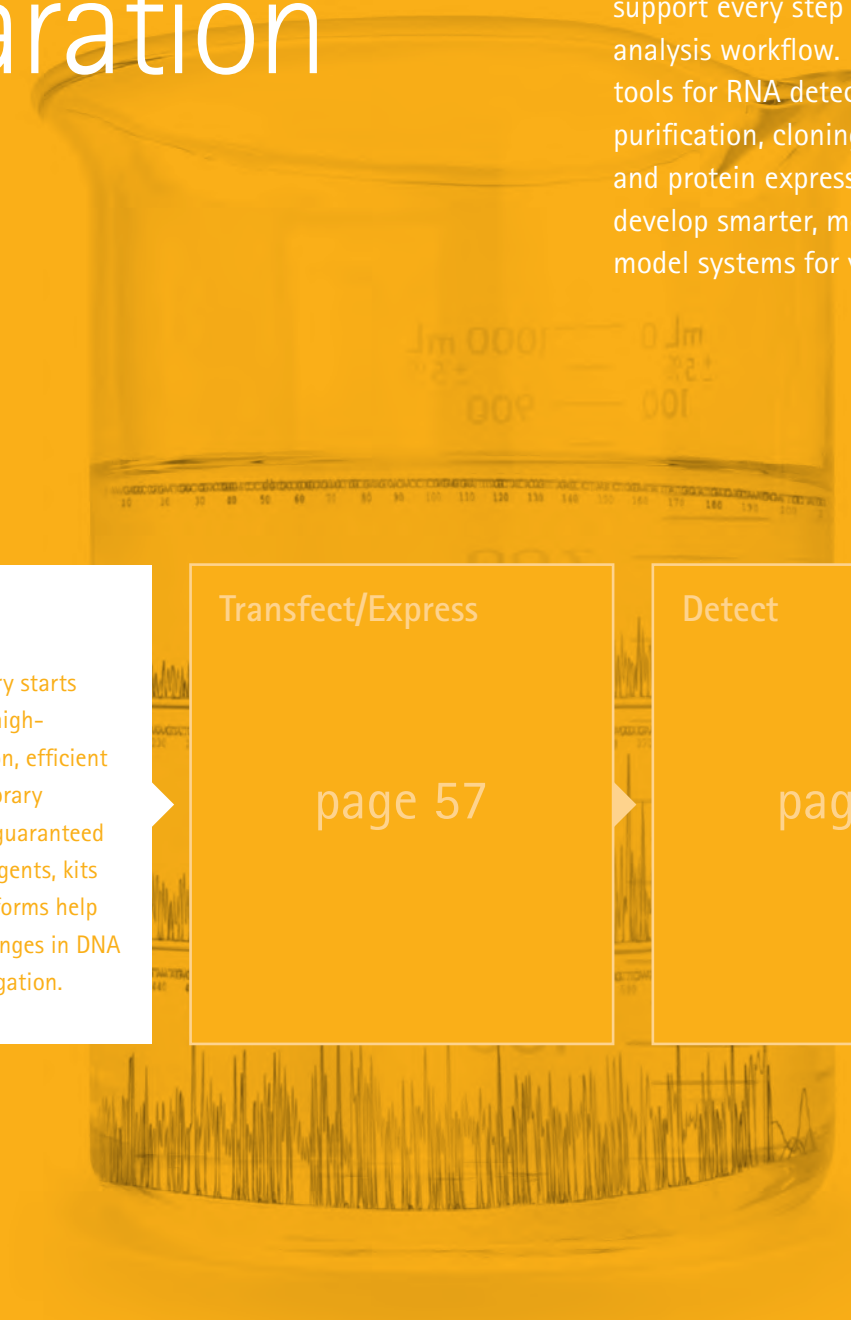
Genomic Sample Preparation

Whether you need to clone a gene, modify a DNA sequence, quantify intracellular DNA and RNA or express a recombinant protein, you need a complete set of genomic analysis tools that work together. Building on the molecular biology expertise of Novagen, Merck Millipore's products support every step of your genomic analysis workflow. Learn how our tools for RNA detection, PCR, DNA purification, cloning, transfection and protein expression can help you develop smarter, more predictive model systems for your research.



Prepare/Clone

Successful gene discovery starts with high-fidelity PCR, high-recovery DNA purification, efficient DNA propagation and library preparation. Our 100% guaranteed polymerases, quality reagents, kits and competent cell platforms help overcome specific challenges in DNA amplification and propagation.

Transfect/Express

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Detect

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Novagen® KOD Polymerase PCR Systems

Optimized for the most challenging samples or DNA templates

KOD DNA polymerase is an ultra high-fidelity, thermostable DNA polymerase that provides low mutation frequency, fast extension rate, and high processivity for higher yields of full-length product in fewer reaction cycles. The KOD polymerase systems provide best-in-class amplification for a wide array of crude samples and targets with up to 90% GC-rich sequences. Combined with their ability to amplify long PCR targets, KOD polymerase systems extend the limits of typical PCR reactions as compared to other PCR enzymes. Choose the appropriate KOD DNA polymerase system based on your application requirements.

Features & Benefits

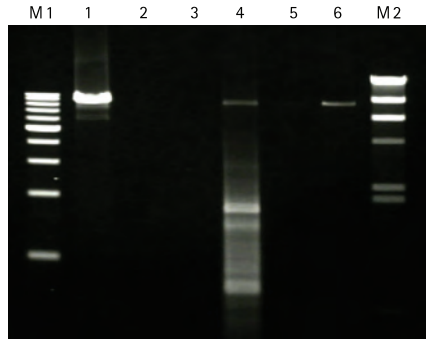
- High accuracy, yield, and processivity compared to most other proofreading DNA polymerases
- Optimized for complex crude samples with minimal sample processing
- Efficient amplification for up to 90% GC-rich templates
- Amplification of genomic targets up to 24 kb

Applications

PCR Amplification, Next-Gen Sequencing, Gene Expression Analysis

Product Performance

KOD Xtreme™ Hot Start DNA Polymerase amplifies GC-rich targets more efficiently than other polymerases. Six polymerases were used to amplify a 8.9 kb human IGF2R gene, containing ~90% GC content. Lane M1 and M2, markers; Lane 1, PCR using KOD Xtreme™ Hot Start DNA Polymerase; Lanes 2 to 6, competitor polymerase systems supplied with GC Buffers and tested using manufacturer protocols. Data contributed by Akio Sugiyama, Tsuruga Institute of Biotechnology.



Specifications

	KOD DNA Polymerase	KOD Hot Start DNA Polymerase	KOD XL DNA* Polymerase	KOD Xtreme™ Hot Start DNA Polymerase
PCR Product Size (kb)	<6	<21	<30	<40
Applications	Cloning, cDNA amplification	Cloning, cDNA amplification	Crude samples, multiplex, incorporation of derivatized dNTPs	Crude samples, long targets, difficult and GC-rich targets

*KOD-XL DNA polymerase amplification results in a mixture of blunt and 3'-dA products while other KOD DNA polymerases generate blunt end products.

