The Complete Roche Portfolio

- Genomics
- Proteomics
- Cellular Analysis

The life science business of Merck KGaA, Darmstadt, Germany operates as MilliporeSigma in the U.S. and Canada.

Sigma-Aldrich®
Lab & Production Materials

Benchtop Breakthroughs Begin with Every Box

Benchtop breakthroughs are driven not only by inquisition and keen insight into biological processes but also by the molecular tools currently available. Progressing your research often employs a multifaceted approach utilizing genomics, proteomics, and cellular analyses. In order to enable your next discovery, we exclusively offer the complete Roche portfolio of biochemical reagents, as well as a comprehensive range of their qPCR and nucleic acid purification products. Through the spirit of collaborative innovation, our partnership with Roche includes our combined rich legacies and drive for continued product quality excellence to truly offer a seamless experience and a world-class suite of advanced molecular tools.

As pioneers and current leaders in the field of PCR, Roche nucleic acid purification, PCR and qPCR products provide you with assurance that your research is valid from the start. Additionally, our suite of reagents for DNA transfection, cell isolation and function analyses, and our protein protease and phosphatase inhibitors provide end-to-end solutions throughout your gene and protein expression workflows. We invite you to explore our combined offerings and discover how we can help you drive your next discovery.

Contents

Genomics

PCR

An essential technique within virtually every molecular biology lab, polymerase chain reaction (PCR) is an easy and affordable method for amplifying specific fragments of DNA by several orders of magnitude. Our specialized kits have been optimized for a variety of PCR applications.

Hot Start

During Hot Start PCR, polymerase activity is inhibited during reaction preparation. This affords room temperature reaction set up while reducing non-specific amplification to produce greater specificity, sensitivity and target yield.

FastStart™ Taq DNA Polymerase

A chemically modified form of recombinant Taq DNA polymerase, FastStart™ Taq DNA Polymerase is inactive below 75°C yet easily activated by a quick 95°C heat step. This initial denaturation yields an enzyme mix which is stable for 24 hours at 15-25°C, making FastStart™ Taq DNA Polymerase ideally suited to automated assay setups. Supplied with an optimized PCR buffer system and GC-RICH solution, the enzyme can handle difficult templates such as secondary structures or GC-rich sequences. Incorporation of dUTP and subsequent decontamination via uracil-DNA glycosylase prevents carryover contamination.

- High specificity, sensitivity, and yield
- Stable enzyme mix for room temperature setup and compatibility with automated setups
- Suitable for a wide range of templates

High Fidelity

High Fidelity PCR relies on DNA polymerases which couple a low error rate with proofreading capability. Utilizing 3′ to 5′ exonuclease activity for excision of incorrectly incorporated mononucleotides, proofreading replaces these with the correct nucleotides to yield highly accurate replication of the target DNA sequence.

Expand™ High Fidelity PCR System

A mixture of Taq DNA polymerase and a DNA polymerase with proofreading activity for high yield and fidelity, the Expand™ High Fidelity PCR System is optimized for PCR of DNA fragments up to 5 kb. Delivering twofold greater yield and threefold greater DNA synthesis fidelity compared to Taq DNA polymerase, the Expand™ High Fidelity PCR System is suitable for even small quantities of template DNA.

- Achieve superior fidelity and higher yields
- Avoid false negatives
- Successful results from even small quantities of template DNA

Long & Accurate

Long and Accurate (LA) amplification combines a thermostable DNA polymerase with a second polymerase exhibiting a 3′ to 5′ exonuclease activity to provide proofreading capability. The repair process allows for greater read lengths and significantly increased fidelity over standard Taq DNA Polymerase.

Expand™ Long Template PCR System

The Expand™ Long Template PCR System is an enzyme mix that contains thermostable Taq DNA Polymerase and a thermostable DNA polymerase with proofreading activity. Allowing amplification of DNA fragments up to 20kb from human genomic DNA, and 40kb from λDNA, the Expand™ Long Template PCR System copies DNA threefold more accurately than Taq DNA Polymerase, producing a high yield of PCR product.

