantities of antibodies in the host of choice to rapidly identify and characterize top candidates and delay the time and investment of stable cell line generation.

- Express antibodies, bispecifics, Fc fusions and fragments
- No special reagents, cells or media required
- High efficiency, high viability transfection of CHO cells enables superior productivity
- Produce high quality antibodies within days
- Seamless scalability supports R&D through cGMP pilots and toxicology studies

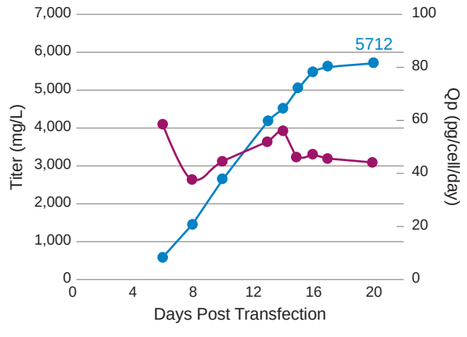


CHO-S cells transfected with a human IgG expression plasmid using the MaxCyte STX were cultured for 17 days post EP.

Streamlined Migration to Stable Expression

Quickly transition to stable protein expression using MaxCyte's delivery platform for generating quality stable pools and high-yield stable cell lines.

- High cell viability leads to faster cell recovery
- Generate high-yield stable clones in <8 weeks
- Screen fewer clones to identify high producers
- Compress timelines by simultaneous stable cell line generation and transient production

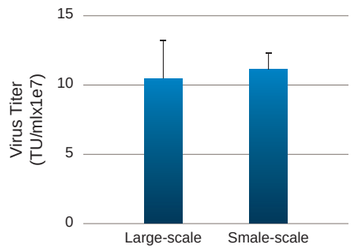


A stable CHO cell pool expressing a hIgG was generated within two weeks of electroporation. 479 clones were screened following limited dilution cloning. The top clone was selected for production within 6 weeks post transfection. 21-day production culture was carried out in shake flasks.

Scalable Vaccine and Viral Vector Biomanufacturing

Achieve shorter lead times using the only non-viral delivery platform that meets the scalability, consistency, and cell type flexibility requirements for vaccine and viral vector development and manufacturing.

- Rapid production of antigens, antibodies, VLPs, VRPs, lentiviruses and AAVs
- Highly efficient (co)transfection of multiple, large plasmids
- Increased yield with safe, cGMP-compliant, FDA Master File technology
- Scales from R&D to biomanufacturing

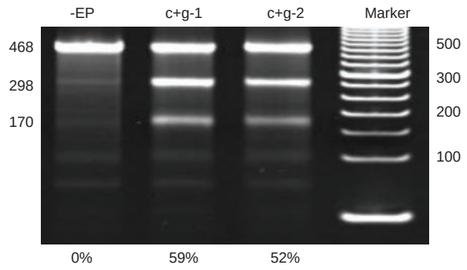


Suspension-adapted HEK 293FT cells were co-transfected with 4 plasmids (HIV-based lentivector system) via small- (1.5×10^7 cells) or large-scale (1×10^{10}) EP. Media was collected and infectious units measured 48 hrs post transfection.

High-Performance Gene Editing

Conduct targeted gene editing by delivering nuclease components to a variety of cell lines and primary cells without the need for developing a viral delivery system.

- High efficiency (co)transfection of DNA, RNA and proteins
- Rapidly engineer cell lines, primary and stem cells, and induced pluripotent stem cells (iPSCs)
- Safe, reproducible means of ZFN, TALEN and CRISPR delivery

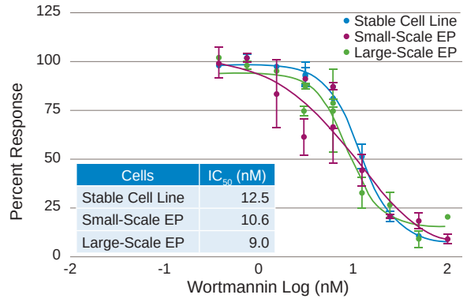


K562 cells were electroporated with mRNA-CRISPR (Cas9 and guide RNA). Products of corrected AAVS-1 site are 298 and 170 base pairs, parental band is 468 base pairs. Editing rate was calculated as (digested bands)/(digested bands + parental band).