Note: NovaTaq™ polymerase is also available for routine PCR.

Ordering Information

Description	Qty/Pk	Catalogue No.
KOD DNA Polymerase	250 U	71085-3
KOD Hot Start DNA Polymerase	20 U	71086-5
	200 U	71086-3
	1,000 U	71086-4
KOD Hot Start Master Mix	100 rxn	71842-3
	500 rxn	71842-4
KOD Xtreme™ Hot Start DNA Polymerase	200 U	71975-3
KOD XL DNA Polymerase	250 U	71087-3
	1,250 U	71087-4
NovaTaq™ DNA Polymerase	100 U	71003-3
	500 U	71003-4
	2,500 U	71003-5
NovaTaq™ Hot Start DNA Polymerase	250 U	71091-3
	1,250 U	71091-4

For more information visit: www.merckmillipore.com/kod

High recovery genomic DNA concentration using the new Microcon® PCR-grade centrifugal ultrafilter

Maximum recovery of pure intact genomic DNA from crude biological samples is the critical first step in any DNA analysis workflow. Typically, the process involves cell disruption, chemical or ion exchange-based extraction of the nucleic acid fraction and concentration of the purified DNA sample. While ethanol precipitation is commonly used for DNA concentration in research settings, an effective alternative is ultrafiltration via small spin columns such as the Microcon® DNA Fast Flow device. However, one concern in genetic testing is consumable product contamination with exogenous DNA during assembly and packaging. To minimize this potential, we have released the Microcon® DNA Fast Flow PCR Grade filter, which is ethylene oxide-treated to disrupt or fragment amplifiable DNA. Here, we show that it matches the original Microcon® filter in performance.

For Microcon® ordering information, please refer to page 100.

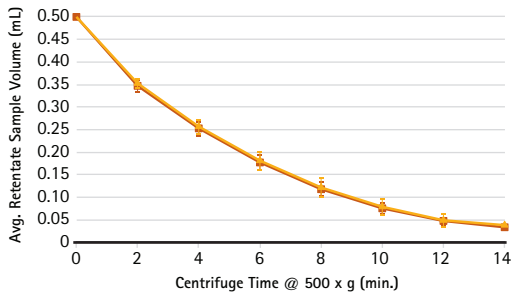


Figure 1. Equally fast ultrafiltration flow of Microcon® DNA Fast Flow (Orange) and Microcon® DNA Fast Flow PCR Grade (Yellow) devices as determined by measuring retentate volume at various time intervals and plotting retentate volume vs. centrifugation time. Each point represents the mean and standard deviation of four replicates.

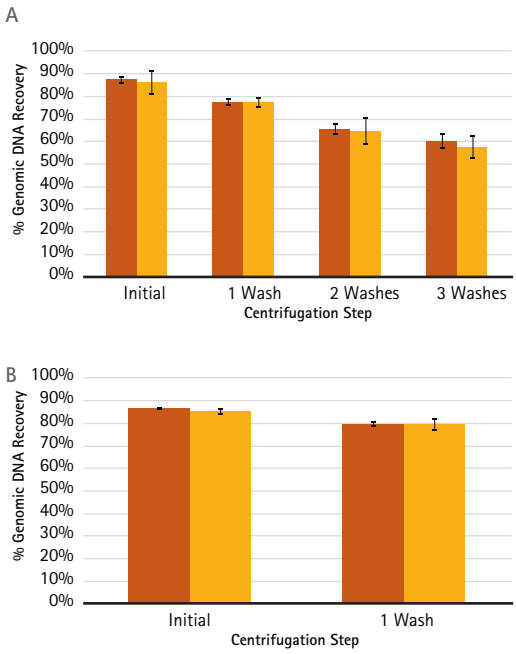


Figure 2. DNA recovery performance of Microcon® DNA Fast Flow (Orange) and Microcon® DNA Fast Flow PCR grade (Yellow) Microcon® devices as determined by comparison of retentate volume to starting material. Results show percent genomic DNA recovered with respect to centrifugation step. In each case, the starting material was either PCI-extracted DNA (A) or DNA in TE Buffer (B). For PCI samples, three successive wash steps were performed. Each bar represents the mean and standard deviation of four replicates.

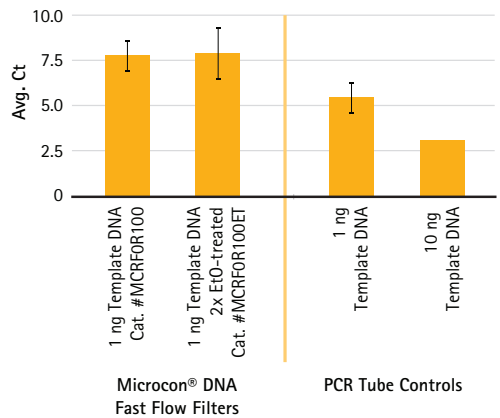


Figure 3. No inhibition of qPCR reactions. 1159 bp DNA qPCR average threshold cycle (Ct) results for Microcon® DNA Fast Flow and Microcon® DNA Fast Flow PCR Grade devices using pLH2 template DNA (1 ng). The qPCR results for the unprocessed PCR Tube Control 1159bp results (1 ng and 10 ng) are also shown. Each bar represents the mean and standard deviation of four replicates.

PCR Cleanup Filter Plates

Remove primers and unincorporated dNTPs in one step

Our PCR filter plates are fast, automatable solutions for high-throughput PCR purification. Available in 96- and 384-well formats and a µ96-well format for small volumes, MultiScreen® PCR plates use a size-exclusion membrane and vacuum filtration to provide a one-step protocol with excellent results. No centrifugation or precipitation is required. Full sample recovery from the top of the plate enhances compatibility with liquid handling systems. MultiScreen® $PCR_{µ96}$ and MultiScreen®PCR_{384} filter plates provide high recovery on even the smallest miniaturized reactions. Working volumes <150 µL conserve reagents and save money. For volumes >150 µL, use MultiScreen®PCR_{96} 96-well filter plate.