- Amplify longer templates
- Achieve superior fidelity and greater yields
- Optimized buffers and protocols for different fragment lengths

Cat. No.	Description
FTAQ-RO	FastStart™ Taq DNA Polymerase
EHIFI-RO	Expand™ High Fidelity PCR System
ELONG-RO	Expand™ Long Template PCR System

qPCR

Unlike traditional PCR, during which amplification results are obtained only once the reaction is complete, quantitative PCR (qPCR) determines the amount of PCR product that is present as the reaction progresses. This is achieved using a fluorescent reporter within the PCR reaction. The Roche biochemical reagent portfolio includes qPCR products based on SYBR® Green, in addition to probe-based qPCR kits.

SYBR® Green-based qPCR

SYBR® Green I is a commonly used fluorescent dye that binds double-stranded DNA molecules by intercalating between the DNA bases. Through measurement of the level of fluorescence at the end of each cycle, it is possible to quantify the amount of DNA that has been amplified.

FastStart™ Universal SYBR® Green Master (Rox)

FastStart™ Taq DNA Polymerase is one of the best-described PCR Polymerases from Roche. A chemically modified form of recombinant Taq DNA Polymerase, the enzyme is inactive below 75°C yet easily activated by a quick 95°C heat step. FastStart™ SYBR® Green Master kits provide the advantage of both reduction of nonspecific products and the reliable sensitivity of SYBR®

- Available for both qPCR and RT-qPCR applications
- Eliminates formation of primer-dimers
- Reliable fluorescent detection of incorporated SYBR® Green I dye during DNA amplification

Probe-based qPCR

Probe-based qPCR uses target-specific primers to amplify a specific DNA sequence, and fluorescent-labeled probes to recognize the resulting product. This technique yields enhanced specificity and sensitivity since a measurable fluorescent signal is only produced upon probe binding. By labeling different probes with different dyes, multiple sequences can be quantified simultaneously.

FastStart™ Universal Probe Master (Rox)

Utilizing both the high reaction efficiencies of FastStart™ Taq DNA Polymerase with the specificity of a probe-based DNA amplification approach, FastStart™ Universal Probe Master (Rox) significantly improves the quality and yield of your PCR product. With the exception of the template, primers, and probe, the ready-to-use FastStart™ Universal Probe Master (Rox) master mix contains all of the required materials to efficiently run your qPCR and two-step qRT-PCR.

- Increased specificity with inactive FastStart™ Taq DNA Polymerase at room temperature
- Novel reference dye facilitates use on all real-time PCR instruments that normalize with ROX
- Suitable for use with robotic pipetting stations for qPCR reactions

Cat. No.	Description
FSUSGMMRO	FastStart™ Universal SYBR® Green Master (Rox)
FSUPMMRO	FastStart™ Universal Probe Master (Rox)

RT-PCR / RT-qPCR

Reverse transcriptase PCR (RT-PCR) is a variation of PCR which employs reverse transcriptase in addition to PCR reagents to amplify a specific mRNA sequence. Following the production of a cDNA copy, which anneals to one of the primers leading to first strand synthesis, PCR/qPCR ensues to generate dsDNA.

One-Step

During one-step RT-PCR / RT-qPCR, the reverse transcriptase step is included in the same tube as the PCR reaction, facilitating multiplex analysis of the gene of interest and the control within a single well. One-step reactions are easy to set up, requiring minimal hands-on time to reduce possible errors and contamination, and are often considered the best option for high throughput screening. They are also ideally suited to workflows which require repeated performance of only a small number of assays.

Transcriptor One-Step RT-PCR Kit

Containing four different enzymes, the Transcriptor One-Step RT-PCR Kit is designed for fast, sensitive, and specific end-point RT-PCR analysis of RNA. Transcriptor Reverse Transcriptase ensures sensitive and robust reverse transcription with high yield. Protector RNase Inhibitor provides maximum template protection during reverse transcription, and the Expand™ System – a blend consisting of Taq DNA Polymerase and a proofreading polymerase – minimizes the possibility of mutations to afford high yield and fidelity within the PCR.

- Detect as little as 1 fg of total RNA
- Includes a superior RNase inhibitor, fully active at elevated temperatures
- Proprietary hot start buffer for high specificity and reduction of primer-dimers

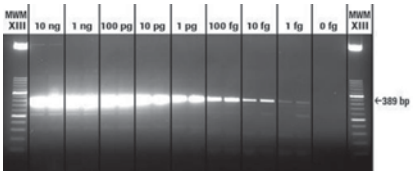


Figure 1: Transcribe difficult templates with high sensitivity.
(A) Various amounts (down to 1 fg) of HeLa total RNA were reverse transcribed with the Transcriptor One-Step RT-PCR Kit. A 389 bp fragment (GC content is 64%) was amplified with specific primers for human 28S ribosomal RNA according to the kit's standard RT-PCR protocol (reverse transcription at +50 °C for 30 minutes). As shown by the clearly visible band obtained after agarose gel electrophoresis and ethidium bromide staining, the kit transcribes even small amounts (1 fg) of template with high sensitivity.