Enabling Cell-Based Assays

Develop biologically relevant assays without waiting for stable cell line development. Produce quality cells engineered to express membrane-, cytosolic-, or nuclear proteins ideal for use in downstream functional assays.

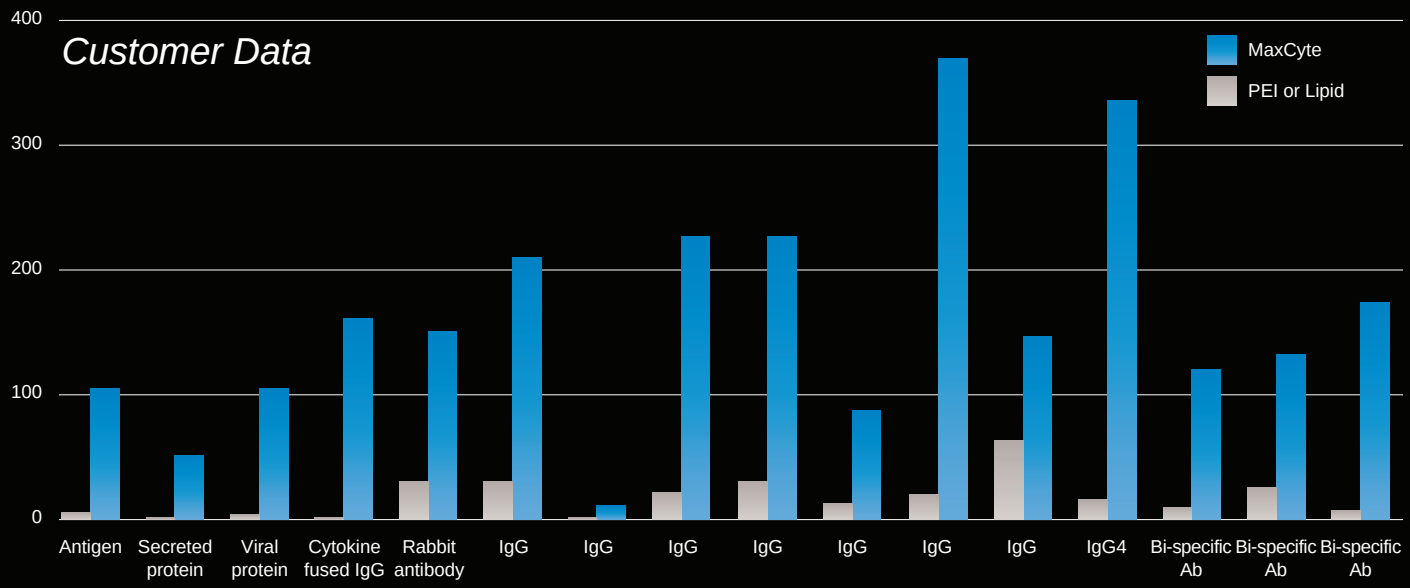
- Easily express complex, multi-subunit proteins
- Scale from assay development to screening without reoptimization
- Cryopreserve transfected cells to create 'assay-ready' cell banks
- Consistent results with minimal day-to-day and user-to-user variation
- Decrease reliance on stable cell lines



Cells	IC_{50} (nM)
Stable Cell Line	12.5
Small-Scale EP	10.6
Large-Scale EP	9.0

Cells were transfected with eGFP-2XFYVE (tandom PI3P binding domains fused to eGFP) using small-scale or large-scale electroporation. Transfected cells or cells stably expressing eGPF-2XFYVE were incubated for 30 minutes with wortmannin, a PI3 kinase inhibitor.

Superior Outcomes Through Superior Cell Engineering



"... transfection efficiencies exceed our previous systems... it feels like we bought the Ferrari among electroporation systems on the market."

Dr. Cosmas D. Arnold
Research Institute of Molecular Pathology
Vienna Biocenter

MaxCyte®

22 Firstfield Road, Suite 110
Gaithersburg, MD 20878 USA

info@maxcyte.com
www.maxcyte.com