

#### **Transfection Into Any Cell Type With Any Nucleic Acid**

*Trans*IT-X2<sup>®</sup> Enables Superior Gene Expression in a Variety of Cell Types

#### TransIT-X2<sup>®</sup> Dynamic Delivery System

A549‡ HUVEC‡ AsPC-1 Immortalized Keratinocytes‡ BHK-21‡ FreeStyle<sup>™</sup>293-F MDA-MB-468‡ BJ‡ BT-20 MDCK<sup>‡</sup> NHDF‡ Caco-2 C2C12 NIH-3T3 CFPAC-1‡ L929‡ CHO-K1‡ LNCaP<sup>‡</sup> **DI-TNC1** PC-12 RAW 264.7 DU-145 Hep G2<sup>‡</sup> T47D‡ HCC1143<sup>‡</sup> HCC38 HEK 293 HMEC (epithelial)‡ 28

AU565 BxPC-3 COS-7 HeLa HCT 116 MCF-7 **MDA-MB-231** 

PC-3

#### 2000

Keratinocvtes<sup>‡</sup> MDA-MB-453 Neuro-2a SH-SY5Y SK-N-MC

 $\ddagger$  Cell types with >2-fold luciferase expression in head-to-head comparisons

TransIT-X2® Dynamic Delivery System (Mirus Bio) and Lipofectamine® 2000 Transfection Reagent (Thermo Fisher Scientific) were used to transfect plasmid DNA encoding luciferase into 41 different cell types at three reagent-to-DNA ratios. Luciferase expression was compared at 24 hours post-transfection using a standard luciferase assay.

Please visit: mirusbio.com/transitx2 for more information.

**PROGRAMMING THE GENOME:** Any Delivery Method. Any Nucleic Acid. Any Cell Type.

## Mirus.

At Mirus Bio, our role in PROGRAMMING THE GENOME is to provide scientists turnkey tools to ADD, DELETE or MODIFY any gene at will. We accomplish this through support of ANY DELIVERY METHOD capable of delivery of ANY NUCLEIC ACID into ANY CELL TYPE. Our work began more than 20 years ago with a passion for science. That passion continues today with a commitment to research that has allowed us to expand upon our expertise in transfection, crafting a more comprehensive offering for nucleic acid delivery by way of chemical transfection, electroporation, virus production and transduction products. Whenever there is a need for high functional virus titers, efficient knockdown of target genes, or effective, low toxicity solutions, our delivery systems for molecular and cell biology applications give researchers unprecedented genome control at their fingertips.

# UKIEKAMMARE **CONTROL AT YOUR FINGERTIPS**







### not just ANY DELIVERY METHOD

#### **Dynamic Delivery System**

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#### A versatile delivery method for hard-to-transfect and common cell types

- Broad range cell transfection compatibility
- Superior performance compared to competitor reagents
- Delivery of plasmid DNA, siRNA/miRNA and CRISPR/Cas9 components

#### Ideal for:

- Gene Expression
- Gene Knockdown
- Co-transfection
- CRISPR/Cas9 Genome Editing
- Primary Cell Transfection
- Stem Cell Transfection
- Stable Transfection

#### DVANCE YOUR TRANSFECTIONS.

Request a FREE SAMPLE of TransIT-X2<sup>®</sup> Dynamic Delivery System. Visit mirusbio.com, call 888.530.0801 (U.S. only) or +1.608.441.2852 (outside the U.S.)

#### Learn more: mirusbio.com

## KIIHKAMMINH FUE PENNK-**CONTROL AT YOUR FINGERTIPS**

Humans have often tried to mimic the functionality of natural, recurring processes. And it just so happens to be that components and the mechanisms of the mammalian cell can be seen rendered in the design of today's modern computer. Both the cell and computers involve the flow of information and a requirement to be able to store, analyze, manipulate, retrieve, and protect information. With the availability of advanced delivery systems, researchers can now create changes in the biological operating system (i.e., the cell) as easily as a computer programmer can modify code in a computer program. For Mirus Bio, "Programming the Genome" represents providing researchers with a set of molecular tools to study biological functions for biotechnological applications.