Titan™ One-Tube RT-PCR System

The Titan™ One Tube RT-PCR System uses Reverse Transcriptase AMV for first strand cDNA synthesis and the Expand™ High Fidelity enzyme blend consisting of Taq DNA Polymerase and a polymerase with a proofreading activity for amplification of cDNA by PCR. Facilitating the cloning of rare messages without the need to construct cDNA libraries, the Titan™ One Tube RT-PCR System reduces the error rate in PCR through the proofreading capability.

- Sensitive, rapid and reproducible analysis of RNA
- Threefold higher fidelity in comparison to Taq DNA polymerase
- Exceptional sensitivity due to high enzyme efficiency

Two-Step

During two-step PCR, cDNA is created by reverse transcription and is then added to the PCR reaction. This highly sensitive technique is typically recommended for reactions in which maximum performance of reverse transcription and PCR is required, and relies on separate, optimized buffers for each step. Affording the possibility to store cDNA for later use, two-step PCR is often chosen for the study of multiple targets per sample.

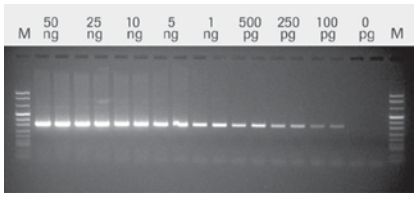


Figure 2: Detection of mouse β-actin mRNA by two-step RT-PCR on a conventional thermal cycler.

Transcriptor Reverse Transcriptase

Recommended for long targets (up to 14 kb), rare targets and GC-rich sequences, Transcriptor Reverse Transcriptase is also suitable for the preparation of labeled cDNA since it accepts a wide variety of modified nucleotides. Delivering high sensitivity in two-step RT-PCR, Transcriptor Reverse Transcriptase may be used in conventional thermal cyclers and real-time PCR instruments.

- Generate cDNA libraries with large inserts
- Operational at high temperatures (up to 65°C)
- Suitable for Cy3, Cy5, DIG, biotin, and aminoallyl labeling during cDNA synthesis

Reverse Transcriptase AMV

A gene product of the RNA genome of avian myeloblastosis virus, the mature form of Reverse Transcriptase AMV includes an RNA-directed DNA polymerase, a DNA-dependent DNA polymerase, an RNase H, and an unwinding activity. The enzyme can be used for cDNA synthesis, synthesis of first strand cDNA for use in subsequent amplification reactions, dideoxy DNA sequencing, RNA sequencing, 3′ end labeling of DNA fragments, and the generation of ss probes for genomic footprints.

- Suitable for multiple applications
- For transcripts with difficult secondary structure
- Functionally tested for cDNA synthesis and RT-PCR

Transcriptor Universal cDNA Master

Containing a unique enzyme with a broad temperature range making it suitable for high temperature reverse transcription, the Transcriptor Universal cDNA Master produces high specificity and sensitivity, even with complex RNA templates. With all the necessary reagents for two-step PCR supplied in just two vials to minimize pipetting, the Transcriptor Universal cDNA Master can be combined with the RealTime™ ready Cell Lysis Kit for direct use with cell lysates.

- Effortless setup simply requires the addition of RNA
- Compatible with incubation temperatures up to 65°C
- Suitable for target amounts as low as 0.1 pg total RNA

First Strand cDNA Synthesis Kit for RT-PCR (AMV)

Suitable for use with sequence-specific primers, poly(dT)15 primers or random primers, the First Strand cDNA Synthesis Kit is used to generate first strand cDNA as the starting reaction for two-step RT PCR. The high thermostability of the avian myeloblastis virus (AMV) reverse transcriptase enzyme allows the reaction to be performed at 42°C, giving higher specificity and superior resolution of secondary structures.