Features & Benefits

- High purity and high recovery
- No centrifugation or precipitation
- Fast processing times, automation compatible
- MultiScreen® $PCR_{µ96}$ filter plate recommended for small fragments (1-150 bp)

Applications

PCR Cleanup, Sequencing, Genotyping, Microarray, RNAi Purification, Microarray Purification, Genomic DNA Concentration

Specifications

Product name	Reaction volume	Number of samples	Mode of operation	Recommended applications	Features
MultiScreen® $PCR_{µ96}$ Filter Plate	20–150 µL	96	Vacuum	Sequencing Genotyping Microarray	• Highly concentrated final sample • Reaction miniaturization
MultiScreen® PCR_{96} Filter Plate	150–300 µL	96	Vacuum	Microarray	• Volumetric capacity
MultiScreen® PCR_{384} Filter Plate	20–100 µL	384	Vacuum	Sequencing Genotyping Microarray	• Highly concentrated final sample • Reaction miniaturization • Ultra-high throughput

Product name	Recovery of 137 bp PCR fragment*	Recovery of 301 bp PCR fragment*	Recovery of 657 bp PCR fragment*	Recovery of 1159 bp PCR fragment*	% Primer removal (20 bases), 100 µL volume
MultiScreen® $PCR_{µ96}$ Filter Plate	+	++	++	++	99.8%
MultiScreen® PCR_{96} Filter Plate	--	+	++	++	98.7%
MultiScreen® PCR_{384} Filter Plate	+	++	++	++	99.5%
-- Not Recommended					
+ Good Recovery					
++ Best Recovery					

*Results will vary based on starting concentration, load, and buffers used. Data obtained using the following concentrations:
137 bp: 10 ng/µL
301 bp: 30 ng/µL
657 bp: 55 ng/µL
1159 bp: 71 ng/µL

Ordering Information

Description	Reaction Volume (µL)	Qty/Pk	Catalogue No.
Filter Plates			
MultiScreen® $PCR_{\mu 96}$ Filter Plate	20–150	10	LSKMPCR10
	20–150	50	LSKMPCR50
MultiScreen® PCR_{96} Filter Plate	150–300	10	MSNU03010
	150–300	50	MSNU03050
MultiScreen® PCR_{384} Filter Plate	20–100	10	S384PCR10
	20–100	50	S384PCR50
Required Equiment			
MultiScreen®$_{HTS}$ Vacuum Manifold	1	1	MSVMHTS00
MultiScreen®$_{384}$ Vacuum Manifold	1	1	SAVM38401
Chemical Duty Pump, 115 V/60 Hz	1	1	WP6111560
Chemical Duty Pump, 220 V/50 Hz	1	1	WP6122050
Chemical Duty Pump, 100 V/50–60 Hz	1	1	WP6110060

For more information visit: www.merckmillipore.com/PCR

Novagen® Competent Cells for Bacterial Protein Expression

Optimized for high yields of full-length, soluble protein

When expressing recombinant proteins in *E. coli*, you need to obtain high yields of full-length, soluble protein. Our bacterial strains for protein expression include the best all-purpose strains and specialty strains for difficult-to-express proteins, all backed by unwavering technical support to ensure success. For ultimate convenience and reliability, Singles™ Competent Cells are provided in 50 µL volumes to eliminate the need to aliquot, freeze/thaw, or waste partially used vials. This saves time and money, minimizes contamination and ensures reliable cell performance.

Features & Benefits

- High yields of full-length, soluble protein
- Easy-to-use Singles™ format for greater convenience
- Selection of cell strains optimized for specific applications

Applications

Bacterial Protein Expression

Application Guide

Expression Strains	Feature	Target Application
DE3 Hosts	Lysogens of bacteriophage λDE3 that express T7 RNA polymerase	Protein induction from T7 expression vectors
(DE3) pLysS Hosts	Express T7 RNA polymerase and also encode T7 lysozyme that suppresses basal expression of toxic target proteins prior to induction	No protein/cell death due to toxic target protein
BL21 Strains	Deficient in *Lon* and *OmpT* proteases that minimize protein degradation	General protein expression
Origami™ 2 and Rosetta-gami™ Strains	*TrxB/gor*$^-$ hosts that minimize protein reduction in cytoplasm	Insoluble protein/no activity
Tuner™ and Rosetta-gami™ B Strains	*LacY*$^-$ hosts that attenuate expression/titrate IPTG and minimize protein misfolding	Insoluble protein/no activity
Rosetta and Rosetta-gami™ Strains	Supply rare tRNAs for improved full-length protein expression	Truncated protein
HMS174 and NovaBlue Strains	*RecA*$^-$ hosts BLR(DE3) that minimize plasmid recombination	Stabilizing target plasmids
B834 Strain	A methionine auxotroph ideal for protein labeling applications	Protein labeling

Ordering Information

Description	Transformation Efficiency	Reaction Size	Qty/Pk	Catalogue No.
Select Competent Cells for Bacterial Protein Expression				
BL21(DE3) Singles™ Competent Cells	>2 x 10^7 cfu/µg	50 µL	11 rxn	70235-3
			22 rxn	70235-4
BL21(DE3) pLysS Singles™ Competent Cells	>2 x 10^7 cfu/µg	50 µL	11 rxn	70236-3
			22 rxn	70236-4
Origami 2(DE3) Singles™ Competent Cells	>2 x 10^6 cfu/µg	50 µL	11 rxn	71408-3
			22 rxn	71408-4
Rosetta 2(DE3) Singles™ Competent Cells	>2 x 10^6 cfu/µg	50 µL	11 rxn	71400-3
			22 rxn	71400-4
Rosetta 2(DE3) pLysS Singles™ Competent Cells	>2 x 10^6 cfu/µg	50 µL	11 rxn	71401-3
			22 rxn	71401-4
HMS174(DE3) Competent Cells	>5 x 10^6 cfu/µg	20 µL	0.4 mL	69453-3
			1 mL	69453-4
Select Competent Cells for Cloning				
NovaBlue Singles™ Competent Cells	>1.5 x 10^8 cfu/µg	50 µL	11 rxn	70181-3
			22 rxn	70181-4
NovaBlue GigaSingles™ Competent Cells	>1.0 x 10^9 cfu/µg	50 µL	11 rxn	71227-3
			22 rxn	71227-4
HT96™ NovaBlue Competent Cells	>1.0 x 10^8 cfu/µg	96 x 20 µL	1 plate	71011-3
			4 plates	71011-4
NovaBlue(DE3) Competent Cells	>1.5 x 10^8 cfu/µg	20 µL	0.4 mL	69284-3
			1 mL	69284-4

For more information visit: www.merckmillipore.com/compcells

96-Well Plasmid and BAC Preparation Kit

Simply clear, concentrate, wash, and recover

The Montage® Plasmid Miniprep$_{96}$ Kit is a fast, easy-to-use kit for high-purity plasmid or bacterial artificial chromosome (BAC) minipreps. This simple protocol eliminates lengthy bind/elute methods and centrifugation steps to yield clean and reproducible DNA in 50% less time than traditional methods. Purified PCR samples are suitable for the most sensitive downstream applications including cloning, DNA sequencing, and transformation. BAC applications include sequencing, fingerprinting, arraying, and PCR amplification. The kit includes all the reagents and disposable materials you need to purify plasmid or BAC DNA in a 96-well format.