#### **CODE: The Nucleic Acids**

Computer programmers rely on 1 and 0 as the binary code from which they develop a multitude of programs. Biology is similar in that 4 key bases are used to produce nearly 20,000 human protein-coding genes. In much the same way a programmer modifies a software program, Biologists in search of ways to treat disease need to make changes to the code. This is enabled through addition of exogenous DNA to allow expression of new genes (PLUS), inhibit gene expression with RNAi approaches (MINUS), or ultimately the ability to modify the DNA to create new outputs through genome editing techniques such as CRISPR/Cas9 (DELTA).

#### **PROGRAM: The Software/Apps**

To create complex algorithms that encode two- and three-dimensional structures, such as RNA and protein, the cell needs to arrange the simple 4-base code into intricate patterns and commands that specify starts, stops, and protein production processing speed. The "software" results in instructions to create the proper precursors, organize step-by-step additions or modifications such as phosphorylation and glycosylation, and ultimately to create a molecule that can carry out the critical functions and applications required by the cell. Being able to change the underlying code that creates these proteins is a necessary tool for understanding essential gene function.

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#### INPUTS: plasmid DNA, mRNA, siRNA and miRNA. Cas9

Whether for overexpression, knockdown, or genome editing, programming the cells in a way that alters the code is reliant on efficient delivery of these inputs to the cell. Founded in 1995. Mirus Bio has extensive experience in chemical transfection, electroporation, and viral vector nucleic acid delivery methods. These methods comprehensively cover the mechanisms that a programmer needs to upload data (i.e., transfer nucleic acid) into the cell.

#### Mirus Bio: Delivery Solutions for Programming the Genome

#### **CHEMICAL TRANSFECTION**

The Mirus Bio line of chemical-based *TransIT®* Transfection Reagents represent versatile tools for gene delivery in mammalian cells and provides gentle, high efficiency nucleic acid delivery into both common and hard-to-transfect cell types.

#### VIRAL TRANSDUCTION

Transduction is the deliberate introduction of nucleic acids to cells via viral vectors such as lentiviruses, adenoviruses, and adeno-associated viruses (AAV). Viruses harness the power of millions of years of evolutionary refinement to efficiently deliver genes to cells. Mirus TransIT®-Lenti and TransIT-VirusGEN® Transfection Reagents provide high efficiency transfection of packaging vectors to achieve maximal virus titers in HEK-293T cells.

#### ELECTROPORATION

Electroporation is a simple and rapid physical delivery method that utilizes a short, high voltage electrical pulse to create transient openings in the cell membrane to allow loading of desired cargo into the cell. Ingenio<sup>®</sup> Electroporation Kits offer a simple solution that addresses hard-to-transfect cell types using most conventional electroporation devices.

Each cell type runs on its own unique biological program. Workhorse cell types such as HEK 293 contain the same basic cellular components as hard-to-transfect cells like T lymphocytes or primary motor neurons. However, the differences in their programs dictate their unique ability to be genetically modified by different methods of nucleic acid delivery. In depth understanding of the cellular machinery involved and optimal nucleic acid delivery method to employ are key strengths of Mirus Bio. The proper combination of those elements leads to the highest delivery efficiency and longterm viability of the cell.

#### **OPERATING SYSTEM and CENTRAL PROCESSING UNIT: The Cell and the Nucleus**

#### **OUTPUT: The Result of** Your Work

There are many obstacles on the path between scientific discoveries and clinical therapies. Along the way, researchers aim to engineer cells to gain specific cellular outputs. The applications addressed through nucleic acid delivery span simple gene expression studies to complex stem-cell work, biotherapeutic protein production, and viral vector production. Mirus Bio seeks to accelerate scientific discovery and drug development processes by providing researchers with tools that allow them to use any method with any nucleic acid and deliver it into any cell type.