- Thermostable enzyme affords enhanced resolution of secondary structures
- Compatible with a sequence-specific primers, poly(dT)15 primers, or random primers
- Can be used in combination with PCR for detection of presence or absence of RNA viruses

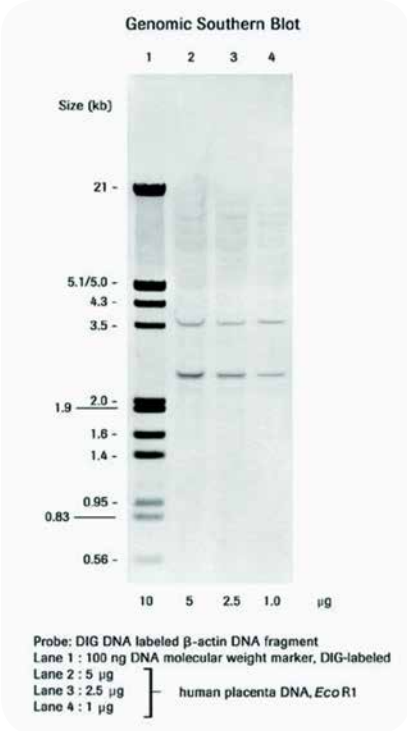
Cat. No.	Description
TOSRTRO	Transcriptor One-Step RT-PCR Kit
11855476001	Titan™ One-Tube RT-PCR System
TRANSRTRO	Transcriptor Reverse Transcriptase
10109118001	Reverse Transcriptase AMV
05893151001	Transcriptor Universal cDNA Master
11483188001	First Strand cDNA Synthesis Kit for RT-PCR (AMV)

DIG-Labeling

Providing an environmentally friendly and safer alternative compared to radioactive materials, the DIG System is the non-radioactive technology of choice to label and detect nucleic acids. Based on the steroid digoxigenin (DIG), DIG-labeled probes afford high sensitivity and low background across multiple applications. Furthermore, since DIG antibodies do not bind other substrates, DIG offers exceptional specificity.

There are two main objectives of the DIG system. Both methods require labeling of the desired DNA and RNA probes first.

- Membrane hybridization: using membrane or blots to detect DNA or RNA.
- *In Situ* hybridization: performing *in situ* localization



Detection of a single-copy gene (B-actin) in total human DNA using the standard protocol.

DIG DNA Labeling by PCR

For both membrane and *in situ* hybridization, PCR is a useful labeling method. DIG-labeled probes are ideal for PCR applications in which the template is available in only limited amounts, is partially purified, or is very short. The PCR DIG Probe Synthesis Kit contains an alkali-labile DIG-11-dUTP formation, enabling simple removal of the DIG label following chemiluminescent detection and subsequent re-hybridization of blots with multiple DIG-labeled probes.

DIG Random Primed DNA Labeling

During random primed DNA labeling, the DNA template is copied in the presence of hexameric primers and alkali-labile DIG-11-dUTP. Suitable for labeling templates of almost any length, this technique is especially suitable for single copy gene detection on genomic Southern blots and in screens of recombinant libraries.

Nick Translational Labeling

Nick translation is commonly used to label probes for *in situ* hybridization. Based on the ability of DNase I to introduce randomly distributed nicks into DNA, which are subsequently used as primers for DNA synthesis by DNA polymerase I, nick translation can be employed to incorporate DIG-11-dUTP into newly synthesized DNA. The method of choice for *in situ* hybridization, nick translation produces highly sensitive targets for indirect (immunological) detection.