Features & Benefits

- Three short filtration steps: No centrifugation or precipitation steps required
- Minimum processing time
- Excellent purity, yields and reproducibility
- Automation compatible

Applications

Lysate Clearing, Plasmid Miniprep, BAC Miniprep, Cloning, Sequencing, Transformation

Ordering Information

Description	Components	Qty/Pk	Catalogue No.
Plasmid Miniprep Kits and Filter Plates			
Montage® Plasmid Miniprep$_{96}$ Kit	Includes 96-well filter plates and reagents	4	LSKP09604
		24	LSKP09624
MultiScreen®$_{HTS}$ Plasmid Plate	Does not include reagents	50	MSNUPSD50
MultiScreen®$_{HTS}$ Clearing Plate	Does not include reagents	10	MSNANLY10
		50	MSNANLY50
Accessories			
Stericup®-GV Filter, 0.22 µm, PVDF, 150 mL, radio-sterilized		12	SCGVU01RE
Adhesive Tape Covers		100	LSKAST100
Required Equiment			
MultiScreen®$_{HTS}$ vacuum manifold		1	MSVMHTS00
V-bottom plates		100	LSKVBP100
Chemical Duty Pump, 115 V/60 Hz		1	WP6111560
Chemical Duty Pump, 220 V/50 Hz		1	WP6122050
Chemical Duty Pump, 100 V/50–60 Hz		1	WP6110060
Reagents			
Cell Resuspension Solution, 0.5 L		1 bottle	LSKCRS500
Cell Lysis Solution, 0.5 L		1 bottle	LSKCLS500
Neutralization Solution, 0.5 L		1 bottle	LSKNS0500
Nuclease-free Water, 0.5 L		1 bottle	LSKNF0500
Tris Buffer, 0.5 L		1 bottle	LSKCTB500
RNase A, 0.9 mL		1 bottle	LSKPMRN30

Novagen® PureGenome™ High Efficiency NGS Library Preparation Reagents

Less bias. Less time. More matched reads.

Prepare Next Generation Sequencing (NGS) libraries with less hands-on time with the PureGenome™ High Efficiency NGS Library Preparation System. The easy, two-step library preparation procedure is followed by library amplification using our ultra-high fidelity KOD Hot Start DNA Polymerase Master Mix. This unique polymerase amplifies DNA with high processivity in highly TA- or GC-rich regions.

The combined efficiency of library construction and accuracy of amplification enables maximum library yields from lower input DNA, with minimal bias for better results.

- Requires less than 1 µg DNA input
- Offers high ligation efficiency
- Supports multiple platforms
- No GC bias in coverage depth

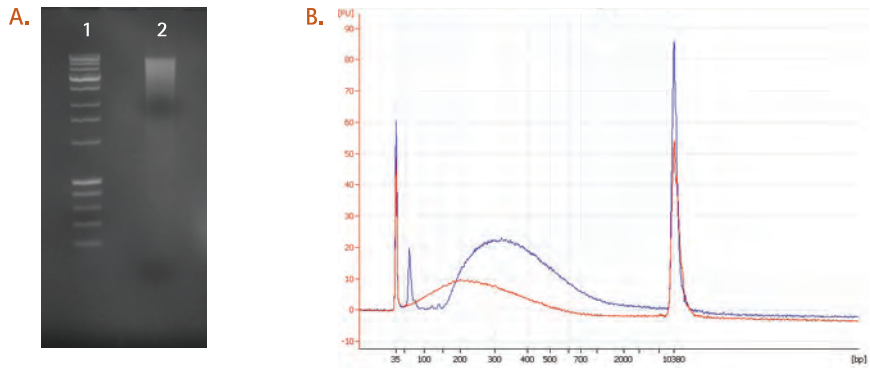
Features & Benefits

- Easy-to-use, less hands-on time with 2-step workflow

Applications

Next Generation Sequencing, Nucleic Acid Sample Prep

Product Performance



Generate pure genomic DNA, ready for shearing and library prep. A. Sixteen micrograms of genomic DNA was purified from 25 mg of mouse heart tissue using the PureGenome™ Tissue DNA Extraction Kit. Lane 1: 0.1-12 kbp DNA ladder; lane 2: genomic DNA. A260/A280 ratio was 1.8. B. DNA shown in (A) was used to generate an Illumina® sequencer-compatible NGS library; DNA was first sheared to an average size of 200 bp (red trace). Two µg of the sheared DNA was used to generate the NGS library using PureGenome™ NGS library preparation reagents (blue trace).