Transcriptional Labeling of RNA Probes

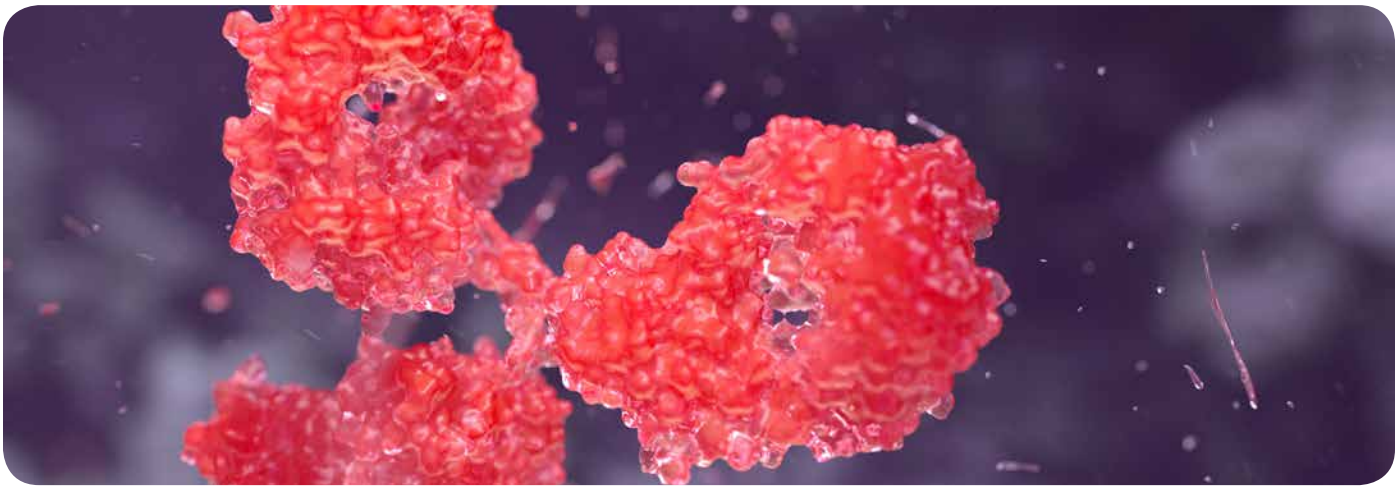
For some applications, DIG-labeled RNA is a more effective hybridization probe than DIG-labeled DNA. One example is its utility to detect rare mRNAs within nanogram amounts of total RNA. In vitro transcription from a DNA template facilitates the production of large quantities of full-length DIG-labeled RNA copies.

DIG Oligonucleotide Labeling

DIG-labeled synthetic oligonucleotides are excellent hybridization probes for *in situ* hybridization, dot/slot blots, library screening, and the detection of repeated gene sequences on Southern blots. Several methods are available for DIG-labeling of oligonucleotides, including 5´ end-labeling with DIG-NHS-Ester, 3´ end-labeling with DIG-ddUTP and the addition of a 3´ tail consisting of DIG-dUTP and dATP.

Cat. No.	Description
11636090910	PCR DIG Probe Synthesis Kit
11277073910	DIG RNA Labeling Mix
11175025910	DIG RNA Labeling Kit (SP6/T7)
11745832910	DIG-High Prime DNA Labeling and Detection Starter Kit I
11585614910	DIG-High Prime DNA Labeling and Detection Starter Kit II
11603558001	DIG Easy Hyb™
11585762001	DIG Wash and Block Buffer Set

Proteomics



Protein Stabilization

To maintain the structure and integrity of a protein, it is essential to prevent degradation or aggregation. This can be achieved through the addition of protease and phosphatase inhibitors to buffers and solutions. Widely cited, cOmplete™ and PhosSTOP™ protease and phosphatase inhibitors from Roche are easy-to-use, flexible tablet-based formulations which inhibit a wide range of proteases and phosphatases respectively.

cOmplete™ Protease Inhibitor Cocktail

Each of these convenient water-soluble tablets contains a broad blend of metalloproteases, serine, and cysteine protease inhibitors to ensure the protection of proteins isolated from almost any tissue or cell. This includes material derived from animals, plants, yeast, bacteria and fungi. Provided as a formulation containing EDTA, as well as EDTA-free tablets to leave the stability and function of metal-dependent proteins unaffected, cOmplete™ Protease Inhibitor Cocktails require no weighing or measuring and dissolve rapidly in solution.

- Easy to use
- Protection against a broad range of proteases
- Suitable for extracts derived from almost any tissue or cell