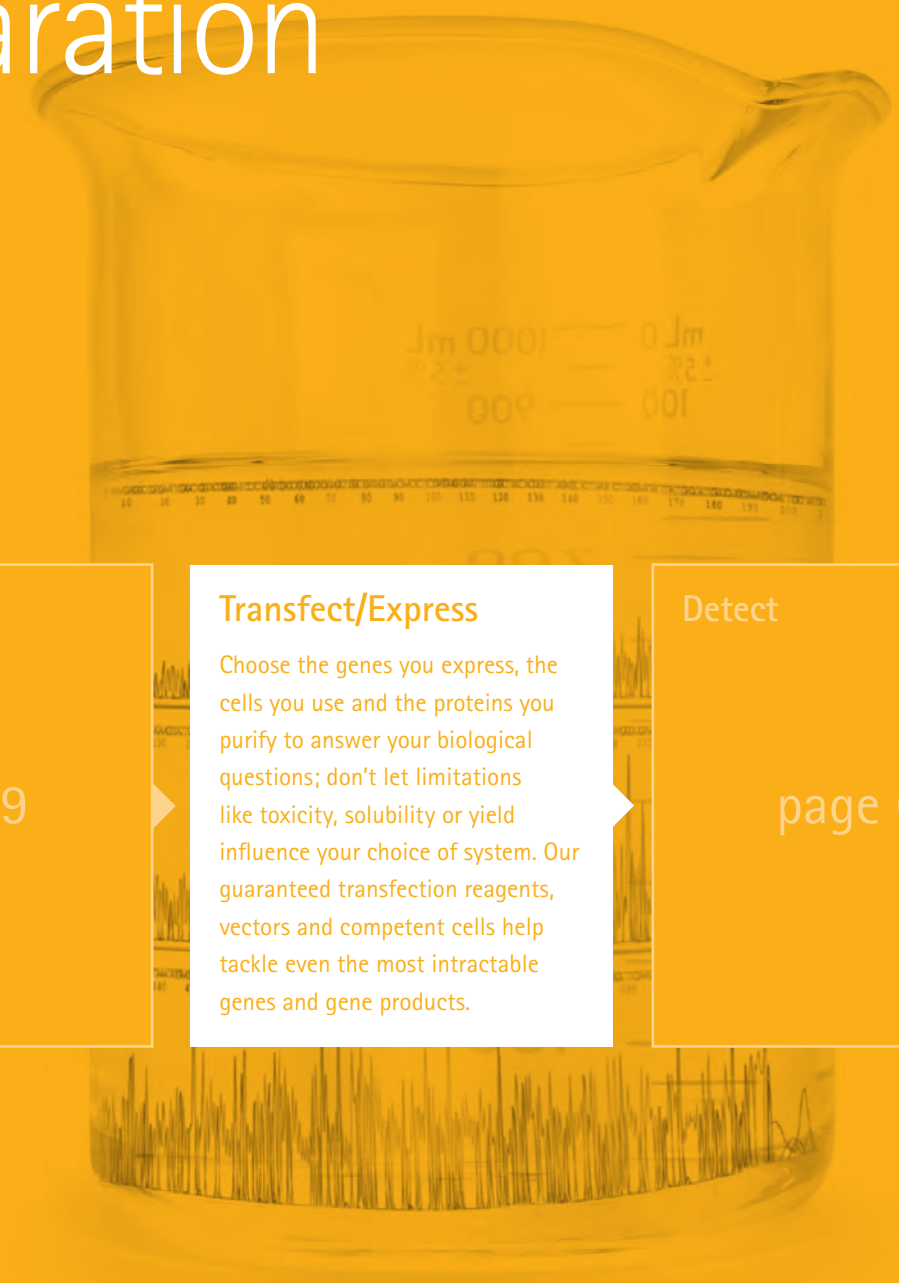
Ordering Information

Description	Components	Qty/Pk	Catalogue No.
Genomic DNA Extraction			
PureGenome™ Tissue DNA Extraction Kit	PureGenome™ Kits contain optimized Proteinase K for tissue lysis, buffers, SpinPrep™ Columns and Collection Tubes.	50 preps	72635-1KIT
PureGenome™ On-Spot Tissue DNA Kit	PureGenome™ Kits contain optimized Proteinase K for tissue lysis, buffers, SpinPrep™ Columns and Collection Tubes.	50 preps	72636-1KIT
PureGenome™ On-Spot Solution is provided for selecting targeted section areas prior to Proteinase K digestion and purification.			
Library Preparation			
PureGenome™ NGS Library DNA Modifier	Blunt-ending, A-tailing components & ligation	50 preps	PGN001-1EA
PureGenome™ NGS Library A-Tail Enhancer	PureGenome™ NovaTaq Polymerase for A-tailing	50 preps	PGN002-1EA
PureGenome™ NGS Library Amplifier	KOD Hot Start DNA Polymerase Mastermix for library enrichment/ amplification	50 preps	PGN003-1EA
The PureGenome™ reagents sets are validated together and uniquely lot-controlled to ensure high quality library preparation. Merck Millipore does not recommend purchasing individual reagent boxes.			
Library Validation			
PureGenome™ Next Generation Sequencing Library Validator Kit*	Kit components include (3) PureGenome™ NGS DNA Controls and PureGenome™ Validator Primer Mix.	1 kit (200 reactions)	PGN004-1EA

*Kit was optimized using SABiosciences SYBR® qPCR mastermix

For more information visit: www.merckmillipore.com/mobio

Genomic Sample Preparation



Prepare/Clone

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Transfect/Express

Choose the genes you express, the cells you use and the proteins you purify to answer your biological questions; don't let limitations like toxicity, solubility or yield influence your choice of system. Our guaranteed transfection reagents, vectors and competent cells help tackle even the most intractable genes and gene products.

Detect

page 61

Novagen® GeneJuice® Transfection Reagent

High-efficiency transfection for a wide variety of cells

GeneJuice® Transfection Reagent is optimized for maximal transfection efficiency, ease of use, and minimal cytotoxicity for successful gene expression. This transfection reagent is a superior alternative to a wide variety of other techniques including lipofection, calcium phosphate coprecipitation, electroporation, microinjection, biolistic particle delivery, and complex formation with DEAE-dextran.

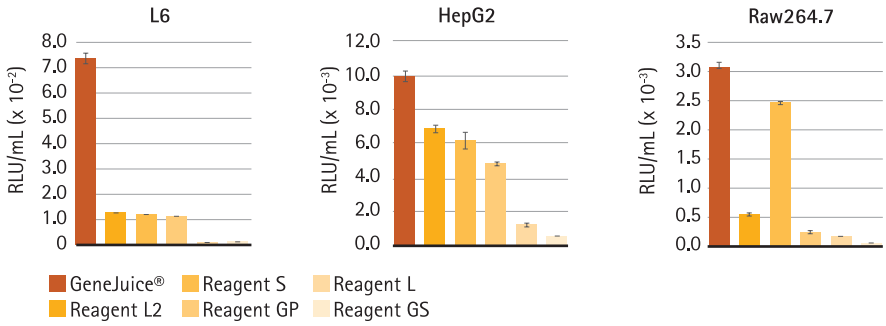
Features & Benefits

- Highly efficient DNA transfer for both stable and transient transfections
- Minimal cellular toxicity
- Compatible with both serum-containing and serum-free media
- Simplified protocol for a wide variety of cell types and applications

Applications

Stable and Transient Mammalian Transfection, Mammalian Protein Expression

Product Performance



GeneJuice® Transfection Reagent provides higher transfection efficiency than commonly used competitor reagents. Cell lines were plated at 3 × 10^4 cells per well in 24-well plates the day prior to gene delivery. Transfections and media changes were performed according to the manufacturers' optimized protocols. For transfection, 0.5 µg of low endotoxin purified pTriEx™-4 Fluc plasmid DNA was complexed with the relevant reagent and introduced into each well. After 48 h, cells were extracted with Reportasol™ Extraction Buffer and Fluc activity was assayed. Data are represented as relative light units per milliliter of extract (RLU/mL). All values reflect an average of four replicate cultures with standard errors.

Ordering Information

Description	Applications	Qty/Pk	Catalogue No.
GeneJuice® Transfection Reagent	The standard for transfection in most cell lines in serum-containing or serum-free media.	0.3 mL	70967-5
		1 mL*	70967-3
		5 x 1 mL	70967-6
		10 x 1 mL	70967-4
*The 1 mL size provides enough reagent to perform up to 500 transfections in standard 35 mm plates. GeneJuice®Transfection Reagent is supplied as a ready-to-use sterile solution.			
Other Transfection Reagents			
NovaCHOice® Transfection Kit	Efficient, scalable protein expression in suspension CHO lines.	1 mL	72622-3
		10 mL	72622-4
293-Free™ Transfection Reagent	Maximal output from HEK293 suspension cultures.	1 mL	72181-3
		5 x 1 mL	72181-4
		10 x 1 mL	72181-5
NanoJuice® Transfection Kit	Overcome the most difficult-to-transfect mammalian cells (e.g. primary cell lines).	240 rxn	71902-3
		2400 rxn	71902-4
Insect GeneJuice® Transfection Reagent	Optimized for insect cells.	0.3 mL	71259-3
		1 mL	71259-4
		10 x 1 mL	71259-5
RiboJuice™ siRNA Transfection Reagent	Effective delivery of siRNA for targeted gene silencing in most cell lines.	0.3 mL	71115-3
		1 mL	71115-4
ProteoJuice™ Transfection Reagent	Delivery of even the most complex proteins into most cells.	0.125 mL	71281-3
		4 x 0.125 mL	71281-4

For more information visit: www.merckmillipore.com/transfection

Novagen® Overnight Express™ Autoinduction Systems

Bacterial expression without monitoring or manual IPTG induction

Increase bacterial protein expression without having to monitor culture density. The Overnight Express™ Autoinduction Systems enable regulated protein expression in *E. coli*, without monitoring the culture or adding IPTG inducer during cell growth. The simplified protocol offers greater convenience, allowing you to focus on your research while it does its job.

Features & Benefits

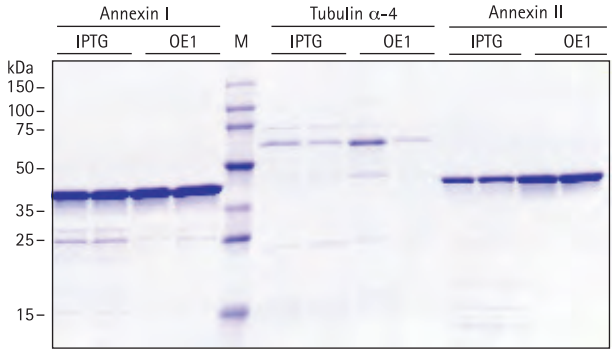
- Effortless protein expression in *E. coli* without the need for monitoring or induction
- Convenient for routine expression of proteins in multiple cultures or for high-throughput parallel analysis
- High cell densities and protein expression levels

Applications

Bacterial Protein Expression

Product Performance

Better yields, better nights' sleep with Overnight Express™ autoinduction. pET recombinants encoding the indicated His•Tag® fusion proteins were transformed into BL21(DE3) cells. For Overnight Express™ System 1 induction, 5 mL medium was inoculated with a single colony and incubated overnight (~16 h) at 30 °C with shaking. For IPTG induction, 5 mL medium was inoculated with a single colony and incubated at 16 °C with shaking to an average OD_{600} of 1.0. IPTG was added to 1 mM final concentration and incubated an additional 16 h. Proteins were purified and then analyzed by SDS-PAGE and Coomassie® blue staining.



Lanes	Sample volume
Annexin I	4 µL
Tubulin α-4	4 µL
Annexin II	IPTG, 8 µL; OE1, 4.5 µL

Lanes	Sample
IPTG	IPTG induction
OE1	Overnight Express™ Autoinduction System 1
M	Perfect Protein™ Markers, 15-150 kDa

Ordering information

Description	Application Information	Qty/Pk	Catalogue No.
Overnight Express™ Instant LB Medium	Complete autoinduction medium in granulated Luria-Bertani formulation.	1 EasyPak*	71757-3
		5 EasyPak*	71757-4
		1 kg	71757-5
Overnight Express™ Instant TB Medium	Complete autoinduction medium in granulated Terrific Broth formulation.	1 EasyPak*	71491-3
		5 EasyPak*	71491-4
		1 kg	71491-5
Overnight Express™ Autoinduction System 1	Autoinduction medium to be added to glucose-free medium (e.g., 2X YT, SOC, LB and TB).	1 L kit	71300-3
		5 L kit	71300-4
Overnight Express™ Autoinduction System 2	Compatible with selenomethionyl (Se-Met) labeling of proteins.	1 L kit	71366-3
		5 L kit	71366-4
Overnight Express™ NMR Medium - Optimization	Determine optimal culture conditions for high-level protein expression before isotopic protein labeling. It can also be used for ^{15}N protein labeling when user provides ^{15}N-ammonium chloride.	1 L kit	71760-3
Overnight Express™ NMR Medium - ^{15}N	High level incorporation of ^{15}N for initial NMR analysis to assess suitability for structure determination.	1 L kit	71759-3
		5 L kit	71759-4
Overnight Express™ NMR Medium - ^{15}N, ^{13}C	High level incorporation of ^{15}N and ^{13}C for backbone and side-chain assignments and for restraint measurements in structure determination.	1 L kit	71789-3

*EasyPak includes 45 g of media.

For more information visit: www.merckmillipore.com/OvernightExpress

UCOE® Mammalian Gene Expression Technology

Rapid, high-yield protein production in mammalian cells

Achieve dramatically improved gene expression in stably transfected mammalian cells by manipulating chromatin structure. Ubiquitous Chromatin Opening Element (UCOE®) technology prevents transgene silencing and gives consistent, stable and high gene expression, irrespective of the chromosomal integration site. UCOE® technology expression elements are small DNA elements (isolated from around house-keeping genes, which need to be active most of the time) that create a transcriptionally active open chromatin environment around an integrated transgene, maximizing its potential to be transcribed into protein, regardless of the position of the transgene in the chromosome.

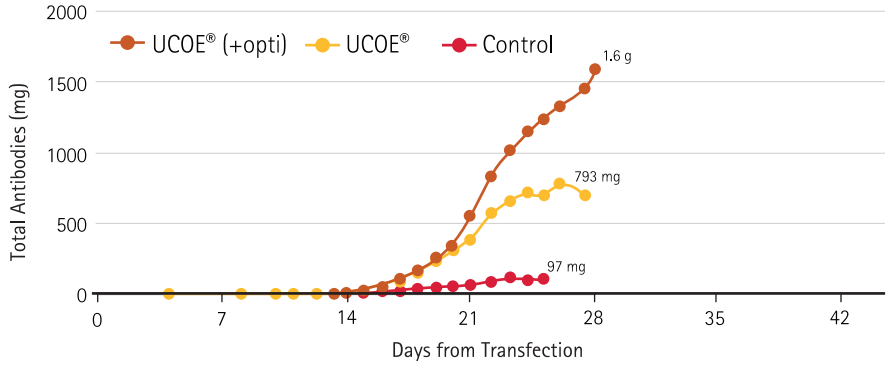
Features & Benefits

- 20-fold higher protein yields versus conventional vectors
- Greater stability of stably transfected cells
- Compatible with most industry standard platforms

Applications

Mammalian Protein Expression

Product Performance



Increased protein yield in mammalian cells transfected with UCOE® protein expression vector.
3 x 10^7 CHO-S cells were transfected with 90 µg of an antibody expression plasmid either with or without a UCOE®. Drug selection was applied, and once sufficient cell numbers were generated, cells were seeded at a cell density that would allow growth to 10 L. On day 16, a small non-feed addition was made to a proportion of the cultures (+opti).

Ordering Information

Description	Qty/Pk	Catalogue No.
UCOE® Expression Vector - Mouse 3.2 kb Puro Set	1 set	5.04865.0001
UCOE® Expression Vector - Mouse 3.2 kb Hygro Set	1 set	5.04866.0001
UCOE® Expression Vector - Human 4 kb Puro Set	1 set	5.04867.0001

For more information visit: www.merckmillipore.com/ucoe

Genomic Sample Preparation

Prepare/Clone

page 49

Transfect/Express

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Detect

Accurately detect nucleic acids in your samples with our well-published, well-documented agarose and electrophoresis reagents. Our molecular biology-grade and Omnipur® grade reagents are DNAse-, RNAse- and protease-free to give you peace of mind and reproducible results.