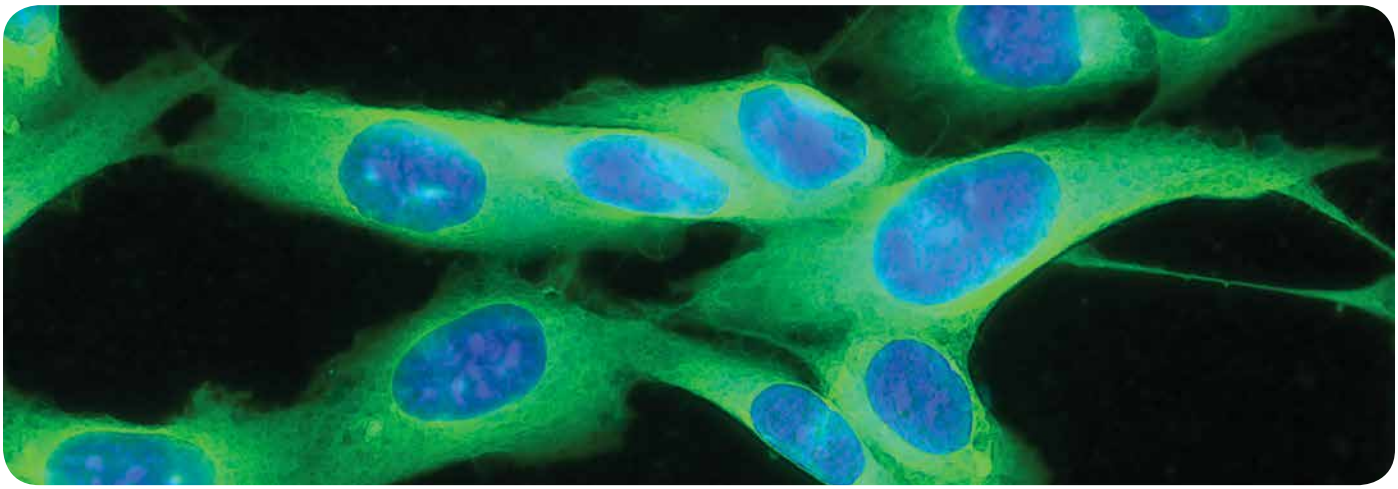
PhosSTOP™ Phosphatase Inhibitor Cocktail

Provided as a quick-dissolving, water-soluble formulation, PhosSTOP™ Phosphatase Inhibitor Cocktail tablets contain a proprietary blend of acid and alkaline phosphatase inhibitors, serine/threonine phosphatase inhibitors and tyrosine protein phosphatase inhibitors. Effective across a wide range of sample materials, including tissues and cells of mammalian, plant, yeast or bacterial origin, PhosSTOP™ Phosphatase Inhibitor Cocktail tablets can be easily combined with cOmplete™ Protease Inhibitor Cocktail for comprehensive protein protection.

- Easy to use
- Protection against a broad range of phosphatases
- Easily combined with cOmplete™ Protease Inhibitor Cocktail

Cat. No.	Description
CO-RO	cOmplete™ Protease Inhibitor Cocktail
PHOSS-RO	PhosSTOP™ Phosphatase Inhibitor Cocktail

Cellular Analysis



Transfection

Involving the introduction of DNA or RNA into eukaryotic cells, transfection is a widely used technique for the study and modulation of gene expression. During stable transfection, the genetic material is incorporated into the genome of the recipient; whereas, during transient transfection expression of this material is relatively short-lived. Various transfection methods have been developed, including physical, chemical and biological techniques.

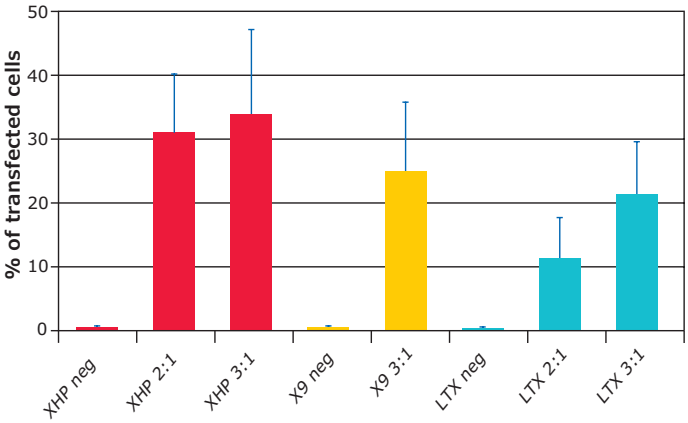
X-tremeGENE™ Transfection Reagents

Created to afford high transfection efficiency, ease-of-use and reproducibility, X-tremeGENE™ Transfection Reagents provide more viable cells and more physiologically relevant results. Including products optimized for use with established cell lines, primary cells, stem cells and insect cell lines, as well as X-tremeGENE™ siRNA Transfection Reagent to knock down gene expression in many different cell types, the X-tremeGENE™ product range demonstrates activity in the presence of serum to avoid the need for media changes.

- Quick and easy to use
- Low cytotoxicity
- Minimal optimization required

X-tremeGENE™ Transfection Reagents Performance Comparison

A.



B.

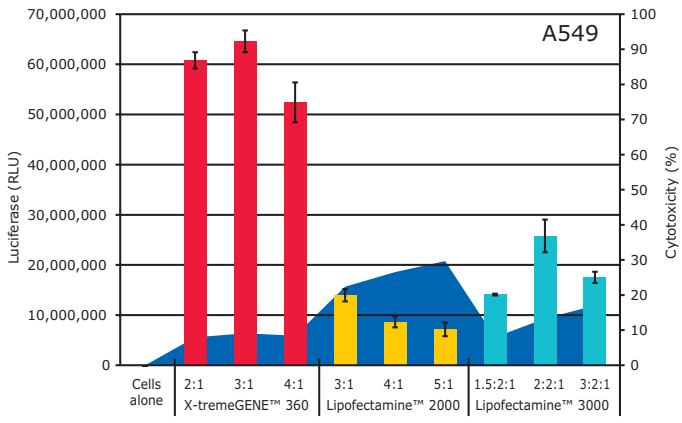


Figure 3: X-tremeGENE™ Transfection Reagents Performance.

(A) X-tremeGENE™ HP (XHP) and X-tremeGENE™ 9 (X9) transfection efficiency compared to LTX (µL reagent : µg plasmid DNA ratios).

(B) A549 cells were transfected with luciferase encoding plasmid DNA using either X-tremeGENE™ 360 (XTG360), Lipofectamine® 2000 (Thermo Fisher Scientific) or Lipofectamine® 3000 (Thermo Fisher Scientific) at indicated reagent-to-DNA ratios or reagent-to-P3000™-to-DNA ratio. Higher transgene expression (luciferase) and lower cytotoxicity was observed in cells transfected with XTG360 at optimal ratios compared to cells transfected with Lipofectamine® 2000 or Lipofectamine® 3000.

X-tremeGENE™ 9 Transfection Reagent

Suitable for commonly used cell lines, the X-tremeGENE™ 9 transfection reagent provides maximal cellular viability post-transfection for physiologically relevant results.

- Transfection with low cytotoxicity
- Proprietary blend of lipids designed to reduce time-consuming transfection optimization
- Suitable for use with or without serum

X-tremeGENE™ HP Transfection Reagent

Providing reliable transfection results for hard-to-transfect cell lines, the X-tremeGENE™ HP transfection reagent is a multi-component reagent that is suitable for insect or animal cells.

- Free of animal-derived components
- Suitable for cancer and primary cell lines
- Low cytotoxicity facilitates generating physiologically relevant data

X-tremeGENE™ 360 Transfection Reagent

X-tremeGENE™ transfection reagents are characterized by their exceptional performance in delivering maximal transfection efficiencies while minimizing cytotoxicity. The X-tremeGENE™ 360 transfection reagent is optimized for use with common and hard-to-transfect cell lines and a variety of applications and molecules, including plasmid DNA, siRNA/miRNA, and Cas9/gRNA RNP. Simplify your molecular workflow and gain confidence with the X-tremeGENE™ 360 transfection reagent for your gene expression and genome editing application needs.

- Utilizes a next-generation synthetic polymer formulation to maximize transfection efficiency
- Provides reduced cytotoxicity compared to traditional cationic lipid transfection reagents
- Free of animal-derived components

Cat. No.	Description
XTG9-RO	X-tremeGENE™ 9 DNA Transfection Reagent
XTGHP-RO	X-tremeGENE™ HP DNA Transfection Reagent
SITRAN-RO	X-tremeGENE™ siRNA Transfection Reagent
XTG360-RO	X-tremeGENE™ 360 Transfection Reagent

For more information, visit
SigmaAldrich.com/xtremegene

Cell Isolation

While many techniques are used to generate data from heterogeneous cell populations, it is often more informative to separate and analyze individual cellular sub-types. By isolating specific cells and growing homogeneous populations in culture, it is possible to study unique cellular signaling pathways or differing developmental behaviors, and to detect genotypic or phenotypic features that may otherwise become overlooked.

Collagenase

Collagenase is widely used for the disaggregation of tissues and for generating single cell suspensions in order to establish primary cell cultures. Prepared from *Clostridium histolyticum* cultures by filtration, ammonium sulfate precipitation, dialysis, and lyophilization, collagenase products from Roche have been cited for the preparation of cell types which include hepatocytes, adipocytes, pancreatic islets, epithelial cells, muscle cells and endothelial cells.