Calbiochem® OmniPur® Grade Biochemicals and Reagents

DNAse-, RNAse- and protease-free reagents

OmniPur® products represent a grade of molecular biology reagents that are of the highest quality and deliver consistent performance from lot to lot. OmniPur® grade reagents are tested for the absence of DNase, RNase, and proteases for safe use in tissue and cell culture work as well as other sensitive applications.

Features & Benefits

- DNase-, RNase-, protease-tested for best results
- Stringent quality testing to ensure lot-to-lot consistency
- Suitable for research labs and production facilities

Applications

Molecular Biology, Nucleic Acid Sample Preparation, Protein Sample Preparation

Ordering information

Description	Qty/Pk	Catalogue No.
OmniPur® Sterile Water, DEPC Treated, Nuclease-Free	100 mL	9601-100ML
	500 mL	9602-500ML
	1 L	9610-1L
	5 L	9612-5L
	10 L	9613-10L
OmniPur® Sterile Water, WFI Quality, Cell Culture Tested	500 mL	4.86505.0500
	1 L	4.86505.1000
	5 L	4.86505.5000
	10 L	4.86505.9010
	20 L	4.86505.9020
	200 L	4.86505.9200
OmniPur® Sodium Dodecyl Sulfate (SDS)	500 g	7910-500GM
	5 kg	7960-5KG
OmniPur® 10X PBS Liquid Concentrate	4 L	6505-4L
	20 L	6504-20L
OmniPur® Formamide, Deionized	100 mL	4610-100ML
	500 mL	4650-500ML
	4 L	4670-4L

Note: Visit our website for a complete listing of OmniPur® offerings.

For more information visit: www.merckmillipore.com/OmniPur

Calbiochem® OmniPur® Grade Agarose PCR Plus

Superior resolution of DNA fragments

OmniPur® products represent a grade of molecular biology reagents that are of the highest quality and deliver consistent performance from lot to lot. OmniPur® grade reagents are tested for the absence of DNase, RNase, and protease for safe use in tissue and cell culture applications.

OmniPur® Agarose PCR Plus features average gel strength and standard melting and gelling ranges. It is specifically designed to prevent smearing or high fluorescence backgrounds. Plus, this low electroendosmosis (EEO) agarose offers high electrophoretic mobility for shorter electrophoretic runs.

Features & Benefits

- Optimized for resolution of less than 1000 bp fragments
- Prevents smearing or high fluorescence backgrounds
- DNase-, RNase-, protease-tested for best results

Applications

Nucleic Acid Detection

Ordering information

Description	Qty/Pk	Catalogue No.
OmniPur® Agarose PCR Plus	25 g	2005-25GM
	100 g	2010-100GM
	500 g	2020-500GM
Related Products		
OmniPur® Agarose	100 g	2120-100GM
	500 g	2125-500GM
OmniPur® Agarose, super-fine resolution	100 g	2081-100GM
	250 g	2082-250GM
OmniPur® Agarose, high gel strength	100 g	2090-100GM
OmniPur® Agarose, low melting	100 g	2070-100GM

For more information visit: www.merckmillipore.com/OmniPur

A novel reagent enables live cell RNA detection and enhances sorting capabilities

Detecting gene expression has traditionally been limited to technologies that examine expression in lysed or fixed cell populations. The ability to detect RNAs in individual, live cells can enable an unequivocal assessment of gene expression, changes that occur in direct response to specified perturbations. Determining which genes are up- or down-regulated in these perturbed cells provides insight into the relationships between gene expression networks and cell functions. We developed SmartFlare™ RNA Detection Probes, capable of detecting specific mRNAs and miRNAs in live, intact cells (Figure 1). This technology allows for carrier-free cellular endocytosis of the reagent, followed by detection and relative quantitative analysis of RNA levels.

Achieve multiparametric, predictive cell analysis with no sample prep, cell lysis or toxicity.

Because the SmartFlare™ probe leaves the cell after the detection event, the same sample can be used for any downstream analysis, enabling the measurement of multiple biomarkers or downstream functionalities in the same cells. Additionally, this reagent requires no upfront sample preparation, has no toxic effects on cellular fate and no known nonspecific, off-target effects. Compared to currently used methods for interrogating RNA that involve examination of non-native, amplified RNA targets, SmartFlare™ probes can provide results that show greater correlation to *in vivo* observations.

Sort cells based on intracellular gene expression.

Separating cells based on intracellular markers typically requires fixing or permeabilizing cells, resulting in poor recovery of viable sort products. SmartFlare™ technology enables users to sort cells based on the level of specific RNAs with high recovery, providing a new opportunity to study cellular functions and identify rare cell types such as certain tumor cells and cancer stem cells. Not only does this technology facilitate the sorting of cell populations that were previously difficult to sort, but it also improves sorting accuracy by using biologically relevant intracellular markers. As shown in Figure 2, SmartFlare™ probes were successfully used to sort a mixed cell population based on miRNA expression, and sort products could then be tested for functional differences.

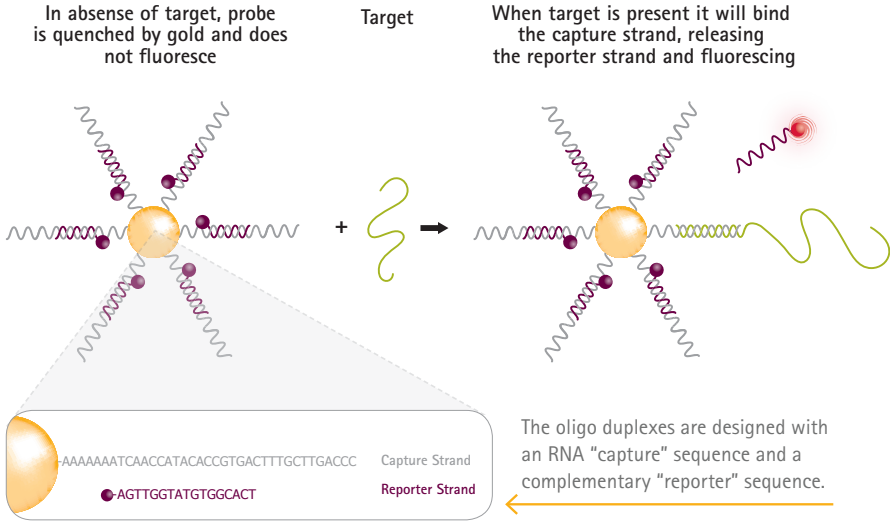


Figure 1. Molecular mechanism of SmartFlare™ detection probes.

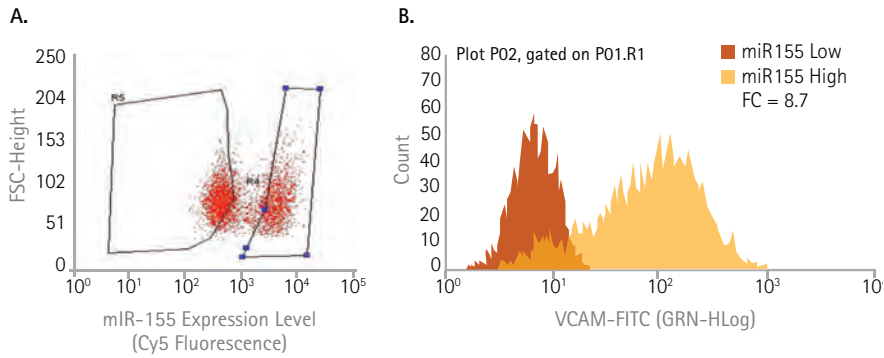


Figure 2. (A) Sorting based on miR-155 expression level differences in HeLa and HUVEC cells. (B) Overlay of TNFα-stimulated miR-155 low and high sort products showed an 8.7 fold difference in VCAM expression, as expected, because HeLa cells lack TNFα receptors.

Measure RNAi-mediated knockdown in live cells

Detecting changes in gene expression in individual, live cells is crucial when performing RNAi-mediated gene knockdown studies, in which it has traditionally been difficult to determine the cause of incomplete knockdown. Traditional methods of RNA detection (which measure average RNA levels) cannot distinguish between inefficient knockdown due to a poorly designed siRNA sequence, inefficient entry of the siRNA into target cells, or vast differences in endogenous gene expression within the target cells.

In contrast, SmartFlare™ RNA Detection Probes detect RNA at single cell resolution (Figure 3), thereby providing information on cell-to-cell variations in expression, knockdown and efficiency of siRNA entry. Such information may greatly facilitate the interpretation of analyses performed subsequent to RNAi treatment.

Also, SmartFlare™ technology makes it possible to sort cells and use them in downstream analyses, such as immunocytochemistry, flow cytometry and xenografts, potentially increasing the strength of observed correlations between gene expression and cell phenotype.

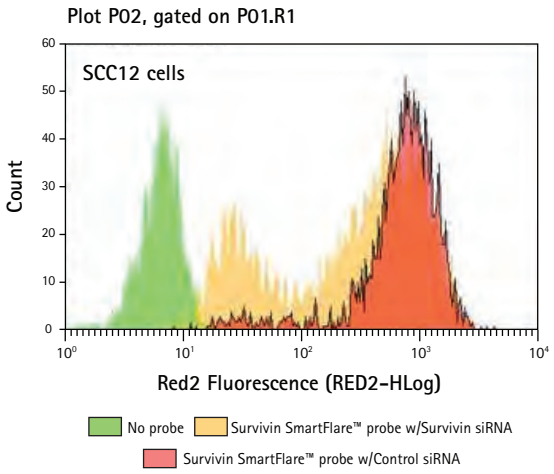


Figure 3.
Survivin mRNA levels detected in live, siRNA-treated SCC12 cells (yellow) using SmartFlare™ probes and flow cytometry reveals a bimodal distribution of survivin expression.

Endless possibilities, countless applications.

We and our customers are discovering the virtually limitless potential of SmartFlare™ probes. Our ever-expanding catalogue of ready-to-order probes include mRNAs and miRNAs relevant to cancer, development, signaling, epigenetics, neuroscience and more. We've used them for simultaneous detection of multiple RNAs, as well as for detection of both nucleic acids and proteins in the same live cells, providing links between the transcriptome and the proteome that were missing until now.

Visit our website to view more performance data, browse our complete selection of ready-to-order SmartFlare™ probes, or design your own.
www.merckmillipore.com/smartflare

Four steps to better chromatin immunoprecipitation

Chromatin immunoprecipitation (ChIP) is a powerful technique for studying protein-DNA complexes. Specific antibodies enrich for regions of chromatin that contain the protein of interest, and various detection methods are employed to detect specific DNA sequences within the enriched chromatin.

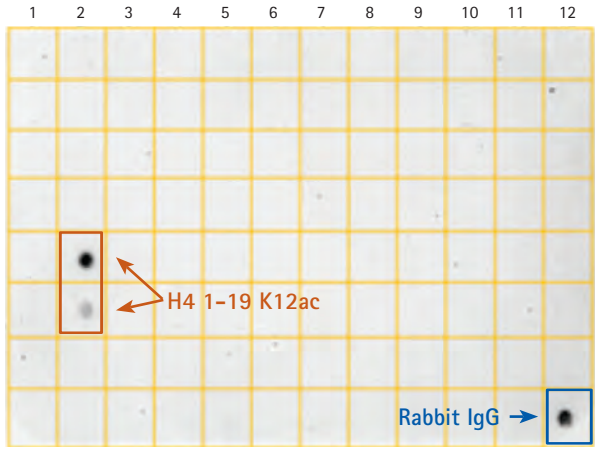
Accurate, reproducible ChIP results start with high quality chromatin and require robust and specific antibodies, reliable controls, and approaches that provide high levels of enrichment with low backgrounds. With an R&D group focused on ChIP innovation and improvement, Merck Millipore has developed the products for optimizing every step:

Step 1. Start with high-quality chromatin specifically optimized for ChIP.

PureEpi™ Chromatin Preparation and Optimization Kit: Discover the first kit specifically designed to produce high-quality chromatin for ChIP experiments. The PureEpi™ approach is detailed in the kit protocol, which addresses multiple chromatin isolation and fragmentation parameters that impact ChIP performance.

Step 2. Select the best performing antibodies and controls proven for ChIP.

ChIPAb+™ Antibodies: Get more than just standard ChIP antibodies with ChIPAb+™ kits. All ChIPAb+™ antibodies are rigorously validated in-house and quality controlled in ChIP, and include a matched negative control IgG antibody and a set of qPCR primers to a positive locus for guaranteed success in ChIP.



Specificity screening of anti-Acetyl Histone H4 (Lys12) using AbSurance™ arrays. The Histone H2A, H2B, H4 Array (Cat. No. 16-665) was probed with anti-acetyl histone H4 (Lys12) antibody (1:2000 dilution, Cat. No. 04-119). Peptides were visualized using a donkey anti-rabbit IgG, peroxidase-conjugated, H+L secondary antibody (Cat. No. AP182P) and a chemiluminescence detection system. Signal was only detected in replicate spots containing the target peptide and rabbit IgG positive control.

Step 3. Verify specificity of your antibody.

AbSurance™ Histone Antibody Specificity Arrays: Unlike Merck Millipore, not all suppliers rigorously evaluate the specificity of their antibodies. This simple dot blot approach allows any lab to evaluate histone antibody specificity in advance of critical experiments.

Step 4. Use a flexible immunoprecipitation approach that gives high levels of enrichment and low background.

Magna ChIP® HiSens Kit: This specialized A/G blend of Magna ChIP® beads and advanced SCW buffer system included in the new Magna ChIP® HiSens Kits deliver high signal and low noise from thousands of cells—or a million. Engineered to outperform any competing kit, and with proven performance for a range of sample types and amounts, the Magna ChIP® HiSens Kit may likely be the only ChIP kit you'll ever need.

See the complete selection of kits, assay, and antibodies for chromatin, DNA methylation and RNA analysis at: **www.merckmillipore.com/epigenetics**