- Specifically degrades native collagen
- Uninhibited by serum
- Convenient, lyophilized formulation

Liberase™ Research Grade Enzymes

Containing highly purified Collagenase I and Collagenase II, Liberase™ Research Grade enzymes offer significantly higher specific activities than traditional collagenases due to enhanced purity of the collagenase enzymes. The enzyme blend also offers the advantage of lower clostripain and trypsin activity as compared to traditional collagenase, in addition to reduced endotoxin content. Suitable for the dissociation of a broad range of tissue types, the high purity of Liberase™ Research Grade enzymes contributes to high cell yield and viability.

- Maximize viability and yield of isolated cells
- Highly pure enzymes afford superior specific activity
- Free of mammalian or avian tissue-derived raw materials

Cat. No.	Description
COLLD-RO	Collagenase D
COLLA-RO	Collagenase A
COLLP-RO	Collagenase P
COLLDISP-RO	Collagenase/Dispase
5401020001	Liberase™ TL Research Grade
LIBTH-RO	Liberase™ TH Research Grade
LIBTM-RO	Liberase™ TM Research Grade
LIBDL-RO	Liberase™ DL Research Grade
LIBDH-RO	Liberase™ DH Research Grade

Cell Function

While different cell types perform a vast range of diverse functions, proliferation and death are processes common to a large assortment of cell types. Measurement of these responses can be highly informative, for example providing an indication of cell health and viability or suggesting whether a potential drug candidate may be cytotoxic. The Roche biochemical reagents portfolio includes optimized ELISA kits for the measurement of cellular proliferation and cell death.

Cell Proliferation ELISA, BrdU (colorimetric)

A colorimetric immunoassay based on the measurement of BrdU incorporation during DNA synthesis, the Cell Proliferation ELISA is a precise, rapid and simple assay suitable for use in in many different *in vitro* cell systems. Specificity is assured through non-reactivity of the peroxidase-conjugated anti-BrdU antibody with endogenous cellular components such as thymidine, uridine or DNA.

- Second generation kit with colorimetric quantification of cell proliferation
- Identifies BrdU-labeled denatured DNA
- Increased safety with no use of radioactive [3H]-thymidine

Cell Death Detection ELISA^{PLUS}

A highly sensitive one-step ELISA kit, the Cell Death Detection ELISA^{PLUS} assay is based upon relative quantification of histone-complexed DNA fragments following their release from the cytoplasm of apoptotic or necrotic cells. Since pre-labeling of cells is not required, it is possible to detect apoptosis even within cells that do not proliferate *in vitro*, such as freshly isolated tumor cells. With no species restriction, the Cell Death Detection ELISA^{PLUS} affords low background and rapid performance.

- Rapid performance (3-4 hours)
- High sensitivity (5 x 102 cells/ml)
- Suitable to assay cell death in a wide range of species

In Situ Cell Death Detection Kit, Fluorescein

A complex cascade of events occur at the molecular level when a cell is undergoing cell death. Many technologies allow researchers to observe this event; however, they may not provide the sensitivity to identify individual cells or distinguish between apoptosis versus necrosis. *In Situ* Cell Death Detection Kit, Fluorescein, incorporates TdT-mediated dUTP-X nick end labeling (TUNEL) and allows detection of apoptotic cells at the single-cell level.

- Apoptosis detection by fluorescent microscopy and quantification by flow cytometry
- Suitable for use with frozen or formalin-fixed tissues
- Identifies DNA cleavage for both double-stranded and single-stranded breaks

Cat. No.	Description
11647229001	Cell Proliferation ELISA, BrdU (colorimetric)
11774425001	Cell Death Detection ELISA^{PLUS}
11684795910	*In Situ* Cell Death Detection Kit, Fluorescein

intelligently designed

with Reliable Performance

Progress in biotechnology and research are increasing in both speed and magnitude for each new scientific breakthrough. In order to advance your molecular biology research, it is critical to maximize the efficiency of your workflow in a multitude of areas including, genomics, proteomics, and cellular analyses. As a pioneer in genomics and PCR technology, Roche's complete suite of reagents and kits are optimized to reduce hands-on time at the bench, expedite data acquisition and the creation of key tools to test the most challenging of biological hypotheses. With a mutual drive for product quality and scientific excellence, our partnership allows us to bring Roche products to you so the answers are there when you need them, wherever your work takes you.

For more product information and to order online, please visit **SigmaAldrich.com/Roche**

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